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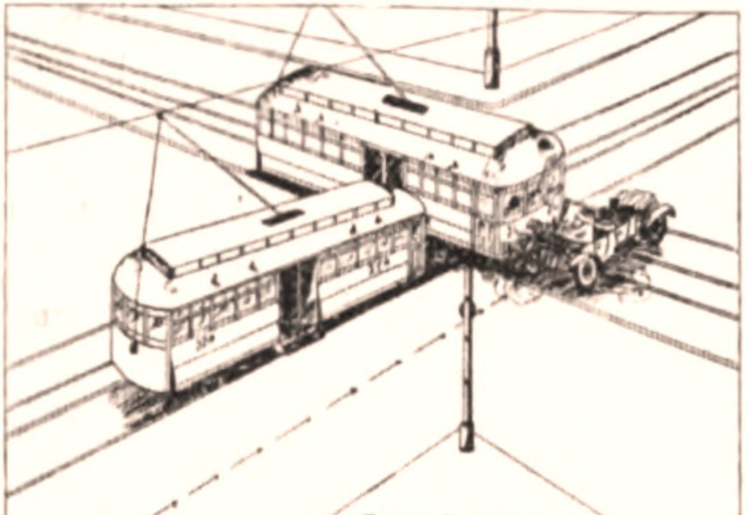
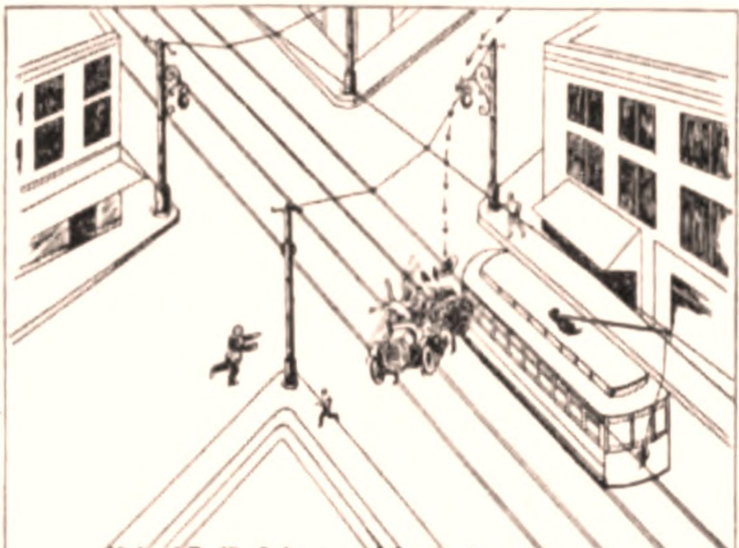
Electric railway journal

ACCIDENT



Tried to Beat Car Across
Once Too Often



Violated Traffic Ordinance and Cut the Corner

FIRST

TRAMWAY

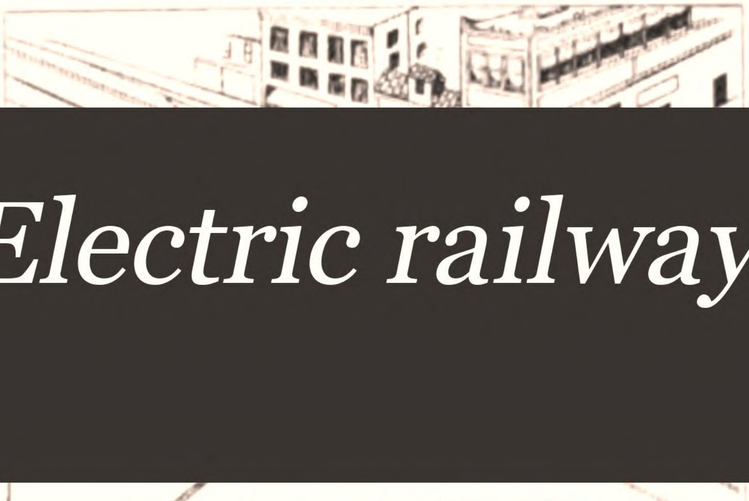
SAFETY

LEAGUE

ALWAYS

DRIVE
SLOWLY
CAREFULLY

nt of



Turned Across Track Without Looking
for Approaching Car

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Electric Railway Journal

Volume XLV

January to June, 1915

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each subject. In addition, a geographical reference is published wherever the article relates to any particular railway company. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the name of the electric railway to which the article refers. Groupings are made under the names of the city in which the main office of the company is located, and cross references are given for the names of the railways, which appear in alphabetical order. An exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the more common keywords used in the index. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven motor trucks he would obviously look in the list under the general subject "vehicles," and of the four keywords that appear under this only "Commercial Vehicles" could apply to the article in question. The reader would therefore refer to this keyword under "C" in the body of the index.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legislation
Legal
Public service commissions
Public service corporations

CARS

Car design
Cars (descriptive)
Cleaning of cars
Gasoline cars
Lubrication
Heating of cars
Lighting of cars
Storage battery cars
Tower cars
Ventilation of cars
Work cars
Wrecking cars

CAR EQUIPMENT

Axles
Bearings
Brakes, air
Controllers and wiring
Couplers
Current-collection
Fenders and wheel guards
Gears and pinions
Headlights
Journals
Motors
Trucks, car
Wheels

EMPLOYEES

Employees
Strikes

FARES

Fare collection (including apparatus)
Fares
Freight rates
Through routes and joint rates
Tickets
Transfers

FINANCIAL AND STATISTICS

Accounting
Appraisal of railway property
Financial
Franchises
Maps
Operating records and costs
Statistics
Traffic investigations, cities

HEAVY ELECTRIC TRACTION

Heavy electric traction
High tension d.c. railways
Interurban railways
Locomotives
Single-phase railways

MAINTENANCE OF EQUIPMENT

Cleaning of cars
Inspection of cars
Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
Tests of equipment
Washing of cars
Welding, special methods

OPERATION

Dispatching trains
Multiple-unit trains
Operating records and costs
Passenger handling records
Rules
Schedules and time tables
Signals
Stopping of cars
Telephones
Trailer operation
Yards

POWER

Boilers and equipment
Cables
Catenary construction
Converters
Energy consumption
Overhead construction
Poles
Power distribution
Power generation
Power stations
Purchased power
Storage batteries
Substations
Transmission lines
Trolley wire
Turbo-generators and equipment

RECORDS

Maintenance records and costs
Operating records and costs
Passenger handling records
Record forms

STRUCTURES

Bridges
Carhouses
Freight stations
Power stations
Repair shops
Terminal stations and terminals
Waiting stations

TRACK

Pavement
Rail joints and bonds
Rails
Ties
Track construction
Track maintenance

TRAFFIC

Advertising
Freight and express
Parks and pleasure resorts
Public, relations with
Publicity
Routing of Cars
Signs on cars
Traffic investigations, cities

VEHICLES (not on tracks)

Commercial vehicles
Motor buses
Service and tower wagons
Trackless trolleys

MISCELLANEOUS

Fire protection and insurance
Lightning
Loading limits for cars
Municipal ownership
Organiation charts
Public, relations with
Standardization
Storerooms
Timber preservation

In addition to the groups of articles covered by these headings the papers and reports from railway associations and technical societies are grouped under the names of the various organizations. Proceedings of other associations are indexed only in accordance with the subject discussed. The heading "Cars" includes all extended descriptions of individual types of cars, but short accounts of cars displaying no important innovations appear only under the name of the railway to which they apply. Under the headings "Financial" and "Statistics" appear all articles relating generally to capitalization, earnings and operating costs, as distinguished from the detailed and highly subdivided figures that are entered under "Operating Records and Costs." Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper keyword.

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* Denotes Portrait.

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THE "JOURNAL" IN 1914 AND 1915

In this issue we present statistical tables showing the number of cars ordered, the miles of track built, block signal systems installed, receivers appointed and foreclosure sales effected during the year. We comment at length in our editorial pages this week upon the salient facts disclosed by these statistics, as well as upon the general business situation and the technical progress made during the year in the electric railway industry. It will be seen from these editorial reviews that while gross receipts of a great many electric railway companies have shown a decrease as compared with last year, or have failed to maintain the usual annual increase, notable progress has been made which promises improved conditions within the near future in the technical, business and legal status of electric railways. The JOURNAL will attempt to report and interpret these events as they occur during the coming year as in the past, as well as carry out special lines of investigation and effort which will be of assistance to electric railway companies. A review of the pages of this paper during 1914 will indicate the class of articles we have in mind. We refer, for example, to the study by this paper of special work track problems in Chicago and elsewhere printed during the year by which new light was thrown upon this important subject; to the direction of attention to the importance of a change from the long-standing M.C.B. brass to a design more suitable to the needs of rapid braking on high-speed trains; to various articles on steel car design and modern methods of signaling, and to the public relations convention number, which presented the views of a large number of railway men, representatives of commissions and publicists on various phases of this important question. The JOURNAL realizes the generous support and assistance which it has received from electric railway companies and their officials during the past year and hopes to merit a continuation of this assistance and approval in the future by even more energetic efforts in behalf of the industry.

A BRIEF FOR THE RAILWAYS

One of the several curious phases of the attitude of a large section of the public toward the railways is the objection that is made if the roads speak out in their own defense. A city official recently wrote to the ELECTRIC RAILWAY JOURNAL advising it to abandon its "partisan attitude in favor of street railroads." "I very frequently get the impression," said this correspondent, "that you are holding a brief for the public utilities in striving to impress their viewpoint." The impression is justified, we hope, and if it amounts to an impeachment we plead guilty. But why should it be considered a fault to speak in defense of electric railways, to state their side of the case, to defend them against attack? No one would propose that the most despicable criminal should be deprived of advocate and counsel. Yet objection is frequently made when railways presume to speak in their own behalf. Nothing could bring into stronger relief the evil that has come upon us by reason of long silence under misrepresentation and abuse. Instead of allowing the fact noted to turn us from the effort to establish the electric railway industry in the esteem of the public, it should revive and renew effort in this direction. After so long and so heavy a list composed almost entirely of railway wrongs, railway rights may seem unpalatable at first. But they must be served as regularly and systematically as the wrongs have been. In the United States we have built up the greatest mileage of the best operated and equipped electric railways in the world. As to speed, comfort, service and cost of transportation they are the envy of every people but our own. How much do we hear about this; how much in volume as compared to criticisms? Yes, this journal does "hold a brief" for the electric railways and is proud of its clients. It will continue to express and impress their viewpoint, and in this effort it hopes to be joined actively by the privates as well as the leaders of the industry. Evidently we must all hang together, or, as an early American statesman remarked, we shall hang separately—and if some present-day patriots have their way, without opportunity for defense.

COMPANY SECTION PROGRAMS

Success in sectional association work, as elsewhere, depends upon the efforts of the program committee in providing what the men need and want. This self-evident truth was suggested again by the announcement of the plans for the winter's work made at the November Public Service Railway Company Section meeting and noted in a recent issue of this paper. There are so many organizations to which a man must or would like to belong that each must prove to him that he cannot get along without it; otherwise he cannot afford to join it. The company section idea appeals to the average railway man as a good proposition. He feels also that loyalty to his employer compels his enthusiastic support when a section is started, on the assumption that he will be benefited in one way or another. For a year or so his enthusiasm carries him along, but a time will usually come when he will strike a balance between cost and profit. A cold, rainy meeting night tests his loyalty. A warm fireside looks good to him. Here is the test of the real value of this section work. In order that a section may be continuingly and increasingly successful certain features of the program appear to us to be essential. In the first place it must be continuous from meeting to meeting so far as fundamental purpose is concerned. Casual speakers, if invited to participate, should be expected to conform to this purpose. While occasional inspirational addresses lend interest invitation to make such should be extended sparingly and cautiously. Second, the topics discussed should be of local interest, dealing primarily with the local property. They should grip the audience by their homely character. The questions following the papers will always show whether or not speakers have found a point of contact with the audience. In the third place the treatment of topics should be elementary and well illustrated. Men are tired at night and no matter how well qualified they are, they do not want to exert any unnecessary effort. The Newark plan appears to meet these requirements. The men there are to be instructed in an interesting way in Public Service problems. Needless to say, they are enthused over the prospect.

ADVANCES IN CAR EQUIPMENT

With the introduction and acceptance of the commutating pole motor for every class of service and the development of master control for city surface cars no further advance in electric railway equipment appeared imminent. The past year, however, has been marked by orders which are more than large enough to indicate that the tapped-field-control motor has also become a fixture. The last cry is the pressed-steel motor which holds forth promise to those who are looking for the ultimate in weight reduction, while the baby motor previously developed is meeting with favor on such large and widely separated properties as the Third Avenue Railway System, New York, and the United Railroads of San Francisco. The cars of the New York Municipal Railway Corporation are being equipped with a system of multiple-unit control, soon to be described in these columns, in which all the usual under-car apparatus, except the resistors, has been placed under one cover to facilitate inspection and maintenance. At the same time the manipulation of the controller effects several train make-up functions which have hitherto been performed separately and at an appreciable loss in time.

An excellent guide to other car improvements, under way, or proposed, is found in the prospectus which W. G. Gove, chairman, has prepared on the work before the 1915 committee on equipment of the American Electric Railway Engineering Association. Perhaps one of the most interesting subjects, because it points to a parting of the ways from steam railroad standards, is that of remodeling the M.C.B. brass. Such heavy electric traction operators as the New York, Westchester & Boston Railway, the West Jersey & Seashore Railway, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation have already adopted modified brasses so that the committee will have a sound basis from which to work out a standard design. Two other subjects which will call for much pioneer work by the committee are specifications for air-brake hose with oil-resisting inner tube, and lighter conduit for car wires and cables. The committee will also continue the work on gears and pinions and review all existing standards and recommendations originating with the committee on equipment. Of all its revisional duties that of steel wheel design promises to prove the most important because the low-floor car has given the small-diameter wheel a degree of prominence that was quite unlooked for two or three years ago.

POSSIBILITIES OF ELECTRIC FREIGHT SERVICE

Several factors in connection with interurban railway operation have forced renewed interest in the development of a wholesale freight business. Paradoxical as it may seem, the freight business on interurban lines has shown little or no decrease during the past six months, and with some companies a handsome increase has been recorded, despite the general business depression and its effect on the freight business of the steam railroads. This difference may be attributed in part to the fact that package freight business as a rule is more stable than bulk freight business, because it consists of foodstuffs and other prime necessities. Another reason undoubtedly is that farm products this year, especially in the Central States where most of the interurban freight lines are, have broken all records of quantity and price, so that these sections have not greatly felt the business depression. The passenger traffic on the interurban lines has decreased to a considerable extent, although proportionately not as much as that of their steam road competitors. The automobile has been a factor in the decrease in passenger traffic on the electric lines, but it has not perceptibly affected the freight business.

Believing that the automobile will become a more and more important competitor for passenger traffic, many electric railway managers are looking with much favor on the development of a wholesale freight business for relief. Interest in this topic was most marked in the discussion of the report of the committee on express and freight traffic at the last Atlantic City convention. Some managers have given the possibilities of development along this line such extended consideration that they have about decided to make an effort to secure franchise amendments in cities where the amount and character of freight traffic which they can now do is restricted. Unquestionably electric interurban roads must seek other fields of endeavor if they want to show increases in their earnings in excess of those made possible by the normal growth of the population in the communities they serve. There is no more desirable business than short-haul freight and express when conducted on a profitable basis. When it is once established, the convenience of the frequent service to the public or community it serves will keep public sentiment in its favor.

DISCRIMINATION AGAINST ELECTRIC FREIGHT

Soon after electric interurban lines came into existence they prepared to handle freight on a large scale. But the steam roads, realizing the danger to them of this popular competition, made it as difficult as possible, by the denial of switching connections and in other ways, for the electric roads to expand their freight business. Since that time, which was more than a decade ago, this attitude has materially changed, particularly toward those roads which have requested privileges from non-competing steam lines. As a rule, however, steam railroad organizations still offer certain barriers which are important, in fact, vital, to the complete development of general freight business. While some electric lines have been admitted to the steam railroad associations and have received the same privileges as a steam railroad member, others have found it impossible to obtain free interchange relations without the aid of state utility commissions or the Interstate Commerce Commission.

Probably the most important stumbling block put in the way of a wholesale electric freight business is that electric lines have been prohibited from becoming members of the per diem agreement. Long electric lines engaged in handling any great amount of freight business cannot interchange equipment profitably on a demurrage basis, since their haul is short, hence their proportion of a through-rate is small. To an unbiased observer it seems strange that the difference in motive power should make any difference in the privileges granted to a common carrier. In some states electric interurban lines have been built under a steam railroad act, while in others they are built under a special interurban act, but in either case they are common carriers so far as their lines run. Under these conditions, nothing less than "rankest discrimination" can be the term applied to the methods employed or the excuses offered by steam railroads in not granting the electric lines free interchange of freight of all classes.

The recent increase in freight rates on practically all commodities in the Eastern district would afford the electric lines financial relief if there were no barriers in the way to limit the handling of freight. Moreover, that fact that electric freight, notwithstanding the present business depression, has demonstrated its stability, attracts the favorable attention of managers more than ever toward a more intensive cultivation. The close friendly relations between the electric line and the public it serves should be a great inducement to steam railroads to grant free interchange of freight. Electric lines not only have additional non-competitive territory to offer to their steam railroad allies, but their intensive cultivation of passenger traffic has placed them in a position practically to glean the territory they serve so far as freight is concerned. To sum up, both the steam and electric roads are in the transportation business for profit. For either of them to assume a myopic policy which results in one or the other not becoming as efficient a machine as it should be, is not only economic waste, but the height of folly, from a standpoint of good management.

THE ALL-STEEL CAR

That the construction of wooden passenger cars has practically ceased during the past year was one of the most striking statements made before the Association of Railway Commissioners a month ago. Of course, this applied only to steam railroads, as the use of steel may be said to be only just beginning on electric railways. Nevertheless, the year 1914 has seen the introduction of the all-steel car on a surprising number of electric lines, of which at least one, the Michigan United Traction Company, has been so enterprising as to have dropped wooden construction altogether and adopted steel exclusively for all of its new equipment. In fact, the steel car for electric railway service has, at last, fully emerged from the experimental stage, this being exemplified by the recently-adopted policy of one electric railway carbuilder who has abandoned his wood mill and now refuses to accept orders for wooden cars of any kind.

New interurban lines like the Kansas City, Clay County & St. Joseph Railway and the Salt Lake & Utah Railroad, have, in general, standardized largely on all-steel equipment, and in elevated and subway service nothing but steel has even been considered during the year just past. In city service the number of all-steel cars has been greatly augmented by the completion of the large orders that had been placed in 1913 for cars of the Brooklyn and New York stepless types, wooden construction, as a matter of fact, being a practical impossibility for the latter design.

The reasons for this rapid growth in the use of steel are by no means obscure. The price of wood, due to the limited supply, is advancing rapidly. That of steel is just as rapidly becoming less with the increased experience of the builders and users of steel cars. Even at this time the matter of first cost seems to favor steel, several prominent builders having stated during the past twelvemonth that, generally speaking, the steel car should cost some 5 per cent less than an equivalent one made of wood. With this, also, go the exceedingly important advantages of light weight, great strength and insignificant maintenance expense, so that it appears not unreasonable to prophesy still further extension of the all-steel idea for every class of service during the coming year. Even in the Southern states, where high-grade wood is plentiful and inexpensive, the use of steel is already making headway—possibly not to the extent of all-steel construction, but at least as regards steel side-sheathing and (perhaps unfortunately) steel underframes as well.

Of course, such substitutions of steel for wood are due to other causes than the inherent strength of the metal. Weight for weight, there is nothing to choose between the two materials. A block of steel, as a matter of fact, has actually less ability to resist force, either tensile or compressive, than a block of wood of equal weight and proportioned accordingly. The qualities that place steel in the van are uniformity and an ability to be worked into irregular shapes in which the strength can be placed where it is needed. Thus the steel car is superior to the wooden car only because it provides an opportunity for improved design, and if this fact is neglected the advantages of steel construction largely disappear. The mere substitution of steel members for wooden ones accomplishes nothing, and it is quite likely that a steel car that is built in accordance with the old "underframe" principle inherent in wooden car design will cost more, weigh more, and involve more repairs than a similar car built throughout of wood. This, at least, has been the experience with most of the early steel cars, and that fact, in turn, has no doubt retarded the use of steel to some extent. On the other hand, when advantage has been taken of the experience already gained in steel car construction, the results have been so thoroughly satisfactory that the possibility of a return to the wooden car has been quite as remote as would be a return to the wooden highway bridge that once was practically universal in rural districts.

POWER GENERATION AND DISTRIBUTION

A review of the situation in regard to power generation, as evidenced in power plant changes and by papers and reports on the subject presented before technical societies, indicates that refinement is the order of the day. Such topics as smoke prevention, improvements in condenser design, the use of more scientific boiler-room practice, cooling and washing of ventilating air for generators and protection of apparatus from the effects of short-circuit occupy attention. These improvements do not effect sensational increases in operating economy but they improve reliability of operation and cut down the unit cost of energy somewhat. Power plant bookkeeping has now developed to a point at which it is possible to calculate this cost more closely, as has been rendered necessary by the wholesale purchase of energy, particularly by electric railways. The topics mentioned are of importance principally in the large plant which has continued more and more to specialize in generating electrical energy on a large scale and in a.c. form, obtaining a high load factor through the diversity of customers' requirements.

As this issue of the paper goes to press the first of the 30,000-kw steam turbine units, mentioned in the issue of Aug. 23, 1913, is undergoing a test in the Seventy-fourth Street power plant of the Interborough Rapid Transit Company in New York. This installation is of particular interest, aside from the large size of the unit, from the fact that the latter is built in two sections, one operating at 750 and the other at 1500 r.p.m. The use of such large units is practicable only in extremely large plants. It is comforting to the operator of the smaller plant to note, however, that the 5000-kw turbine consumes but about 14 lb. of steam per kilowatt-hour as compared with 13 lb. in the 30,000-kw machine.

In boiler room practice the use of the large boiler is still urged and W. L. Abbott, chief operating engineer of the Commonwealth Edison Company, recommends that the boiler be made shorter. High combustion efficiency of these large units is shown in the Detroit Edison plant where the flue gases average 13½ per cent CO_2, reaching 16 per cent at times. The old-fashioned horse-power rating of boilers is becoming more anomalous as stokers employing forced draft become more popular and this same forced draft practice is bringing the economizer back. All of this is forcing the use of a higher grade of fireman who takes a personal pride in delivering steam to the turbine room at the lowest possible rate of cost.

While electric railway engineers are still interested in power generation their attention is being concentrated on distribution, as they are relieved from responsibility in the power plant. They are taking up the making of concrete poles among other things and these poles are standing up well. The committee on power distribution of the Engineering Association considered the matter important enough to go again into design details in its report and the assignments for this year include further study of it. The Toronto Hydro-Electric Commission has made 25,000 poles at about the same cost as wooden ones.

In high-tension transmission the insulator still furnishes interesting problems for designer and manufacturer as was explained by A. O. Austin in the A. I. E. E. paper abstracted in our issue for Dec. 19. As he pointed out, however, progress in the making of better insulators is encouraging and the "chunky" string of suspension insulator units can be made almost lightning proof by forcing lightning, as it does, to "spill over" rather than puncture the porcelain.

Following the prevailing "get-together" tendency a joint rubber insulation committee was formed some time ago and last year presented a report on a standard specification for 30 per cent Para rubber insulation. This was adopted by the Engineering Association in October and constitutes a real advance through co-operation. Within a few weeks past a joint committee on overhead and underground line construction has been inaugurated with excellent prospects for securing plenty of work.

The joint national committee on electrolysis has its first report in process of editing, indicating that much work has been done during 1914. These joint committees, of which there is a constantly increasing number, are evidences of a constantly growing spirit of co-operation.

A glance backward would be incomplete unless it included a glimpse of the revised A. I. E. E. standardization rules just published. These suggest the significant changes which have occurred in electrical machinery design particularly in regard to improvement in heat-resisting properties of insulation. The rules recognize the fact that temperatures can run higher than the traditional limits set to protect earlier and less durable insulation. The rules include for the first time a section on standards for wires and cables. They are also richer in definitions than the old ones, practice now being sufficiently standardized to justify more careful attention to standardization of phraseology. All of the Railway Association committees to whose work these rules relate have undertaken to apply them to electric railway conditions.

ELECTRIC RAILWAY SIGNALING

Events in the field of signaling have moved during 1914 with all of the rapidity characteristic of previous years. Notwithstanding the hard times, the number of installations, as shown by the list on another page of this issue, is surprisingly large. This is due, no doubt, to the growing realization that signals are no longer a luxury, as exemplified by the willingness of the industry to accept refinements that must, of necessity, involve a somewhat increased cost. Such an attitude is shown by the prompt commercial development, during the year, of the American Electric Railway Association's standard aspect for contact signals, which requires one more light than the number used in any of the previous all-light signals, but which thus assures a definiteness of indication that previously had been lacking.

In track-circuit signaling for high-speed, single-track lines the year has been notable for the apparent supercession of the preliminary by the intermediate signal. The former device, involving the extension of the insulated track beyond the signal at one end of each block, was developed for the early single-track installations to prevent simultaneous entrance of trains at opposite ends of a block. The beginning of its end came in 1912 when self-contained blocks with intermediate signals were introduced on the Washington, Baltimore & Annapolis Electric Railroad, and, among the new signal installations ordered since the latter part of 1913, all have used the intermediate signal in some form. Indeed, it seems hardly likely that the preliminary will be used for any future systems, for the self-contained block offers the great advantage of simplicity as well as the ready opportunity to accelerate traffic by operating under signals alone and without train orders.

Recognition of the possibilities of the latter procedure has been, perhaps, the most important feature of the year's progress in signaling. Strange to say, it has been the steam railroads that have first seized upon its opportunities. F. P. Patenall, president of the Railway Signal Association, stated at the convention last fall that, to be up to date, the signal engineer must now meet successfully the widespread demand for the operation of single-track railroads by signal indications alone, and this assertion, coming as it does from the field wherein the train order has been supreme for half a century cannot fail to have deep significance for electric railways.

During the year, however, operation without train orders has been introduced successfully on one interurban electric line, the Scranton & Binghamton Railway, and other roads are reported to be considering it, so that there is reason to believe that the electric railways will not fail to play a significant part in the future development of this important and far-reaching improvement. Certainly the interurban lines with their short trains and frequent service have far more to gain by such a time-saving scheme than have the steam roads, whose real profits come from freight trains of such enormous length and such inherent slowness of movement that the time lost in taking orders is not of so great importance.

THE WORK OF THE COMMISSIONS

It was not to be expected, of course, that the year 1914 would show much progress in the way of new public service commission laws, for at the beginning of the period all states except Delaware, Utah and Wyoming already possessed regulatory bodies of some kind. The work of the last year has been rather that of perfecting the operations of the organizations already existing and of formulating standards and systems for the guidance of new commissions. Yet just before the bells began ringing out the old year there came proposals for bills to create in Texas and Alabama bodies separate from the railroad commissions for the regulation of public utilities, and an intimated intention on the part of the administration to divide the Interstate Commerce Commission into three divisions controlling rates, valuation and security issues. There can assuredly be expansion in the commission organization of some states to bring all public utilities under uniform control, and the leaders at Washington may find it expedient to divide the Interstate Commerce Commission as suggested. To our mind, however, such structural changes are less important than the future choosing of commission personnel and utilizing of commission powers so that there can be not even a breath of suspicion or disfavor against this most modern branch of our government.

Public utility regulation is of value in proportion to its fairness and impartiality, and the influence of commission personnel on these points is too generally recognized in theory if not always in practice to need emphasis by expansion. In properly carrying out their delegated powers, however, public service commissions are constantly opposed by advocates of local regulation or federal regulation. We believe that state regulation offers the only sane solution of public utility problems. Just as our government is founded on a proper and successful division of authority between Congress for interstate questions, state legislatures for intrastate affairs and the exercise of the police power, and municipal councils for matters exclusively local, so the power of regulation should be used by the federal commission for purely interstate transportation, by state commissions for controlling the state-wide important subjects of public utility competition, capitalization, accounts, rates and municipal operation, and by municipalities for police regulation and a right to forbid the use of particular streets. We have no patience with those who advocate local regulation, a system which results only in poorer service, discriminatory rates and expenses concealed in tax levies. State regulation has proved successful, and the only problem to be solved as regards jurisdiction is the drawing of a clear-cut line between interstate and intrastate cases. On this point we hope the recent hearing in Washington before the Interstate Commerce Commission will result in a simple separation satisfactory to state commissions and public utilities.

In the exercise of state regulatory powers, the cloud on the horizon in previous years has been the evident attempt to give excessive weight to the reproduction-cost-new theory of valuation with too limited allowance for intangible values in rate-making cases. Yet several decisions have been handed down during the last year which lead us to hope that this cloud may not be entirely without its silver lining. First we have the enlightened view of the New York up-State commission in the Schenectady Railway case, leading to the affirmation that commissions were not intended to restrict utilities to such scanty earnings as would keep them out of bankruptcy but rather to allow them under good management to attain a portion of reasonably assured prosperity. Then we have the Manchester Street Railway decision of the New Hampshire commission, recognizing the impossibility of taking care of past depreciation and adding this amount as cost of progress to the depreciated value in order to determine the present fair value. A decision reaching a similar result, although by a different principle, is that in the Middlesex & Boston rate case, where as a result of the strict Massachusetts capitalization laws the company was allowed to earn a return on its actual investment instead of on reproduction cost. It is interesting to note that as an outcome of this decision the commission decided that the patrons had fared better than the investors and that the bugaboo of a maximum 5-cent fare should be banished in favor of a 6-cent rate.

For the last examples, we have the more recent rate decision of the Interstate Commerce Commission giving consideration to the increasing hire of capital as well as other increased costs, and the opinion of the New Jersey Court of Errors and Appeals in the Public Service Gas Company case, stating that when the market value of stock added to indebtedness shows an excess over the physical valuation and development cost, there is evidence of special franchise values that should be included in the basis for rate-making. The capacity for forceful and sound thinking exhibited in all these cases leads us to feel that all commissions will eventually realize that they are as responsible for the equitable treatment of public utility capital as for prompt attention to any complaining citizen.

We hope that the doctrine of the above decisions will be spread far and wide. In this connection, we take delight in referring to one specific outcome of the year's progress, the definite plans to publish annotated commission reports. While commissions must be guided by the empowering laws, most problems cannot be solved by reference to the statutes but require careful personal consideration and the exercise of good judgment on all the factors concerned. Identical facts have often appealed to various commissioners in different ways, but the annotated reports that are to begin with Jan. 1, 1915, should do much to clear up the lack of harmony that has previously existed. Such a system has long been needed to provide the commissioners and the public at large with material for a systematic development and wider recognition of the doctrines and principles underlying public utility regulation.

INCREASING THE CAPACITY OF THE LINE

The problem of the operating department to increase the capacity of the line or, reciprocally considered, to decrease the congestion of the line, has been in the foreground during the past year. The measures for relief, if not for cure, naturally fall into two classes, those which can be applied to the car and those which can be applied to the line. Palliative measures on or at the car lie almost solely in the hands of the railway itself, but those relating to the line require a large degree of co-operation from the public and the municipality. It is clear that the first step in increasing line capacity is to speed up car movement at terminals or other heavy loading points. Here the facilities for the entrance of passengers to the car and the ease of fare collection are prime requisites at all locations where ticket booth operation is impracticable. The speed of passenger handling at the car is being promoted by a low-level drop platform like those of the Third Avenue Railway System, New York, by a separate front exit as on the Pittsburgh Railway's latest type, and by an emergency rear exit as used on the Philadelphia near-side cars. So far as fare collection is concerned, the Kansas City plan of front-end fare collectors has been adopted also at San Francisco, Detroit, and one or two other cities. By this plan of simultaneous prepayment collection at both ends the loading time is cut almost in half. At Brooklyn no attempt is made to get fares in advance on the center-entrance prepayment cars during the rush hour at heavy terminal points like the Atlantic Avenue loop and the New York end of the Brooklyn Bridge. At these points the triple aisle (two exits and one entrance) permits the car to be filled directly in very quick time and with better distribution of passengers than in end-entrance cars. The non-stop run over the Brooklyn Bridge and other local conditions favor this plan of collecting the fares after the passengers have boarded the car, but before the prepayment zone is reached.

Increase in the capacity of the line is largely a matter of the number of stops, the stop spacing and traffic regulations. The question of stops lies largely with the public and that of regulation with the municipality and police. To lengthen the distance between stops and have the cars halt at fixed intervals regardless of crossings, as in Europe, seems a hopeless task here because of paving conditions and reckless drivers. American city railways are therefore working along the more promising lines of educating the public to accept the plan of stopping at every other crossing, and at Cleveland it has been proposed to be fair to all riders by having the car, when outward bound, stop at those streets which it is privileged to skip when inward bound. Express or non-stop runs in the outer zones have also found acceptance in a few places. Wider than either of these movements has been the adoption of the near-side stop in scores of cities, sometimes eliminating thereby two or three stops per mile.

The more stringent traffic regulations which have been a feature of the past year, even in the smaller cities like Canton, Ohio, and Louisville, Ky., are directed primarily against the ubiquitous, self-propelled vehicle. In Cleveland and San Francisco semaphore and lighting devices are giving most effective results in promoting safe traffic movement. The electric railway can only benefit from this tendency toward better traffic regulation, for it will insure a less obstructed track accompanied by greater safety to those who want to ride.

DEVELOPMENTS IN TRACK CONSTRUCTION

Interest in track construction during the year just passed has been almost wholly confined to that in paved streets, although the increasing demand for better special work to withstand the heavy service incident to closer headways, higher speeds and heavier rolling stock has extended into all fields. Track and roadway engineers generally are anxious to see solid and insert manganese steel pass through the development stage to a point where a more uniform product can be assured. While rapid strides have been made by the manufacturers, many of whom now believe they have approximated perfection, sufficient time has not elapsed to demonstrate that convincing service results have been obtained. On the other hand, the various steps taken to obtain a more uniform product indicate that marked progress has been made.

Probably during no other similar period has so much interest been aroused in all classes of track special work as during the past year. The fact that there was little or no available literature on this subject aided largely in intensifying interest in the discussions and articles. No doubt these contributions will ultimately be crystallized in the form of specifications governing the manufacture and installation of the various types of track special work.

Along this same line much attention has been directed toward the refinement of electric welding processes in track repairs. But few other pieces of track and roadway equipment have grown so rapidly in popularity or have been the center of so much attention as the welder in its application to track repairs. It has made possible economies which have been of vital importance during the present period of retrenchment. In addition to its adaptability to track repairs the electric welder has also introduced new types of welded joints, welded special work, tie plates, etc. In fact, completely welded all-steel track, including the ties, has been successfully laid.

The report of the 1914 committee on way matters regarding proper foundations for tracks in paved streets was one of the most important contributions to the electric railway industry that this committee has ever made. Although the four types of foundation construction submitted for adoption as recommended designs were not accepted in detail, it was generally conceded that they were representative of the best practice at this time. The committee's treatment of this subject in such a comprehensive and scientific manner makes the report valuable as a guide in the selection of track foundation construction for both large and small companies. As indicated in another part of this report, there is but little to be added to the information already available regarding use of T-rails in paved streets. The facts that there are approximately 2250 miles of T-rail track in use in the paved streets of this country furnishes some light on its popularity. It is also probably safe to predict that the future will see a still larger percentage of the total miles of track in paved streets laid with T-rails. There has also been increased interest in the so-called "alloy steel" rail for other than special conditions.

Evidence that carefully maintained, permanent track construction is all that the name indicates was probably never more forcibly exemplified than in the track rehabilitation undertaken in Detroit during the past summer. The fact that this company found that its concrete-slab, sand-cushion track construction, which had been under extremely heavy service for twelve years could be rehabilitated by simply renewing the rail and pavement demonstrated what may be obtained from work well done. The Detroit experience also indicates that there is much to be accomplished by the adoption of tie plates and screw spikes toward prolonging the mechanical life of wooden ties. The conditions of the white oak ties after twelve years of service in Detroit indicate that unless they fail mechanically at least twelve years more may be expected of them.

In general, our observation leads us to believe that track and roadway engineers are working along the right lines at the present time. Many of them have adopted the policy of attaining true economy by the employment of the best materials in conjunction with the most practical workmanship consistent with the class of service to be rendered.

THE BUSINESS SITUATION

It is difficult to form an opinion acceptable to all in regard to the electric railway business situation. Like any subject of great enough importance to be widely discussed, it is kaleidoscopic, and observers divergently located secure different views according to their peculiar combination of the factors involved. By factors we mean such items as the following: rates; gross earnings; maintenance, depreciation, transportation and traffic expenses; federal, state and local taxation; rentals, leases and other cantractual obligations; holding company administration versus local management; federal and state regulations; causes of receiverships; rights of stockholders; financing; accounting; labor legislation; politics, and changing economic and social conditions. All these and others may be blended into innumerable combinations before the financial results of the year are complete. In order, then, for a man to reach a sound conclusion as to electric railway prosperity, it is necessary for him not to judge the question from his own limited sphere of action or be guided by such a familiarity with a particular factor as precludes a general knowledge of all, but rather to look at all factors without prejudice so that accurate deductions may be made. It is of no avail to live in the past days of railroading or to measure past morality by present standards. Railway conditions to-day are a product of the present and should be so judged, for only in this way can the factors of railway economics be analyzed and properly correlated.

We should like to make here such a composite analysis of all the factors involved in the present business situation, but space forbids anything more than a summary of what is treated more in detail in other editorials of this issue. The characteristic tone is that of optimism. This in a way may seem surprising. For many months a large number of industries have been prostrated and most have suffered curtailment of business, a condition not caused entirely by the European war but also by a steadily increasing depression in this country from the middle of 1913. The effect of this prostration has been clear for months to railways, industrials, banks, shippers and the general public. In view of the effects upon general business, it is not surprising that many electric railways have shown decreased returns or have not maintained the normal rate of increase. We do not look for a business "boom," but the opening of the New York Stock Exchange, the favorable settlement of the steam railroad rate case, the new banking law and the increasing adjustment of other factors upset by political disturbances and war conditions seem now really to justify the expectations of an era of improving general business conditions during the new year. In these improved conditions the electric railways should share, as greater industrial activity will mean greater demands for transportation for both passengers and light freight.

It might be well to dwell for a moment on one or two factors that pertain particularly to the electric railway field and therefore are not usually mentioned in any general discussion of business prospects. One of the most interesting of these is the comparatively small number of receiverships and foreclosure sales in 1914. In spite of the depression, only one-half as many companies were forced to go under receivers as in 1913, while the foreclosure sales in 1914 were only eleven as compared to eighteen in 1913. It is true that the tightness of money was a direct preventive of three sales, but even with these included the last year's showing would be better. These results speak well for the economy and the financing ability of electric railway officials, for they were obtained in a period that was a more severe drain on electric railway earnings than on those of other utilities. Other favorable signs are the evidences that a more rational view of the urgency of some form of relief to the railways is being taken by the courts, by the commissions and by the general public.

In the equipment field there ought to be a corresponding or even greater improvement. The times themselves should encourage purchases. As long as we remain in the shadow of a receding business depression prices will be low, labor plentiful and deliveries from underworked manufacturers amazingly prompt. Building operations, such as shops, etc., begun at this time, should show a much lower cost than if postponed until prices are higher. We believe that electric railways will have no difficulty in floating long-time loans in the coming business revival at fairly moderate rates, although all interest rates will be higher for a long time to come, owing to the destruction of capital in the war.

STANDARDS IN THE OPERATING DEPARTMENT

Tangible evidence of the value of standards in the transportation department can be found by studying progressively the reports of the several committees of the American Electric Railway Transportation & Traffic Association since it was organized in 1907, but during the past year a really definite step forward has been taken by the formation of a permanent transportation and traffic standards committee, whose first duty will be to co-ordinate and classify for ready reference the work already accomplished. As a matter of fact, it is somewhat surprising that such a committee has not been organized before this, because it is obvious that, through co-operation between the new committee and the committee on standards of the Engineering Association, valuable results may be expected in the many cases where the scope of engineering work overlaps the field peculiar to the transportation branch of the electric railway industry.

Aside from matters allied with engineering, however, much can be accomplished by the development of standard units of comparison as well as of standard practices, because the possibility of their adoption cannot fail to define more clearly the objects of association work. With the opportunity for stamping any practice with the formal approval of the Transportation & Traffic Association, there will be not only an increased incentive for the investigations of committees, but also a definite aim toward which the committees' efforts may be directed—a condition which has not always obtained in the past.

Certainly this difficulty has been patent in the actual operating methods existing at present. While the electrical, mechanical and way departments of electric railways have evolved carefully elaborated standards for their own use, the transportation side of the railway organization has been handicapped because working largely without the assistance of standardized operation. Of course, no one doubts that time and effort are being intelligently put forth by railway managers and their subordinate officers in transportation work, but, in many cases, the idea that operating problems are largely susceptible of analytical study and precise definition by scientific methods has not been fully realized. However, a change is now taking place in this department of the industry, with a marked extension of so-called modern methods of operation.

As an example. In the matter of service regulation and schedule construction it will be found that great advances have been made by some of the representative companies. Standard routine for the assembling and compilation of data on which to base schedules, the use of graphs and the systematic comparison and study of such data with that obtained under identical conditions on previous occasions have enabled the production of operating time-tables that regulate the service furnished as nearly as practicable to the demands of traffic and to the economics of the situation. Standard units such as passengers carried per car-mile, average length of ride, capacity of intersections, rates of passenger interchange and the like are now being developed and are beginning to be used with valuable results. On one city system, by the use of analyses made possible by the establishment of standard units, the car mileage has been cut down by more than 10 per cent, although the efficiency of the service has actually been increased. Other instances might be quoted were they needed to demonstrate the value of such operating practices. Suffice it to say that such companies as have applied modern methods would, under no conceivable circumstances, go back to what are sometimes called the "horse-car ways" of conducting the transportation department.

PUBLIC RELATIONS

The public function of an electric railway is twofold, mechanical and social. From the mechanical standpoint it is to move a passenger with a mass of one or two hundred pounds between two points in a reasonable time. From the social standpoint this mass is a person who must be treated as a guest and made to enjoy himself as much as possible. The mechanical part of the railway's function is a technical one, and it can be performed easily by compliance with well-understood laws. The social part is not so easy as it requires personality to perform it and mine host in this case has to exert his hospitality by proxy. There is no doubt in the minds of any of us, however, that the success of a railway system depends partly upon the extent to which the passengers "enjoy themselves."

Of all the problems now before the managements of electric railways that of turning the antagonism of the public into friendliness is one of the most pressing. The commonly accepted formula is "take care of the service and public relations will take care of themselves," but the application of the formula is not easy. There is no popularly accepted standard of good service, for what some riders would consider such could be supplied only at a ruinous cost. The railways must therefore take the initiative in showing what good service is in view of all the conditions involved. To give the best practicable service and to demonstrate conclusively that it is such are the two problems of public relations. What is needed is to develop a sense of pride in the railway system on the part of the local public so that "boosting" will be as common as "knocking" was formerly.

The American Electric Railway Association, at the Atlantic City convention, promulgated a "code of principles" which is now officially a platform or creed of the members of the association and describes the duties which the railways owe to the public as well as those which the association thinks that the public owes to the railways. The work now to be done is twofold; first, to convince the public that the code is right and that the public should carry out its principles, and, second, that the railways themselves live up to their part of the contract. For example, the code makes certain statements in regard to service and publicity. Let each manager ask himself: "To what extent do I recognize the principle that the first obligation of public utility companies is service?" and "To what extent am I following the practice of full and frank publicity?" Finally, let him ask himself: "What am I doing to improve the public relations in my own community?" If these three questions are conscientiously asked and answered and the precepts contained in the answers are put in force, we believe that the most serious part of the problem connected with the establishment of good public relations will disappear. At any rate, each manager will feel that he has done his part toward the establishment and maintenance of good public relations.

THE BANNER YEAR IN ACCOUNTING PROGRESS

Since the first thought of uniform action on the part of electric railway accountants found concrete expression in 1897 in the formation of the Street Railway Accountants' Association of America, the advances made in electric railway accounting have been equalled only by the steady growth and improvements of the industry itself. To speak of 1914 as the banner year in electric railway accounting in the face of such a fact may seem slightly presumptuous, but voluminous and important as the results of previous years have been, they must give precedence to the twofold work of this year, the adoption of an official standard accounting system for interstate electric railways and the successful institution of a correspondence course for accountants.

This combination of a more nearly perfected uniform system of accounts with the machinery for fixing its principles in the minds of those who must put its provisions into practice seems to us most auspicious. Through the educational course the mature electric railway accountant can secure a broader view of his field, while the younger man will not only become familiar at the outset with the technical procedure and practice of his chosen calling but will also get a grip on the fundamental principles underlying its operations and a drill in the solution of many of the difficult problems with which he will be confronted. Of the real basis of the course as it specifically concerns electric railways—the official accounting system—little needs be said. The revision of the existing classifications of operating expenses, operating revenue, and road and equipment accounts, the adoption of standard classifications of income, profit and loss, and general balance sheet accounts, together with specific provisions for the depreciation of equipment and the segregation of power plant expenses —all were distinct advancements in electric railway accounting. Not the least satisfactory feature of the system, however, is the evidence it gives that electric railway accountants during the last two decades have been working on the right basis, for the changes made by the commission from the results embodied in old classifications of the Accountants' Association are simply the logical outcome of the industry's growth. This in a way weakens our assertion that 1914, the year of the accomplished accounting system, deserves the banner, for the basic work had been so largely and thoroughly laid in previous years by electric railway accountants.

While the accounting system and the educational course represent the only two completed results of the year, there were many other movements worthy of investigation that showed various stages of progress. Leading the list, probably, is the subject of cost accounting, the functions of which are every day becoming more and more widely recognized by carriers. The joint engineering and accounting report at Atlantic City displayed a praiseworthy grasp of the theoretical principles of the subject, but electric railways have much to learn from manufacturing plants in regard to the accounting technique to be followed. The actual order requiring the separation of freight and passenger operating expenses on steam railroads and the growing necessity for a proper apportionment of costs between city and interurban service make it seem that the time is indeed here for electric railways to adopt a system of apportionment that will permit the accurate stating of costs for the various enterprises under one management.

Then, of course, there is our old friend "uniformity." Unrealizable as this ideal may be, it may still be approximated more closely than in the past. Uniformity of terms, uniformity of accounting practice for depreciation, uniformity of financial statements, uniformity of holding company accounts—all these should be fruitful sources for investigation and action. We are particularly interested in the uniformity of financial statements, both monthly and annual. Conformity between the statements required by the Interstate Commerce Commission and by various state commissions is eminently desirable, and the state commission with the interests of the public properly at heart will surrender its small differences in favor of the national system and not show unbecoming obstinacy because it happened to devise its system first. Moreover, on the part of some interstate companies there seems to be an undercurrent of feeling that inasmuch as the Interstate Commerce Commission does not compel them to issue their annual report to stockholders in the official form, such reports may be modified at will to suit their whims. We believe that it would be more beneficial to the industry if all individual managements would sacrifice personal prejudices and follow the standard provisions in order to make all stockholders' reports readily comparable, as the steam railroads have done.

In the matter of monthly reports, it seems to us unfortunate that barely 5 per cent of the electric railways in the country make public such reports to indicate the trend of gross and net earnings. While most companies cannot afford to go to the expense of compiling and printing complete monthly statistics, practically all should be able by the end of the succeeding month to furnish totals for gross earnings, operating expenses and net earnings. The Electric Railway Journal feels that there is a need for such information on the part of commissions, investors and operators, and it would welcome the receipt of simply a monthly communication with such amounts from the auditor of each company, the data to be kept confidential and to be used only in compiling totals and percentages for the several classes of lines and territorial divisions, somewhat similar to those published in the Financial Department in our issue of Nov. 28. This is one line of development where each accounting officer can do his part without waiting for any others, and we hope there will be a generous response.

A. C. ELECTRIFICATION

During the past twelvemonth more progress has been made in alternating-current traction than for some years past. Practically all of this development has occurred in this country, as the war abroad has naturally prevented much electric railway development there. One notable event of the year has been the completion for the Norfolk & Western Railroad of the split-phase locomotive, the contract for which was announced a year ago. Although only general descriptions of the locomotive have yet been made public, it is understood that the performances under test have been fully up to the calculations and in some points exceeded expectations. The liquid rheostat used in the secondaries of the induction motors during acceleration gives a smoothness to the control of the locomotive which it would be impossible to obtain in any other way. The automatic regeneration on descending grades is very important on a line such as the Pocohontas Division of the Norfolk & Western, where long, heavy grades like the Elkhorn are encountered, as it greatly increases the safety of operation and the reliability of the equipment, besides effecting a material saving in energy consumption. A combination gear and side-rod drive is used on these machines and removes all dead motor weight from the driving axles. While a comparatively large amount of apparatus is required in the cab, the apparatus is simple and rugged in design and should be easy to maintain. The main driving motors have, of course, all of the characteristics of three-phase induction motors with the wound secondary. Altogether these locomotives should give an excellent account of themselves in the heavy service in which they will be placed.

Another event of importance in a.c. development during the year is the electrification of the main line of the Pennsylvania Railroad at Philadelphia, where, like the Norfolk & Western, the single-phase system with 11,000 volts at twenty-five cycles is used on the trolley. The Philadelphia electrification will, however, employ initially multiple-unit cars, as the service is a suburban one. The motors will be somewhat in excess of 225 hp each and of the series commutator type for a.c. operation only. Hence the complications necessary for combined operation on direct current will be avoided, and as good results as those obtained in the operation of the New York, Westchester & Boston equipments should be expected. The overhead construction on both the Pennsylvania and the Norfolk & Western Railroads possesses marked advances in simplicity over the original designs for single-phase lines.

The experimental service obtained during the latter part of the year with mercury rectifier equipment has been notably successful, and a 1000-hp equipment installed on one of the Pennsylvania Railroad combination cars and now in test service on the New Haven railway was recently described in these columns. It is manifestly too early yet to predict the exact place of the rectifier equipment in future traction work, but its successful development would simplify a number of electrification problems, notably the interchange of equipments on a.c.-d.c. lines. For such an equipment, it would only be necessary to add to a standard d.c. locomotive a transformer and rectifier, which would change the alternating current to direct current at the desired voltage, to make an equipment capable of operating with equal facility and capacity on both systems. Where the equipment is designed for operation on alternating current only, it would be natural to use voltage control and thereby avoid rheostatic losses. As a whole, then, we may look back upon 1914 as a notable year in a.c. electrification and as presaging still more valuable development in the near future.

CAR DESIGN IN 1914

Unquestionably the most prominent feature of the past year's progress in surface car design has been the truly remarkable growth in the use of the fully-inclosed platform. Of course, it is no new idea to have cars completely inclosed while in motion, thus preventing ingress and egress of passengers with the consequent practical elimination of boarding and alighting accidents. In fact, several lines, notably the Twin City Rapid Transit Company, have used it in modified form for many years. But the scheme has, until recently, met with scant favor throughout the country at large because of a widespread belief that it would involve a material decrease in schedule speed, and it is probable that the change in sentiment, such as has taken place within the past year, could only have been effected through the successful introduction some two years ago of the center-entrance car, which is, of necessity, completely inclosed. Including center-entrance cars the fully-inclosed designs constitute a surprisingly large percentage of the year's output, the principle appearing indiscriminately among all types from the smallest one-man cars to the largest standard units for metropolitan service.

The center-entrance idea, however, when considered alone has failed to grow in accordance with early expectations. Numerically, the center-entrance has just about remained stationary during the past year, although the decreased output of cars of all types has no doubt affected this to a marked degree. In general, sentiment seems to be still very much divided over its merits. Nevertheless, it has provided an excellent solution for many of the problems of trail-car design and also for the utilization of old equipments which, when operated alone, are too small for profitable use. Boston's articulated car, a scheme which has recently also been adopted in Portland, is a successful example of this development, and in Pittsburgh old bodies have been spliced together in pairs to make thoroughly satisfactory, large-size units. In several cases, too, old-style open or California-type cars have been rebuilt as closed center-entrance cars, so that it is safe to say that the center-entrance car, even if it has not revolutionized the industry, has at least produced a well-defined dent in the smooth outlines of conservative practice.

Of course, the center-entrance from the first has been associated with the low step, and this, in turn, has drawn a great deal of attention to the small wheel. During the past year the latter appears at last to have taken hold to an appreciable extent in places other than its birthplace, Pittsburgh. In San Francisco more than 100 cars have been re-equipped with small wheels and motors, the old equipment being scrapped, and the replacement has been found to pay handsomely. A considerable number of new city cars also have been thus equipped, and for interurban service the small wheel has been successfully used in several cases, the Ohio Electric Railway having five cars and the Seattle, Renton & Southern six cars with 22-in. wheels on the idler trucks.

It is with the single-truck car, however, that the most spectacular installation of small wheels has been made, the Third Avenue Railway of New York having used this combination under practically standard car-bodies 35 ft. long and seating forty-five passengers. Owing to the use of radial-axle trucks a 10-ft. wheelbase is provided, and as the platforms are brought within 12 in. of the rail the customary step is eliminated, the weight of the car complete being only 533 lb. per passenger. Much of the saving in weight is, of course, due to the single truck, and that this advantage, together with the accompanying reduction in maintenance expense, has been recognized to a great extent during the year is indicated by the relatively large number of new single-truck cars that have been built. In fact, there has been quite a revival of interest in the single-truck principle, which has even involved a fairly ready acceptance of the complication of radial axles. For the future it is difficult to avoid the conclusion that the single-truck car, in combination with the fully-inclosed principle, is going to play an important part in the design of equipment for city service.

CONDITIONS IN THE LABOR FIELD

While there have been several strikes during the past year and wide publicity has been given to certain arbitration proceedings between electric railways and their employees, 1914 has not been a year of labor discontent or unrest. In spite of the adverse business situation, few companies have followed the practice general in industrial establishments of reducing wages, and the policy of both companies and men has seemed to be to let well enough alone.

In welfare work and allied subjects there has been substantial progress. Of the many advances made in this direction those made in the extension of company loan bureaus, co-operative buying and group insurance have perhaps been the most conspicuous. The idea of establishing closer relations with the employees, especially in larger cities, by lending money to them for legitimate purposes, as in time of serious illness or death, instead of forcing them to pay exorbitant rates to loan sharks, is well conceived. Progress in co-operative buying for the benefit of the employee is necessarily slower, but the plans followed in New York and Philadelphia, though essentially different from each other, have shown every evidence of success during the past year and are being extended. Finally, the plan of group insurance has been adopted by a number of companies as a very satisfactory means of testifying to the interest of the company in long-continued service of the trainmen.

The group insurance plans to which we refer are those of voluntary insurance, and have nothing to do with the mandatory insurance under compensation laws which have been passed by a number of states during the last twelve months, the New York law having gone into effect last July. The rapidity with which such laws are superseding the old master-and-servant and fellow-servant liability laws as a method of dealing with industrial accidents is indicated by the fact that, besides the national government, twenty-three states have enacted such legislation and the subject is being seriously considered in most of the other states. No electric railway will deny the innate justice of the general principle underlying such laws. Indeed, several of the railways in the states concerned had hardly established compensation systems for the benefit of their employees, similar in general scope to those covered by the various acts. As a whole, therefore, this new legislation has not changed the conditions on electric railway properties to so great an extent as it has in industrial enterprises, where, as a rule, no such provisions have heretofore existed. It has, however, like any entirely new legislation, introduced a number of new problems. Many of these acts were passed hastily and are crude, and these inconsistencies will have to be straightened out. Again, the questions of administration and best method of insurance remain to be solved. Many considerations govern this matter, but it seems as if a mutual association, acquainted with the problems of the industry concerned, or self-insurance, if the company is of sufficient size, offers the best solution.

Perhaps one of the most interesting events of the year was the report submitted to the American Federation of Labor last September on the subject of labor conditions on European municipally and privately owned railways. The conditions of railway employees abroad, especially on municipally owned lines, have been so often held up before the American laborer as exemplary that it must have come as a surprise to be told that the living standards here are only from 25 to 65 per cent higher than in Europe but that the maximum and minimum wages are twice as large respectively. But it is not only in the rates of pay that our car men are better off than their confreres abroad. Fines, ranging in size from a day's pay to eight days' pay, are enforced "for the slightest error made by men on duty," and the retention of wages to pay for repairs to company property injured while in charge of an employee, forfeiture of bond for leaving the service without due notice, renouncement of the right of appeal, etc., are common. In short, when we consider the rewards of the last year to trainmen in America and this vivid portrayal of European conditions, there seem to be few matters of which serious complaint can be made here, and the halo which some of the advocates of municipal ownership here have tried to throw around the labor conditions on European tramways disappears.

STATISTICS FOR 1914

Statistics for the past year, which are published in accordance with our long-standing custom in the first issue of the year, show a decrease both in cars ordered and miles of track built during the past year as compared with 1913. The decrease is greater in cars than in mileage, which, on the face of the returns, is within approximately 10 per cent of the figures for 1913, but some 25 per cent of the miles of new electric track is made up of electrified steam railroads or gas-electric lines. Most of the electrified mileage for the year was that completed on the New Haven extension of its electric zone, and this has given to Connecticut the leadership over the other states on the list. Outside of this electrical division, the mileage of new electric line constructed in New England was less than 20, or considerably less than one-half of 1 per cent of the mileage at the beginning of the year.

The Eastern states, as a whole, show approximately the same percentage rate of growth, as do also the Southern states, if we exclude the completion of a long interurban line in North Carolina which forms a part of the extensive hydro-electric development in that state. The states which have shown the greatest activity in electric railway construction during the year have been Minnesota, Utah and Michigan, each having two new interurban lines which bring the mileage of track constructed in each of these states up to an average of 75. All told, thirty-seven states are represented to some extent in this year's list, as against forty for last year, but in many of them the extensions constructed, as will be seen from the table elsewhere in this issue, represent merely short spurs or extensions, and no great amount of new electric railway has been built. On the other hand, several important enterprises have been inaugurated or brought to a successful completion. Outside of the New Haven electrification the most important have been a 50-mile line built in Michigan as part of the system of the Michigan Railway, two important interurban roads in Utah (one of which is described elsewhere in this issue), the gas-electric line in Minnesota and the Piedmont line in North Carolina, already mentioned. Proportionately, the interurban lines show much greater activity than the systems in larger cities, a situation that might be expected owing to the fact that an extension to an interurban line means additional fare, whereas on the city line it usually means simply a longer ride for the same fare.

When we consider the car statistics we find that the total number of cars ordered or built during the year is less than half of that recorded in 1913. In this case the major part of the reduction is traceable to the absence of a few large orders such as those made last year by Philadelphia and Chicago for more than 500 cars apiece, the number of roads buying cars being only 7 per cent less than last year. However, the fact that the smaller, and presumably weaker, urban roads as well as the interurban lines are providing an appreciably increasing percentage of the orders can be taken only as an encouraging sign of inherent strength in the industry. Altogether the statistics confirm the previous general impression that the investment in electric railways is not keeping pace with the growth and prosperity of the country just as it has not done for a number of years back, but there are some signs that this condition will not continue indefinitely. This subject is discussed at length in the editorial on the business situation.

HIGH-VOLTAGE DIRECT-CURRENT RAILWAY EQUIPMENTS

Since the installation of the first 1200-volt equipment in 1907 on the lines of the Indianapolis & Louisville Traction Company, steady progress has been made in perfecting high-voltage car equipments and locomotives and extending their use. There are now in operation or under construction more than thirty roads in the United States and Canada using 1200 volts or higher on the trolley, and approximately 800 motor car or locomotive equipments are involved. The reliability and cost of maintaining such equipments compares very favorably with accepted 600-volt d.c. practice, and there is practically no disagreement among engineers as to the excellent qualifications of 1200-volt and 1500-volt d.c. equipments for interurban railway conditions.

It early became evident that no new fundamental principles were involved in the development of the high-voltage d.c. equipment. Two standard 600-volt motors connected permanently in series were found to operate perfectly on 1200 volts, but the addition of a greater creepage distance and more insulation to ground were of course desirable. Otherwise the motors used with the 1200-volt trolley do not differ from the commutating-pole d.c. motors in extensive use.

The control equipment at the higher voltage required some modification, but the construction of contactors, fuses, and auxiliary apparatus operating at higher voltages offered no difficulties, the only departure from regular 600-volt practice being the introduction of the dynamotors to reduce the line voltage to a safe operating control voltage.

The operation of 1200-volt and 1500-volt d.c. equipments has passed through so long a period of demonstration as to leave no room for doubt of their success, and interest therefore centers in the use of still higher potentials for either interurban railways or to meet the larger demands of steam railroad electrification. While the costs of substations and distribution copper are both entirely reasonable in interurban systems operating at a trolley potential of 1200 volts or 1500 volts, the need of a higher voltage was felt to take care economically of the requirements of main-line electrification. Experimental equipments built at the factory showed conclusively that higher voltages were feasible, and this led to the placing of contracts for 2400-volt d.c. locomotives and substation apparatus to operate the Butte, Anaconda & Pacific Railway. Here again no new departure was made in standard 600-volt d.c. practice except as to insulation and creepage distance, as already described. This installation has been in operation for about one and a half years and has not only been most successful from the standpoints of reliability and economy, but it has demonstrated the great advantages of electrification in general as compared with steam-engine operation on a road having the same traffic conditions in both instances. Contracts for similar apparatus have been placed by the Canadian Northern Railway, and 2400-volt motor cars are now in operation upon the lines of the Michigan United Railway. In all but one installation, two motors are permanently connected in series and the same practice is followed with the power supply in the substations.

The next step in advance appears to be the adoption of a still higher voltage under certain conditions. Indeed, this has already been specified in the very extensive work now under construction on the Chicago, Milwaukee & St. Paul Railway in whose initial installation of 113 miles of main line electrification 3000 volts will be used, and this section will soon be followed by a change to electricity on three additional engine divisions, or a total of approximately 440 miles of main-line track. The adoption of 3000 volts in this installation was undoubtedly largely influenced by the success of 2400-volt d.c. locomotives operating upon the Butte, Anaconda & Pacific, lying in the same territory as the Chicago, Milwaukee & St. Paul tracks to be electrified. The plans of the St. Paul Railway contemplate a substation spacing of more than 30 miles apart, and factory tests indicate no difficulty in the construction of motor-generator sets, switchboard apparatus and locomotive equipments at this potential. The locomotives are to be equipped with regenerative control and are much larger than those on the Butte, Anaconda & Pacific Railway. The results of this application of high-voltage direct current to heavy electric traction will certainly be watched with interest.

Just how much higher d.c. potentials for railway work will be carried during the immediate future is still an open question. There have been published accounts of tests made by one manufacturing company of two 100-hp motors operating permanently in series from trolley voltages of 5000 and 7000. In this case mercury arc rectifiers were used to supply the voltage so that all difficulties of commutation in the substation were eliminated. Undoubtedly the reduction to be effected in feeder copper, or the wider spacing of substations possible with this doubling of the voltage, constitutes an important saving, and the tests do not indicate that any serious difficulties are to be anticipated. On the other hand, any increase in voltage means necessarily a more expensive motor, and the higher cost in motor construction and maintenance will have to be balanced against the saving in substations and feeder copper. What the ultimate results will be in this economic equation remain to be seen. Certainly it has been proved that 3000 volts are economically desirable, and a much higher voltage is electrically practicable. There have also been advances in the method of current collection, secured by a modified double-shoe pantograph which permits the collection of larger current at higher speeds than hitherto has been practicable. These facts alone are noteworthy events of the year and hold forth the greatest encouragement for electrification in 1915.

New Electric Railway Track Built in 1914

Reports Received from the Different Railway Companies in the United States and Canada Show a New Mileage of 946.38 Constructed During the Past Year

The new track built during 1914 by city systems and interurban lines is tabulated in the accompanying lists, the mileage of old steam railroad track electrified during the year being also included. The statistics are compiled from reports received from the railway companies themselves, and the record is complete except in the case of a few of the small companies whose replies were not received in time for inclusion in the list. All items which appear are, of course, accurate. It is possible, however, that there may be some mileage that does not appear either because of the failure of the companies to report it, or because the construction was reported during 1913 and hence appeared in the statistical table published in the issue of this paper for January 3, 1913.

The following summary shows the electric railway lines built or put in operation each year since 1907 in the United States and Canada:

1907	1,880 miles
1908	1,258.5 miles
1909	887.1 miles
1910	1,397.2 miles
1911	1,191.5 miles
1912	950.2 miles
1913	1,018.9 miles
1914	946.38 miles

The total mileage of the year, 946.38, shows a decrease of 7 per cent from that recorded last year. In this year's record Connecticut heads the list of states with 208.94 miles reported. This unusually high total for a state intensively equipped with electric railways is due to the 204.94 miles of steam line electrified by the New York, New Haven & Hudson River Railroad between Stamford and New Haven. Minnesota ranks second with 80.85 miles of track construction, 40 miles of which is contributed by the new gasoline electric line of the Electric Short Line Railway between Minneapolis, Wayzata, Watertown and Winsted, a part of the line which will ultimately extend to Hutchinson. The Twin City Rapid Transit Company also built 23.10 miles, and 17.54 miles were constructed by the St. Paul Southern Railway.

Utah is third with 77.55 miles. The Salt Lake & Utah Railroad built a 48.50-mile interurban line between Salt Lake City and Provo, and the Ogden, Logan & Idaho Railway made a 26.50-mile extension from Wellsville to Lewiston which will eventually reach Preston, Idaho.

In Iowa, which has a total of 56.80 miles, the Centerville, Albia & Southern Railway electrified 25 miles of its former steam line between Centerville, Moravia and Albia. The Waterloo, Cedar Falls and Northern Railway constructed 24 miles of new line between Center Point and Cedar Rapids. The greatest mileage built by any interurban railway in the United States during 1914 was constructed in Michigan by the Michigan Railways. The new mileage, 49.30 miles, connects Bradley, Grand Rapids, Kalamazoo, Martin, Moline, Plainwell, Shelbyville and Wayland.

The total mileage of steam lines electrified is recorded at 229.94 miles, which includes the New Haven's electrification of 204.94 miles and that on the Centerville, Albia & Southern Railway, 25 miles. The electric railways of Canada built 59.67 miles of track compared with 147.86 in 1913, a decrease of 60 per cent.

ALABAMA

	Miles
Birmingham Railway Light & Power Co.—Between Baylis and Farrant City	1.29
Birmingham—Tuscaloosa Railway	4.00
Gadsden, Bellevue & Lookout Mountain Ry.—Between Noccalula Falls and Gadsden	1.00
Mobile & Baldwin County R. R	5.00
	11.29

ARIZONA

Phoenix Railway	2.00
	2.00

ARKANSAS

Little Rock Ry. & Elec. Co	2.38
Pine Bluffs Co	.50
	2.88

CALIFORNIA

Crescent City Ry.—Between Bloomington and Rialto	3.47
Fresno Interurban Railway—Connects Fresno with suburban properties, being portion of line under construction from Fresno to Clovis	4.50
Los Angeles Ry.	2.00
Municipal Railways of San Francisco—San Francisco	16.80
Northwestern Pacific R. R.—Between San Anselmo and San Rafael	1.33
Peninsula Railway—Santa Clara and vicinity	2.90
United Railways of San Francisco—San Francisco, South San Francisco	3.56
Visalia Electric Railroad	2.10
	36.66

CONNECTICUT

New York, New Haven & Hartford R. R.—Electrification of steam line Stamford to New Haven, including yards and sidings	204.94
Waterbury & Milldale Tramway—Between Cheshire, Wolcott and Southington	4.00
	208.94

COLORADO

Denver Tramway	1.00
	1.00

DISTRICT OF COLUMBIA

Washington Railway & Electric Co.—Washington	2.06
	2.06

FLORIDA

Central of Florida Railway—Between Daytona, Daytona Beach and Seabreeze	8.00
Jacksonville Traction Co.	3.29
St. Petersburg & Gulf Ry	1.25
	12.54

GEORGIA

	Miles
Augusta & Aiken Ry	2.00
Savannah Electric Co.—Savannah	.57
	2.57

ILLINOIS

Chicago & Interurban Traction Co.—Between Blue Island and Harvey	1.25
Chicago & West Towns Ry	2.20
Chicago Surface Lines	19.00
City Railway, Mt. Vernon	2.50
Kankakee Elec. Railway	1.00
Kankakee & Urbana Traction Co.—Between Rantoul and Ludlow	5.00
Rockford City Traction Co	1.29
Springfield Consolidated Ry	1.00
Tri-City Railway Co. of Illinois	.13
	33.37

INDIANA

Gary, Hobart & Eastern Traction Co.—Between Glen Park, New Chicago and Hobart	5.80
Terre Haute, Indianapolis & Eastern Traction Co.—Richmond, Ind.	.60
	6.40

IOWA

Cedar Rapids & Marion City Ry	1.70
Centerville, Albia & Southern Railway—Electrification of former steam line between Centerville, Moravia and Albia	25.00
Davenport & Muscatine Railway	.80
Iowa Railway & Light Co.—Between Mt. Vernon and Lisbon	2.50
Keokuk Electric Co	.69
Mississippi Valley Electric Company	.30
Tri-City Railway Company of Iowa	.74
Union Electric Company	1.07
Waterloo, Cedar Falls & Northern Ry.—Between Center Point and Cedar Rapids	24.00
	56.80

KANSAS

Choctaw Ry. & Lighting Co	.83
Joplin & Pittsburg Ry	.50
Manhattan City & Interurban Ry.—Between Eureka Lake, Ogden & Fort Riley	11.00
Metropolitan Street Railway and Kansas City Elevated Ry	2.94
Kansas City, Kaw Valley & Western Railway—Between Kansas City (Mo.), Kansas City (Kan.), Muncie, Edwardsville, Lake Forest and Bonner Springs	16.00
Topeka Railway	2.00
	33.27

MAINE

	Miles
Bangor Railway & Electric Co.—Between Bangor and Brewer	.30
Biddeford & Saco R.R.	.23
	.53

MARYLAND

United Railways & Electric Co.	1.44
	1.44

MASSACHUSETTS

Bay State St. Railway	1.30
Boston Elevated Ry.	4.44
Holyoke Street Railway—Holyoke	.41
Springfield St. Railway—Westfield	.11
Worcester Consolidated St. Ry.	.12
	6.38

MICHIGAN

Detroit, Almont & Northern R. R.	10.84
Detroit United Ry.—Detroit	5.62
Grand Rapids Ry.	2.78
Michigan Railway—Between Bradley, Grand Rapids, Kalamazoo, Martin, Moline, Plainwell, Shelbyville and Wayland	49.30
Michigan United Traction Co.	.75
	69.29

MINNESOTA

Electric Short Line Ry. (gas-electric line)—Between Minneapolis, Wayzata, Watertown and Winsted	40.00
Mankato Electric Traction Co.—Mankato	.21
St. Paul, Southern Electric Ry.—Between Inver Grove, Pine Bend and Hastings	17.54
Twin City Rapid Transit Co.	23.10
	80.85

MONTANA

Butte Electric Ry.—Butte	.79
Great Falls St. Ry.—Great Falls	.67
Missoula St. Ry.—Missoula	.06
	1.52

NEBRASKA

Lincoln Traction Co.	.50
Omaha & Council Bluffs St. Ry.	2.74
	3.24

NEW HAMPSHIRE

Springfield Electric Railway	2.00
	2.00

NEW JERSEY

Cape May, Delaware Bay & Sewell's Point R. R.	2.00
Morris County Traction Co.—Millburn	.75
Public Service R. R.—Between Port Reading Junction and Sewaren Junction	1.68
Public Service Railway—Ridgewood	3.31
	7.74

NEW YORK

Hornell Traction Co.	1.00
International Railway—Between North Tonawanda and Lockport; Buffalo	12.80
Manhattan & Queens Traction Corp.—Jamaica	.25
United Traction Co.—Troy	1.37
	15.42

NORTH CAROLINA

Southern Public Utilities Co.	1.25
Piedmont & Northern Railway—Between Greenville, Paris, Taylor, Chick Springs, Greer, Duncan, Tucapau and Spartanburg	33.00
	34.25

OHIO

Cleveland Ry.	9.66
Gallipolis & Northern Traction Co.	.12
Hocking-Sunday Creek Traction Co.—Between Chauncey and Athens	6.00
Lake Shore Electric Ry.	1.84
Lancaster Traction & Power Co.	.85
Mahoning & Shenango Railway & Light Co.	2.75
New Midland Power & Traction Co.	.75
Northern Ohio Traction & Light Co.	1.78
Springfield Ry.—Springfield	5.76
	29.51

OKLAHOMA

Bartlesville Interurban Ry.	2.40
Sand Springs Ry.—Between Tulsa and Sand Springs	2.00
Tulsa St. Ry.—Tulsa	1.50
	5.90

OREGON

Pacific Power & Light Co.—Astoria	1.00
Portland Ry. Light & Power Co.	3.13
Southern Oregon Traction Co.	2.37
Willamette Valley Southern Ry.—Between Beaver Creek, Mulino, Liberal, Molalla and Monitor	32.00
	38.50

PENNSYLVANIA

Philadelphia Rapid Transit Co.—Philadelphia	.70
Pittsburgh, Harmony, Butler & Newcastle Ry.—Between Koppel Park Gate, Homewood and Morada Park	6.50
Pottstown & Phoenixville Ry.	4.00
Scranton Ry.	.26
Southern Cambria Ry.	3.50
West Penn Traction Co.—Between Leisenring and Uniontown	10.00
West Side Electric Street Railway—Between Charleroi, Bentleyville and Ellsworth	6.00
Wilkes-Barre Ry	4.50
York Railways	.67
	36.13

RHODE ISLAND

	Miles
Rhode Island Company	6.13
	6.13

SOUTH DAKOTA

South Dakota & Sioux Falls Traction System	.25
	.25

TENNESSEE

Chattanooga Railway & Light Co.	.70
Chattanooga Traction Co.—Between Chattanooga and Signal Mountain	10.63
Jackson Railway & Light Co.	2.00
Knoxville Ry. & Light Co.	.38
Memphis St. Ry.	.74
	14.45

TEXAS

Austin St. Ry.	.54
Dallas Consolidated Elec. St. Ry.	2.69
El Paso Elec. Ry.	1.78
Houston Elec. Co.	5.77
Marshall Traction Co.	.33
Northern Texas Traction Co.	3.39
San Antonio Traction Co.	1.50
Texas City St. Ry.	.85
Tucson Rapid Transit Co.	.50
	17.35

UTAH

Ogden, Logan & Idaho Ry.—Between Logan, Wellsville, Hyrum, Millville, Providence, Greenville, Hyde Park, Smithfield, Richmond and Lewiston (23 miles); Idlewild extension (1.75 miles); Ogden City (1.75 miles)	26.50
Salt Lake & Utah R. R.—Between Salt Lake City, American Fork, Lehi, Pleasant Grove and Provo	48.50
Utah Light & Traction Co.	2.55
	77.55

VIRGINIA

Charlottesville & Albemarle Ry.	.19
Danville Traction & Power Co.	.83
Lynchburg Traction & Light Co.	2.84
Roanoke Ry. & Elec. Co.	.42
Virginia Ry. & Power Co.	2.03
	6.31

WASHINGTON

Everett Railway Light & Water Co.	.90
Gray's Harbor Ry. & Lighting Co.	2.00
Municipal Line of Tacoma	1.51
Puget Sound Traction, Light & Power Co.—(Bellingham Div.)	.30
Seattle Municipal St. Ry.—Seattle	.14
	4.85

WEST VIRGINIA

Appalachian Power Co.	1.25
Charleston Interurban Railroad	.75
Monongahela Valley Traction Co.—Riverside	1.50
Ohio Valley Elec. Ry.—Huntington	3.60
	7.10

WISCONSIN

Badger Ry. & Light Co.—Connects Whitewater and Elkhorn	5.50
Milwaukee Northern Railway	.40
Sheboygan Railway & Elec. Co.	1.00
Wisconsin, Minnesota Light & Power Co.—Between Eau Claire and Altoona	3.00
Wisconsin Public Service Co.	.54
	10.24

CANADA

Brantford Municipal Ry.	.13
Fort William Elec. Ry.	5.50
Guelph Radial Ry.—Guelph	.57
London St. Railway—London	.27
Montreal Tramways—Between Montreal and Pointe aux Trembles	6.35
Moose Jaw Elec. Railway	1.00
Niagara, St. Catharines & Toronto Ry.—Between St. Catharines, Port Weller, MacNab and Niagara-on-the-Lake	14.00
Port Arthur Municipal Ry.—Port Arthur	.50
Regina Municipal Ry.—Regina	.09
St. John Ry.—St. John	3.75
Sandwich, Winsor & Amherstburg Ry.	1.50
Saskatoon Municipal Ry.—Saskatoon	1.00
Suburban Rapid Transit Co.	1.37
Toronto Civic Ry.—Toronto	.74
Toronto Suburban St. Ry.—Between Thistletown and Woodbridge Mountain	7.83
Winnipeg Elec. Ry.—Winnipeg	7.57
Winnipeg, Selkirk & Lake Winnipeg Ry.—Between Stony Mt. and Stonewall	7.50
Total Mileage	59.67
Grand Total, United States and Canada	946.38

The Joplin & Pittsburg Railway, Joplin, Mo., and the Spring River Power Company have presented the city with a quit claim deed covering about $25,000 worth of improvements which they made in Schifferdecker Park, held by the companies under lease. When the owner of the park deeded it to the city to be used as a municipal resort the public service companies immediately signified their willingness to present the city with these improvements.

Electric Rolling Stock Ordered in 1914

A Tabulation Showing the Number, Type, Car-Body Length and Character of Construction of All Cars Built During the Year—Compiled from Official Returns Made by the Railway Companies

The tables below show in detail the number of cars of all kinds as well as electric locomotives which were either purchased by electric railways or else built in the companies' shops during the past year. The lists do not include freight trail cars for other than city or interurban lines, nor those used for interchange service. This differs from last year's procedure. The total number of rolling equipments of all kinds is 3010, a decrease of approximately 45 per cent from the number listed for the previous year. The tables, in accordance with the usual procedure, have been made up from the orders noted from week to week in the rolling stock columns of the ELECTRIC RAILWAY JOURNAL and from returns made at the close of the year by the electric railways of the United States and Canada. These figures were checked against reports received from practically all of the car builders, and every effort has been made to make the record complete, although there may be some omissions of a minor character.

The greatest number of cars ordered by any electric railway during 1914 was the 228-car order placed by the Chicago Surface Lines. The Cleveland Railway ranks second with a total of 223 cars ordered, including 200 city passenger and 23 miscellaneous cars. The New York Municipal Railway stands third with 200 subway cars ordered.

The number of electric locomotives ordered was seventy-eight as against sixty-eight in the preceding year. The chief orders of this kind were those of the Chicago, Milwaukee & St. Paul Railroad and the Norfolk & Western Railway, each for twelve locomotives.

The total number of cars of all types built in companies' shops was 228 as against 772 cars in 1913.

The number of cars ordered by Canadian electric railways during 1914 was ninety-seven, compared with 676 in the preceding year. Certain of the manufacturers have contributed the information that electric railways in foreign countries, not including Canada, ordered a total of 50 cars from American car builders, of which 27 cars were built for properties in South America, 7 for Panama, 8 for South America and 8 for other localities.

The following summary shows the records in condensed form for the past seven years, and gives the number of cars, classified in accordance to the service in which they are used, from 1907 to 1914.

Year	City Cars	Interurban Cars	Freight & Misc. Cars	Total
1907	3483	1327	1406	6216
1908	2208	727	176	3111
1909	2537	1245	1175	4957
1910	3571	990	820	5381
1911	2884	626	505	4015
1912	4531	783	687	6001
1913	3820	547	1147	5514
1914	2147	384	479	3010

Purchaser	No.	Gen'l Type	Motor or Trailer	Length of Car Body	City or Int.	All-steel, Semi-steel or Wood
Albany Southern R. R	2	Ps. Clsd.	Motor	30- 6	Int.	Semi-steel
	1	Express	Motor	....	Int.	Semi-steel
Allentown & Reading Trac. Co.	1	Car	......	....	....	....
Altoona & Logan V'y El. Ry	5	Ps. Clsd.	Motor	28- 0	City	Semi-steel
	4	Ps. Clsd.	Motor	32- 6	Int.	Semi-steel
Androscoggin Elec. Co.	1	Snow Plow	......	30- 0	Int.	Semi-steel
Arkansas Northwestern R. R	1	Gasoline Mech. Drive	......	70- 0	Int.	All-steel
Arkansas Valley Int. Ry	1	Ps. Clsd.	Motor	30- 0	City	Wood
Atlantic Shore Line Ry	2	Ps. Conv.	Motor	30- 8	City	Semi-steel
Bartlesville Int. Ry	1	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Batavia Traction Co	2	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Bay State St. Ry	1	Ps. Conv.	Motor	30- 0	City	Semi-steel
Biddeford & Saco R. R	1	Snow Plow	......	....	....	......
Binghamton Ry	1	Ps. Conv.	Motor	....	City	......
Birmingham-Tuscaloosa Ry	1	El. Loco.	Motor	30- 0	....	......
Boston Elevated Ry	100	Pass.	Trail	....	City	Semi-steel
	3	2-Way Dump	......	24-10¾	City	Steel
	1	Snow Plow	Motor	31- 6½	City	Wood
	1	Snow Plow	Motor	30- 0	City	Wood
	2	Sweeper	Motor	27- 0	City	Wood
Brantford Municipal Ry	6	Ps. Clsd.	Motor	21- 0	City	Semi-steel
	1	Express	Motor	45- 0	City	Wood
Bridgeton & Millville Tr. Co.	1	Ps. Clsd.	Motor	29- 6	City	Semi-steel
Brit. Columbia Elec. Ry	10	Ps. Clsd.	Motor	....	City	......
	1	Ps. Exp.	Motor	....	Int.	....
Bryan & Cent. Tex. Int. R. R.	2	Gasoline	......	52- 4	Int.	All-steel
Bryan & College Int. Ry	1	Ps. Clsd.	Motor	45- 0	Int.	Semi-steel
Buffalo & Depew Ry	2	Snow Plow	......	....	....	......
Buff. & Williamsville El. Ry	2	Ps. Clsd.	Motor	41-10	City	Semi-steel
Butte, Anaconda & Pac. Ry	4	El. Loco.	Motor	80-Ton	Int.	......
	3	El. Loco.	Motor	40-Ton	Int.	....
Butler County R. R	1	Gasoline Mech. Drive	......	55- 0	Int.	All-steel
Butte Elec. Ry	6	Ps. Clsd.	Motor	41-10	City	All-steel
Calgary Municipal Ry	1	Sprinkler	......	....	City	Steel
Cambria & Indiana Ry	1	St. Bat.	Motor	44- 4	Int.	Semi-steel
Canadian Northern R. R. (Montreal Tunnel & Ter.)	8	Ps. Clsd.	Motor	67- 7	Sub.	All-steel
	6	El. Loco.	Motor	83-Ton	Sub.	....
Carolina Trac. Co	2	St. Bat.	Motor	18- 0	City	Semi-steel
Cedar Rap. & Marion C'y Ry.	10	Ps. Clsd.	Motor	44- 8	City	Semi-steel
Centerville, Albia & So. Ry.	2	Ps. Clsd.	Motor	47- 0	Int.	Semi-steel
	1	Express	......	41- 0	Int.	Semi-steel
Central Ill. Trac. Co	2	Ps. Clsd.	Motor	48- 0	Int.	Semi-steel
Central of Florida Ry	2	St. Bat.	Motor	32- 0	Int.	....
	1	Express	Trail	....	....	......
Central N. Y. Southern R. R.	2	Gasoline, Mech. Drive	......	70- 0	Int.	All-steel
Central Passenger Ry	3	Ps. Clsd.	Motor	21- 0	City	Wood
Charleston Inter. R. R.	12	Ps. Clsd.	Motor	30- 0	City	All-steel
Charlottesv'le & Albem'le Ry.	7	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Chattanooga Trac. Co	2	Ps. & Bag.	Motor	44- 4	Int.	Semi-steel
	5	Flat	......	32- 0	....	....
	1	Work	......	35- 0	....	Steel
Chicago & Joliet Elec. Ry	5	Ps. Clsd.	Motor	36- 0	Int.	Semi-steel
Chicago & West Towns Ry	10	Ps. Clsd.	Motor	44- 6	City	Semi-steel
Chicago Elevated Rys	62	Ps. Clsd.	Motor	37-10	City	All-steel
	66	Ps. Clsd.	Trail	37-10	City	All-steel
Chicago Great Western R. R.	1	Gasoline Mech. Drive	......	...	Int.	All-steel
Chicago, Mil. & St. Paul R. R.	12	El. Loco.	Motor	260-Ton	....	...
Chicago Surface Lines	228	Ps. Clsd.	Motor	32- 8	City	Semi-steel
Cleve., Painesv'le & Ea. R. R.	1	Pass.	......	37-10¼	Int.	Wood
Cleveland Ry	200	Ps. Clsd.	Motor	51- 0	City	Semi-steel
	2	Sweeper	......	....	....	......
	8	Dump	Motor	....	....	Steel
	1	Crane	......	....	....	......
	12	Yd. Loco.	......	....	....	......
Clevel'd, Southw. & Col. Ry	4	Dump	....	......	....	Wood
Conestoga Traction Co	1	Ps. Clsd.	Motor	33- 6	City	Semi-steel
	2	Ps. Clsd.	Motor	28- 0	City	Semi-steel
	1	Work	......	....	....	......
Columbus, Del. & Marion Ry.	1	Flat	......	32- 0	Int.	Wood
	1	Work	......	32- 0	Int.	Wood
Columbus Ry., Lt. & Pwr. Co	1	Snow Plow	Motor	40- 0	City	Wood
	2	Sweeper	Motor	40- 0	City	Wood
Connecticut Co.	10	3-Comp. Dump	......	39- 9	Both	Semi-steel
	10	4-Comp. Dump	......	25- 8¼	Both	Semi-steel
	2	El. Loco.	......	25-Ton		
Corpus Christi St. & Int. Ry	2	Ps. Clsd.	Motor	21- 6	Int.	....
Cumb. & Westernport El. Ry.	2	Ps. Clsd.	Motor	34- 3	Int.	Semi-steel
Cushing Traction Co	1	El. Loco.	......	50-Ton	Int	......
Dallas Consol. St. Ry	15	Ps. Clsd.	Motor	26- 6	City	Semi-steel
Danville Trac. & Pwr. Co	2	Ps. Clsd.	Motor	43- 0	City	All-steel
Dayton & Troy Elec. Ry	4	Box Ft.	......	47- 6	Int.	Wood
Day., Springfi'd & Xenia Ry.	3	Ps. Clsd.	Motor	29- 0	Int.	Steel
Dayton Street Ry	5	Ps. Clsd.	Motor	29- 0	City	All-steel
Denver Tramway	6	Ps. Clsd.	Trail	40- 8	City	Wood
	4	Sweeper	......	28- 3	City	Semi-steel
Des Moines City Ry	1	Sweeper	......	39- 2	City	Semi-steel
Detroit United Ry	5	Express	Trail	50- 0	Int.	Semi-steel
	1	Sw. Loco.	Motor	31- 1½	City	......
E. Liverpool Trac. & Lt. Co	4	Ps. Clsd.	Motor	32- 0	City	Steel
Easton Transit Co	1	Ps. Conv.	Motor	30- 8	Int.	Steel
	9	Ps. Clsd.	Motor	20- 8	City	Semi-steel
	1	Sweeper	......	23- 8	Int.	Wood
	1	Work	......	41- 8	Both	Steel
El Paso Elec. Ry	6	Ps. Clsd.	Motor	29- 0	City	Semi-steel
Elec. Short Line Ry	14	Pass.	Trail	60- 0	Int.	......
	2	Gas-electric	Motor	71- 0	Int.	All-steel
	28	Flat	......	....	....	......
Elmira Water, Lt. & R. R. Co.	1	Ps. Conv.	Motor	....	Int.	Steel
	2	Gondola	......	....	....	Wood
	1	Work	......	22- 0	....	Semi-steel
	1	El. Loco.	......	....	....	
Empire United Rys	12	Ps. Clsd.	Motor	26- 0	City	Semi-steel
	12	Ps. Clsd.	Motor	....	City	....
	5	Freight	Motor	....	Int.	Wood
Ephrata & Lebanon St. Ry	3	Ps. Clsd.	Motor	41- 6	Sub.	All-steel
	3	Ps. & Bag.	......	43- 0	Sub.	All-steel
	1	Bag. & Ex.	......	40- 0	....	Wood
Escanaba Trac. Co	1	Ps. Clsd.	Motor	31- 6	City	Semi-steel
Evanston Ry.	12	Ps. Clsd.	Motor	28- 0	City	All-steel
Evansville Sub. & Newb. Ry.	10	Gondola	......	36- 0	....	Wood
Fargo & Moorhead St. Ry	1	Ps. Clsd.	Motor	33- 0	City	Wood
Fitchb'g & Leominster St. Ry.	1	Ps. Conv.	Motor	30- 8	Int.	Semi-steel
Florence & Huntsv'le Int. Ry.	2	Pass.	Trail	....	Int.	....
	2	Pass.	Motor	...	Int.	
Fort Dodge, Des Moines & Southern R. R	1	Ps. Clsd.	Motor	32- 0	City	Semi-steel
Fort William Elec. Ry	1	Work & Sn. Plow	......	30- 0	City	Wood

Purchaser	No.	Gen'l Type	Motor or Trailer	Length of Car Body	City or Int.	All-steel, Semi-steel or Wood
Freeport Ry. & Lt. Co	1	Ps. Clsd.	Motor	30- 0	City	Semi-steel
Gadsden, Bellevue & Lookout Mountain Ry	2	Ps. Open	Motor	....	Int.	......
	2	Pass.	Trail	....	Int.	......
Gary, Hobart & Ea. Trac. Co	2	Ps. Open	Motor	....	City	Wood
	2	Ps. Conv.	Motor	42- 6	Int.	Wood
	1	Ps. Clsd.	Motor	....	City	Wood
Geneva, Seneca Falls & Auburn R. R	2	Ps. Clsd.	Motor	34- 0	Int.	Semi-steel
Goldsboro St. Ry	2	Ps. Clsd.	Motor	....	City	......
Grafton Lt. & Pwr. Co	3	Pass.	......	21- 0	City	Wood
Greeley & Denver R. R	2	Ps. Clsd.	Motor	28- 0	City	Semi-steel
Guelph Radial Ry	2	Ps. Clsd.	Motor	32- 0	City	Semi-steel
Hagerstown & Frederick Ry	3	Ps. Conv.	Motor	30- 6¾	City	Semi-steel
Harrisburg Rys	6	Ps. Conv.	Motor	25- 0	City	Semi-steel
	4	Ps. Conv.	Motor	31- 8	Int.	Semi-steel
Hershey Transit Co	3	Flat	......	....	....	......
	1	Snow Plow	......	....	....	......
Hocking-Sunday Creek Trac Co.	3	Pass.	Motor	32- 6	Int.	All-steel
Homestead & Mifflin St. Ry	1	Ps. Clsd.	Motor	21- 0	City	Wood
Houston Elec. Co	10	Ps. Conv.	Motor	26- 6	City	Steel
Hutchinson Inter. Ry	1	Ps. Conv.	Motor	30- 0	City	All-steel
Idaho Ry., Lt. & Pwr. Co	1	Work	......	28- 0	....	......
Illinois Central R. R	4	Gas-electric	Motor	71- 0	Int.	All-steel
Illinois Traction System	30	Hopper Bot.	......	....	....	......
Indian. & Louisville Trac. Co.	1	Pass.	Trail	42- 0	Int.	Wood
Interborough Rap. Tran. Co.	10	Side Dump	......	33- 0	....	Steel
Ithaca Traction Corp	5	Ps. Open	Motor	28- 8	City	Semi-steel
	5	Ps. Clsd.	Motor	20- 8	City	Semi-steel
Jackson Ry. & Lt. Co	4	Ps. Clsd.	Motor	32- 0	City	Semi-steel
	1	Work	......	26- 0	City	Wood
Jacksonville Trac. Co	15	Ps. Clsd.	Motor	26- 6	City	Semi-stel
Jamestown, Westfield & Northwestern R. R	6	Ps. Clsd.	Motor	53- 6	Int.	All-steel
	2	Bagg.	Motor	43- 0	Int.	Semi-steel
	1	Sweeper	......	28- 3	City	Semi-steel
	1	Work	......	45- 0	City	All-steel
	1	El. Loco.	......	45-Ton	....	......
Janesville Trac. Co.	4	Pass.	Motor	30- 0	City	All-steel
Jefferson Tract. Co	1	Ps. Clsd.	Motor	33-10	Int.	Semi-steel
Jersey Central Traction Co	5	Ps. Clsd.	Motor	42- 2	Int.	Semi-steel
	1	Flat	Motor	34- 0	....	Steel
Kansas City, Clay County & St. Joseph Ry	1	Line Car	......	40- 0	Int.	Wood
Kansas City, Kaw Valley & Western Ry	4	Ps. Clsd.	Motor	50- 0	Int.	All-steel
	4	Ps. & Bag.	Trail	48- 0	Int.	Wood
	1	Express	Motor	48- 0	Int.	Wood
	6	Gondola	......	....	....	......
	1	Flat	......	....	....	......
	1	Work	......	30- 0	....	W'd & St'l
Kansas City, Lawrence & Topeka Elec. R. R	1	Express	Motor	40- 0	Int.	Wood
Kansas-Oklahoma Trac. Co	1	Ps. & Bag.	Motor	50- 5	Int.	Semi-steel
Keokuk Elec. Co	1	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Kingston Consol. R. R	1	Snow Plow	Motor	26- 0	City	Wood
Lackawanna & Wyo. Vy. R. R.	15	Steel Hop.	......	31- 2½	....	All-steel
Lancaster Trac. & Power Co	2	Ps. Clsd.	Motor	18- 0	City	All-steel
Lawton Ry. & Lt. Co	2	Ps. Open	Trail	34- 0	City	Wood
Lebanon & Campbelltown Ry.	2	Ps. Conv.	Motor	30- 8	Int.	Semi-steel
Lehigh Valley Tract. Co	2	Freight	......	45- 0	Both	Wood
	1	Work	......	40- 0	Both	Wood
	1	Work	......	30- 0	Both	Wood
	1	Line	......	33- 0	Both	Wood
	1	Private	......	50- 2	Both	Wood
Lewisburg & Ronceverte Ry	1	El. Loco.	......	25-Ton	....	......
Lincoln Trac. Co	4	Ps. Clsd.	Motor	41- 0	City	Semi-steel
	2	Pass.	Trail	39- 0	City	Semi-steel
London & Port Stanley Ry	3	El. Loco.	......	60-Ton	....	......
London St. Ry	4	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Long Island R. R	2	Ps. Clsd.	Motor	22- 7	Int.	Semi-steel
Los Ang. & San Diego B'h Ry.	5	Ps. Calif. Type	Motor	50- 0	City	Semi-steel
	4	Ps. Calif. Type	Trailer	50- 0	City	Semi-steel
Los Angeles Ry	1	Ps. Clsd.	Motor	46- 0	City	Compos.
Macon Ry. & Lt. Co	9	Pass.	......	20-0	City	Semi-steel
Mahoning & Shenango Ry. & Lt. Co	20	Pass.	Motor	45- 0	City	All-steel
Manhattan Bridge Three-Cent Line	6	Ps. Conv.	Motor	33- 3	City	Semi-steel
Manhattan & Queens Trac. Corp	1	Sprinkler	......	33- 0	City	Wood
Mansfield Ry., Lt. & Pwr. Co.	2	Pass.	......	19- 6¾	City	Semi-steel
Memphis St. Ry	25	Ps. Clsd.	Motor	31- 6	City	St'l Un. Fr.
	10	Pass.	Trail	30- 3	City	St'l Un. Fr.
	1	Sprinkler	......	....	City	Steel
Mesaba Railway	1	Ps. Clsd.	Motor	49- 0	Int.	Steel
Miami Trac. Co	4	St. Bat.	Motor	....	City	Wood
Michigan Central R. R. (Detroit River Tunnel Co.)	4	El. Loco.	Motor	120-Ton	...	......
	1	Wreck Crane	......	....	....	......
Michigan Railway	6	Ps. Clsd.	Motor	67- 0	Int.	All-steel
	6	Ps. Clsd.	Motor	61- 0	Int.	All-steel
	4	Express	Motor	61- 0	Int.	All-steel
Michigan United Trac. Co	6	Ps. Clsd.	Motor	61- 0	Int.	All-steel
	4	Pass.	Trail	56- 8	Int.	All-steel
Milford & Uxbridge St. Ry	2	Snow Plow	......	....	....	......
Minneapolis, St. Paul & Sault Ste. Marie Ry	1	Gasoline, Mech. Drive	......	70- 0	Int.	All-steel
Minneapolis, St. Paul, Rochester & Dubuque El. Tr. Co.	5	Gas-elec.	Motor	....	Int.	Steel
Minnesota & Northwestern Elec. Ry	1	Gas-elec.	Motor	....	Int.	......
Missouri & Kansas Inter. Ry.	2	Pass.	Trail	35-10	Int.	Wood
Missouri & N. Arkansas R. R.	1	Gas-elec.	Motor	70- 0	Int.	Steel
Mobile & Baldwin Co. R. R	1	Pass.	......	22- 0	City	......
	2	Gasoline	Motor	....	Int.	......
	1	Service	......	....	....	......
	1	Flat	......	....	....	......
Montreal & So. Counties Ry	1	Flat	......	34- 0	....	Wood
Morris County Trac. Co	10	Ps. Clsd.	Motor	36- 0	Int.	All-steel
	1	Sweeper	......	28- 3	City	Semi-steel
Motley County R. R	1	Gasoline, Mech. Drive	......	70- 0	Int.	All-steel
Mt. Mansfield Elec. Ry	1	Express	Motor	35- 0	Int.	Semi-steel
Mun. Rys. of San Francisco	125	Ps. Calif. Type	Motor	32- 4	City	......
New Bedford & Onset St. Ry	1	Flat	......	40- 0	Int.	Semi-steel
New Jersey & Penna. Tr. Co	4	Ps. Clsd.	Motor	52- 0	Int.	All-steel
	2	Bagg.	......	45- 0	Int.	Steel
New Orleans Ry. & Lt. Co	50	Ps. Clsd.	Motor	47- 8	City	Semi-stee
N. Y. Central & H. R. R. R	1	Wreck. Crane	Motor	....	....	......
New York Municipal Ry	200	Ps. Clsd.	Motor	66- 2¼	Sub.&El.	All-steel
New York, New Haven & Hartford R. R	1	El. Loco.	Motor	130-Ton		......
Newport News & Hampton Ry. Gas & Elec. Co	1	Express	Motor	45- 0	....	Wood
Niagara, St. Catherines & Toronto Ry	6	Ps. Clsd.	Motor	55- 6	Int.	Semi-steel
	6	Ps. Clsd.	Motor	45- 0	City	Semi-steel
	2	El. Loco.	Motor	34-Ton	...	Steel
Nipissing Central Ry	2	Ps. Clsd.	Motor	51- 0	Int.	Semi-steel
Norfolk & Western Ry	12	El. Loco.	Motor	270-Ton	Int.	......
Northern Elec. Ry	1	Ft. Loco.	Motor	....	....	All-steel
	1	Ft. Loco.	Motor	....	....	W'd & St'l
Northern Ohio Tr. & Lt. Co	16	Ps. Clsd.	Motor	35- 5¼	City	Semi-steel
	5	Ps. Smok.	......	42- 1¾	Int.	Wood
North Carolina Pub. Ser. Co.	2	Ps. Conv.	Motor	26- 0	City	Steel
Northern Texas Trac. Co	20	Ps. Clsd.	Motor	33- 9	City	Semi-steel
Ohio Elec. Ry	5	Ps. Clsd.	Motor	50- 3	Int.	Steel
	4	Express	Motor	50- 0	Int.	Wood
	14	Box Ft.	......	38- 6	Int.	Wood
Ogden, Logan & Idaho Ry	3	Ps. Clsd.	Motor	60- 0	Int.	All-steel
Ogdensburg St. Ry	1	Ps. Clsd.	Motor	20- 8	City	Semi-steel
Ohio Elec. Ry	5	Ps. Clsd.	Motor	50- 2	Int.	Steel
	4	Express	Motor	50- 0	Int.	......
	14	Freight	Trail	38- 6	Int.	......
Oklahoma Ry	1	Box. Ft.	......	36- 0	Int.	Wood
Orleans-Kenner Ry	4	Ps. & Smoking	Motor	54- 8	Int.	Semi-steel
Otsego & Herkimer R. R	1	Express	Motor	45- 0	Int.	Semi-steel
	2	Gondola	......	....	....	......
	8	Dump	......	....	....	......
Pacific Elec. Ry	24	Ps. Clsd.	Motor	58- 1	Int.	All-steel
Pacific Gas. & Elec. Co	6	Ps. Calif. Type	Motor	38- 0	City	Semi-steel
Pacific Great Eastern Ry	2	Gasoline	......	65- 0	Int.	All-steel
Parkersburg, Marietta & Int. Ry	2	Ps. Clsd.	Motor	50- 0	Int.	All-steel
	4	Ps. Clsd.	Motor	38- 0	City	Semi-steel
	4	Ps. Clsd.	Motor	22- 0	City	Semi-steel
Peninsular Ry	1	......	......	....	....	......
Pennsylvania & Ohio Ry	1	Pass. & Smok.	Motor	31- 8	Int.	Wood
Pennsylvania R. R (also 84 pass. coaches equipped with motors)	9	Ps. Clsd.	Motor	54- 6	Sub.	All-steel
Peterborough Radial Ry	2	Ps. Clsd.	Motor	30- 0	City	Wood
Phila. & Garretsford St. Ry	5	Ps. Clsd.	Motor	44- 6	Int.	Semi-stee
Piedmont & Northern Ry	8	Ps. Clsd.	Trail	62- 0	Int.	All-steel
	2	Parlor	......	62- 0	Int.	All-steel
Piedmont Ry. & Elec. Co	1	Ft. Loco.	......	25- 0	....	Wood
Pittsburgh, Harmony, Butler & New Castle Ry	5	Ps. Clsd.	Motor	54- 0	Int.	Wood
	1	Express	Motor	35- 0	Int.	Wood
Pittsburgh Rys	50	Ps. Clsd.	Motor	45- 2	City	Steel
	50	Ps. Clsd.	Motor	45- 2	City	Steel
Port Arthur Municipal Ry	1	Ps. Conv.	Motor	26- 0	City	Wood
	3	Ps. Conv.	Motor	26- 0	City	Semi-steel
Port Arthur Traction Co	4	Ps. Clsd.	Motor	32- 0	City	Semi-steel
Portland, Eugene & Ea. Ry	4	Ps. Conv.	Motor	21- 0	City	Semi-steel
	3	Bagg. & Mail	Motor	47- 0	Int.	Steel
Portland Ry., Lt. & Pwr. Co	3	Ps. Clsd.	Motor	50- 0	Int.	Semi-steel
	3	Ps. Clsd.	Trail	50- 0	Int.	Semi-steel
	1	El. Loco.	Motor	50-Ton		Steel
Pottstown & Phoenixville Ry	3	Ps. Clsd.	Motor	....	Int.	......
Princeton Power Co	4	Ps. Clsd.	Motor	....	Int.	......
Public Service Ry	15	Ps. Clsd.	Motor	34- 0	Int.	Wood
	10	Ps. Clsd.	Motor	32- 0	City	......
	1	Sweeper	......	28- 0	....	Wood
	6	Side Dump	Trail	33- 0	....	Steel
	1	Line Car	......	18- 0	....	Wood
Puget Sound Traction, Light & Power Co. (Bellingham Div.)	1	Ps. Conv.	Motor	50- 0	City	Semi-steel.
Puget Sound Traction, Light & Power Co. (Seattle Div.)	12	Ps. Clsd.	Motor	38- 0	City	Semi-steel
Regina Municipal Ry	1	Flat	......	21- 0	City	Wood
Reno Traction Co	1	Ps. Clsd.	Motor	34- 0	City	Semi-steel
Rhode Island Co	50	Ps. Conv.	Motor	29- 0	City	Semi-steel
Richmond Light & R. R. Co	32	Ps. Clsd.	Motor	28- 0	City	All-steel
Rockford & Interurban Ry	4	Ps. Clsd.	Motor	....	City	......
Rockland, Thomaston & Camden St. Ry	1	Bagg.	......	30- 0	Int.	Semi-steel
	1	Sprinkler	......	....	City	......
Saginaw Bay City Ry	12	Ps. Clsd.	Motor	31- 0	City	Wood
St. John Ry						
St. Joseph Ry. Lt. Ht. & Pow. Co	2	Pass	.....	....	City	......
	1	Work	......	....	....	......
St. Joseph Valley Ry	1	Gasoline	......	65- 0	Int.	All-steel
St. Louis Southwestern Ry	8	Gas-elec.	Motor	....	Int.	All-steel
St. Louis Water Works Ry	2	Pass.	Motor	39- 0	Sub.	Semi-steel
St. Paul Southern Ry	2	Ps. Clsd.	Motor	51- 0	Int.	Semi-steel
	2	Bag. & Pass.	Motor	51- 0	Int.	Semi-steel
St. Petersburg & Gulf Ry	2	Ps. Open	Motor	36- 0	Both	Wood
	2	Ps. Conv.	Motor	40- 0	Both	Semi-steel
	2	Ps. Conv.	Motor	46- 0	Both	Semi-steel
	1	Express	Motor	40- 0	Both	Semi-steel
	2	Flat	......	20- 0	Both	Wood
Salt Lake & Utah R. R	2	Ps. Clsd.	Motor	31- 8	City	All-steel
	5	Ps. Clsd.	Motor	59- 8	Int.	All-steel
	2	Ps. Clsd.	Trail	58- 7½	Int.	All-steel
	2	Ft.	Motor	50- 0	Int.	All-steel
	1	El. Loco.	Motor	50- 0	Int.	......
San Antonio Trac. Co	3	Work	......	....	....	......
	11	Flat	......	....	....	......
San Diego Elec. Ry	41	Ps. Calif. Type	Motor	50- 0	City	Semi-steel
Santa Barbara & Sub. Ry	2	Ps. Clsd.	Motor	39- 4	City	Semi-steel
	1	Express	Motor	35- 0	....	Wood
	4	Flat	......	34- 0	....	Wood
Scranton Ry	10	Ps. Clsd.	Motor	30- 6	City	Semi-steel
Seattle Municipal Ry	1	Box Ft.	......	42- 0	City	Wood
Shamokin & Mt. Carmel Transit Co	1	Sweeper.	Motor	24- 0	....	Wood
Sheboygan Ry. & Elec. Co	2	Ps. Clsd.	Motor	49- 0	Int.	Semi-steel

Purchaser	No.	Gen'l Type	Motor or Trailer	Length of Car Body	City or Int.	All-steel, Semi-steel or Wood
Shreveport Traction Co.	1	Sprinkler	......	....	City	......
Sioux City Service Co	8	Ps. Clsd.	Motor	38- 0	City	......
Slate Belt Elec. St. Ry	2	Ps. Conv.	Motor	30- 1	Int.	Semi-steel
Southern Cambria Ry	1	Express	Motor	51- 0	Int.	Wood
Southern Public Utilities Co.	6	Ps. Clsd.	Motor	39- 0	City	Semi-steel
Southern Tr. Co. of Illinois	6	Ps. Clsd.	Motor	38- 0	Int.	Semi-steel
Southern Trac. Co	11	Ps. Clsd.	Motor	28- 0	City	All-steel
Southwestern Trac. Co	1	Pass.	......	46- 8	Int.	......
Spokane, Portland & Seattle	1	Gas-elec.	Motor	....	Int.	Steel
Springfield Consol. Ry	12	Ps. Open	Motor	38-10	City	Wood
Springfield Ry.	10	Ps. Clsd.	Motor	28- 0	City	Semi-steel
Springfield Street Ry	10	Ps. Conv.	Motor	30- 0	City	Semi-steel
Stark Electric R. R	2	Pass.	......	55- 0	Int.	Steel
	1	Snow Plow	......	....	Int.	Wood
Steubenville & East Liverpool Ry. & Light Co	4	Ps. Clsd.	......	33- 2	City	Semi-steel
Stroudsburg Pass. Ry	1	Ps. Clsd.	Motor	28- 0	City	......
Sunbury & Susquehanna Ry	4	Ps. Clsd.	Motor	41- 0	Int.	......
Sunset Central R. R	3	Gasoline, Mech. Drive	......	10- 0	Int.	All-steel
Tacoma Ry. & Power Co	5	Ps. Clsd.	Motor	34- 5	City	Semi-steel
Tennessee, Kentucky & Nor. R. R	1	Gasoline, Mech. Drive	......	70- 0	Int.	All-steel
Terre Haute, Indianap. & Eastern Trac. Co.	1	Express	Trail	45- 0	Int.	Semi-steel
Texas Traction Co.	1	Ps. Clsd.	Motor	28- 0	City	All-steel
Third Ave. Ry	50	Ps. Conv.	Motor	24- 0	City	Semi-steel
	2	Snow Plow	.....	40- 0	City	Wood
	12	Sweeper	......	26- 0	City	Wood
	2	Scrapers	......	29- 0	City	Wood
	1	Wing Car	....	29- 0	City	Wood
Tidewater Power Co	3	Ps. Conv.	Motor	20- 8	City	Semi-steel
Toledo & Western R. R.	2	Cars	....	.....	...	....
Toledo, Fostoria & Findlay Ry	2	Ps. Clsd.	Motor	51- 0	Int.	Steel
Topeka Ry	6	Pass.	Trail	45- 0	Park	Semi-steel
Toronto Suburban Ry	2	Ps. Clsd.	Motor	46- 0	Int.	Semi-steel
	1	Sweeper	......	28- 3	City	Semi-steel
Transit Development Co.	26	Air Dump	Trail	26- 0	....	Wood
	2	Rail Trucks	......	53- 0	....	All-steel
Trenton & Mercer County Trac. Corp	10	Ps. Clsd.	Motor	32- 8	City	Semi-steel
Trenton, Bristol & Philadelphia St. Ry	5	Ps. Clsd.	Motor	30- 6	Int.	Semi-steel
Twin City Rapid Transit Co.	60	Ps. Conv.	Motor	48- 0	City	Semi-steel
Union Electric Co.	6	Ps. Clsd.	Motor	27- 4	City	Semi-steel
Union St. Ry	6	Ps. Clsd.	Motor	33- 0	Int.	Wood
	1	Snow Plow	......	31- 6½	Both	Wood
	1	Air Sander	......	35- 0	City	Semi-steel
Union Pacific R. R	5	Gasoline, Mech. Drive	......	70- 0	Int.	All-steel
United Rys. & Elec. Co	85	Ps. Conv.	Motor	30- 8	City	Semi-steel
United Rys. of St. Louis	68	Pass.	......	....	City	......
Utah Light & Trac. Co.	18	Ps. Clsd.	Motor	36- 0	City	Semi-steel
	6	Ps. Clsd.	Motor	36- 0	City	Semi-steel
Vicksburg Lt. & Trac. Co.	2	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Walla Walla Valley Ry	1	Express	Motor	41- 0	Int.	Semi-steel
Washington, Baltimore & Annapolis Electric R. R.	10	Ps. Clsd.	Motor	51- 0	Int.	All-steel
	3	Ps. & Bag.	......	51- 2	Int.	All-steel
Washington-Virginia Ry	5	Ps. Clsd.	Motor	50- 8	Int.	All-steel
Washington Ry. & Elec. Co.	3	Work	......	21- 9	....	Wood
	1	El. Loco.	Motor	30- 0	....	Semi-steel
Waterbury & Milldale Tramway	2	Ps. Conv.	Motor	30- 8	Int.	Semi-steel
Waterloo, Cedar Falls & Nor. Ry	5	El. Loco.	Motor	60-Ton	Int.	All-steel
	4	Com. Ps.	......	58- 0	Int.	All-steel
	3	Observ.	......	61- 0	Int.	All-steel
Wellsburg, Bethany & Washington R. R	1	Ps. Motor	Motor	30- 6	Int.	Wood
West Penn. Trac. Co	2	Ps. Clsd.	Motor	56- 0	Int.	Semi-steel
	4	Ps. Clsd.	Motor	46- 0	Sub.	Semi-steel
Western New York & Pa. Trac. Co	1	Flat Car	Motor	36- 0	Both	Wood
Western Ohio R. R	1	El. Loco.	Motor	35-Ton	...	......
Westmoreland County Ry	3	Ps. Clsd.	Motor	40- 0	Int.	Steel
Wichita Falls Trac. Co	3	Ps. Clsd.	Motor	27- 0	City	Semi-steel
Wilkesbarre Ry	6	Ps. Clsd.	Motor	47- 0	City	Semi-steel
Willamette-Pacific Ry	1	Gasoline, Mech. Drive	......	55- 0	City	All-steel
Windsor, Essex & Lake Shore Ry	2	Ps. Clsd.	Motor	....	Int.	......
Winnipeg Electric Ry	20	Pass.	......	33- 0	City	......
Wisconsin-Minnesota Light & Pwr. Co	1	Ps. Clsd.	Motor	34- 0	Int.	Semi-steel
Wisconsin Public Serv. Co	4	Ps. Clsd.	Motor	28- 0	City	All-steel
Worcester Consol. St. Ry	10	Ps. Conv.	Motor	30- 0	City	Semi-steel
Yakima Valley Transp. Co.	4	......	Trail	46- 0	Int.	Wood
York Rys	1	Pass.	Trail	46- 0	Int.	Stl. frame
Yuma Valley Ry.	1	Gasoline, Mech. Drive	......	55- 0	Int.	All-steel

Electric Railway Signals

The accompanying list of signals installed by the electric railways during 1914 has been prepared from reports made by the various signal manufacturers, all of whom furnished partial statements. The record is complete with regard to important installations. In the list, under the heading "Remarks," a brief description of each installation has been given, and in this all installations not otherwise classified are of the trolley-contact type. In all cases the number of signals, not the number of blocks, has been shown, together with mileage where that is known. As might be expected from the depressed conditions affecting industrial activities the list shows a material decrease from last year, although the reduction is not so noticeable as it has been in the case of the electric railways' orders for rolling stock.

The number of roads purchasing signals during the year was just half of that recorded in 1913, but if allowance is made for the equivalent in signals of the speed-control system ordered by the New York Municipal Railways the number of signals ordered during the past year is more than 80 per cent of the number purchased during the previous year.

Name of Road	No. Sig.	Miles	Manufacturer	Remarks
Altoona & Logan V'y	2	....	St. Ry. Sig	S.T. Reg.
Auburn & Syracuse	10	....	U.S. El. Sig	S.T. Reg.
Auburn & Syracuse	2	....	U.S. El. Sig	S.T. Non-reg.
Aurora, Elgin & Chi	3	....	U.S. El. Sig	S.T. Non-reg.
Bangor (Me.) Ry	10	....	C. N. Wood	S.T. Reg.
Bay State St. Ry	12	....	U.S. El. Sig	S.T. Reg.
Birmingham Ry. & Lt	9	....	U.S. El. Sig	S.T. Non-reg.
Boston Elevated	10	....	U.S. El. Sig	S.T. Reg.
Chautauqua Trac	2	....	U.S. El. Sig	S.T. Reg.
Chi. & Milwaukee	2	....	Nachod	S.T. Reg.
Chi., So. Bend & N. I. T	6	....	Nachod	S.T. Reg.
Cleveland, S. W. & Col	4	1.1	Union S. & S	S.T. Track Circ. Light Sig.
Connecticut Co	18	....	U.S. El. Sig	S.T. Reg.
Cumberland C'y (Me.) Ry	16	....	C. N. Wood	S.T. Reg.
Dallas Trac	2	....	St. Ry. Sig	S.T. Reg.
East St. Louis & Sub	2	....	C. N. Wood	S.T. Reg.
Fitchburg & Leominster	2	....	U. S. El. Sig	S.T. Non-reg.
Fonda, Johnst'n & G'v'le	3	....	Nachod	D.T. Rear-prot'n
Holyoke St. Ry	2	....	C. N. Wood	S.T. Reg.
Hudson V'y Ry	6	....	Nachod	S.T. Non-reg.
Ill. Trac. System	116	41.8	Union S. & S	S.T. 89 Sema. 27 Light
Jamestown St. Ry	6	....	C. N. Wood	S.T. Reg.
Jefferson County Trac	4	....	U.S. El. Sig	S.T. Non-reg.
K. C., Clay C'y & St. J	100	71.4	Union S. & S	S.T. Track Circ. 50 L't., 50 Sema
Lehigh V'y Transit	34	....	Nachod	S.T. Reg.
Lehigh V'y Transit	1	....	Nachod	Spur protection
Mass.-Northeast'n	6	....	U.S. El. Sig	S.T. Non-reg.
Middlesex & Boston	1	....	U.S. El. Sig	Spur protection
Michigan Ry	2	....	Nachod	S.T. Subway
Monongahela V'y Trac	2	....	Nachod	S.T. Reg.
N. Y. Municipal Rys	103	5.5	Federal Sig	D.T. Track Circ Light Sigs Subway Auto Stops
N. Y. Municipal Rys	Cab Sigs.	103	Gen'l Ry. Sig	D. T. Subway Track Circ Auto speed control
N. Y. & Queens Co	14	....	St. Ry. Sig	S.T. Reg.
Norfolk South'n	2	....	U.S. El. Sig	S.T. Non-reg.
North'n Ohio T. & L	3	....	Nachod	D.T. Rear prot'n
North'n Ohio T. & L	2	....	Nachod	Gauntlet track
Norwich & Westerly	2	....	U.S. El. Sig	S.T. Reg.
Ogden Rapid Transit	4	....	U.S. El. Sig	S.T. Reg.
Ogden Rapid Transit	12	....	U.S. El. Sig	S.T. Non-reg.
Ogden Rapid Transit	1	....	Nachod	Special
Ottawa Elect. Ry	1	....	U.S. El. Sig	S.T. Non-reg.
Philadelphia R. T	9	....	Nachod	S.T. Reg.
Philadelphia R. T	1	....	Nachod	Repeater signal
Phila. & West. Trac	2	....	St. Ry. Sig	S.T. Reg.
Port Arthur Trac	4	....	U.S. El. Sig	S.T. Non-reg
Rhode Island Co	2	....	C. N. Wood	S.T. Reg.
Richmond Lt. & Ry	24	....	U.S. El. Sig	S.T. Reg.
San Fran.-Oakl'd Ter	5	....	U.S. El. Sig	S.T. Reg.
Sand Springs Ry	2	....	C. N. Wood	S.T. Reg.
Schenectady Ry	2	....	Nachod	S.T. Reg. With preliminary
Scranton & Bing't'n	36	12	Union S. & S	S.T. Track Circ. 18 Sema., 18 L't.
Terre H'te, Ind. & East	2	....	St. Ry. Sig	S.T. Reg.
Union Trac. of Ind	20	13.8	Gen'l Ry. Sig	S.T. Track Circ. Light Sigs.
Union Ry., New Bedford	6	....	C. N. Wood	S.T. Reg.
Westchester El. Ry	4	....	U.S. El. Sig	S.T. Reg.
Wheeling Trac	2	....	Nachod	S.T. Non-reg.
Wilkesbarre St. Ry	2	....	St. Ry. Sig	S.T. Reg.
Yakima V'y Trans	4	....	C. N. Wood	S.T. Reg.
Youngstown So. Trac	2	....	St. Ry. Sig	Headway Rec.

In connection with the Durban (South Africa) Municipal Tramways, two very handsome tourist gasoline-electric chars-a-bancs (sightseeing cars) have been put into service. The vehicles are of 40 hp and carry eighteen passengers. The chars-a-bancs at present run excursions within the town limits for sightseers, at a cost of 25 cents per tour, which lasts half an hour. Night tours of forty-five minutes are also made for which the charge is 35 cents. It is the intention of the tramways department to obtain power to operate these machines outside the town, thus opening up to visitors the magnificent country districts around Durban.

Receiverships and Foreclosure Sales in 1914

In Spite of Depression Tendency Is Shown Toward a Decline in Number of Receiverships and Forced Sales

The records of electric railways undergoing receivership during 1914 indicate that the number of companies whose finances were involved to such a degree, was, in spite of the current financial depression, only one-half as large as in the preceding year and the smallest in the last five years. Owing to the fact, however, that two companies, having more than 100 miles of single track, were placed under receivers, the mileage total affected for 1914 was only slightly less than in 1913. The amount of outstanding stock was greater for the last year on account of the $25,000,000 issue of the Northern Electric Railway, but this company's funded debt of $12,127,000 was far too small to bring the total up to last year's figures, in which were included the outstanding guaranteed funded debt of American Water Works & Guarantee Company subsidiaries. The record of receiverships for 1913 compares with the preceding four years as follows:

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1910	11	696.61	$12,629,400	$75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	9	332.39	34,812,550	18,745,460

The totals for 1913 in the above table do not include any figures for the Idaho Railway, Light & Power Company, which went into receivers' hands at almost the close of that year. The trackage of this company amounted to 85 miles, its outstanding stock $30,000,000. and its funded indebtedness, $11,266,000. If these amounts are included for 1913, so as to give mileage of 427.84, outstanding stock of $61,006,900 and outstanding debt of $58,538,200, the year just passed shows up better in all these respects. It may be noted, however, that the electric railway lines owned by this company are operated by the Idaho Traction Company under lease and are not under the direct supervision of the receiver.

A few of the companies placed under receivership had not reached the stage of operation as completed systems. and the mileage given is for the number of miles in actual operation, wherever ascertainable. An attempt was made in all cases to take the figures from the most up-to-date sources, but in the case of some companies, especially those newly or only partly constructed and those not publishing yearly reports, the information secured has been lamentably meager. It will be noticed from a glance at the accompanying list that most of the companies under receivership in 1914 operated a small mileage. The receivership of one of the larger companies, the Interurban Railway & Terminal Company, was a direct result of the severe floods in the Ohio valley in 1913 and drastic fare regulations over city lines in Cincinnati. During the year a receiver was appointed in Indiana for the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, but this was merely the formal appointment in that State of the receiver who had formerly been chosen to handle the more extensive Ohio interests of the company, as shown for the company as a whole in the 1913 table.

Although, as before stated, the number of companies placed under receivership during the year was small in consideration of the general condition of business, it must be admitted that this very depression kept the figure from being slightly larger. The resale of one large company was repeatedly postponed in the hope of obtaining more favorable selling conditions, while two smaller companies were three times offered for sale without bids being received. With a return to normal conditions the sale of these railways will undoubtedly be consummated.

Electric Railway Receiverships in 1914

	Mileage	Outstanding Stock	Outstanding Funded Debt
Birmingham, Ensley & Bessemer Railroad	36	$4,050,000	$2,650,000
Interurban Railway & Terminal Company	101.24	3,500,000	1,650,000
Lincoln Railway & Light Company	8	....	....
Minneapolis & Northern Railway	18	....	....
Northern Electric Railway....	138.5	25,000,000	12,127,000
Washington Interurban Railway	8.45	500,000	232,000
Washington-Oregon Corporation	......	1,552,500	2,018,500
Waukegan, Rockford & Elgin Traction Company	15	210,050	67,960
Waycross Street & Suburban Railway	7.2	....	....
Total	332.39	$34,812,550	$18,745,460

Although there were eighteen electric railway foreclosure sales in 1913, only eleven took place in 1914, and the mileage directly affected was little more than half as much. Most of the companies had low outstanding stock and funded debt issues, but the inclusion of the American Waterworks & Guarantee Company, a holding company, gives a material inflation to these totals for 1914. The following table shows the comparative figures for the last five years:

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1910	22	724.36	$19,106,613	$26,374,065
1911	25	660.72	91,354,800	115,092,750
1912	18	267.18	14,197,300	10,685,250
1913	18	311.28	15,743,700	19,526,000
1914	11	181.26	26,239,700	44,094,241

As in previous years, it has been found that some electric railways for which receivers had been appointed and against which foreclosure suits had been brought, were able to carry out reorganization plans without offering the property at public sale. All the various forms of reorganizations, readjustments and change in ownership without formal receivership or foreclosure sales have been passed over. For example, the Columbus, Urbana & Western Electric Railway, Columbus, Ohio, was offered for sale, but no bids were received. Subsequently, through the State banking department the interest held by the Columbus Savings & Trust Company was sold by the State bank superintendent, but the remaining interests were held by the original owners. All claims against the property were later adjusted and the receiver discharged. In another case the receiver of the Grand Valley Railway System had control of the Grand Valley Railway and its owned lines, the Brantford Street Railway and the Woodstock, Thames Valley & Ingersoll Railway. The first two lines were sold to the municipality of Brantford, but the last, located in Woodstock, was taken over by a trustee under a mortgage prior to that giving rise to the receivership. The list of individual companies undergoing formal sales during the year is shown in the accompanying table.

Electric Railway Foreclosure Sales in 1914

	Mileage	Outstanding Stock	Outstanding Funded Debt
Alton, Jacksonville & Peoria Railway	21.5	$514,700	$600,000
American Waterworks & Guarantee Company	......	20,000,000	37,589,000*
Brantford Street Railway.....	9.75	200,000	125,000
Grand Valley Railway	40.83	1,100,000	688,800
Ithaca Street Railway........	9.56	325,000	788,041
Joliet & Southern Traction Company	47	1,500,000	1,608,400
New York, Auburn & Lansing Railroad	7†	1,000,000	1,095,000
Northern Illinois Electric Railway	12	....	....
Pekin & Petersburg Interurban Railway	7	50,000‡	50,000
Richmond & Henrico Railway	9.12	1,250,000	1,250,000
Titusville Electric Traction Company	17.5	300,000	300,000
Total	181.26	$26,239,700	$44,094,241

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*Holding company had no bond issues: figures represent summary of funded debt of subsidiaries.

†Electric mileage; company also has 33 miles of steam mileage.

‡Authorized amount; outstanding amount not known.

Public-Be-Pleased Policy in Practice

SOME OPERATING PROBLEMS THAT AFFECT THE PUBLIC ATTITUDE

A Review of Current Electric Railway Practice in Such Matters as Courtesy of Platform Men, Complaint Bureaus, Public Referendums, Handling Lost Articles, Way Stations and Shelters, and the Like

THE interest that has been accorded of late to the establishment of mutually satisfactory relations between the electric railways and the public that they serve has focused attention during the past year upon those phases of operation in which the public is directly interested, and an issue in which the statistics of the year are published seems an appropriate place for the presentation of information of this kind. In most of these problems, of which a few are outlined in the following paragraphs, the interests of the public and the railways are largely identical. Indeed, a divergence of interest seems to occur in no case. Even in such matters as the development of a courteous attitude on the part of platform men and the use of public referendums to determine directly the wishes of the public, the efforts of the railway companies are not altogether without indirect benefit to themselves, and it is somewhat surprising to find that this important fact is not recognized in all cases.

COURTESY OF PLATFORM MEN

In the following pages no attempt is made to cover the practice of all companies, or even of all of those which have been conspicuous in each of the subjects covered. The purpose has been to describe the method rather than the company, and the examples selected were chosen with this object in mind.

Some months ago Thomas Duncan, chairman of the Public Service Commission of Indiana, was reported to have said: "Of all complaints that come to the commission, few are aimed against the conduct of the managers. The chief complaints arise from the insolence of employees." The point is obvious, yet, comparatively speaking, surprisingly little attention seems to have been afforded to this most important factor in establishing cordial relations with the public. Generally the efforts of the railway companies have been confined to the personal efforts of the officials of the transportation department. Nevertheless, a number of companies have supplemented these efforts by the conduct of definite and regular campaigns toward the end of developing courteous conduct on the part of the platform men. It has been thought that an account of a few of these special campaigns would be interesting.

Among the lines which have grasped, along with the doctrine of "The Public Be Pleased," the necessity for developing an invariably courteous attitude toward the public on the part of the employees, the Hudson & Manhattan Railroad possesses perhaps the greatest interest, for this company stands unique on having raised its short-haul fare from 5 cents to 7 cents without even involving itself in complaints from its patrons, let alone the opposition that might have been expected to result from such action. It is true that the enormous cost of tunneling the Hudson River, under which this line runs, involved such heavy fixed charges as to make the increased fare obviously just, but, even so, it is admitted that the cordial relations existing between the company and the public permitted the management to explain its case in places other than the courts.

The truly remarkable degree of popularity that is enjoyed by this company is, in the opinion of Wilbur C. Fisk, president, largely due to the trainmen, among whom a courtesy campaign is consistently carried on at all times. This policy, in fact, had its inception in an address that was delivered to the trainmen, when the line was opened for traffic, by W. G. McAdoo, then president of the company, and a copy of the address in pamphlet form is still issued to every new employee before he goes to work. The following is abstracted from it:

"I want to impress upon you the fact that this railroad is operated primarily for the convenience of the public. Safety and efficiency of the service are, of course, the first considerations, but among the things of the highest importance are civility and courtesy in your dealings with the public. It requires a great deal of patience to be courteous to people who may be rude and offensive to you, and it is human nature not to be, but, at the same time, you must learn to take such things in good temper; it is a part of your job. You must treat people courteously no matter how they treat you. You must not engage in unnecessary conversation with passengers, and you must not address passengers before they enter into conversation with you. You are not there for the purpose of entertaining the public; you are there for the purpose of seeing that the road is safely and properly operated. Attend strictly to your duties, answering questions when they are addressed to you. No matter if questions seem to be foolish, give civil replies. I want to caution all conductors, guards and platform men against telling passengers to 'step lively.' It does no good; people step as lively as they can any way, and to order them to do so in a loud and commanding tone is irritating and objectionable. The amount of courtesy you display is going to have an important bearing upon the popularity of this road. The day of 'the public be damned' policy is forever gone. It always was an objectionable and indefensible policy, and it will not be tolerated on this road under any conditions."

In brief, this covers the policy of the railroad, and the advice is driven home to each new employee by a personal talk with the superintendent of transportation, during which it is explained that, while Marshall Field's epigram that the "customer is always right" may not be literally true, the presumption is that passengers do not complain without grievances, and that any discourtesy will involve discipline.

New employees are taken only on a ninety-day probationary period. During this time they are watched carefully. Should complaints be made against any of them the first case involves a personal talk with the superintendent of transportation, as it is believed that the vast majority of men can be educated, but if a second complaint of any serious nature is received during a new employee's probation, he is dropped forthwith. The principle is that the trainman is paid to take knocks and that the mere fact of his getting into a dispute with a patron establishes a preponderance of evidence against his becoming a satisfactory employee.

In the case of older trainmen, however, such a drastic procedure is not followed. Alleged infractions of the rule of courteous treatment for all passengers are investigated, and when it is found that the trainman has been goaded into making a retort by a disagreeable passenger, he is disciplined only to the extent of being given demerits on his record, a system based upon the Brown system of discipline being used. Of course, should such disputes occur several times, there is evidence that the trainman is not living up to the spirit of the rule and he is dropped, a bulletin being issued to that effect. When old employees are found to have wilfully entered into disputes with passengers the discipline is, of course, made proportionately severe, and involves discharge for serious offences, such as striking a patron.

In addition to the matter of complaints from the public, the conduct of trainmen is checked up by an efficiency system wherein trainmen are observed at intervals averaging about one week in length with regard to the performance of their work. These observations are made by the trainmaster, the motorman's instructor and the despatchers who ride the trains and fill out cards on which there is space for the identification of the trainman and a "test number" which refers to a printed list of 102 tests covering all branches of the service. Among these are included such items as treatment of passengers, neat appearance and the like.

Summed up, the maintenance of courteous deportment among this company's trainmen is due, according to John O'Rourke, superintendent of transportation, to a thorough drilling of new men in the "public be pleased" policy of the company and their education by personal contact with officials; to the rigid elimination of men who cannot get along with the public; to frequent and regular observation of the actions of platform men; and to considerate treatment and good wages for all employees. The feeling of confidence in the company on the part of the men is reflected in their attitude toward the public, and the spirit of co-operation between the men and the company makes for the popularity of the organization as a whole.

PROCEDURE IN ROCHESTER

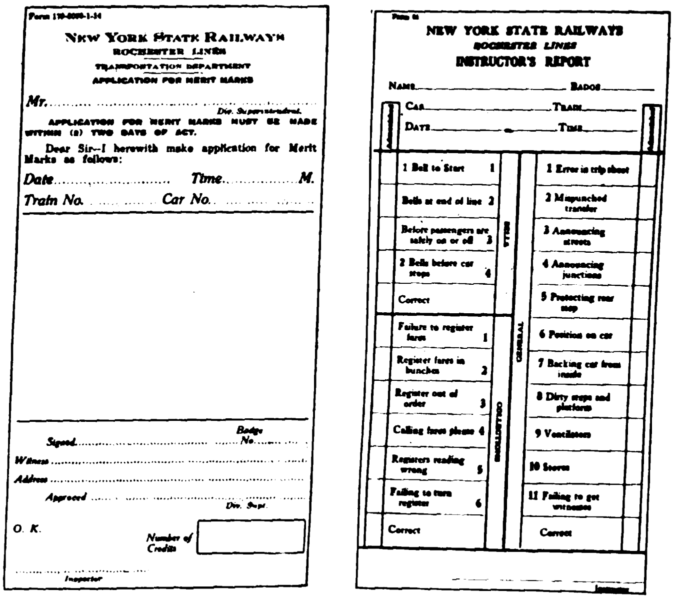
On the Rochester lines of the New York State Railways, also, results of a most satisfactory nature have been accomplished. It has been the practice to consider that employees during the first six months of service make mistakes rather through lack of knowledge of the correct manner of doing their work than through wilful action. For this reason new employees who are guilty of violations of rules or orders are sent to the company's instruction department for a talk, the assumption being that they have not been sufficiently instructed. The result has been that a new employee, instead of getting through his first six months' service with a record bearing many black marks, reaches the end of his probation with a much better working knowledge of railroading and with good-will toward the company.

Since 1906 the company has used the merit and demerit system of discipline. Published in the rule book is a schedule of credits for meritorious acts, as well as demerits for various violations of rules. Under this system it is necessary only to establish the fact that a rule has been violated and the discipline is automatic. On the other hand, a man who performs a meritorious act receives credit marks upon turning in a card requesting them, as the company believes that this plan of recognizing the meritorious acts of men is far superior to the other systems of discipline under which only delinquencies are entered on the records. It is not altogether necessary that a man should turn in a request for credits, as any official noting that a trainman has performed some act which would entitle him to credit, reports it, and the credits are given.

Under this plan ten credit marks are allowed for the first six months without demerit marks, and fifteen credit marks for each succeeding six months without demerit marks. Ten credit marks are allowed also for tying up trolley wire, or removing same to allow car to move; for making exceptionally good stop, thereby preventing accident, or using good judgment in preventing accident; for holding broken trolley pole on wire, and for securing names of witnesses or information valuable to claim department when off duty.

Five credit marks are allowed for removing obstructions from track or wire; for removing broken trolley wire from track; for placing or assisting to place cars on track; for tying up guy or span wire; for watching broken wire when off duty; for reporting defective cars or trouble on line when off duty; for protecting company's property, and for six months' neatness in appearance of person and car.

Three credit marks are given for recovering and turning in lost pass books and badges; for using good judgment in preventing blockades; for repairing parts of car, preventing it from being turned in or avoiding a blockade; and for finding and returning company's property, such as signs, train numbers and parts of car. From five to twenty credits are allowed for special cases of politeness or courtesy to passengers and also for using good judgment in avoiding controversy with a passenger who has real or imaginary grievances.



Form [illegible]

NEW YORK STATE RAILWAYS
ROCHESTER LINES
TRANSPORTATION DEPARTMENT
APPLICATION FOR MERIT MARKS

Mr. ....
Div. Superintendent.

APPLICATION FOR MERIT MARKS MUST BE MADE WITHIN (2) TWO DAYS OF ACT.

Dear Sir—I herewith make application for Merit Marks as follows:

Date .... Time .... M.
Train No. .... Car No. ....

Signed .... Badge No. ....
Witness ....
Address ....
Approved ....
Div. Supt.

O. K.
Number of Credits

....
Inspector

NEW YORK STATE RAILWAYS
ROCHESTER LINES
INSTRUCTOR'S REPORT

NAME ____________ BADGE ____________
CAR ____________ TRAIN ____________
DATE ____________ TIME ____________

BELLS	GENERAL
1 Bell to Start 1	1 Error in trip sheet
Bells at end of line 2	2 Mispunched transfer
Before passengers are safely on or off 3	3 Announcing streets
2 Bells before car stops 4	4 Announcing junctions
Correct	5 Protecting rear step
COLLECTIONS	6 Position on car
Failure to register fares 1	7 Backing car from inside
Register fares in bunches 2	8 Dirty steps and platform
Register out of order 3	9 Ventilators
Calling fares please 4	10 Stoves
Registers reading wrong 5	11 Failing to get witnesses
Failing to turn register 6	Correct
Correct	

Instructor

PUBLIC-BE-PLEASED POLICY IN PRACTICE—TWO FORM BLANKS USED ON THE NEW YORK STATE RAILWAYS

In the discipline of new men, unless an act is of a distinctly wilful nature, no demerits are applied. E. E. Strong, superintendent of city lines, who developed this system, has stated that he has found that most men entering the employ of a railroad company are inexperienced in dealing with the public. As a result they are apt to be hasty in act or in speech and to have altercations with their passengers. Nothing is gained by immediately dismissing such a man from the service, as the chances are that another man employed in his stead would be equally liable to commit the offence, so that it is considered much better to keep the first man, providing that under proper training he can be taught to govern himself, thus assisting the company to secure proper relations between itself and its patrons. From the beginning every trainman should be given to understand that while on duty no act of his will be considered as an individual act but as an act of the company. He should fully realize that he is a representative of the company, so designated by his uniform and badge, and that he is authorized to do business for the company he represents. If these men can be brought to realize the bigness of the work they are performing and how much depends upon their treatment of the public they will, by virtue of the consciousness of responsibility, do far better work than if they believed themselves to be mere machines. The company finds that recognition of meritorious acts never "spoils" the recipients and no difficulty is experienced in having men apply for credits.

In the case of men who have been in the service for some time and who are assumed on account of their long service to be able to avoid entering into controversies with passengers, discipline is invariably applied when disputes involving insolence occur. Twenty demerits are given in cases of insolence that may be classed as serious, a net total of sixty demerits being required for dismissal. The use of such expressions as "step lively" are, however, not considered as objectionable conduct.

During the first six months of a man's service he reports to the superintendent of the instruction department and is not disciplined by the superintendent of transportation. There are traveling uniformed instructors whose duties are to follow up new men on the road and to correct any wrong tendencies. Each instructor carries printed lists of the more usual failures on the part of the men, and failures are checked off on these. The company reserves the right under the merit and demerit system to dismiss a man for general lack of ability at any time during his first six months of service, or for failure to respond to instructions. All employees are advised regarding their balance of credits and demerits at six-month intervals, and they are notified every time when their credits or demerits are entered on their records to provide opportunity for an appeal when the employee desires this.

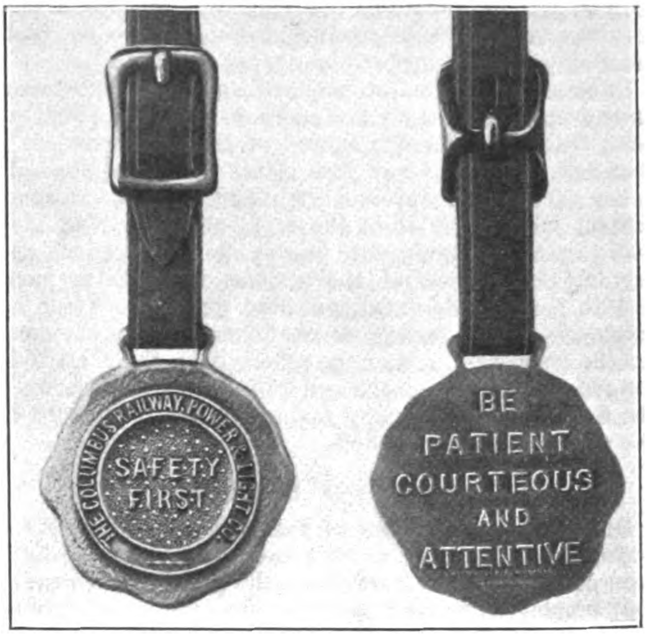
In cases where it is found that a trainman has been nagged by a passenger to such a point as to make a retort only natural, the matter of discipline is left to the disinterested judgment of the head of the service improvement department. In cases where the complainant demands discipline for an employee when the company believes it is not deserved, the service improvement department settles the matter by personal calls or by having a meeting between the employee and the complainant.

COURTESY CARDS

To improve the department of platform men several lines have made use of the so-called "courtesy card" with considerable success. The Twin City Rapid Transit Company has posted in all stations, clubrooms and other places where employees gather, a placard calling attention to the necessity of a courteous and cheerful attitude toward the public, especially with regard to the answering of questions by the passengers. The Federal Light & Traction Company has followed the same plan for all of its properties, a reproduction of its courtesy card having been shown in a recent issue. This is reported to have produced excellent results largely through showing the public that the company was anxious that its employees should accord every courtesy to its patrons. As a matter of fact the public press of every town in which this operating company has a property gave space to a notice regarding the use of the card. One of the editorial comments made at the time of the production of this card emphasized the fact that the company, by endeavoring to obtain courteous treatment of the traveling public, conferred a benefit on the town because visitors would be favorably impressed with the actions of the street railway employees.

COURTESY WATCH FOBS IN COLUMBUS

In Columbus a regular campaign was begun about a year ago. Prior to the inauguration of this campaign it had always been the policy of the company to take every precaution possible in the selection of its platform men, and upon their entering the service an endeavor was made to develop in them a proper sense of the attitude which should be taken toward the patrons of the company. This policy was so continuously followed up that it resulted in the general comment from the traveling public to the effect that the platform men of Columbus were exceptionally courteous. In the early part of 1913, however, with a view still further to improve the general attitude of the platform men toward the public a vigorous "courtesy campaign" was instituted as a part of the "safety first" movement. As a first step in this campaign, pamphlets on the subject of courtesy were distributed to all the employees by S. G. McMeen, president Columbus Railway & Light Company. Each employee was also presented with a bronze watch fob with a leather strap, as shown in the accompanying illustration. The distribution of these pamphlets and fobs is continuous, and all of the new employees entering the service since the campaign was inaugurated receive them.



PUBLIC-BE-PLEASED POLICY IN PRACTICE—WATCH FOB DISTRIBUTED TO COLUMBUS EMPLOYEES

Another part of the campaign consists in weekly meetings between the operating officials and the traffic inspectors and transportation foremen. At these the superintendent of transportation, the claim agent and the general superintendent take part in the discussions which cover the company's policy of "Safety first and service next," which the management is perpetually endeavoring to instill in the minds of its employees.

It is stated by Harold W. Clapp, general superintendent Columbus Railway & Light Company, that the campaign has produced a distinct improvement in conditions in the territory involved. This is noticed in the daily course of routine business by the operating officials of the company. In fact, the civility of the platform men receives very favorable comment from time to time by the traveling public as well as by the daily press of the city.

COURTESY BULLETINS

Several railways are making use of employees' bulletins for the same purpose. In May, 1914, the New York Railways Company began to issue a bulletin for distribution among its 8000 employees. This is similar in character to the *Interborough Bulletin,* which has been published for some years for the benefit of the employees of the subway and elevated lines of New York. A feature on both the bulletins is a page, "Pleasing the Public," in which are entered such matters as letters from patrons praising the action of the Interborough employees, acknowledging the receipt of lost articles and the like. Where a correspondent does not know the name of the employee about whom he writes, the man in question is traced and his name published in a note beneath the letter.

The Texas Traction Company has issued to trainmen a pamphlet containing numerous epigrammatic clauses pointing out the desirability of maintaining at all times cordial relations with the public. In the Memphis Street Railway the opportunity provided by the "safety first" organization has been used to advance the principles of courteous treatment of the public. This is accomplished by addresses from officials before the large safety committee that is formed among the employees. The Detroit United Railway distributes a pamphlet entitled "Courtesy" among the men, and also utilizes the columns of a trainman's magazine for the same purpose.

The United Railways Company of Baltimore depends largely upon the selection and training of its employees to attain the same result. To quote William A. House, president: "In the selection and training of motormen and conductors the method pursued by this company is thorough, and has for its object the highest possible standard of efficiency. Applicants are required to present a letter in their own handwriting, together with two letters of endorsement, one of which must be from the last employer. Accepted applicants, after a course of instruction and prior to being regularly assigned, are given a lecture by the superintendent on the rules, regulations and requirements with respect to deportment. Great care is taken to impress upon applicants the responsibility of their position, and they are informed that the wearing of a uniform stamps them as the duly accredited representative of the company who comes in direct contact with the public, and that, as such representative, they are expected to treat patrons with unfailing courtesy under all conditions. It is pointed out to them that proper deportment and consideration for the rights of passengers will in the majority of cases tend to make one who is disposed to be antagonistic to the company change his attitude, and, in the course of time, become one of its warmest friends."

COMPLAINT BUREAUS

The formal organization of a distinct bureau for receiving and investigating complaints is another matter of direct interest to the public of which the importance seems to be by no means generally recognized. In Rochester, however, such a bureau has been organized and has given remarkable satisfaction. This is called the service improvement department, already mentioned, and to it is assigned all the work of handling complaints, returning excess fares, settling transfer disputes, talking with vehicle owners about delays due to trucks on the company's tracks and similar matters. One of its cardinal principles is that no complaint must ever be dropped until it is either settled satisfactorily or else has reached an impasse. All complaints are immediately acknowledged and an investigation is started in the department involved. At the close of the investigation a personal call is made upon the complainant and the situation is explained to him with perfect frankness, no attempt being made to settle the matter by letters, as these are always open to misconstruction. Chronic kickers are followed with perfect patience and their complaints, under this gentle treatment, are reported to have become greatly reduced in number.

The service improvement department was first established by E. J. Cook, vice-president New York State Railways, on Feb. 1, 1911, as a complaint department, and the work was handled by the chief clerk to the vice-president. After Oct. 1, 1911, the work was handled in conjunction with that of the claim department on account of the many complaints which developed into claims. In August, 1912, the name was changed to "service improvement department" but the work was still handled in conjunction with that of the claim department. On April 1, 1913, the organization became a separate department, whose head was placed in charge also of the land and tax, insurance and special service departments.

ORGANIZATION OF SERVICE IMPROVEMENT DEPARTMENT IN ROCHESTER

The department consists of the head of department who devotes part of his time to the work, a stenographer and two outside men who call upon patrons, either for the purpose of receiving complaints or for satisfying complainants after investigation. The outside men also interview any witnesses furnished by the patrons or employees against whom complaint is made. Employees are encouraged in case of any controversy on a car to secure the names of witnesses to protect themselves just as they would do in case of accidents.

Complaints or suggestions for the betterment of the service are received by letter, by telephone or by personal calls. In addition patrons may notify the telephone operator after office hours when they have complaints or suggestions to make. The telephone operator takes the name and address of the complainant, and a member of the service improvement department makes a personal call on the following day to get the details. Thus provision is made so that patrons can reach the service improvement department for twenty-four hours in the day and for 365 days in the year.

In whatever one of the above ways a complaint is made, all receive investigation as promptly as possible and patrons are notified of the outcome in a personal interview by the outside members of the department. No case is considered complete until the complainant expresses himself as being satisfied. The number of cases where this assurance is not finally received is negligible. Originally it was found that the cost of investigating complaints was from $3 to $5 each. However, some changes have been made in the method of procedure which have reduced the cost without affecting the results.

The number of cases handled has increased each year over the preceding year. The number in 1911 was 1017; in 1912, 1631; and in 1913, 1947. For the first eight months of the year 1914 the number was 1401. The steady increase can be attributed to the work of the department and the co-operation of the public in the improvement of the service. It has been noted in cases where a patron has made a complaint and has been satisfied, and then has occasion to make a second complaint, that it is made in an altogether different spirit. Moreover, the attitude of the public toward the company has become more kindly by reason of the fact that patrons call the company's attention to little grievances immediately after their occurrence instead of allowing a number of them to accumulate in their minds, thus embittering them in their relations with the company and its employees. In other words, if grievances can be satisfied as rapidly as they occur, each one is treated more as if it were an isolated case, whereas if complaint is not made, each individual annoyance recalls all that have previously occurred.

HANDLING COMPLAINTS ON THE NEW YORK RAILWAYS

The New York Railways Company has no special department for handling complaints, but it has established, with excellent results, a very thorough system under the immediate supervision of the vice-president and general manager for the receipt and utilization of complaints or statements that may be received from patrons or from the general public. In the case of telephone communications it is the rule to request the complainant for a confirmation in writing, the obvious reason for this being that a written communication tends to establish the fact that the report is made in good faith.

In the case of oral complaints that are made by personal calls at the company's offices, the statements of the complainant are copied in typewriting. The majority of such complaints are received at the division offices of the company located in the various carhouses. Therefore, a copy of each complaint is sent immediately from the division office to the office of the vice-president and general manager. There its receipt is at once acknowledged by means of a courteous letter to the complainant. Following this an investigation is made by the transportation department and a report of the investigation, together with a statement as to the action taken by the division superintendent, is sent to the executive office. In case the circumstances warrant a statement covering the investigation and outlining the action taken by the company is sent to the complainant.

Complaints that are made by mail are acknowledged in the same way, and a copy of the complaint, together with a copy of the acknowledgement, is sent to the division office for investigation and report. From this point the procedure is the same as that outlined in the case of oral complaints. In general, it is the custom to answer all complaints over the signature of the vice-president and general manager. Every case is investigated and in many cases the complainant is advised regarding the action that is taken by the company as a result of his complaint.

The organization by which this procedure is carried on consists of a single complaint clerk who devotes his whole time to the work and who is thoroughly experienced in dealing with the public. Several transportation department employees also devote part of their time to making personal calls upon complainants when this is necessary to adjust discrepancies that sometimes exist between the testimony of the complainant and that of the employees involved. In addition to the above, one of the assistants in the office of the vice-president and general manager devotes a large part of his time to this work.

All complaints are received at the general office by the complaint clerk, whether they come in the form of a letter or as transcriptions of statements made at division offices, and he writes the letters of acknowledgment. Each of these letters is passed to the assistant above mentioned, for check and criticism. When a report of the investigation is received it is handled in the same manner, the complaint clerk preparing statements regarding the action taken, if such a course seems necessary.

Each month all of the complaints received on each division are tabulated and thus a competitive system is set up between the various divisions. In these tabulations the complaints are classified under a series of headings such as "insolence," "short change," "transfer dispute," "erroneous information," "neglect of duty," "premature starting," etc., and the result of the investigation is given. For the month of October, for example, there were about 200 complaints received on the whole system; in approximately 42 per cent of these cases the employee was found to be at fault and was disciplined; in about 27 per cent of the cases the employee was found not to be at fault, and in the remaining cases the information which was furnished by the complainant was not sufficiently definite to determine the identity of the employee or whether or not he was at fault. A notation of the facts in each case is entered in the record of the employee involved and this record constitutes an important bearing on the continuance of his employment. Commendations as well as criticisms are invariably entered. During October, 1914, it should be stated that 33,950,000 passengers were carried, including transfer riders.

Another angle of this work covers the matter of fare box and transfer disputes. If a passenger inadvertently drops more money in the fare box than is required by the number of fares which he wishes to pay, the conductor makes out a card with the passenger's name and address and the amount involved, as the conductor is not authorized to make refunds, for obvious reasons. A report with the card attached is turned in to the receiver or cashier and from there sent to the division superintendent. In case the passenger is found to be entitled to a refund, a memorandum of the facts in the case is sent to the office of the vice-president and general manager and the refund, in stamps, accompanied by a letter, is sent to the person involved, the matter being handled in the same manner as previously outlined in the case of oral or written complaints. Many very commendatory letters are continually being received owing to the establishment of this system, as many patrons who receive refunds acknowledge their receipt. About four hundred such cases are handled each month.

In cases where passengers inadvertently place cash fare in the fare box, and subsequently tender valid transfers the same procedure is followed. A card with the passenger's name and address and a statement of the circumstances is sent, through the cashier to the division superintendent for investigation and then sent to the office of the vice-president and general manager. In general, in transfer disputes, the practice is followed of making a refund on a transfer whenever there is reasonably good evidence that the passenger is acting in good faith.

A typical letter from the company in regard to a refund is as follows: "Under recent date a conductor of the Broadway line of this company reported that you boarded his car and by mistake deposited 10 cents in the fare box in payment of your fare. I take pleasure in returning to you herewith, in the form of stamps, the equivalent of the excess amount which you paid." To this letter the following acknowledgment was received: "Gentlemen: Your letter received with the enclosure of 5 cents ($0.05) for excess fare dropped in the slot of a Broadway car. I take this opportunity to thank you for the same and to express my admiration for your system. While I am expressing these thoughts I am spending 2 cents ($0.02) out of my 5 cents ($0.05)."

Another reply to a similar letter said: "Yours of the 29th instant containing 10 cents refund has been received, for which please accept my thanks. It was a mistake on my part in depositing 25 cents in change for three persons, but your conductor was very gentlemanly about it and insisted upon my giving him my name and address, which I did. It only shows that your company is conducted under good business principles in taking note of so small a matter as this. Hoping the next time I visit New York I shall not put you to this trouble again, I remain, etc." A refund to a resident of Cincinnati brought the following: "Gentlemen: I wish to thank you for the promptness of your remittance and would say also that I don't think the matter could have been taken care of as quickly without my writing you and explaining the circumstances in any other city but New York. Thanking you, I remain, etc." Still another acknowledgment said: "Permit me to thank you for the return of excess fare paid on the Sixth Avenue line and contained in your letter of June 30, and permit me also to congratulate you on the civility of your conductor and the efficiency of your organization shown by such prompt attention to a small detail. I, for one, appreciate the service given to the public by the surface lines and I am glad to have this opportunity of saying so."

The following statement also is enlightening: "Accept my sincere thanks for the efficient system which permits of the return of money which may be dropped into the box of your pay-as-you-enter cars by mistake. I may add here that I did not think at the time that the conductor had told me that my money would be returned to me that he was telling the truth, but I gladly apologize. Again thanking you, I am, etc."

A third section of the work of handling complaints on the New York Railways is that involved in cases of collisions with vehicles. Of course, when such collisions are serious in character the whole matter is referred to the claim department, but where the damage to equipment amounts to not more than a few dollars, a letter is written to the owner of the vehicle giving details of the collision and stating the number of the automobile or wagon that caused the accident. The object of sending these letters is to acquaint the owner of the vehicle with the actual conditions even though no claim for damages is made, because in this way it is believed that careless drivers can be located and eventually eliminated. The following letters taken at random from the correspondence indicate how this practice is working out:

"In reply to your letter of Oct. 29 regarding the careless driving of one of our drivers named ———, we beg to say, that, as it costs us hundreds of dollars yearly to settle claims arising from the carelessness of our employees, you can readily see we are very grateful to receive the result of your investigation. Thanking you for calling our attention to this matter, we are, etc."

"Accept my thanks for your courteous note of Nov. 20. Since I do not employ a chauffeur I suspect that my car was taken out of the garage on the occasion in question without my sanction, and in order to investigate this I would be glad to have a statement of the time of day at which the accident occurred, and whether there was any injury to my car during the occurrence. I found one of the fenders severely damaged at about that time, though I am not sure of the date, and was told that it had happened in the garage. If you can supply me with these further details you would aid me very much in running the matter down. Thanking you, I am, etc."

In another recent case a wagon driver called at the railway company's office and stated that upon receipt of the company's letter regarding a collision between his wagon and a car his employer had reprimanded him severely for his carelessness, had handed to him a set of traffic rules to study, and had instructed him to call upon the vice-president of the railway company and offer to pay for the damage done to the car. The driver stated that his earnings were not large and that he hoped the company would not be too severe with him. He admitted his responsibility for the accident and said that, although he had been driving for his present employer three years, this was his first collision. He was told that the company did not want to inflict any hardship on him and would not require him to pay for the damage done. He departed stating that in the future he would take no chances with street cars and expressed his gratitude for the consideration shown him, adding that hereafter the company would have no cause for complaint regarding him.

In cases such as these, whenever further information is requested, it is the policy of the company to furnish the facts. As a rule it has been found that the owners of the vehicles involved are glad to have these matters brought to their attention. They realize that it is to their advantage, as well as to the advantage of the general public and the street car company that occurrences of this character should be promptly investigated, in order to eliminate as far as possible the careless operation of vehicles in the streets of New York. Obviously all of this correspondence entails considerable work, but the results have been gratifying and tend to create a favorable sentiment toward the company on the part of the public.

PROCEDURE IN DENVER

Complainants are treated by the Denver Tramway Company on the assumption that they are always right, which, as a matter of fact, is correct from their point of view, otherwise the efforts extended by them in making reports would not have been exerted.

Grievances received by mail are sent at once to the various divisions for thorough investigation, while those registered in person or by telephone are taken down verbatim, typewritten and treated in the same manner. After each investigation has been completed, complainant is advised by mail as to the results obtained. In cases where trainmen are found in the right, the complainant is so advised in the most courteous and inoffensive terms at the company's command, thereby giving assurance that the investigation is at all times very thorough. Such methods are adopted in order to discourage exaggerated or false statements. Where fault is attributed to the actions of trainman, a letter of regret is forwarded to the complainant with an assurance that the matter has been effectively taken up with the offending employee.

In cases embodying charges of a serious nature, the names of witnesses are required from trainmen. The importance of this procedure is so well known throughout the entire system that such names are invariably procured at the time difficulties of this type occur. These are promptly forwarded to headquarters, together with the reports of trainmen. Written statements are then requested from such witnesses, in order that the company may have, along with the assertions of complainant and employee, the additional information available from disinterested parties.

All complaints are noted upon the records of employees, with added statements covering the result of each investigation. Every trainman is aware of the inadvisability of having very many such notations upon his record. Even though in all cases he might have acted within his rights, it is assumed that his manner and bearing must have been offensive to some extent if complaint is inspired against him. Such notations carry considerable weight in determining a man's fitness to deal with the company's patrons, since courtesy toward and accommodation of passengers are considered two very important features of up-to-date operation. W. M. Casey, superintendent of transportation Denver Tramways Company, states that this system has brought about a very marked decrease in the number of complaints received by the company.

PROCEDURE IN BROOKLYN

The Brooklyn Rapid Transit Company maintains a special department to deal with the general matter of complaints. This department, which is in charge of one of the executive officers of the company, handles all work of this class and it is so well known that about 95 per cent of all communications from the traveling public are addressed direct to it. All complaints are acknowledged by the vice-president in charge of the department, the reply being made sometimes at once and sometimes after an investigation, according to the nature of the complaint. In serious cases both an acknowledgment and a second letter are written, the latter giving in brief the outcome of the investigation. All complaints are handled by clerks, but all letters addressed to patrons are read and signed personally by the vice-president.

Investigations are made by the several departments, the department of complaints requesting them where necessary. Personal calls upon complainants are, however, made in certain cases by the complaint clerk, who is thoroughly informed as to details of the service on all lines of the system. These personal calls are considered to be of great value in cases where the complainant feels so much aggrieved as to extend the correspondence unduly.

All commendations as well as complaints about any employee are filed with his record. In cases where an employee is reprimanded, a standard form is made out and signed by the employee as evidence of his having read it. In cases where an employee is commended he is also advised of this fact by having the letter of commendation handed to him to read before it is filed with his record.

Transfer disputes and cases of overpayment of fare are also handled by this department, refunds being made by sending 5-cent tickets good for a ride on any of the company's elevated or surface lines. In all such cases the passenger is given the benefit of any doubt, but as a matter of principle refunds are not made upon a mere complaint but only after investigation has established a strong probability that the complainant is entitled to a refund.

PERSONAL DISCUSSIONS ENCOURAGED IN BOSTON

The Boston Elevated Railway receives about 250 complaints per month at its general offices, either by mail or personal calls. The former are promptly acknowledged by letters written either from the office of the superintendent of surface lines or by the division superintendent in whose territory the occurrence at issue happened. In case the complainant is found to be considerably exercised he is given full opportunity to discuss his views in person with the superintendent of surface lines, his assistant, or the division superintendent concerned. All complaints are consecutively numbered, and are indexed on cards, which furnish a means of making monthly comparisons of troubles, localities concerned, etc. Complaints received at the main office are forwarded to the division superintendent for investigation and report, followed by a review of the case by the superintendent of surface lines. If the affair is complicated it is usually brought before the company's discipline committee for consideration and action. This committee consists of four operating officials who meet daily at the headquarters of the company. If it is necessary to bring the employee and the complainant together to clear up the case, the committee frequently endeavors to do this. Anonymous complaints are considered by the company, but these do not furnish as satisfactory a basis for action as those which are signed.

PLAN FOLLOWED BY THE HUDSON & MANHATTAN RAILROAD

On the Hudson & Manhattan Railroad complaints are very few in number, and these are handled personally by the president of the company. About fifty complaints are received during the course of the year, and of these about 10 per cent relate to details of the service, the balance being aimed against employees. The sources of most of the latter are failures of car doors to open and the calling back of passengers by ticket choppers at the platform entrances. About half of these complaints are found to be without justification.

Upon receipt of a complaint it is at once acknowledged, and if opportunity exists a full explanation is made to the complainant. Often where employees are involved an extended investigation may have to be made, and in such cases the acknowledgment states only that fact. Investigations of complaints are made by the head of the department—equipment or operating—that is involved, and if necessary an investigator is sent to talk to the complainant. The complainant, however, is not advised regarding the final action of the company. Complaints about the service are discussed with the superintendent of transportation, and if they contain practical suggestions for the benefit of the service these are at once tried out. Complaints about any employee in the transportation or station department are noted on his record, and when the nature of the offense warrants strong corrective measures, demerits in accordance with a system which is based on the Brown system of discipline are entered in addition.

CARD FORM FOR UTICA COMPLAINANTS

In connection with fare and transfer disputes on the Utica lines of the New York State Railways, a novel procedure is followed. The conductors are furnished with three small blank books containing slips which can be torn out and handed to the complaining patron. Two of these provide for overpayments of fare and for other classes of complaints. The third slip provides for statements of conductors who are involved in disputes. This system was adopted about five years ago and was reported at that time to have been most favorably received by the public. The records of the company showed that more than 50 per cent of the slips issued by conductors were never returned, indicating that the complainants in half the cases concluded after thinking them over that their complaints were unjustified. At the present time the use of these blanks has diminished very considerably, as the public has become thoroughly acquainted with the local conditions and therefore the number of fare and transfer disputes and other causes of difficulty has been materially reduced.

PRACTICE IN CHICAGO

No regular complaint bureau is maintained on the Chicago Surface Lines. All complainants, however, are advised by a notice to the public that is posted in the cars to file any complaints about the service with L. A. Busby, president of the company. Mr. Busby has an assistant secretary who receives and classifies all complaints of this kind, devoting his entire time to the work. When the complaint is of a serious nature it is referred to Mr. Busby personally, and he writes a personal letter to the complainant. If the complaint is of such a nature as to require investigation it is referred to the department that is affected for a report to the president. The company makes it a rule to write a courteous acknowledgment for every written complaint, but in no case is the complainant advised as to the nature of the action that is taken by the company after its investigation. The employee regarding whom the complaint is made is never informed as to the source of the complaint. Acknowledgments are generally made after the investigation has been concluded, and if the company or employee was found to be at fault a plain statement to this effect is included, as well as one to the effect that proper steps will be taken to prevent repetition of the occurrence.

On the Detroit United Railway the complaint bureau is included in the publicity department, and one man devotes practically his entire time to the work of receiving, acknowledging and answering complaints, of which about 250 are made each month. The practice of the company is to investigate practically all complaints and to advise the complainant of the results of the investigation.

PERIODICAL TRAFFIC COUNTS

Naturally, many complaints received by street railways deal with matters pertaining to sufficiency of service, and the use of frequent traffic counts has been introduced by several roads with a view to providing definite answers for them.

In the development of such a system, in which the results are generally expressed by means of curves, it has been advocated by C. M. Larson of the Wisconsin Railroad Commission that a characteristic curve for each line of any system should be obtained by counting the passengers on each car as it passes each one of a series of observation points. This scheme locates the point of maximum load for each line, and as this point is usually approximately stationary it is sufficient for all future counts to have two checkers stationed at it to count the passengers on all the cars as they pass. From the results thus obtained a traffic curve may be developed for each route in which each car is indicated by a vertical line located according to its time of arrival at the point of maximum load, the length of the line being proportionate to the number of passengers on the car. By averaging results on a half-hourly basis for several days and by plotting also the number of seats provided in which curve should be considered the voluntary standees, the relation of the traffic to the service may be accurately demonstrated in graphical form and a means is given for knowing at all times how to regulate the service to the needs of the public.

A different scheme is used in Pittsburgh, where a traffic bureau employing eight investigators has been permanently organized, the investigators devoting their entire time to the work of making traffic counts. Here the characteristic curve for each line is obtained by having observers ride separate cars during the rush hour, the average of the several observations being considered to give the average results for the line in question. From these characteristic curves half-hourly load curves are plotted, as outlined in the previously mentioned scheme, but in addition combined characteristic curves are made up for lines in which several routes converge in order to show the points at which the total load is discharged from all the cars during a given rush-hour period. In Pittsburgh there has also been introduced the so called time-load curve which shows the position of each car with regard to the schedule as well as its load, thus indicating any tendencies toward the bunching of cars.

In Boston also there is maintained a permanent traffic bureau, although its methods differ somewhat from the foregoing. The traffic counts are supplemented by tabulations of conductors, trip reports and by reports from street inspectors, although the latter, of course, are of only indefinite value as they are based on personal opinion only. Temporary changes in accordance with the varying needs of the traffic are provided for by information from the street inspectors, but permanent changes which are imbodied in the time-tables are made only upon the results of regular traffic investigations. These are made by traffic counts taken at seventy-six points on the 472 miles of track that is operated by the Boston Elevated Railway. A schedule of dates upon which traffic counts are to be made is drawn up for each division, every point being checked at approximately fifteen-day intervals. Thus, about five points are checked each day. The observers at the checking points report, for each car that passes them, the car number, the time of arrival and the number of passengers. The latter figures are totaled and averaged every half hour, and from these figures the service is regulated directly without the use of traffic curves. The method of utilizing these traffic counts was described in a contributed article in the last issue.

In Kansas City the railway has introduced the novel scheme of having all attaches of the general offices make out statements regarding the traffic as they travel to and from work on the company's cars. These statements are made out on cards which are provided with spaces to show route, car number, direction, the points where the employee boards and alights from the car, the number of passengers on the car and such additional remarks as the employee considers of sufficient importance.

PUBLIC REFERENDUMS

The public referendum or popular vote constitutes indirectly a method of handling complaints en masse that seems to have been treated rather gingerly thus far by the electric railway industry as a whole. Apparently, referendums have been held in only four cities, but of these Brooklyn has had two, one relating to the near-side stop and the other to a proposed new route.

In both of the Brooklyn referendums ballots 5 in. x 3 in. in size, which provided space for the name and address of the voter as well as his decision as to the matter at issue, were distributed by all conductors. Voting was carried on for two days in the first referendum, but only for one day in the second one. Ballots were collected by conductors, inspectors or ticket agents, or received by mail at the general offices of the company. The ballots called for the name and address of the voter, and all those which were not signed were rejected in the count. The public was prepared for the vote by advertisements in the daily papers setting forth the details of the proposal, as well as by posters which were located conspicuously in the cars. Both of these referendums are considered to have expressed definitely the wishes of the majority of riders, the result of the vote on the near-side stop constituting, in all probability, the main reason for the recent adoption of this scheme in Greater New York. It should be said that the total count of the vote was equal to 11 per cent of the total traffic for one day, or say 22 per cent of the total number of one-way riders. Duplication of votes was probably eliminated largely by the signature and address required on each ballot.

The popular vote conducted in Kansas City, Mo., was on the question of smoking on the cars. This matter had been agitated for some time prior to June, 1912, and in view of this fact the company conducted a referendum for a whole week, passengers receiving ballots upon payment of fare. These ballots contained the printed words "yes" or "no," and one of these was marked by each voter and the ballot deposited in boxes, which were located one at the exit and the other at the entrance of the car. The interest with which the referendum was received was indicated by the fact that more than 1,500,000 votes were received during the week. This constituted more than 60 per cent of the riders during that period. About 60 per cent of the voters were against the permission of smoking on cars, and as a result of the referendum the City Council repealed the existing ordinance that covered the matter. Notwithstanding considerable opposition, which was reported to be encouraged by the manufacturers and dealers in tobacco, the "no smoking" rule was maintained and is now in force. It is generally considered that the referendum demonstrated accurately the wishes of the public, the cost of conducting the referendum involving an expenditure on the part of the company of about $3,000.

A popular referendum was held in Denver on the question of maintaining the skip-stop on one of the railway companies' lines. This was conducted by means of return postcards which were mailed to some 9600 householders who used the routes in question. Of these about 5600 replied within a short period, the vote on a percentage basis showing 30 per cent against the skip-stop and 70 per cent in favor of it. The final action of the company on the question was, however, complicated by premature action of the local government, although since that time the skip-stop has been introduced on other of the company's lines.

In Boston a referendum was held regarding the relative desirability of two proposed locations for an easterly terminal for a new subway. Notices outlining the various points in favor of each station were posted on all in-bound cars on the routes having passengers who would be affected by the station location, and upon the arrival of the cars at the downtown district they were boarded by uniformed employees who distributed printed ballots indicating a choice of route. The ballot was perforated across the middle so that either half could be used and the other half destroyed. Upon the arrival of the cars at the terminals ballot collectors in uniform on the platforms and stairways gathered the slips from alighting passengers.

The balloting was continued for three days, about 69,000 votes being cast during that time. Unfortunately, the opinion of the voters was almost evenly divided, and the result was considered indecisive. The company's officials were of the opinion that the opportunity for repeating votes that was afforded by limiting, necessarily, the balloting to the business district rendered such a referendum less useful than it would have been in a residential section. In its decision the local railway commission recommended the temporary use of a location, subject to the final action of the State Legislature.

HANDLING LOST ARTICLES

The return of articles left by passengers on cars is, naturally, a matter of direct interest to the patrons of an electric railway. A number of surface lines have established organizations to take care of the matter, but the system in use on the New York Railways is especially notable because of its extreme simplicity. Under it, lost articles are turned over at the end of the trip on which they are found to the receiver, or cashier, at the depot that serves the line. The receiver then makes out a lost property coupon in triplicate, upon which is given the date, the line, the time of finding the article, the number and direction of the car in which it was found, the name of the employee who turns it in and a description of the article in question. These coupons are made up in book form and are consecutively numbered. The original and the duplicate are torn out of the book and sent with the article by the depot messenger or wagon, on the morning following the receipt of the lost article, to the lost property room. This is located at a central point on the system. Upon receipt at the lost property room the original of the coupon is retained with the lost article and the duplicate coupon is receipted by the lost property clerk and sent back to the depot where the article was first turned in.

As soon as any lost property is received a search is made for any clew as to the ownership and if this is found the addressee is asked to call at the lost property room and identify the article, the request being made in printed form on the back of a postcard. When claimants call at the lost property room they are required to give all information that is written on the coupon which is attached to the lost article. If this identification is satisfactorily given the claimant signs the coupon as a receipt and is given the article to which it is attached. All communications regarding lost property are answered immediately, and if full descriptions of lost articles are given by mail by claimants who live out of town the articles are forwarded in any way that the owner may desire. In the case of New York residents, however, a personal call is required.

All lost property is retained for a period of six months, after which it is sold in semi-annual allotments and the proceeds are applied to the employees' benefit association, this procedure being in accordance with the Railroad Law of the State of New York. The number of lost articles turned in daily for all lines of the New York Railways varies between twenty-five and 100, and approximately 75 per cent of the material that is received by the lost property department is called for within three months after its receipt. All the material held for the first three months is kept in a single room, approximately 30 ft. x 100 ft. in size, which is equipped with shelves and cupboards upon which the property is stored. The articles are classified according to the lines on which they are found. The lost property room is in charge of a single clerk, who maintains a register in which is entered a record of every lost article turned in. In this is reported the date upon which the article was found, the line upon which it was found, a brief description, the date upon which it was received, the date upon which it was turned over to a claimant, the name and address of the claimant and place for remarks regarding the transaction.

In some cases rewards are left by claimants and these are recorded in a separate book showing the date when the reward was offered and its amount, together with the coupon number of the lost article, the badge number and the name of conductor finding the article, the date when the reward was turned over to the conductor and the signature of the conductor receipting for the reward. In case rewards are given numbered letters are sent to the superintendent of transportation asking to have the conductor call for the reward. About one article in each forty or fifty involves a reward for the conductor finding it, the majority of lost articles being of little value. Roughly speaking, about 25 per cent of all claimants at the lost property room are able to get their property back. However, if umbrellas are excluded from consideration, the ratio runs to about 50 per cent.

SCHEDULE SPEED IN CITY SERVICE

Of all details of operation affecting the public directly it is probable that schedule speed is the one that receives least attention from passengers. However, the value of the time that may be saved by high speed has been estimated at an average figure of 15 cents per hour per passenger, and, on this basis, the recently planned rapid transit scheme in Philadelphia was calculated to have a capitalized value, to the population of the districts affected, of $25,000,000. From the standpoint of the railway companies the importance of high schedule speed is generally given more attention, as fixed charges on rolling stock and cost of platform labor are reduced almost in exact proportion to the rapidity with which the cars are moved, or, in other words, to the number of revenue-miles that are obtained daily from each car.

An interesting case in connection with schedule speed occurred a year ago in Cleveland, where it was found, through an effort by the platform men to have the schedule rearranged, that the speed ordinance in the city had been repealed. The ordinance, which had limited the running speed to 10 m.p.h. in the business district and to 15 m.p.h. in the residence district, had permitted claimants in damage suits to allege that cars were exceeding the speed limit as a basis for an unwarranted action. For this reason, the repeal of the ordinance was accomplished, and for the last year Cleveland cars have been operated without a speed limit, the average non-rush hour schedule speed having reached the high figure of 10.51 m.p.h.

The most prolific cause of reduced schedule speed is generally admitted to be the delays due to vehicular traffic. Various schemes have been tried to overcome this. At the present time the Chicago surface lines are endeavoring to have the local City Council pass an ordinance making it an offense subject to fine for vehicles to occupy the street railway right-of-way during the rush-hour periods. It has even been suggested in connection with this movement that vehicular traffic should be kept altogether from the congested loop district during the rush hours, the term vehicular traffic meaning teams and trucks that transport package freight and similar material. In Chicago all movements of this character must originate with the local transportation committee of the City Council and then, to be effective, must take the form of an ordinance. The company's campaign to educate drivers of commercial vehicles to keep off the surface railway tracks is, therefore, confined to getting such an ordinance passed. However, in the past the police department has afforded considerable assistance to the street railway companies in keeping trucks from occupying the tracks unnecessarily, and in a large number of instances arrests have been made on the charge of obstructing traffic. Since that time teamsters have heeded the sound of the gong more rapidly, to the advantage of the patrons of the railway.

The Public Service Railway of New Jersey has organized a campaign with the same end in view as a part of its "safety first" movement. Placards requesting co-operation on the part of teamsters were submitted at personal interviews and then furnished free of charge to all owners of trucks in the cities through which the company's lines extend. After the cards had been posted the effort was followed up with talks before the truck drivers' social organizations and before meetings of the teamsters' unions. In addresses direct to the teamsters, generally, the attitude of the hearers was at first derisive, but later, when the object of the talk was fully disclosed, this changed completely. In the use of the pamphlet and in the talks, which are made by A. J. Van Brunt, director safety education Public Service Railway, the idea is to avoid exerting any actual pressure upon the teamsters but to appeal to them to recognize the matter as being of mutual benefit to themselves, to the motormen and to the passengers in the cars. On the posted placard no mention is made of the Public Service Railway, the card bearing only the signature of the owner of the stable or garage in which it is posted. Excellent results in regard to reduction of vehicular delays are reported from the campaign, a noticeable decrease having occurred during the year that the plan has been in operation.

The Northern Ohio Traction & Light Company about eighteen months ago sent out letters asking for the co-operation on the part of truck drivers in keeping the tracks clear. These are reported to have been well received and to have produced noticeably good results. The scheme has been followed up by letters sent to the actual offenders as they are found from time to time.

In Rochester, the New York State Railways has also made efforts along these lines, having published an advertisement in the local official trades union paper which showed, for each month of the previous year, the duration of interruption to service caused by stalled or broken-down wagons, automobiles or trucks. The advertisement appealed for co-operation on the part of teamsters, and asked them not to drive on the tracks except when absolutely necessary. The vehicular delays, it might be said, averaged lost time of six and a half hours in each month. The effect of this plan was excellent as regards the establishment of good-will between the teamsters and motormen, the latter being advised by bulletin to consider that pulling clear of the

ALWAYS THINK OF "SAFETY FIRST"

We are having too many accidents with street cars. Valuable time is lost, unnecessary suffering caused, and property wasted.

"Accidents" can and must be avoided; they need not happen, the best drivers do not have them. To think "SAFETY FIRST" is becoming a habit in these United States, and the man who does not so think is behind the times.

When possible, drive on streets where there are no cars. Drive between track and gutter whenever possible. When you must drive on tracks, do so for shortest distance possible, and pull out at once for cars.

Cars cannot pull out; they are confined to the tracks, they must run faster than you do; they cannot stop as quickly.

You are delayed only a short time by letting a car go by. Driving on the track or pulling across in front of car is dangerous and delays many people.

Don't pull on the track without being sure that no car is near; if it is LET IT GO BY FIRST.

Motormen are human and working for a living too, they have to run by a time table, and if obliged to slow up or stop often, cannot run on time.

Cars are seldom broken. Wagons often are.

Cars do not suffer pain, drivers and horses do. Money cannot pay for pain, and when an "accident" could have been avoided by care on the part of our driver, there is no money due him. Think of "SAFETY FIRST"

Act as you would want the driver to act if you were a motorman.

Notice the kind of driver that does not help the other fellow. Notice the kind of a rig he drives, he is not your kind, his rig is not as good as yours. He cannot think of "SAFETY FIRST" Does he, can he, think at all? He is not good enough to hold your job.

Keep off the tracks, pull up and let the car go by. Save time, property, suffering, perhaps life.

"SAFETY FIRST"

PUBLIC-BE-PLEASED POLICY IN PRACTICE—POSTER DISTRIBUTED AMONG GARAGE OWNERS BY PUBLIC SERVICE RAILWAY track was an act of kindness rather than duty on the part of the teamster.

To the same end the Detroit United Traction Company takes up from time to time with the police department the question of diverting traffic from certain streets to aid in the movement of cars, and motormen are instructed to take the numbers of vehicles which cause delays. Complaints are then made to the vehicle owners, and the experience has been that they take prompt action to co-operate with the traction company.

RELIEVING TRAFFIC CONGESTION

The general question of traffic congestion is, of course, influenced to a large degree by the length of time over which the rush-hour traffic extends. This is especially noticeable in the case of lines having the traffic from large factories, but notwithstanding the attention that has been devoted to the possibility of establishing variable factory closing hours, little success has been attained in this regard. However, in Detroit a novel scheme has been introduced for reducing congestion at the plant of the Ford Motor Company, where 12,000 employees leave at the same hour. The Detroit United Railway sells seven tickets for 25 cents throughout the city of Detroit, and to avoid the necessity of making change on the cars a ticket booth has been provided within the grounds of the Ford factory near the exit, tickets being sold to the employees as they leave at noon and night. It has been found that the sales average $75 daily, the Ford Motor Company having posted notices in the plant requesting employees to purchase tickets before boarding the cars. The operating department of the traction company reports a great improvement in maintaining schedules since the introduction of this scheme, which eliminates entirely the delays that originally took place. It should be added that the Ford Motor Company releases its employees at 3 p. m., 4:30 p. m. and 11:40 p. m., the railway storing thirty-three cars for the 3 o'clock rush, and twenty-five and sixteen cars respectively for the other two. The tickets sold at the booth are not reduced in price, the sales being effected solely through the desire of the Ford company and its employees to co-operate with the railway.

723
PREPAYMENT CAR
LIMITED
STOPS

PUBLIC-BE-PLEASED POLICY IN PRACTICE—LIMITED STOP SIGN ON BOSTON CAR

Another case of great difficulty exists at the Schenectady works of the General Electric Company, which employs at the present time about 17,500 hands, including some 2500 office employees. At the main entrance to the works is located a trolley terminal, and the larger part of the traffic originates at this point, which is adjacent to a paved street having a double track. The terminal at the main entrance gate consists of a single-track loop of about 100-ft. radius where the different lines terminate, passengers being loaded and discharged around this loop, as well as on the main line during rush hours. Shunting from this loop and parallel with the main track is a 500-ft. siding where cars can be loaded or unloaded without interfering with the regular operation on the main tracks. The terminal is simply a continuation of this double track at the side of the public highway which runs adjacent to and parallel to the company's plant for about ½ mile and includes a cross-over for terminal purposes only.

Five of the eight regular scheduled lines in the city run to the main entrance of this plant on a headway of from twelve minutes to fifteen minutes. As the main entrance to this plant is only about ¼ mile distant from the principal business street of the city it serves as a sort of terminal for cars operated through the business section. In fact, all of the lines mentioned pass through the main business street of the city going to and from the General Electric plant.

About 20 per cent of the employees are classified as office help and go to work at 8 a. m., leaving between the hours of 5 p. m. and 5:15 p. m. The factory employees go to work at 7 a. m. and leave at 5:30 p. m. The headways on regular lines which run to this plant are decreased about one-half at these rush hours. About twenty extra trippers leave between 5 p. m. and 5:15 p. m., and about forty trippers immediately after 5:30 p. m. In the morning before 7 a. m. 90 per cent of all regular and extra cars are routed to this plant and from that point assume their regular schedules on the respective lines and divisions. The records of the railway company show that about 1500 of these passengers come from the neighboring cities of Albany, Troy, Ballston Spa, Saratoga and Amsterdam, and extra service is provided for their accommodation. It may seem that these track and terminal facilities are very small in proportion to the magnitude of the plant, yet James F. Hamilton, general manager Schenectady Railway Company, has stated that 50 per cent more traffic could be handled in this way without creating much delay or congestion.

One of the plans for relieving rush-hour congestion indirectly that is reported to have given successful results is the so-called M. U. F. campaign which was originated by the Cleveland *News*. This campaign was inaugurated to get passengers to move forward in the cars and thus prevent congestion at the rear entrance. The Cleveland Railway followed up the movement by posting in the cars signs reading "Please move forward." The campaign included the formation of a voluntary organization in which the members agreed to move up forward and to encourage others to do the same, badges being furnished to all members. It proved thoroughly successful and was even supported strongly by the local labor organizations. The same plan was followed by the Pittsburgh Railways, but in this city the campaign was started by posting signs upon which were the letters "M. U. F." Considerable speculation as to the meaning of the signs was produced and this attracted a great deal of attention to them.

"Car full" signs for the purpose of preventing overcrowding of a delayed car have been tried in several cities. The Metropolitan Street Railway in New York introduced the scheme a number of years ago, and it has been left in use to a greater or lesser extent since then. The sign is displayed by the motorman upon receipt of a four-bell signal from the conductor and the car then picks up no more passengers. A similar plan was tried in Boston in March, 1913, the car full signs being carried in the vestibule and turned up so as to come into sight at the order of the traffic inspectors on the street. Cars upon which the signs were shown made no stops to receive passengers until reaching their destinations. The plan was adopted only for lines on which the headway was about two minutes or less.

FRONT-END COLLECTORS FOR CONGESTED POINTS

As an aid to the handling of rush-hour traffic front-end collectors were introduced in Kansas City some three years ago. At the present time about thirty-five of them are used regularly for the evening rush, which lasts from 3 o'clock to 6:30. They are placed at busy transfer points, at department stores, and also in the packing house district. The collectors stand on the ground opposite the front platform of each car as it comes to a stop. Each one is provided with a register carried on a cord from his shoulders and each one keeps a trip sheet exactly as do the regular conductors. In one test the loading time was found to have been reduced to 1.07 seconds per passenger, about 40 per cent of the passengers using the front door. Under similar conditions without the front-end collectors the loading time was found to be 2.23 seconds. It should be said that, while the public did not take kindly to the innovation at first, this sentiment was quickly overcome as soon as the results in faster schedule speed became apparent.

A similar scheme has just been introduced in San Francisco, where the presence of large numbers of passengers desiring to board cars at a few points in the heart of the business district complicates the handling of rush-hour traffic. Here a record of the front-end conductor's work is kept on a portable register, tickets being registered the same as cash. The trip sheet of the front-end conductor does not show the number of fares collected for any individual car, or for any particular line, but shows the collections made for the entire period. Receipts are credited to the several lines by the auditor in a proportion that is determined by a front-end conductor for each line passing the collection point for one week, after which the one conductor collects for all lines.

The front-end conductors are recruited from the various divisions and in some cases are used at terminals to the extent that they make a day's work. In other cases where used only for an hour or so morning and evening they are given any special work that may occur in the remainder of the day. They are used in place of regular men who want to get off but who do not care to lose an entire day, and consequently do the morning and evening work. In other cases regular conductors, after completing a day's work on their own runs ask to be assigned to this work during the evening.

Where front-end conductors are at work, all passengers desiring to leave the cars by the front exit are permitted to do so before intending passengers board the car. The front-exit door is of the standard small size, and, when at work, the conductor stands on the ground at its forward side collecting and issuing transfers as the intending passengers are ready to step upon the car. Where the conductor is collecting for one line only he issues the transfers at that line, but in cases where he is collecting for many lines, he issues a special conductor's transfer. The front-end conductor also assists materially in the moving of cars by signaling the motorman to proceed after having collected the fares and having seen that the rear end is clear. Sometimes the front-end conductor collects fares and issues a transfer before an approaching car has come to a stop; however, this practice has not developed to any great extent. In large crowds the conductor stations himself firmly against the car at the forward side of the exit gate so that only one passenger can pass at a time, and there has been experienced little or no difficulty in preventing people from slipping past the conductor. During periods of great congestion traffic officers are present to prevent jams and to regulate the crowd. This has been done frequently and with such success that many times the people voluntarily form a line in front of the door.

No difficulty was experienced in San Francisco in getting the public to accept the innovation. In fact, after an experiment at two or three prominent points, the people were enthusiastic in their praise and their demand for the increased convenience. The result of loading by front-end conductors is an advantage in time both to the patron and to the company; passengers are permitted to enter the front end where the car is the least crowded; the congestion on the rear end is greatly reduced, and the load is more evenly distributed throughout the entire car. In short, it fills the forward section of the car, that part which the conductor on the rear end has so much difficulty in trying to persuade passengers to occupy.

TRAILERS IN REGULAR CITY SERVICE

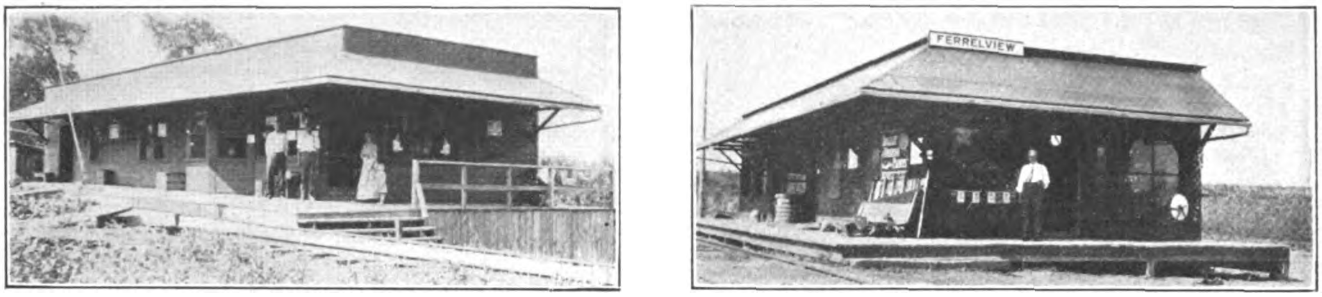
In many of the cities that have practically reached the physical maximum of service which can be handled owing to congestion the possibility of the use of trailers has been adopted. The important advantage is an increase in the size of the unit. The important disadvantage is the inevitable decrease in speed unless the number of stops is fixed. In 1912 a London County Council Tramway official made an investigation on the subject of trailers, finding that these were used in large numbers in all of the capitals of continental Europe with the exception of St. Petersburg, and that Brussels and Marseilles even had three-car trains. In this country, out of approximately 1300 electric railroads 130 use two-car trains either for city or interurban service. For regular city operation, however, not including special traffic to parks, ball games and the like, trailers are used in comparatively few cases. A partial list is shown below:

PARTIAL LIST OF CITIES REGULARLY USING TWO-CAR TRAINS

Birmingham, Ala.
Boston, Mass.
Charleston, N. C.
Cleveland, Ohio.
Cincinnati, Ohio.
Columbus, Ohio.
Denver, Col.
Des Moines, Ia.
Detroit, Mich.
Fort Wayne, Ind.
Indianapolis, Ind.
Louisville, Ky.
Montreal, Can.
Memphis, Tenn.
Muskogee, Mich.
New Orleans, La.
Newark, N. J.
Pittsburgh, Pa.
Portland, Ore.
Savannah, Ga.
St. Joseph, Mo.
St. Louis, Mo.
Spokane, Wash.
Springfield, Mo.
Toledo, Ohio.
Toronto, Can.

THE NEAR-SIDE STOP

The near-side stop, owing to the general belief in its ability to decrease delay under certain conditions, is another feature of operation that possesses mutual interest for the railways and the public. However, the railway companies in general have much less at stake than their patrons. Except in the case of the larger cities, where traffic control is maintained, no increase in schedule speed can be effected by its introduction and its ability to reduce vehicular interference and collisions is still sometimes questioned. That it is distinctly advantageous under traffic control, however, can hardly be disputed, because of the saving in time which may be made by eliminating the double stop, one at the near side of the crossing for traffic and another at the far side for boarding and alighting passengers. For this reason, indeed, it has come into use in several of the smaller communities whose business districts suffer from badly congested traffic, and in order to avoid confusion on the part of waiting passengers its use has, in many cases, been extended to include all parts of such towns where the existence of paved streets make it no hardship to board a car at a distance from the cross-walk.



PUBLIC-BE-PLEASED POLICY IN PRACTICE—EXAMPLES OF K. C., C. C. & ST. J. STATIONS BUILT IN RETURN FOR NEWSSTAND PRIVILEGES AND PERCENTAGE OF RECEIPTS

This tendency toward the use of the near-side stop in the business districts of smaller cities is shown in the following partial list of places where it has been adopted.

PARTIAL LIST OF CITIES WITH NEAR-SIDE STOP

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N. Y.
Charleroi, Pa.
Charleston, S. C.
Cincinnati, Ohio
Chattanooga, Tenn.
Chico, Cal.
Chicago, Ill.
Columbus, Ohio
Detroit, Mich.
Dubuque, Iowa
Denver, Col.
East St. Louis, Ill.
Fitchburg, Mass.
Hanover, Pa.
Jacksonville, Fla.
Indianapolis, Ind.
Kansas City, Mo.
Kewanee, Ill.
Knoxville, Tenn.
Los Angeles, Cal.
Lawrence, Kan.
Leavenworth, Kan.
Louisville, Ky.
Milwaukee, Wis.
Monterey, Cal.
Marysville, Cal.
Minneapolis, Minn.
Nashville, Tenn.
New York, N. Y.
New Orleans, La.
Norristown, Pa.
Owensboro, Ky.
Paducah, Ky.
Philadelphia, Pa.
Pine Bluff, Ark.
Pontiac, Mich.
Rochester, N. Y.
Sacramento, Cal.
Salt Lake City, Utah
San Bernardino, Cal.
San Francisco, Cal.
San Diego, Cal.
Scranton, Pa.
St. Paul, Minn.
Steubenville, Ohio
Syracuse, N. Y.
Springfield, Ohio
Tacoma, Wash.
Toledo, Ohio
Toronto, Can.
Trenton, N. J.
Vancouver, B. C.
Waco, Texas
Washington, D. C.

That the near-side stop is growing in favor is shown by the fact that more than two-thirds of the cities on record have adopted it since 1910, although the dates of introduction extend back as far as 1891, when it was reported to have been adopted in Toronto, Can. In the United States, Knoxville, Tenn., is reported to have adopted it in 1896.

In several cases the near-side stop has been tried and has failed to meet popular approval, but in others it has been tried and abolished and then introduced a second time with apparent success. This was the case in Rochester, where its temporary abolishment may be traced to the objections of individual merchants whose store locations were affected by the change. The near-side stop was reintroduced in this city at a later date owing to its time-saving features under traffic control and at the present time it is in successful operation.

In Newark, where it was abolished after a trial of less than four months, the railway company was absolutely non-partisan in the matter. The introduction was effected by city ordinance, as was also the abolishment, which was reported to be due to a few vigorous complainants who were lined up against the plan. Apparently the only case where the wishes of the majority of riders have been definitely ascertained on the question was that of the popular referendum in Brooklyn. Here the vote showed eleven to one in favor of the plan. This is undoubtedly one of the main reasons for its recent adoption in Greater New York.

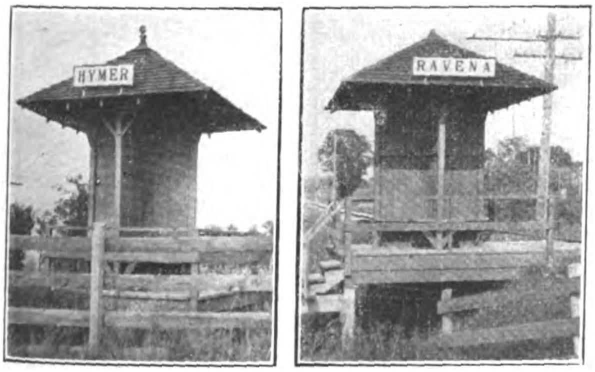
The saving in time due to the introduction of the near-side stop was reported in Rochester to be in excess of 20 per cent through the business district during the rush hours. In this city, prior to 1909, cars made two stops at each downtown intersection. Through checks it was found that the traffic stop at the near side was often as long as thirty-five seconds in addition to a twenty-five-second loading stop at the far side. Some of the delay at the near side was due to blockades of loading cars at the far side, so that the use of the near-side stop alone indicated a saving even greater than that effected through the elimination of the twenty-five-second stop at the far side of each crossing. On the first night when the near-side stop went into effect an increase of 20 per cent in speed was effected, and the headway in the business district was eventually reduced to twenty-five seconds, although later this was found to exceed the possibilities of traffic direction, which limited the average headway to twenty-eight seconds.

PUBLIC-BE-PLEASED POLICY IN PRACTICE—ORNAMENTAL SHELTER ON K. C., C. C. & ST. J. RY.

WAITING STATIONS AND SHELTERS

The construction of suitable stations and shelters for waiting passengers is generally conceded to be a most important provision for the comfort of patrons, and to this end the Kansas City, Clay County & St. Joseph Railway has developed the ingenious scheme of building its open shelters in the form of a cross, so that waiting passengers are enabled to avoid the wind regardless of the direction from which it blows. The illustration on page 32 shows the general arrangement. The same company also has recently adopted a novel policy for providing suitable waiting stations at the growing towns along its line. This consists in getting outside parties to stand the expense of the station building in return for store privileges, and the company has been successful in having a number of these stations built under the following agreement: The company gives the contractor the lease for five years on the ground. The contractor erects the station, which is built large enough so that he can live in the building and carry on a store. He also acts as the company's agent and is paid by the company by receiving free rent both for his family and for his store. In addition he receives 5 per cent of all outgoing business emanating from that station. This provides an inducement for the agent to get as many passengers as possible to purchase tickets, thus keeping cash out of the hands of conductors. The percentage also provides an inducement to the agent to have as much grain shipped from his station as possible. There is a minimum compensation for the agent amounting to $10 per month in case his percentage falls below this figure. This line at present has an agreement with a parallel steam railroad to handle the grain originating at the electric railway's stations, and as most of the stations are located at switches, every carload of freight loaded at that switch provides 5 per cent of the returns to the agent.

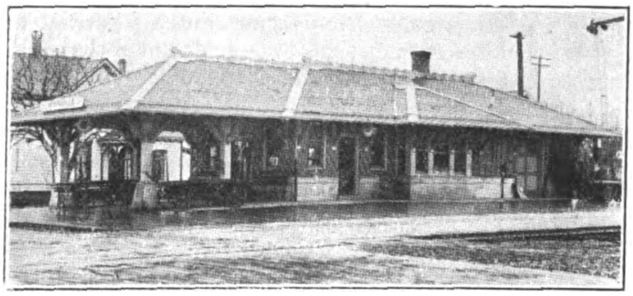
PUBLIC-BE-PLEASED POLICY IN PRACTICE—SHELTER BUILT BY CITY OF HARTFORD AT JUNCTION POINT



PUBLIC-BE-PLEASED POLICY IN PRACTICE—SHELTERS BUILT IN THE FORM OF A CROSS TO PROTECT AGAINST WIND

On the Pacific Electric Railway the way stations have been erected very largely of reinforced concrete. A standard design with an overhanging roof, as shown in the illustration, has been adopted for important points. For the shelters at crossroads reinforced concrete has also been universally used, and the permanence and beauty of these small structures has been reported to have added greatly to the prestige of the line with the public.

Shelters within city limits are, of course, somewhat unusual, but the accompanying cut shows an elaborate structure built in Hartford at a main loading point of the local lines of the Connecticut Company, which operates in that city. The shelter, which cost $2,100, was built by the city of Hartford as a convenience for its citizens. Another novelty in shelters has been introduced on the Manila (P. I.) Electric Railroad. In the Philippines torrential rains are common, and the difficulties of transferring passengers during the rainy season are, in consequence, acute. For this reason The J. G. White Management Corporation, which operates the property, has erected at five main transfer points in the city of Manila shelters that are located between double tracks or at turn-outs and have roofs extending over the tops of passing street cars. As the shelter roofs are carried out beyond the center lines of the cars there is no drip from the eaves upon boarding passengers, and transfers can be made from one car to another without a wetting, no matter how severe the rain. The structures are of the simplest character, the roof sloping both ways from the center and being supported at intervals by posts on the center line. In general the length of each shelter is sufficient to serve two or more cars. The distance between tracks at each shelter is, of course, increased enough to provide ample standing room between cars on opposite tracks, and a platform that is raised enough above street level to insure a dry footing is provided.



PUBLIC-BE-PLEASED POLICY IN PRACTICE—ORNAMENTAL STATION ON PACIFIC ELECTRIC RAILWAY

Electrical Smoke Recorder

In a recent issue of *Power* there is described a novelty in smoke recorders for steam boiler plants. The action depends upon the variable conductivity of the flue gases accordingly as more or less smoke is present in them. When the smoke is dense the conductivity is small, whereas the transparent flue gases from a furnace are comparatively good conductors. In the smoke flue there is a gap in the high-tension circuit of a small transformer, supplied from an a.c. lamp socket, and there are gaps in the circuit leading to a condenser; all are in parallel. When there is smoke the condenser is charged and this closes an electric circuit and operates a watch or recording clock. When there is no smoke the discharge occurs across the gap in the stack and nothing happens. By changing the length of the gaps the recorder may be made to record almost any density of smoke or fumes.

The "Safety First" Movement

HOW ELECTRIC RAILWAYS HAVE WORKED TO REDUCE ACCIDENTS

A Review of the Work Done from the Inception of the "Safety First" Slogan, and a Description of the Practices of Different Properties to Maintain Interest in the Subject

> "Among the many objects to which a wise and free people find it necessary to direct their attention, that of providing for their **Safety** seems to be the **First**."—John Jay, in *The Federalist*, Nov. 3, 1787.

THAT the safety of the lives and property in their charge has been the concern of operators from the early days of electric railroading is attested by the numerous convention papers on this subject and the still more numerous technical inventions and changes in operating rules. In fact, fully ten years ago the Street Railway Claim Agents' Association was organized for the sole purpose of reducing the number and cost of electric railway accidents. The work of this body in co-operation with the engineering and transportation men of the field had already borne good fruit, while the advent of the prepayment car had reduced materially the number of accidents in car operation. Nevertheless it is now plain that the accident prevention movement could not realize its possibilities to the full until the public, always the chief source of accidents, could be made to appreciate that the efforts of the railways were more humanitarian than financial in purpose. Here and there an occasional talk to school children had supplemented the time-worn cautions of "Wait Until the Car Stops" and "Watch Your Step," but the spark of public enthusiasm remained unkindled until there arose the magic-working phrase of "Safety First." The event has proved that the use of a catch phrase was the one way to bring accident prevention from the restricted field of the operator into the wide domain of public co-operation.

STATEMENT SHOWING NUMBER OF RECOMMENDATIONS MADE BY SAFETY FIRST COMMITTEES IN 1912 AND 1913, ON WHICH ACTION WAS TAKEN.

	ADOPTED	REJECTED
Division Committees	6480	291
Shop Committees	2180	69
Terminal Committees	744	20
Local Committees	180	7
Central Safety Committee . .	188	
Total	9772	387

SAFETY FIRST—STATEMENT POSTED BY CHICAGO & NORTHWESTERN RAILWAY TO SHOW EFFECTIVENESS OF EMPLOYEE'S CO-OPERATION

In an issue like this, which from its nature marks the progress of the industry, it seems especially appropriate to review a movement in the transportation field which of late years has grown so rapidly and produced such excellent results in promoting co-operation with railway employees and the public. Necessarily the scope of the subject makes it impracticable to present all of the valuable ideas applied by the different electric railways or even to assert priority of invention for any of their users.

The "safety first" movement was originated early in May, 1910, on the Chicago & Northwestern Railway, under the general claim agent of the company, R. C. Richards. Curiously enough this pioneer movement did not take the form of a direct appeal to the public, but was conceived to insure heartier co-operation from the employees following a fiscal year during which injuries to the men had increased 37 per cent. The work was organized by holding meetings of all the division officers and foremen of various division points on the system, and at these meetings the company explained what it wanted to do, and why. Meetings of the same kind were then held with all of the employees at accessible points throughout the system. As Mr. Richards could spend only a week or ten days of every month on this work, this initial organization required five months. The next step was to organize "safety first" committees of all the divisions in all the large shops, large terminals and points far distant from headquarters where any number of men were employed. A central safety committee was also organized to co-ordinate the work of the departmental committees. All committees, including the central committee, meet once a month, and the committeemen are paid for their time and expenses due to attendance. Each committee passes on all safety matters within its territory, corresponding to the jurisdiction of the division, shop or terminal offices, but any recommended changes in standards, rules or customs which apply to the whole system are referred to the central safety committee for action. If approved by that committee these general changes are referred to the management and adopted. Out of 9772 recommendations covering all phases of "safety" work, made in 1912 and 1913, a total of only 387 were found to be impracticable.

Statement showing reduction in number of accidents for four years ending June 30th, 1914, as compared with four years on same basis as year ending June 30th, 1910.

		PER CENT.
137	fewer employes killed, a decrease of	32.
9150	" " injured, "	26.5
813	" passengers injured, "	21.8
176	" outsiders killed, "	18.7
150	" " injured, "	6.6

Mileage June 30th, 1910 - 7951.34
Mileage June 30th, 1914 - 8408.31

SAFETY FIRST—STATEMENT POSTED BY CHICAGO & NORTHWESTERN RAILWAY DEMONSTRATING BENEFICIAL EFFECT OF ITS SAFETY CAMPAIGN

Mr. Richards points out that all committeemen are on an equal footing, whether they come as firemen, engineers, brakemen or officers. In the opinion of the executive officers of the company nothing that the Chicago & Northwestern Railway has ever done has brought about so much good feeling and so much co-operation on the part of the men as the organization of the "safety first" movement.

The continuing value of this work is proved by the fact that for the four years ending June 30, 1914, the number of deaths as compared with the four preceding years was decreased by 310 and the number of injuries by 10,113. This reduction is all the more remarkable because the length of line operated for the same period increased from 7951 miles to 8408 miles, while the wage roll increased from $12,000,000 to $15,000,000 a year. News concerning recommendations, accidents, etc., is printed on 5½-in. x 8½-in. leaflets similar to those reproduced. It may be interesting to state in conclusion that at this time at least seventy-seven American steam railroads, with a combined trackage exceeding 200,000 miles, have "safety first" organizations. The idea has even spread abroad, as appears from a splendid "Safety Movement" booklet of the Great Western Railway, England, from which several typical illustrations on the right and wrong way of doing things are reproduced on pages 43 and 44.

The Beaver Valley Traction Company

CONNECTING

At Beaver with Tri-State Railways Cars for

EAST LIVERPOOL

AND

STUEBENVILLE

CONNECTING

By Automobile Bus Line between Leetsdale and Sewickley with Pittsburgh Railway Company's Cars for

CORAOPOLIS

AND

PITTSBURGH

SAFE RULES OF TRAVEL

Never jump on or off a moving car.
Never cross a busy street or track until you look both ways.
Never go behind a car until you have looked both ways for an oncoming car from opposite directions.
On Leaving a Car Step, face front and grasp the left handle.
When on a Car, ride in a safe place—not out the window or on the steps.

THE BEAVER VALLEY TRACTION CO.

SAFETY FIRST—BLOTTER ADVERTISEMENT OF THE BEAVER VALLEY TRACTION COMPANY, NEW BRIGHTON, PA.

"SAFETY FIRST" WORK ON ELECTRIC RAILWAYS

The immediate success of the employees' committee plan on American railroads clearly has been due to the gratification that the men felt in becoming so directly associated with the management in the operation of the property, and in gaining the assurance that the company was ready to remove any avoidable risks that accompanied their employment. In turn, the enthusiasm of a large number of employees could not fail to react favorably on the attitude of the public toward the railway. In 1911 the committee plan was introduced on electric railways by the Fort Dodge, Des Moines & Southern Railroad. Previous to this time a number of claim agents and transportation superintendents had instituted accident talks to trainmen, but without following it up by committee organizations.

In enlisting the interest of the general public, however, the electric railways anticipated the steam railroads. In 1910 several electric railways on the Pacific Coast, notably those at Portland and Seattle, had begun a series of lectures to school children, while in the East the United Railways & Electric Company of Baltimore had inaugurated the distribution of accident prevention cards in schoolrooms with the approval of the Baltimore school board and in the Central states E. F. Schneider had begun an active campaign on the Cleveland, Southwestern & Columbus Railway. Thus the seeds of a popular safety movement had already been planted by the electric railways, and only some happy slogan like "Safety First" was needed to give a greater impetus to the work.

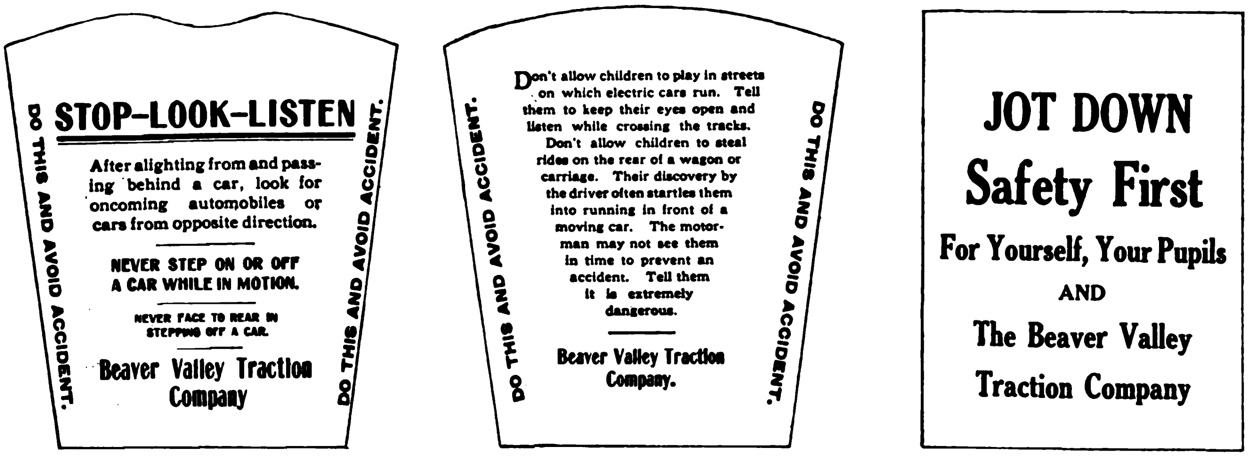
On the Pacific Coast the talks to school children were accompanied or followed by appeals to vehicle owners to instruct their drivers or chauffeurs to exercise greater care in avoiding collisions with cars and rundowns of pedestrians. Then the movement expanded into public safety leagues, with central and subsidiary committees composed of representatives from every large civic and industrial class. As the interest most vitally affected by accidents, it is natural that electric railway managements should be found among the most active elements in safety promotion. At the same time their co-operation with the most influential people in the community has given a much higher sanction to their motives for accident prevention than was possible under previous conditions.

The popularization of the safety campaign also has had the natural effect of developing specialists for this work who are available to those railway companies which feel that they have not within their own ranks men gifted as public lecturers or as inventors of attractive safety literature. The first comprehensive effort to exhibit and encourage the use of safety devices for general purposes was the exhibit of the American Museum of Safety, made as early as 1908. In October, 1913, a "safety first" exhibit was held in New York, and since then other conventions have been held. The safety medal for electric railways offered by the A. N. Brady Estate is another instance of the wide ramifications of this movement.

TALKS TO SCHOOL CHILDREN, PARENTS AND TEACHERS

The precociousness of American children is great enough to justify the famous German aphorism—"Es giebt keine Kinder mehr" (There are no longer any children). This forward disposition makes it hard to secure obedience to any advice about playing in streets or using cars recklessly, unless certain attractive elements like gifts, pictures and self-government are added. As to the last, the same principle that makes children willing to obey superiors when they are organized as boy or girl scouts, or as auxiliary street cleaners in a sanitary brigade, may be utilized to create enthusiasm for safety purposes. In a number of cities public school safety leagues have been organized, the members of which take the pledge not only to avoid street and vehicle dangers themselves but also to keep their younger brothers and sisters out of trouble.

As stated, the first work for school children consisted of class talks which were given during school hours under the sanction of the local education boards or principals. At first the talks were made by the claim agents of the local electric railways, but as the work was extended, special lecturers were employed. In the pioneer work at Portland, Ore., particular stress was placed on using caution in crossing streets where cars were operated, in taking youngsters out of danger zones, in confining all playing to trackless streets and in cultivating the habit of standing still until a car had gone by, instead of running in front of it.



DO THIS AND AVOID ACCIDENT.

STOP–LOOK–LISTEN

After alighting from and passing behind a car, look for oncoming automobiles or cars from opposite direction.

NEVER STEP ON OR OFF A CAR WHILE IN MOTION.

NEVER FACE TO REAR IN STEPPING OFF A CAR.

Beaver Valley Traction Company

DO THIS AND AVOID ACCIDENT.

DO THIS AND AVOID ACCIDENT.

Don't allow children to play in streets on which electric cars run. Tell them to keep their eyes open and listen while crossing the tracks. Don't allow children to steal rides on the rear of a wagon or carriage. Their discovery by the driver often startles them into running in front of a moving car. The motorman may not see them in time to prevent an accident. Tell them it is extremely dangerous.

Beaver Valley Traction Company.

DO THIS AND AVOID ACCIDENT.

JOT DOWN
Safety First
For Yourself, Your Pupils
AND
The Beaver Valley
Traction Company

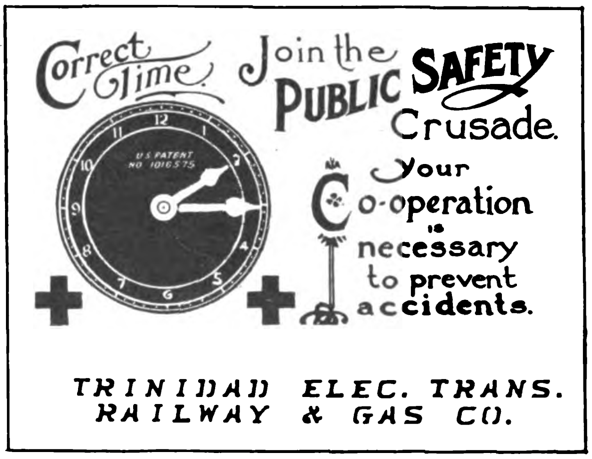
SAFETY FIRST—ADVERTISEMENTS ON WATER CUP FOR CHILDREN, AND COVER OF FREE BLANK BOOK DISTRIBUTED AT A TEACHERS' CONVENTION

Most of the companies which have adopted this plan keep their precepts fresh in the memories of the children by donating "safety first" buttons and blotters. The Beaver Valley Traction Company, New Brighton, Pa., combines sanitation and safety promotion by giving paper drinking cups to the children, while the Trenton (N. J.) & Mercer County Traction Company presents celluloid calendars, also with health and safety advice. The Oklahoma Railway presents lead pencils bearing the "Safety First" slogan. In Brooklyn, after listening to the lectures the children have written essays on accident prevention and on accidents witnessed, some of these being printed in their school papers. In the immigrant sections of Brooklyn the safety notices have been used also as a basis for language studies.

In 1912 the Boston Elevated Railway offered prizes for verses on this topic, and out of 780 sets which were submitted in response to newspaper advertisements the company gave 208 prizes totaling $700. Two of these prizes were for $50 each. In June, 1914, the Philadelphia Rapid Transit Company followed a similar scheme through its safety bureau by offering $250 in prizes from $10 down for essays, verses and drawings. The response was so great that the company doubled its reward, offering a total of $500, comprising one $10, twenty $5, fifty $2 and 290 $1 prizes. The Kentucky Traction & Terminal Company, Lexington, Ky., has also reinforced its school campaign by giving prizes for essays on accidents. The Montreal Tramways has made "safety first" cards palatable to the youngsters by placing them in boxes of chocolate for distribution at the company's annual picnic.

The straight printed matter usually distributed by the lecturers or by the class teachers consists of readable little pamphlets addressed directly to the children. Some companies, however, include material for the parents who are likely to need the advice as much as their children. To promote the delivery of such circulars, the Boston Elevated Railway attaches a receipt for signature which can be returned by the children to their teachers as proof that the circulars have been given to their parents. Placards in the cars are also used to supplement such publications, an endeavor being made to vary the text and pictures at frequent intervals. Such changes are essential to secure and maintain the interest of the public.

During August last year the Beaver Valley Traction Company, New Brighton, Pa., took advantage of a convention of the Beaver County Teachers' Institute to present the teachers with a pamphlet containing a series of safety first pictures with appropriate text. In addition each teacher received a notebook with no other advertising than the cover-wording shown in an accompanying illustration. This notebook scheme was a very good one as the teachers found the books convenient for making notes of the lectures and proceedings, so that the matter of caution was always before them. These books cost the company only $1 per gross.



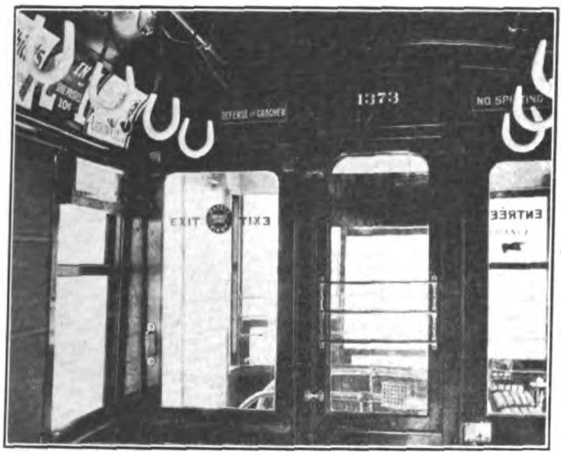
Correct Time
Join the PUBLIC SAFETY Crusade.
Your Co-operation is necessary to prevent accidents.

TRINIDAD ELEC. TRANS. RAILWAY & GAS CO.

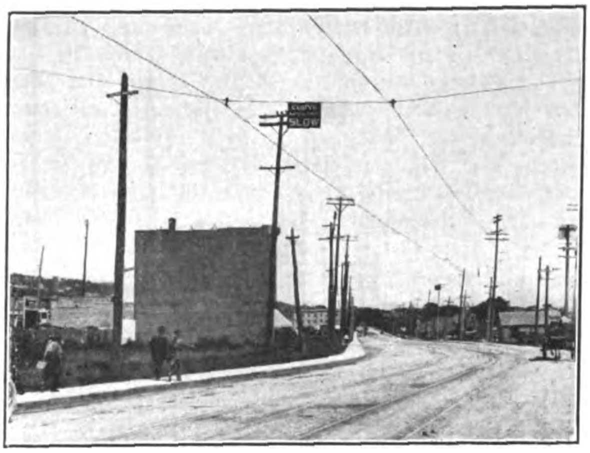
SAFETY FIRST—LANTERN SLIDE WITH MOVABLE CLOCK HANDS FOR DISPLAY BETWEEN REELS IN MOVING PICTURE HOUSES

THE MOVING PICTURE

In an editorial in the Aug. 3, 1912, issue of the ELECTRIC RAILWAY JOURNAL, it was suggested that the moving picture could be used for teaching accident prevention in a most attractive way. Shortly thereafter word came that pictures of this kind had already been displayed at Düsseldorf, Germany. In the following year the first American story film entitled "The Price of Thoughtlessness," was used by the Brooklyn Rapid Transit System. This film is now making the rounds of the United States and Canada, and others will follow. The Kentucky Traction & Terminal Company, Lexington, Ky., gives a free moving picture show from 10 a. m. to 4 p. m. on Saturdays, comprising one accident picture with two others as sugar coatings for the pill. Similar free exhibits are made by other companies.

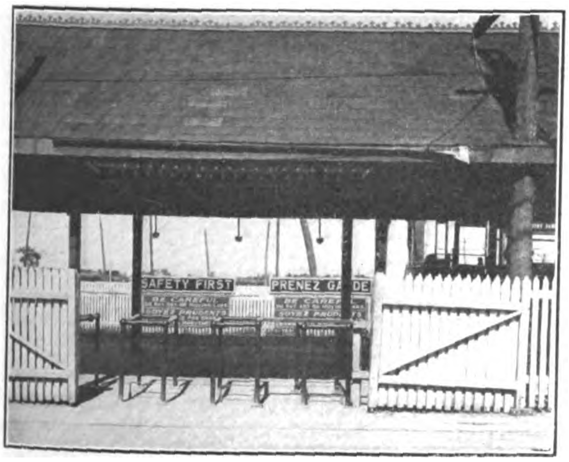


SAFETY FIRST—MONTREAL TRAMWAYS DECALCOMANIA SIGNS



SAFETY FIRST—MONTREAL TRAMWAYS WARNING SIGN AT CURVE

The usual type of film is made of inflammable celluloid and must be projected from a special booth, but a fireproof and narrower reel has been invented for use in schoolrooms, churches and other buildings which are not of fireproof construction. It requires no argument to see that this thoroughly modern device offers a splendid opportunity for safety education if the scenario does not make the accident prevention feature too obvious. Very recently one of the film companies has presented a splendid story of what happened to a workman who ignored a safety device.



SAFETY FIRST—MONTREAL TRAMWAYS' CAUTION SIGNS AT DOMINION PARK

GNIE TRAMWAYS
MONTREAL

SAFETY FIRST—CAUTION SIGNS ON AUTOMOBILES AND WAGONS AT MONTREAL

An interesting novelty in connection with this work is used by the Federal Light & Traction Company in the different cities where it operates public utilities. It displays in the moving-picture houses of these towns twenty-six colored slides, each of which bears some "safety first" advice. The novel feature of each slide, however, is the use of movable clock hands which are set for exact time by the picture operator and flashed between reels. This scheme has attracted the attention of other electric railways and it is possible that it will be adopted by several of them.

SAFETY AND THE GENERAL PUBLIC

Wider public interest in the safety movement began with campaigns among school children and vehicle owners. The Cleveland, Columbus & Southwestern Railway and the Portland and Seattle companies appear to have been the pioneers in both of these fields, and the Northern Ohio Traction & Light Company, Boston Elevated Railway and Montreal Tramways are among those who have devoted much effort to the work among vehicle owners and users. The ordinary course in the latter work is to address personal letters to the owners of trucks and automobiles, but a variation introduced by the Montreal Tramways is to prepare a series of "Don't" cards for distribution among drivers and chauffeurs. Furthermore, the Montreal company demonstrates its sincerity in trying to protect the vehicle owner against car collisions by issuing to its men precautions concerning the kind of accidents which must be guarded against more particularly during certain seasons. Thus, during the autumn stress is placed upon the danger of greasy rails, and during the household moving days of spring precautions are issued concerning proper clearances with heavily-loaded furniture vans. The Montreal management has also pointed out to team owners that tail-lights are as indispensable to the security of a slow vehicle as they are to a pleasure rig. In Boston and vicinity during a recent "Safety Week," the co-operation of the Boston Chamber of Commerce and of the local police and fire departments was secured to make a record of all vhicle operators who disobeyed the traffic regulations. The information was transmitted by the railway claim department to the Highway Safety League of Massachusetts, which in turn courteously took up the matter with the individual owners by correspondence. The Beaver Valley Traction Company obtains the direct interest of teamsters by furnishing them horse-blanket safety pins attached to a card of suggestions on wagon operation in and about railway tracks.

From these various forms of co-operation the safety movement inaugurated by many electric railways has expanded into a universal citizens movement to secure "safety first" in all industries as well as on the highways. In Brooklyn a public safety committee, whose membership includes many of the influential citizens of that borough, has been in existence for about a year, and early this year the Brooklyn Rapid Transit System contributed $1,000 as a basis for a "safety first" exhibit. The chairman of the Ontario Safety League at Toronto is a member of the Toronto Railway & Municipal Board, and otherwise the organizers embrace prominent men from other walks of life.

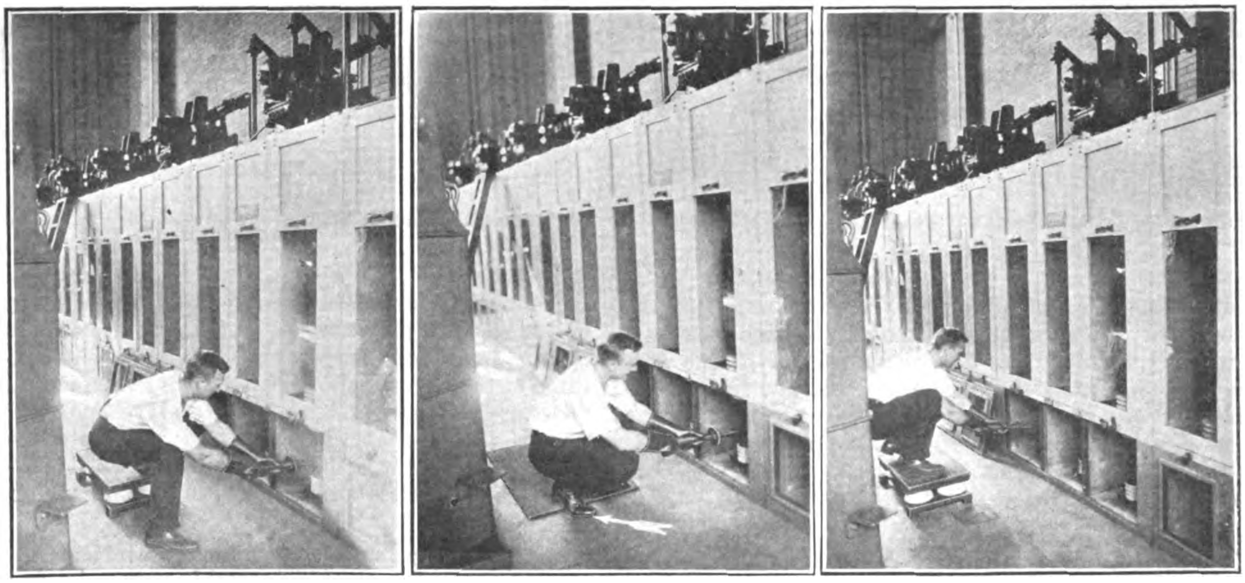
As the organization at Buffalo is one of the latest and most elaborate, it may be described in a little more detail. The Buffalo campaign was begun jointly by the mayor of the city and the International Railway. The general counsel of the railway is chairman of a general committee with thirteen standing committees as follows: school and playgrounds; boy scouts; church and civic bodies; public institutions other than schools; vehicular and pedestrian traffic; structures and pavements; street railways; explosives; fireworks and firearms; hazardous trades; legislation; publicity; finance and membership. Addresses are given by committee members and employees of the International Railway Safety Bureau. The week beginning May 3, 1914, was designated "Safety First" week, during which period a large number of lectures and safety exhibits were made; street banners with appropriate slogans were displayed and every automobile in the city carried "Safety First" streamers and pennants. Late in August a woman's committee was organized to act in conjunction with the general committee.

SAFETY LEAGUES

A most notable feature of modern "safety first" work is its dissociation from the old-time claim department. Thus the Chicago Surface Lines maintain a safety bureau; the Georgia Railway & Electric Company backs the Atlanta Public Safety League, Denver has a Tramway Safety League and Louisville has a Safety First League. Another important feature in the organization of safety work is in the co-operation of public utilities. A most conspicuous example of this kind is the Bureau of Safety, Chicago, which has supervision and direction of the safety work of the following public utility companies operating with general offices in Chicago: Commonwealth Edison Company, Public Service Company of Northern Illinois and the Middle West Utilities Company. This bureau devotes all of its attention to accident and fire prevention, sanitation and welfare and was organized primarily for the work outlined.

Believing that the chief factor in accident prevention is the proper education and co-operation of the workmen, the safety organizations of the various companies under the auspices of this bureau are arranged to include each and every workman in proper groups, officered from among their own members. These respective groups hold periodic meetings, reports of which are transmitted by the respective secretaries to committees of higher authority. Above these organizations of workmen are organizations of foremen designed as intermediate committees, and above these is a central committee composed of the active working heads of departments. The bureau maintains a staff of safety lecturers who devote their time to the proper instruction of the various committees and organizations, and a corps of inspectors who look after the elimination of fire hazards and mechanical dangers. This system has been very thoroughly tried out and has been most effective in these properties.

In bureaus and leagues like those mentioned, the financial aspect properly has been overshadowed by their humanitarian aspirations. It is also to be noted that these organizations maintain a permanent staff to keep



SAFETY FIRST—CHICAGO BUREAU OF SAFETY INSTRUCTIONS, SHOWING TWO WRONG WAYS (FIRST AND SECOND ILLUSTRATIONS) AND ONE RIGHT WAY (THIRD ILLUSTRATION) OF USING INSULATED STOOL IN OPENING OR CLOSING DISCONNECTS ON HIGH-TENSION OIL SWITCHES up the interest in the campaign, especially in disseminating safety hints.

PUBLICITY

The newspapers have given most liberal space to the "safety first" campaigns, especially in Montreal, where all the dailies gave full pages gratis to reproduce the Montreal Tramways pictures and warnings. One of them even went to the additional expense of posing its own live models. Of course, regular advertisements have been used in great variety, and it is impracticable to reproduce even a fraction of them. Of those presented, one is a stock advertisement which the Federal Light & Traction Company has placed in a number of newspapers in towns where it operates public utilities. Where possible this announcement is printed with red crosses in the corners. This particular advertisement begins with a reference to the *Titanic* to back up the warning of "Never take a chance." Another good newspaper advertisement is that of the Wichita Railway & Light Company. In this advertisement the "safety first" idea is combined with advice about stops that, if obeyed, will greatly simplify operation.

"SAFETY FIRST"

NEVER TAKE A CHANCE!!!

Just a little over a year ago the greatest ship of modern times left the shores of Europe on her maiden voyage to this country.

Aboard the giant vessel were THREE THOUSAND SOULS, proud to be the first passengers of the QUEEN OF THE SEAS, confident that the ship carried every device for SAFETY

Though far out at sea, passing ships flashed wireless warnings to the liner, the substance was "REDUCE SPEED—DANGER AHEAD!!!"

Still the ocean greyhound sped on, on to DESTRUCTION!!!

The sea, quiet as a mill-pond, appeared safe to everyone aboard. There was no thought of *DANGER*. There was LIFE everywhere. Joy reigned supreme.

ALL OF A SUDDEN — WITHOUT *WARNING*—the *TITANTIC* STRUCK—AN ICEBERG—*AND OVER 1600 HUMAN BEINGS WENT TO THE BOTTOM OF THE SEA!!!*

WHY DID THE ACCIDENT HAPPEN?

"SOME ONE TOOK A CHANCE" it was afterward said.

AND THE SLOGAN "*SAFETY FIRST*" HAS SINCE BEEN RENEWED ON LAND AND SEA WITH INCREASED VIGOR.

NEVER TAKE A CHANCE!

STOP—LOOK—LISTEN.

More people are killed and injured every year in the industries and city streets of this country THAN WERE KILLED AND WOUNDED ON BOTH SIDES DURING THE GREAT CIVIL WAR.

That is why *YOU* are urged to be CAREFUL and IMPRESS IT UPON YOUR CHILDREN.

NEVER touch a dangling or loose wire. It may be charged with electricity.

NEVER cross a street without looking on both sides for passing cars, automobiles, or other vehicles.

NEVER board or leave a moving car.

NEVER alight from a car backwards, always step off facing the front with your right foot first.

NEVER let your children PLAY IN THE STREETS where trolley cars, automobiles, and other vehicles are constantly passing.

ALWAYS wait until the car stops before getting off.

ALWAYS THINK, ACT AND SET THE "SAFETY FIRST" EXAMPLE—DON'T TAKE A CHANCE.

REMEMBER IT IS BETTER TO BE SAFE THAN SORRY.

NO CAMPAIGN FOR "SAFETY FIRST" CAN SUCCEED WITHOUT THE SUPPORT OF THE PUBLIC. WE ASK YOUR CO-OPERATION FOR YOUR OWN SAKE, FOR YOUR FAMILY'S SAKE, FOR THE PUBLIC'S SAKE AND FOR THE SAKE OF "SAFETY FIRST."

SAFETY FIRST—STANDARD FORM OF ADVERTISEMENT WITH SOCIETY FOR ELECTRICAL DEVELOPMENT AND FEDERAL LIGHT & TRACTION COMPANY

Even more numerous than the newspaper advertisements have been the astonishing variety of placards, posters, folders, letters and other printed matter prepared by electric railways on safety matters. The Metropolitan Street Railway, Kansas City, Mo., the Louisville (Ky.) Railway and the Montreal Tramways have prepared chains of car placards, several of which are reproduced. The Denver Tramways has issued illustrated posters showing possible accidents to wagons and automobiles respectively. A very effective scheme used by the Louisville company is to use colored backgrounds such as blue, orange, red, etc., thus presenting its cautions in a new dress at frequent intervals.

The Glasgow Corporation Tramways, the first British company to adopt the "safety first" idea, has developed a series of car posters a novel feature of which, and one flattering to the average Scotchman's knowledge of the Bible, is the use of Scriptural references to book, chapter and verse. A variety of blotters for children was also prepared during the summer for distribution at the opening of the schools in September, 1914. Several of the blotters carry little stories about boys who were injured through carelessness in playing on the streets, etc., and others bear the usual warnings. The Glasgow management recently suggested to the Glasgow Presbytery that the ministers set aside one Sunday in the year for a sermon on "safety first." While the Presbytery did not accept the suggestion in this form it did promise to take up the matter in a way that would lead to the most beneficial results. The management is very well pleased with the results of the campaign to date despite the fact that no elaborate plans have yet been worked out.

For the Benefit of the Public

Don't attempt to get on or off while the car is in motion. It's dangerous to life and limb.

Don't make request of the conductor to stop the car in the middle of a block or slow up, for his instructions are to the contrary. He must refuse you, for we are looking after your safety when we issue orders. Wait until the car stops.

Your welfare is uppermost in our minds, and under our "Safety First" system nothing can happen.

It is the duty of the public also to assist in the "Safety First" plan by using every precaution themselves to prevent accidents.

Safety First

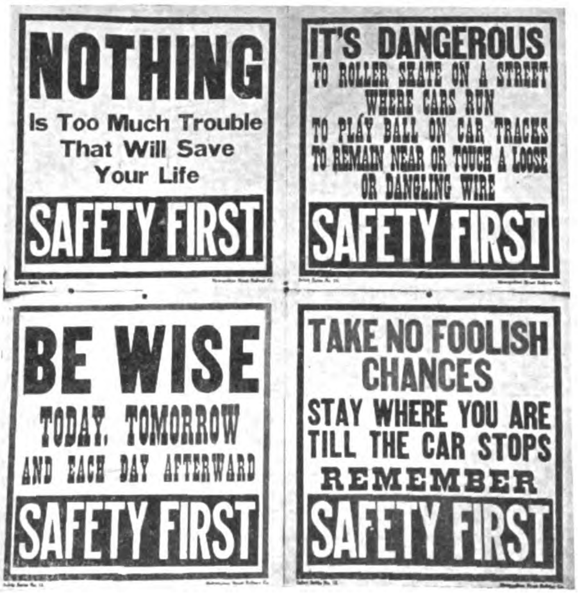
is a "get-together" movement that we suggest. Will you help us? If so the problem of safety and protection to us both is solved.

Cars for Wonderland park will leave corner Main and Douglas at 8:50 a. m. on Sundays for benefit of bathers.

Wichita Railroad & Light Co.

SAFETY FIRST—NEWSPAPER ADVERTISEMENT, WICHITA RAILROAD & LIGHT COMPANY

The decalcomania car sign also has made its appearance on some roads, and that employed by the Chicago Elevated Railways is typical. As this form of publicity is striking in outline as well as artistic in color, it cannot help but attract attention. The decalcomania shown in the accompanying illustration is printed in red and gold. The Montreal Tramways sign of this character is illustrated in the car on page 37.



NOTHING
Is Too Much Trouble
That Will Save
Your Life
SAFETY FIRST

IT'S DANGEROUS
TO ROLLER SKATE ON A STREET
WHERE CARS RUN
TO PLAY BALL ON CAR TRACKS
TO REMAIN NEAR OR TOUCH A LOOSE
OR DANGLING WIRE
SAFETY FIRST

BE WISE
TODAY, TOMORROW
AND EACH DAY AFTERWARD
SAFETY FIRST

TAKE NO FOOLISH
CHANCES
STAY WHERE YOU ARE
TILL THE CAR STOPS
REMEMBER
SAFETY FIRST

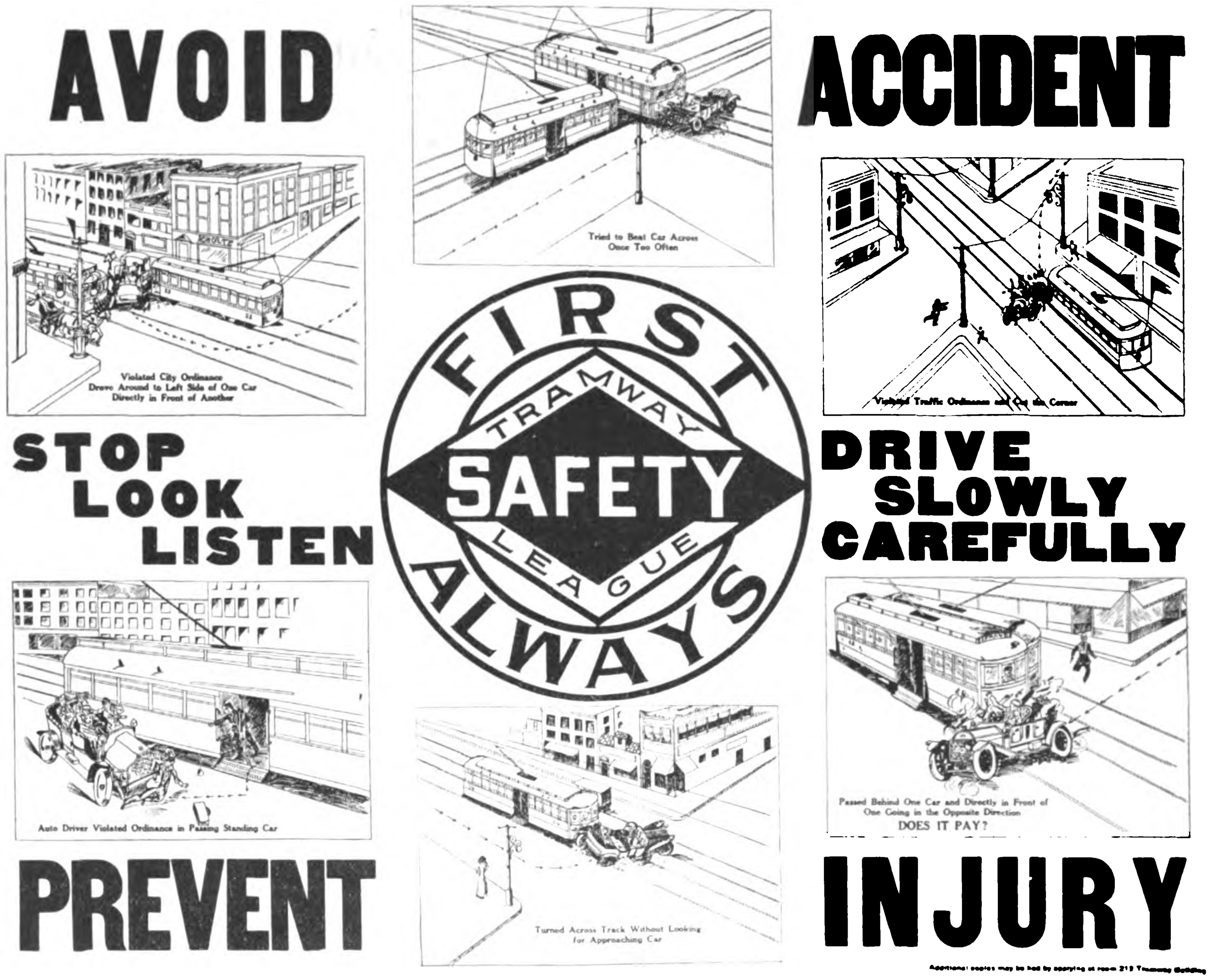
SAFETY FIRST—PART OF A SERIES OF KANSAS CITY CAR POSTERS

HELP
PREVENT
ACCIDENTS
SAFETY FIRST
LOUISVILLE · RAILWAY · SAFETY · LEAGUE

SAFETY FIRST—PLACARD OF LOUISVILLE RAILWAY

OUR SLOGAN
SAFETY
FIRST
MOTORMEN AND CONDUCTORS
OF
LOUISVILLE RAILWAY SAFETY LEAGUE

SAFETY FIRST—PLACARD OF LOUISVILLE RAILWAY


AVOID
ACCIDENT
Tried to Beat Car Across Once Too Often
Violated City Ordinance Drove Around to Left Side of One Car Directly in Front of Another
Violated Traffic Ordinance and Cut the Corner
FIRST
TRAMWAY
SAFETY
LEAGUE
ALWAYS
STOP
LOOK
LISTEN
DRIVE
SLOWLY
CAREFULLY
Auto Driver Violated Ordinance in Passing Standing Car
Turned Across Track Without Looking for Approaching Car
Passed Behind One Car and Directly in Front of One Going in the Opposite Direction
DOES IT PAY?
PREVENT
INJURY
Additional copies may be had by applying at room 219 Tramway Building

SAFETY FIRST—A PLACARD OF DENVER TRAMWAYS, SHOWING SIX POSSIBLE KINDS OF ACCIDENTS TO AUTOMOBILES. A SIMILAR PLACARD IS ISSUED FOR WAGON DRIVERS

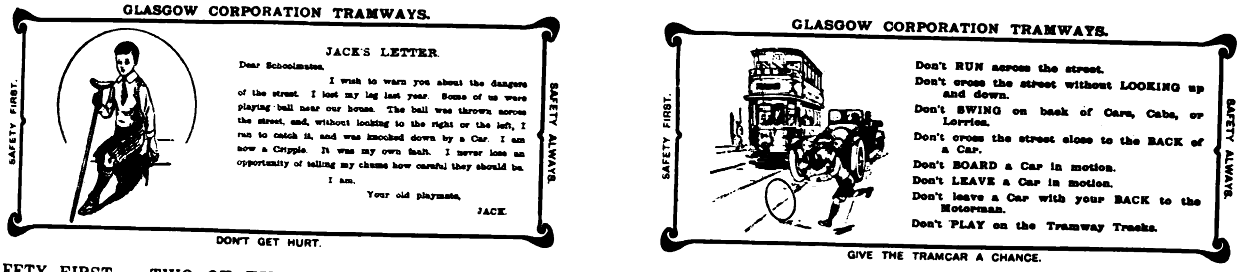
PRENEZ GARDE
ARRETEZ
REGARDEZ ECOUTEZ

SAFETY FIRST—MONTREAL TRAMWAYS WARNING MEANING "TAKE CARE," "STOP," "LOOK," "LISTEN"

PRENEZ GARDE
TRAVERSEZ
AUX TRAVERSES SEULEMENT

SAFETY FIRST—MONTREAL TRAMWAYS WARNING TO CROSS THE STREETS ONLY AT CROSSINGS

In its advertisements, the Boston Elevated Railway has discussed one kind of accident at a time, while the International Railway, Buffalo, N. Y., has treated separately all accidents which have occurred during a given time at a given block or crossing. Both of these ways of segregating statistics have shown good results. The Public Service Railway, Newark, N. J., finds department stores effective distributors of those pamphlets which show women how to get on and off cars, particularly when they are carrying packages. During the summer the Montreal Tramways gave 50,000 "safety first" fans to the ladies at Montreal, the moving picture houses and the annual picnic being used for the distribution.


GLASGOW CORPORATION TRAMWAYS.

SAFETY FIRST.

JACK'S LETTER.

Dear Schoolmates,

I wish to warn you about the dangers of the street. I lost my leg last year. Some of us were playing ball near our house. The ball was thrown across the street, and, without looking to the right or the left, I ran to catch it, and was knocked down by a Car. I am now a Cripple. It was my own fault. I never lose an opportunity of telling my chums how careful they should be.

I am,

Your old playmate,

JACK.

SAFETY ALWAYS.

DON'T GET HURT.

GLASGOW CORPORATION TRAMWAYS.

SAFETY FIRST.

- Don't RUN across the street.
- Don't cross the street without LOOKING up and down.
- Don't SWING on back of Cars, Cabs, or Lorries.
- Don't cross the street close to the BACK of a Car.
- Don't BOARD a Car in motion.
- Don't LEAVE a Car in motion.
- Don't leave a Car with your BACK to the Motorman.
- Don't PLAY on the Tramway Tracks.

SAFETY ALWAYS.

GIVE THE TRAMCAR A CHANCE.

SAFETY FIRST — TWO OF THE BLOTTERS DISTRIBUTED AMONG SCHOOL CHILDREN BY THE GLASGOW CORPORATION TRAMWAYS

Other forms of publicity include monthly publications, such as those of the Detroit United Railway's *Safety*, the Chicago Bureau of Safety's *Safety Bulletin* and the United Gas Improvement Company's *Safety News*. Aside from advice and warnings the articles in these magazines contain many practical hints with illustrations to show how certain kinds of accidents are caused, how they can be avoided and how first aid should be applied. Thus, a recent issue of the *Safety Bulletin* contained a series of pictures to teach the safe way of handling the disconnects of high-tension switches. The instructions which appeared under the illustrations on page 38 follow:

SAFETY
IS
FIRST AID
TO
UNINJURED

FOR VEHICLE WORKERS
1st THESS.
5th CHAP.
6th VERSE

GANG
WADILY

ALWAYS FACE FORWARD
PROVERBS
3rd CHAP.
23rd VERSE

SAFETY FIRST—CAR PLACARDS OF THE GLASGOW CORPORATION TRAMWAYS

The first Biblical reference reads: "Therefore let us not sleep as do others; but let us watch and be sober." The second reads: "Then shalt thou walk in thy way safely, and thy foot shall not stumble."

(First Illustration)
The Wrong Way

The operator has neglected to move insulated stool after pulling disconnect from compartment directly in line with it. In this unsafe position he attempts to open or close an adjacent disconnect and thoughtlessly allows one foot to rest on the concrete floor.

This position is extremely hazardous.

(Second Illustration)
The Wrong Way

Rubber mat directly in front of adjacent compartment, and not of compartment from which disconnect is to be pulled, because the workman did not place the rubber mat in front of the compartment where he is working. He has thoughtlessly allowed one foot to rest on the concrete floor.

The position illustrated is very hazardous.

(Third Illustration)
The Right Way

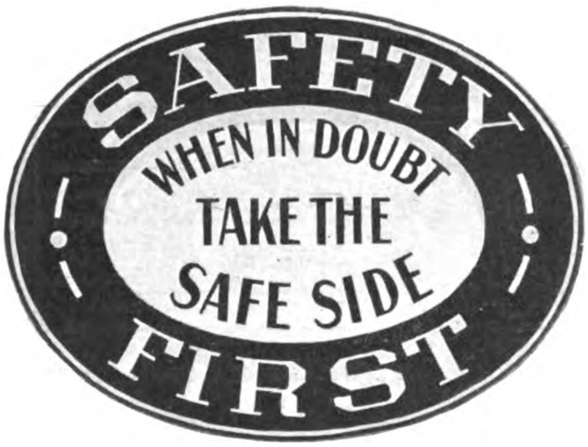
Have oil switch in series open and ample light on disconnect. Have insulated stool or rubber mat placed directly in front of and at a convenient distance from the disconnect which is to be pulled or replaced.

Stand firmly with both feet on insulated stool or rubber mat, and with the aid of properly tested rubber gloves and clip puller, remove or replace disconnect. Use particular care not to lose your balance.

Perhaps the most elaborate form of publicity is the "safety first" instruction car of the Detroit United Railway and the "safety first" publicity car used by the Boston Elevated Railway. The Beaver Valley Traction Company, New Brighton, Pa., uses 5-ft. x 4-ft. spaces on its park theater curtain to convey this message: "Safety First Means—Wait Until the Car Stops."

While the stenciling of the words "safety first" on all kinds of railroad property has become extremely common, too much should not be expected from this kind of reminder, because its excessive use means that it will soon be read unthinkingly. Permanent success can come only by devising features which will continually renew the interest of the public and employees. However, the fact that organizations like the Southwestern Gas & Electric Association and the New York State Electric Railway Association last year devoted entire conventions to safety topics give good ground for belief that stagnation of ideas in this field is far away.

Of course, the "safety first" campaign has not been merely a question of talking and advertising, for this kind of work would have little lasting effect if it were not backed by tangible evidence that the railway companies were anxious to do their share to eliminate dangerous conditions. So far as city railways are concerned, the effect of prepayment cars in reducing platform accidents is generally admitted, but such accidents are being reduced still further by the use of the fully vestibuled car, even in cities where temperatures are never low. Thus on the Jackson (Miss.) Light & Traction Company's lines fully-vestibuled cars are declared to have practically eliminated boarding and alighting accidents. Again, the Oklahoma Railway reports that the addition of folding doors and steps and the elimination of outside grab handles cut alighting accidents 75 per cent during the first month. In fact, the aim for safety is evidenced still further by the use of doors which cannot be opened while the car is in motion. The step heights of modern cars are also much more moderate through the use of ramped floors, wells, baby motors, etc. The Portland (Ore.) Railroad, Light & Power Company and the New York State Railways—Rochester Lines, have actually rebuilt open cars to the center-entrance low-step design for reasons of safety alone.



SAFETY FIRST—DECALCOMANIA SIGN, CHICAGO ELEVATED RAILWAYS

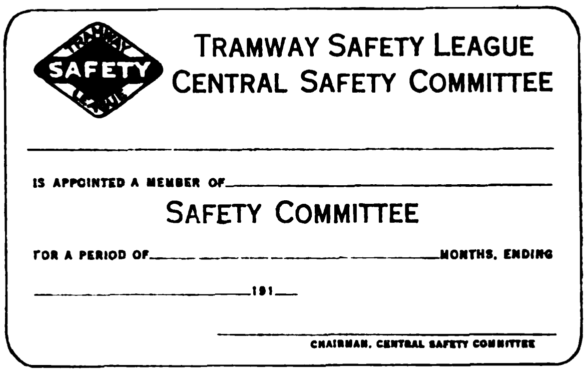
The reduction of street-crossing accidents has been promoted by an extensive increase in the number of cities using the near-side stop. Thus the files of the ELECTRIC RAILWAY JOURNAL for the past three years record the change from far-side to near-side stops in about forty cities of all sizes and every part of the country. One of the latest large cities to adopt the near-side stop is New York, where its use became effective Sept. 1, 1914. In the preceding year the Brooklyn Rapid Transit System gave its patrons opportunity to express their preference in this matter, and of the votes received 181,764 were in favor of the near-side stop and only 17,128 votes were against it. In practically every case the chief reason offered for the change to the near-side stop, whether made voluntarily by the railway or arbitrarily by local ordinance, was the reduction of crossing accidents. In but one recorded case, that of the Tri-City Railway, which operates at Rock Island, Ill., was the far-side stop resumed after a trial of near-side operation. The agitation by citizens' safety committees concerning crossing stops has frequently disclosed and led to the cure of bad paving and lighting conditions, thereby absolving the electric railways from blame for accidents that had hitherto been ascribed to them.

Interurban railways are giving more thought than ever to signal systems, as is evident from the great increase in trolley contact and track signal installations. Reports from employees' safety committees have been largely instrumental in calling attention to danger points along the right-of-way, such as depressions along the road and obstructive trees at curves. Thus on the Beaver Valley Traction Company, New Brighton, Pa., the following improvements were made at the suggestion of the trainmen:

Removal of poles too close to the track; changing the location of derailing switches at railroad crossings; requiring the motorman to give two bells to the rear platform on the conductor's signal bell before proceeding over a railroad crossing, when the conductor is in front of the car and flagging the same over the crossing; the painting of an 8-ft. deep white strip on the third trolley pole approaching all railroad crossings, sharp curves and other dangerous places where during fogs the motorman might have trouble in locating his whereabouts; installation of hand-operated sand levers instead of foot pins; relocation of arc headlight buttons so that these lights can be switched off when approaching other cars or automobiles; the installation of warning signs at road crossings and the relocation of signal light boxes.

An important contribution to safety rules is that prepared lately by the bureau of standards, Department of Commerce, as Circular No. 49. The present rules, which are open to suggestions from operators, include all portions of work on or about power and signal lines and the electric equipment of central stations, substations, mines and testing departments. The first two parts consist of general rules which apply to the employer and employee respectively, and the third part consists of special rules which apply particularly to employees. Rules for employees in general are subdivided into six groups. The first enumerates those general precautions the necessity for which seems obvious but non-compliance with which is nevertheless responsible for many injuries. The second presents general operating rules, defining the duties and relations of those employees who direct others and the operating methods by which safety is secured. The third group prescribes the precautions for handling live parts under varying conditions of voltage and location. The fourth and fifth deal with the procedure for assuring the continued safety of work about normally live or moving parts respectively by avoiding all possible sources of misunderstanding in killing parts. The sixth group covers in some detail the procedure for making protective grounds and short circuits.

Special rules for employees cover separately the special hazards of work about electrical equipment in stations, at switchboards, about overhead lines, in arc-lamp attendance, on underground lines, meter setting, testing and in tunnel work. Each class of worker is directed to familiarize himself also with the preceding general rules which apply to all classes of electrical employment. By this arrangement, a more adequate and convenient treatment has been realized without unnecessary repetition. In an appendix the value of organized accident prevention work through safety committees is emphasized as a means for reinforcing the effectiveness of safety rules. The report on this sub-


TRAMWAY
SAFETY
LEAGUE

TRAMWAY SAFETY LEAGUE
CENTRAL SAFETY COMMITTEE

____

IS APPOINTED A MEMBER OF______________________________

SAFETY COMMITTEE

FOR A PERIOD OF________________________MONTHS, ENDING

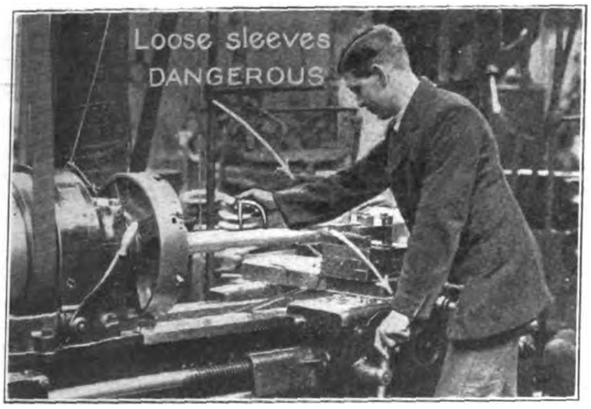
________________________191__

____
CHAIRMAN, CENTRAL SAFETY COMMITTEE

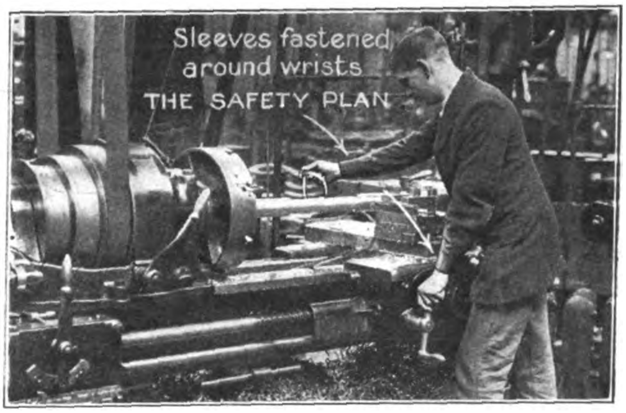
SAFETY FIRST—SAFETY LEAGUE COMMITTEE APPOINTMENT BLANK ject by the accident prevention committee of the National Electric Light Association is briefly abstracted, and citations are made from the reported organizations and methods of several large and some small electrical utilities.

SAFETY CO-OPERATION WITH EMPLOYEES

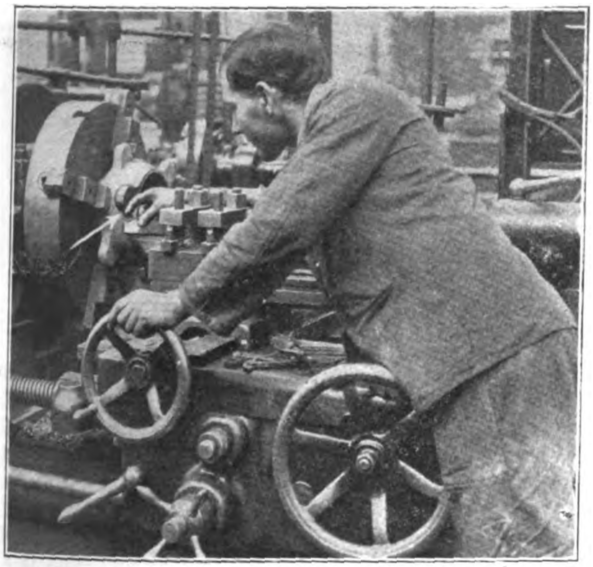
The Cleveland, Columbus & Southwestern Railway gave accident talks to trainmen as early as 1908, but the employees' committee plan is a later development which has met with very gratifying results. Among the companies which have organized such committees are the Chicago, South Bend & Northern Indiana Traction Company, where the title of the committee is "Safety and Efficiency." On the San Francisco-Oakland Terminal Railways the executive and advisory committees are permanent in order to maintain the continuity of the work, but the divisional and departmental committees are appointed for terms of four months only, so that a large number of employees get a taste of executive responsibility in the course of the year. The executive committee meets once a month and the remaining committees twice a month. Monthly meetings are also in vogue on the Pacific Electric Railway, Los Angeles, Cal., with moving pictures as a feature in educating the trainmen. On the Union Traction Company of Indiana there is a general safety board and five local safety committees. The department head is a permanent member of each committee, and the members, numbering fourteen to fifteen per committee, are appointed for six months each.



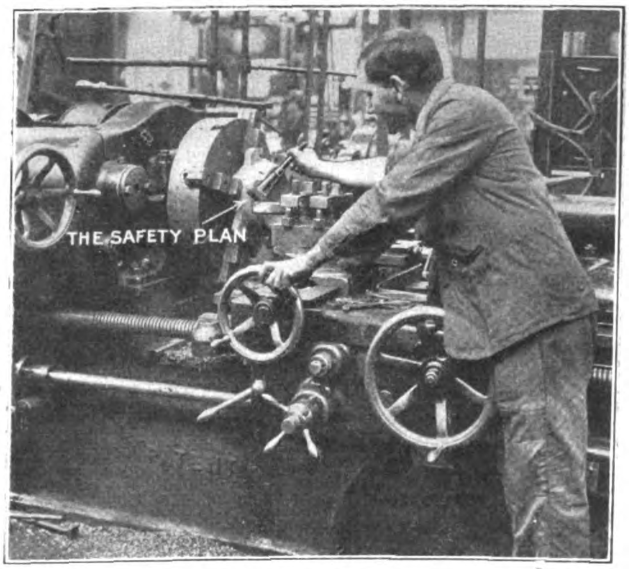
SAFETY FIRST—GREAT WESTERN RAILWAY—SHOWING DANGER OF LOOSE SLEEVES



SAFETY FIRST—GREAT WESTERN RAILWAY—TIGHT SLEEVES AVOID ACCIDENT



SAFETY FIRST—GREAT WESTERN RAILWAY—DANGEROUS TO PICK UP STEEL CHIPPINGS BY HAND

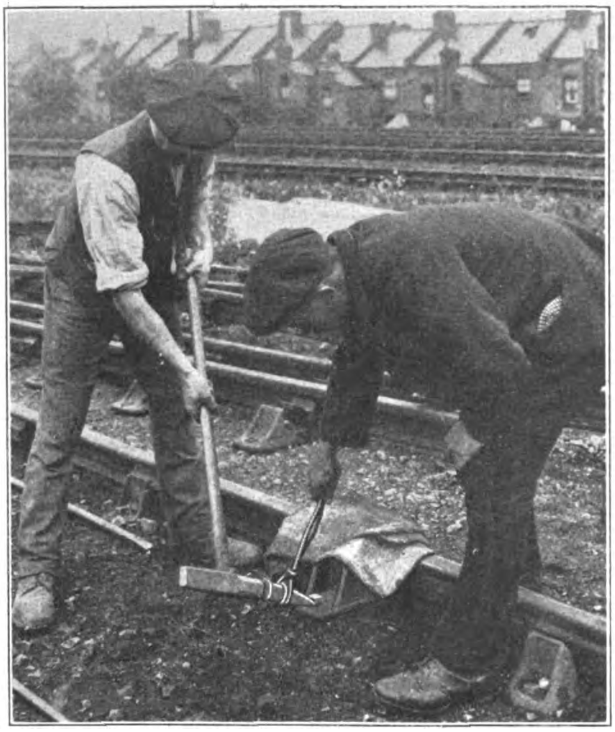


SAFETY FIRST—GREAT WESTERN RAILWAY—USE OF BRUSH TO CLEAN UP STEEL CHIPPINGS

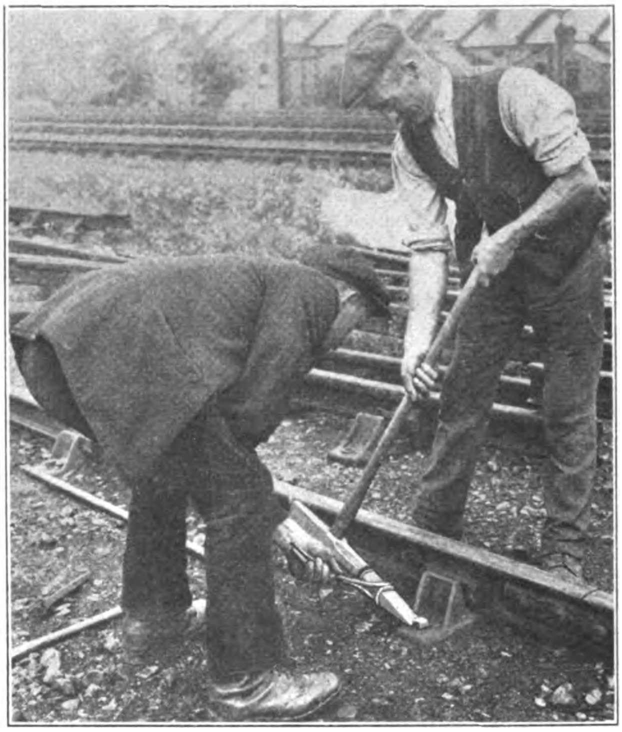
Since Nov. 1, 1913, the former discipline board of the Hudson & Manhattan Railroad, New York, has been converted to a sub-safety committee. The latter committee, reporting to the general safety committee, is composed of one motorman, one switchman, one conductor and one station agent. It meets with the general safety committee on Thursday of each week. Any employee may offer safety suggestions through the sub-safety committee member in his department. For each safety suggestion which is subsequently adopted, the employee receives appropriate merit marks and a safety pin or button.

On the Chicago, South Bend & Northern Indiana Railway the work was organized in August, 1912. The committee as a whole meets at the office of the general manager the second Monday of each month, at which time reports of defects are gone over and checked up and such questions as are brought up in the matter of efficiency or further protection are discussed and settled. During the first six months of this committee's life 101 cases were brought up and disposed of. During the second six months ninety-two cases were handled. During the third, sixty-eight cases, and during the fourth six months fifty-three. The management feels that the movement has been extremely profitable. It has not as yet gone into any expensive or extensive general campaigns, although it expects to inaugurate poster work during the present winter. On the Kentucky Traction & Terminal Company's system at Lexington the claim agent is chairman of an employees' safety committee numbering ten men. In Denver members of the departmental safety committees are furnished with cards like that on page 42. The Brooklyn Rapid Transit System is probably the largest electric railway in the world numbering platform men on its depot safety committees.

The work of the general safety board and publicity campaign has produced on the Detroit United Railway a decrease in collisions of 25 per cent during the first six months of the safety campaign. Again, on the lines of the Northern Ohio Traction Company, Akron, Ohio, intensive employees' committee work reduced fatal accidents from eighteen during the first seven months of 1913 to nine during the corresponding part of 1914, while the injuries decreased from 131 to forty-seven. The latter company makes it a point to analyze every accident in circular letters to all employees interested.



SAFETY FIRST—GREAT WESTERN RAILWAY—SAFE WAY BECAUSE THE BAGGING WILL CATCH THE BOLT HEAD

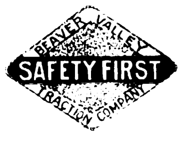


SAFETY FIRST—GREAT WESTERN RAILWAY—DANGEROUS BECAUSE THE BOLT HEAD MAY FLY AND HIT SOMEONE

The "safety first" organization on the Spokane & Inland Empire Railroad at Spokane and Oregon Electric Railway and United Railways at Portland is a part of the general organization on the Spokane, Portland & Seattle Railway and affiliated lines which was started in January, 1913. The organization consisted of a general committee of seven general officers and two division committees of employees from each branch of the service, one at Portland and one at Spokane. These committees met once each month and considered suggestions made by the employees for the prevention of accidents. These suggestions were first considered by the division committee and referred to the officer in charge of the division or shop for investigation and action, or to the general committee if the suggestion called for a change in standards or rules. Considerable interest in the movement was shown by the men and it is believed that much good was accomplished in that conditions were made more safe and the men were urged to use greater care in the performance of their duties. Comparison of accidents occurring during the year ending June 30, 1914, with the previous year shows a considerable reduction in the number of serious accidents, and it is believed that in a great measure this was due to the campaign for "safety first."

Recently a change has been made in the safety organization by abolishing general and division committees. The work is now being handled by the bureau of safety and efficiency, in charge of the general claim agent. Suggestions made by the employees are sent to and handled by the superintendent of the division or shop, and after being acted upon are forwarded to the general claim agent's office with recommendation or advice of action taken. All accidents are investigated to determine the cause and apply a preventative remedy, and it is expected that by this method they will get better and quicker results.

Quite a variety of "Safety First" insignia has been developed in the form of enameled or gold plate buttons and watch fobs. In Atlanta employees of the Georgia Railway & Electric Company carry fobs marked "Atlanta Public Safety League," but ordinarily the wording on the buttons or the fob is "Safety First" or "Safety League." The Beaver Valley Traction Company's button made in red, white and blue is so popular with the trainmen that they want two, one for their uniform and one for citizen's dress.



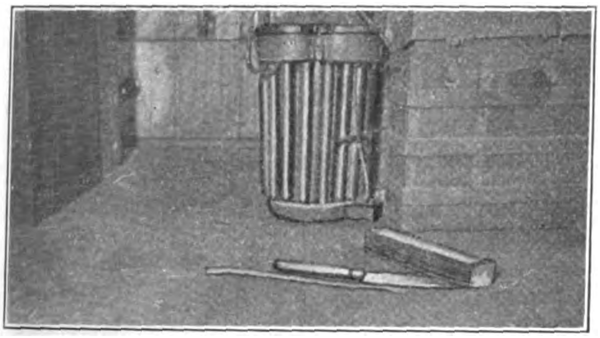
SAFETY BUTTON

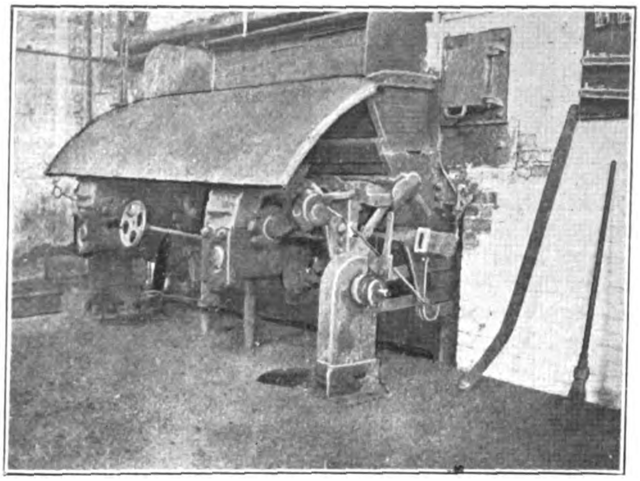
Of course, co-operation with the men has not been confined entirely to safety committee work. A good plan seems to be that of the Union Traction Company of Indiana which sustains the interest of the trainmen in other ways by offering them prizes up to $15 for suggestions or essays on accident and prevention. The granting of prizes is made the occasion of a banquet where company matters can be discussed informally.

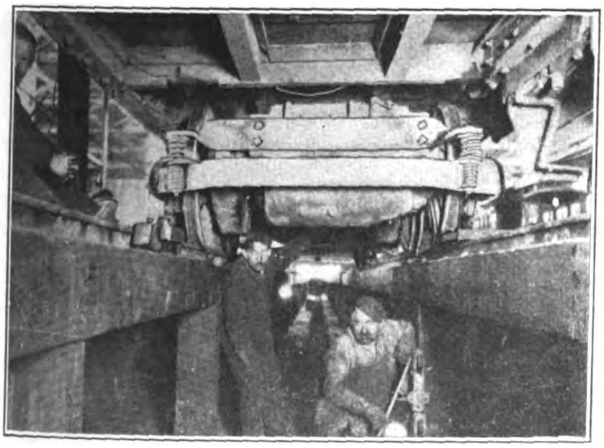
The Louisville (Ky.) Railway has set aside a safety fund of approximately $35,000 which is distributed by giving each motorman and conductor 1 cent an hour in addition to the regular platform rate. The distribution of this fund is to be operative during the year commencing June 1, 1914, and terminating May 31, 1915. Aside from this stimulus the company has employees' committees consisting of one conductor or motorman from each carhouse to constitute a committee of eleven which meets every two weeks with the heads of all departments to discuss methods of accident prevention. Every committeeman serves one month. Blanks on which safety suggestions may be written are distributed also among all the men.

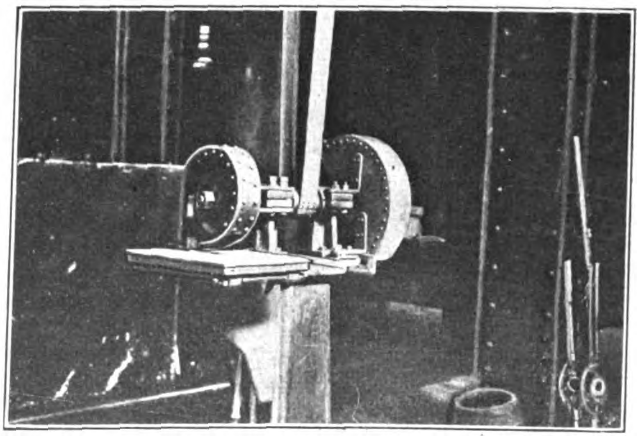
The chauffeurs of the General Omnibus Company, Paris, also share in a safety fund. They are paid a monthly premium of 16 francs 65 centimes, or about $3.33, for a good accident record. If a chauffeur succeeds in obtaining this premium for three consecutive months he is entitled to another premium of $3.33 so that it is possible in a year for one man to obtain sixteen premiums of $3.33 on account of his accident record. London bus drivers are also rewarded for avoiding accidents.

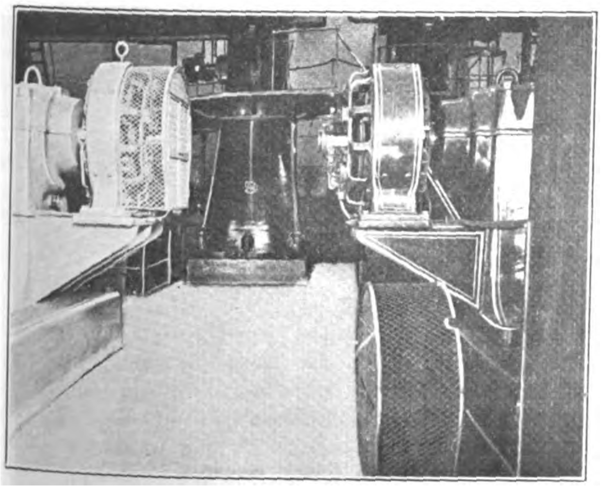
The Boston, San Francisco-Oakland and other rail-

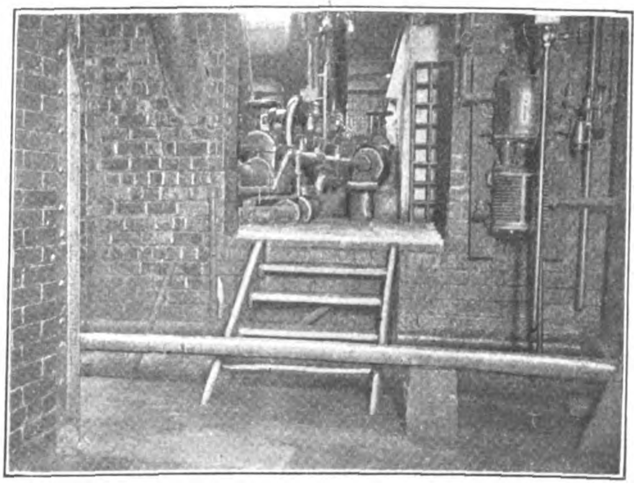

SAFETY FIRST—TRIPPING HAZARD, SHARP CLEAVER FOUND IN PASSAGEWAY


SAFETY FIRST—GUARD MADE FOR STOKER DRIVING MECHANISM, TO PREVENT INJURY


SAFETY FIRST—TAKING OFF CRACKED MOTOR SUPPORT, MOTOR NOT BLOCKED TO PREVENT INJURING MEN


SAFETY FIRST—GUARDS FOR EMERY WHEELS, WHICH WERE MADE BY THE EMPLOYEES


SAFETY FIRST—COMMUTATOR GUARDS WHICH ARE USED ON EXCITERS FOR FREQUENCY CHANGERS


SAFETY FIRST—TRIPPING HAZARD, A PIPE PLACED DIRECTLY IN FRONT OF STAIRWAY TO BOILER ROOM

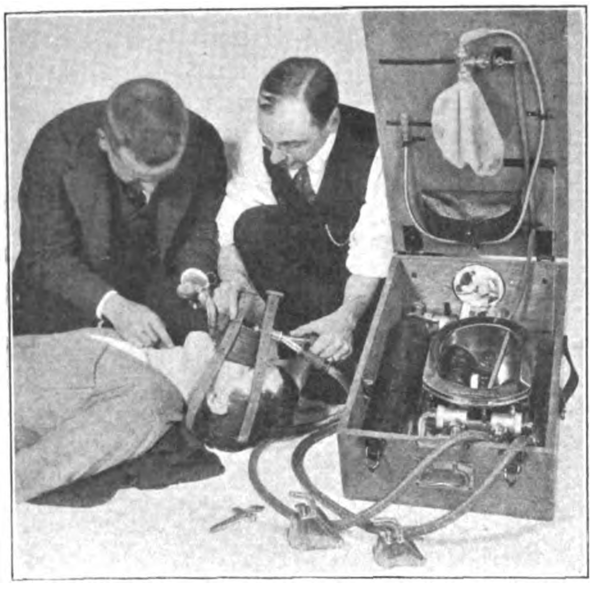
ways have made use of safety charts or bogie boards. These are analyses of the number and kind of accidents occurring during given periods on each division and the object in displaying them is to encourage competition for their reduction.

Unique bristol board safety cards reminding the men of certain risks supplement the work of the safety club of the Kansas City, Clay County & St. Joseph Railway. These cards may be regarded as ticklers to revive flagging interest. Incidentally a special card is dropped casually by the trainmen in places where trespassers are likely to pick them up and thus read timely warnings of the dangers that they risk. The Chicago Tunnel Company sends postcards to the homes of its men asking their dependents to preach the gospel of safety to their relatives in its employ.

PROTECTIVE DEVICES

While the greatest service of "safety first" among employees is to eliminate the foolhardiness or recklessness of men who have become accustomed to working under risky conditions, it is as essential to protect even deliberate carelessness by means of protective equipment. The spur of a workmen's compensation act should not be necessary to call for the use of such devices. In this respect the American electric railways have lagged far behind Europe. A beginning for the better has been made in some shops where belting is screened and dangerous parts of tools are shielded. At the car maintenance depots of one company a red flag is placed on the car by the man who is to work under it and this flag must not be removed by anyone else under penalty of discharge. Eye troubles from babbitt shavings may be easily avoided, and no shop can be said to be safely equipped unless cranes and hoists are provided in ample number to make it unnecessary for the men to lift any extraordinary weight or to take unnecessary chances with jacks.

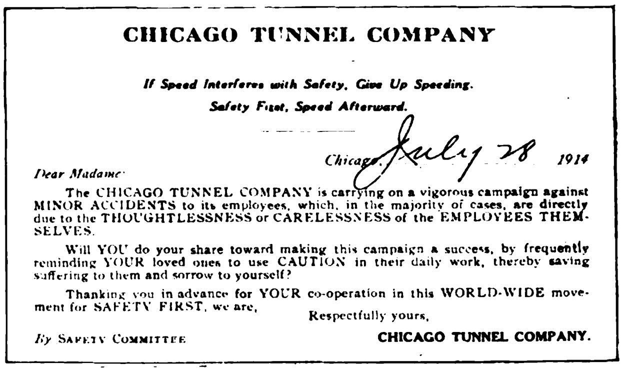
As accidents may be unavoidable even under the best conditions, it is good practice to provide medical and surgical kits in shops and at other places where large groups of men are employed at some distanace from drug stores and physicians. These kits are now made in standard packages by surgical manufacturers, in accordance with their own experience or in accordance with the specifications of the railway physicians and surgeons. In addition some systems, like the Hudson & Manhattan Railroad, New York, have pulmotor installations at the places where high-tension apparatus is used. The pulmotor demonstration illustrated was reproduced in the Hudson & Manhattan Company's employees' booklet "Safety Hints" by permission of the National Electric Light Association.



SAFETY FIRST—VIEW OF PULMOTOR INSTRUCTIONS IN HUDSON & MANHATTAN RAILROAD'S BOOKLET

TYPES OF ACCIDENT HAZARDS AND METHODS OF PREVENTION

As a supplement to the foregoing remarks it is of value to reproduce a fraction of a large number of instructive pictures taken by G. O. Smith, supervisor of safety, Doherty Operating Company, in the course of his work. These illustrations show a few of the accident hazards of the more common type, with which managers of electric railway companies have to contend. They also show certain methods which are used to prevent accidents, such as guards, protection for apparatus, non-slipping ladder shoes, etc. The hazards shown have either been eliminated or plans have been prepared to make the necessary changes to prevent accidents. Mr. Smith's views are published on page 45.



CHICAGO TUNNEL COMPANY

If Speed Interferes with Safety, Give Up Speeding.
Safety First, Speed Afterward.

Chicago, July 28 *1914*

Dear Madame:

The CHICAGO TUNNEL COMPANY is carrying on a vigorous campaign against MINOR ACCIDENTS to its employees, which, in the majority of cases, are directly due to the THOUGHTLESSNESS or CARELESSNESS of the EMPLOYEES THEMSELVES.

Will YOU do your share toward making this campaign a success, by frequently reminding YOUR loved ones to use CAUTION in their daily work, thereby saving suffering to them and sorrow to yourself?

Thanking you in advance for YOUR co-operation in this WORLD-WIDE movement for SAFETY FIRST, we are,

Respectfully yours,

By SAFETY COMMITTEE **CHICAGO TUNNEL COMPANY.**

SAFETY FIRST—POSTAL CARD SENT TO THE DEPENDENTS OF EMPLOYEES AS A CAUTION REMINDER

Statistics show that it is usually the simple, apparently insignificant hazard which causes the most trouble; that it is not the unprotected high-tension apparatus nor the unguarded flywheel, but rather the wheelbarrow carelessly left in front of a doorway or the improper placing of materials on shelves without protective risers. It should be the endeavor of every claim department and safety organization in all classes of public utility companies to watch carefully for these minor types of hazards and see that the property is kept free of them. Mr. Smith states that an accident prevention campaign around a power plant usually is found to be more in the nature of a general house-cleaning than a case for spending much money to put in expensive guards and other safety appliances for machinery, etc.

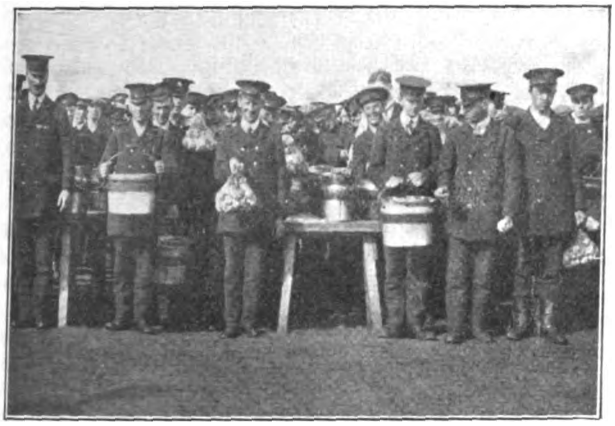
Nearly all of the photographs taken by Mr. Smith have been used in the form of lantern slides, and some will be used in the form of posters to show the men how simple can be the cause of a serious accident.

Under the title of "Trade Opportunities in South America," the New York, New Haven & Hartford Railroad has issued a 27-page pamphlet dealing with South American statistics and general information. Tables showing exports and imports to the Central and South American countries are presented, together with sections describing conditions relative to packing, credits, language, currency, postal and weight systems, steamship service, postal regulations and population.

Glasgow Railway Men As Soldiers

More than 1700 Out of a Total of 6100 Employees Are Now in Military Service—Glasgow Drained Dry of Free Briar Pipes for the Warriors

When war was declared on Aug. 4, 1914, a very large number of the men of the Glasgow Corporation Tramways, more especially of the motormen and conductors, were called up. At that time the Corporation had 592 reservists in the service. These men had immediately to hand in their uniforms, and they have been at the front almost from the start. A large number have been wounded and have spent some time at home in Glasgow. Most of these men, however, have already returned to the firing line. Almost every day, in fact, men who have been wounded call to see James Dalrymple, general manager, before returning to duty in France.



GLASGOW'S RAILWAY SOLDIERS—IN WAR TIMES THE SCOTCH LADS FORGET THEIR LOYALTY TO HAGGIS

Early in August all the men of the staff who were members of the local territorial battalions were also called up. The Corporation Tramways had, in all, 330 of this class. These men are now either on the firing line or are preparing for active service in their various training camps.

About the middle of September the municipality of Glasgow offered to raise and equip two battalions of 1100 men each for the government. On the day that the magistrates committee decided to put this recommendation before the Corporation, Mr. Dalrymple sent out a notice to all the depots of the department asking for volunteers for one of the city battalions, should these be formed. The following morning 1100 names were handed in. Some of these men were, of course, not accepted, but the "First Glasgow" is, for the most part, composed of tramwaymen. The men who were accepted for service were at once sworn in and sent off to camp, where they are still under training and are in the pink of condition. The Tramways arranged to let them keep their tramway uniform until they received their khaki. Their new regimentals have since been sent on to camp, and by this time every man has been thoroughly equipped for active service. One half

GLASGOW'S RAILWAY SOLDIERS—STRENGTHENING LIMBS AND WIND BEFORE THE DAYS OF KNAPSACK AND RIFLE

GLASGOW'S RAILWAY SOLDIERS—PIBROCH AND DRUM IN A RECRUITING PARADE SET SCOTTISH HEARTS ASTIR

GLASGOW'S RAILWAY SOLDIERS—GRUELLING RECRUITS IN CALISTHENICS DURING THE EARLIER DAYS OF CAMP TRAINING

of the battalion is made up of married men, and the average age of the whole battalion is twenty-seven and a half years. No one in the battalion is less than twenty-one, and no one is more than thirty-five years of age.

Recently the Tramways have been losing a number of men who are past the fighting age. These men are joining what is called the national reserve, and their work will be the guarding of bridges, railways, shipyards and other vulnerable points. Possibly also these men may get the work of guarding prisoners of war. Up to Dec. 14, 1914, the total number of men who had left for active service was 1711. The normal staff numbers 6100. Up to the date named the number of men killed in service had been nine.

That the British soldier of to-day deserves the designation of "best-paid" appears also from the co-operation of the Glasgow Corporation Tramways with the government. Thus the department is making up the income of the wives of the married men who have left the service to two-thirds of their husbands' pay. This sum includes the government separation allowance but does not include any allowance for children or any allotment which the soldier may make from his own pay. In general, therefore, the wives and dependents of the men are as well off, financially, as they were when their husbands were at home.

Single men, without dependents, get one-third of their wages. This weekly allowance is either kept for the soldiers or is paid over to any one who may be designated by them.

The Second Battalion, which has been raised and equipped by the municipality, is chiefly formed of old officers and men of the Boys' Brigade. This battalion is being trained in the same camp as the First Battalion at the Gailes territorial camping ground about 2 miles north of Troon.

The Tramways department is also doing a good deal in the way of recruiting among the general public. Illuminated cars are sent out during the evenings, and, in addition to these cars, there is always a second car with a band. Sometimes these cars are followed by four other cars full of soldiers, who, of course, usually make an abundance of noise. These cars stop for a few minutes at important points on the route, and the crowds on the street are addressed by a rousing speaker.

In addition to the above, the staff has been enthusiastic enough to collect from passengers and others old briar pipes, which, after being cleaned, repaired and disinfected, are sent out to the troops at the front. The Tramways department has already dispatched considerably more than 20,000 pipes, and Mr. Dalrymple receives every day numerous letters from the troops thanking the staff of the department for gifts. As Glasgow has now been drained pretty dry Mr. Dalrymple is endeavoring to get people throughout the other towns in Scotland interested in the collection of pipes.

The following are extracts from recent letters of Glasgow railway men: Horace Jowl, who is in the Army Service Corps, said "that they were now feeling

GLASGOW'S RAILWAY SOLDIERS—THE FIRST GLASGOW BATTALION OF STURDY RAILWAY SCOTS AT GAILES CAMP

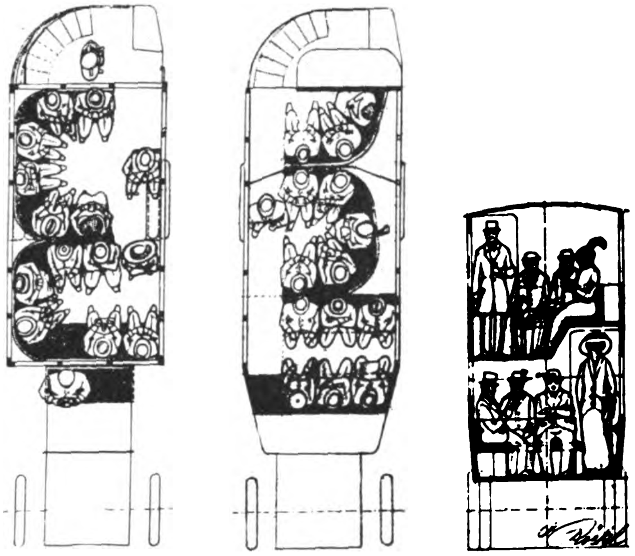
GLASGOW'S RAILWAY SOLDIERS—A LESSON IN CUT AND COVER TRENCH CONSTRUCTION the pinch of both the war and winter, but they were contented with the knowledge that they were doing their best for King and country." A. E. Simmons, who is attached to the anti-aircraft section, in his letter said: "Firing here is going on night and day, and the way our infantry stick it seems to be beyond human endurance. South Africa was a picnic to this as regards firing, but our commissariat is far better than in that war.

"Troops are being very well fed under the conditions that exist at present. It is bitterly cold, and we have had rain for days, then frost, and now the ground is covered with snow, which makes a very pretty picture. We get no news about what is going on, only by a newspaper now and again, so, you see, you know more than us about what is going on. Our section has brought down three or four German aeroplanes that came spying over our lines. Our aeroplanes are very good, and the pilots are very daring. I am pleased to say that the majority of our section are keeping fairly well."

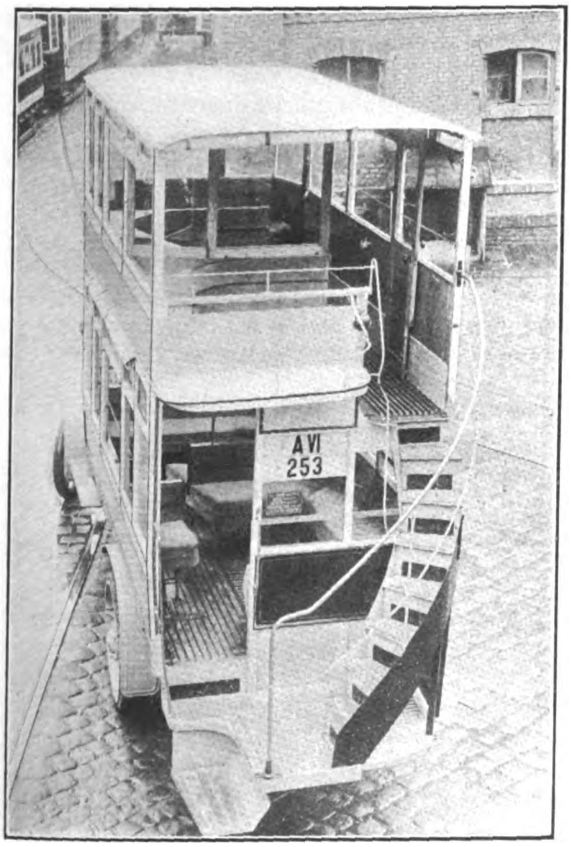
Well Construction of Vienna Auto-Bus

The Vienna Municipal Tramways, after a study of auto-bus designs used in Berlin, Paris and London, and following several experiments of its own, has recently installed a covered double-deck construction of the type shown in the accompanying illustrations. The most interesting feature of the new design is the use of wells whereby a most efficient seating arrangement is secured within the minimum over-all height, 14.4 ft. The cross-sectional view shows that this was obtained by lowering that part of the upper floor which is directly above the seating on the lower floor. As arranged for gasoline operation the new bus is 16 ft. over the body alone, 19 ft. from the front of the body over the rear stairway and 6.6 ft. over the sides. The lower deck seats fourteen passengers and the upper deck fifteen.

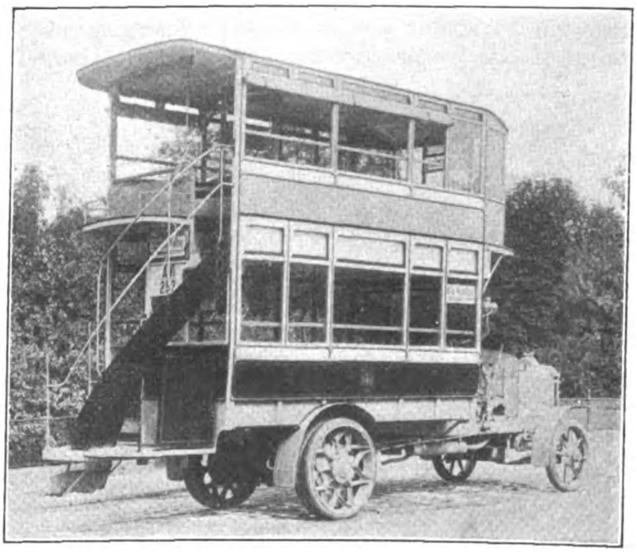
The view of the rear of the bus shows a single seat at the left. This seat is directly over the rear wheel, the housing of which extends through the flooring. Except for this seat a clear aisle 6.1 ft. high is provided to give access to the U-shaped seats, laid out as shown on the plan. The clearance between these seats and the ceiling is 4.8 ft. Passengers for the upper deck use the rear outside stairway which leads to a right-hand aisle 6 ft. high. Alongside this aisle are groups of curved and transverse seats, as illustrated. Another unusual feature is that a partition and door are provided on the upper deck to keep in the open, yet under cover, one three-passenger bench for the convenience of fresh-air lovers. This bus was invented by Ludwig Spängler, director Vienna Tramways.



VIENNA AUTO-BUS—FIRST AND SECOND FLOOR PLANS AND CROSS-SECTION OF WELL-TYPE DOUBLE-DECK BUS



VIENNA AUTO-BUS—REAR VIEW OF BUS SHOWING SEATING ARRANGEMENT



VIENNA AUTO-BUS—SIDE VIEW OF DOUBLE-DECK BUS WITH WELL FEATURES

On Nov. 29, 1914, occurred the twenty-fifth anniversary of operation by electricity of the street railway lines in the city of Ottumwa, Ia.

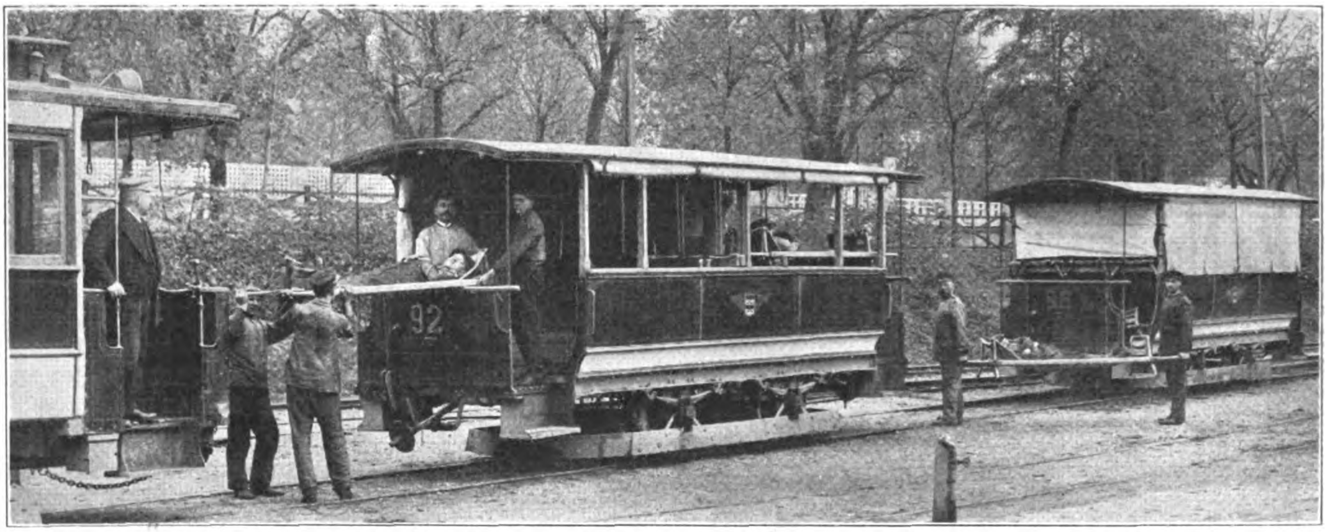
War Hospital Cars in Germany

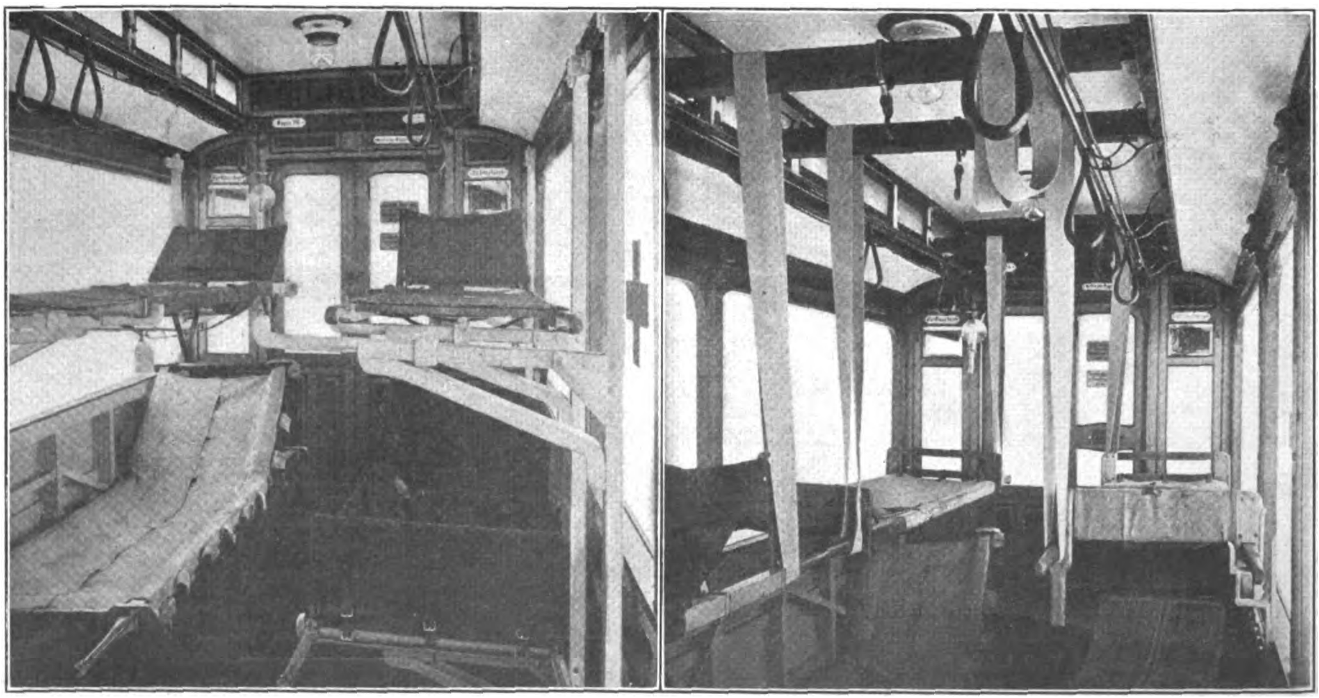
The Tramways Assist in Transporting the Wounded to the Hospitals

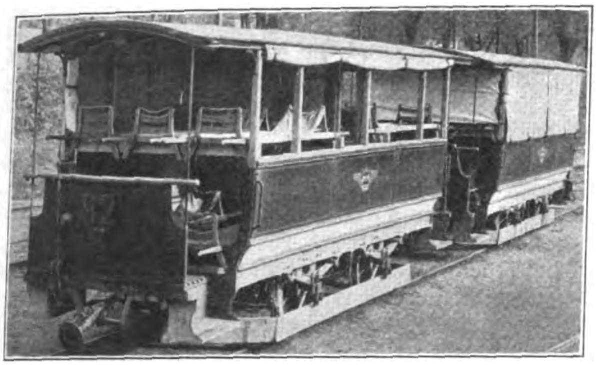
Through the courtesy of Eugen Eichel, editor *Elektrische Kraftbetriebe und Bahnen,* it is possible to present the accompanying data on what a number of the electric railways throughout Germany are doing to assist in the national crisis by the transportation of wounded soldiers.

In general, the soldiers who are wounded at the front are brought back for treatment by steam train to different cities in the Empire, where their proper care can be assured. Upon their arrival by train at the city thus selected they must be transferred from the railroad station to the local hospitals, and the tramways are used very largely for this purpose. The work is carried on in the thorough way so characteristic of German undertakings. A regular service has been inaugurated, and trains of one motor car and one or two trailers are usually provided by the tramway managements. The motor car serves to carry those who are slightly injured, whereas the trailers, which have been especially converted for hospital use with stretchers, etc., care for those men who have to be transported while recumbent. Especial pains are taken to disinfect all rolling stock.

The simplest way of using the trailers, as at Cologne, is to support the handles of the stretchers on the window sills, at right angles to the track. The windows are replaced by weather-proof curtains. Where the cars are wide enough, as at Berlin, the seats have been removed and the cots have been placed at right angles to the track but entirely within the car. However, where the wounded men are to be carried an appreciable distance the less compact but more comfortable plan of placing the cots longitudinally is followed. It is usually possible to leave an aisle for the physician or nurse, and in some cases, as at Breslau, brackets have been installed to carry two tiers of stretchers. If the men require no attention during the trip, the cots are placed three in a row and in double tiers across the car (twelve

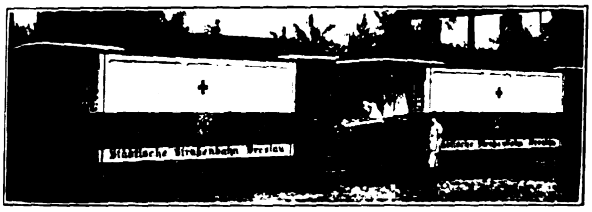

GERMAN HOSPITAL CARS—CARRYING WOUNDED TO BRÜNN TRAILERS BEFORE HAULING TO HOSPITAL VIA MOTOR CAR


GERMAN HOSPITAL CARS—BRESLAU CAR FITTED WITH BRACKETS TO CARRY UPPER TIER OF STRETCHERS, AND CAR WITHOUT BRACKETS



GERMAN HOSPITAL CARS—ARRANGEMENT OF TWELVE STRETCHERS PER CAR AT BRÜNN

cots in all), as at Brünn. Felt packing is used to minimize vibration. At Breslau the window posts and dashers were removed to facilitate the handling of stretchers. The sashes of the Breslau cars were also coated with a white oil paint to discourage the curious, and all dust-catching curtains and hangings were removed.

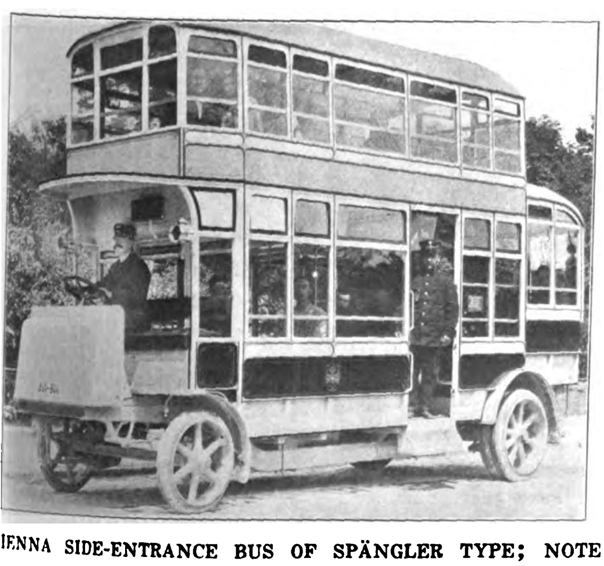


GERMAN HOSPITAL CARS—BRESLAU ROLLING STOCK IN RED CROSS SERVICE

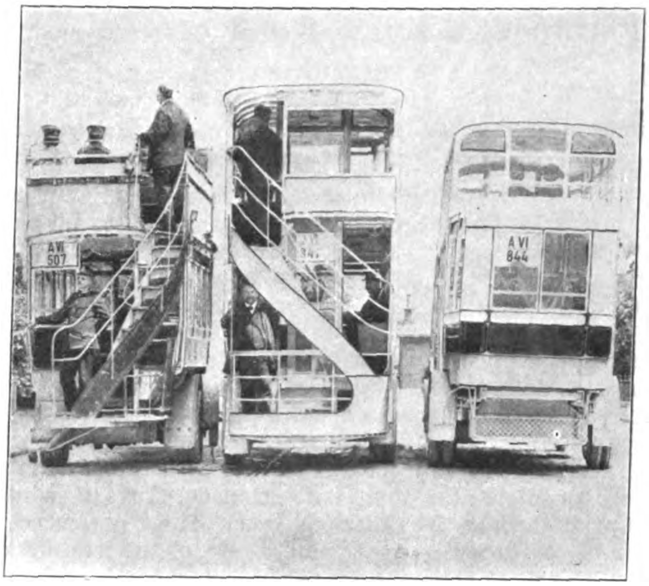
The Grosse Berliner Strassenbahn and several other railways have also built special sidings to bring these cars as close to the hospitals as possible.

Double-Deck Electric Buses at Vienna

The Vienna Tramways was one of the first street railway systems to look into the possibilities of the auto-bus. Its first trials were made with gasoline and trackless trolley types, but two years ago, on one line with 3.5 per cent grades, it placed in successful service thirteen storage-battery buses. These buses, however, had room only for eighteen seated and five standing passengers, which made their operation under city conditions too costly from the standpoint of crew expense. Following the purchase of some gasoline buses, the municipality decided to develop a high-capacity (thirty-three-passenger) electric bus which would be more agreeable to the passengers and give more revenue to the city's power plant.



VIENNA SIDE-ENTRANCE BUS OF SPÄNGLER TYPE; NOTE OVERHANG



END VIEWS OF LONDON OPEN-TOP BUS; VIENNA ELECTRIC END AND SIDE-ENTRANCE BUSES

The double-deck type selected was designed by Ludwig Spängler, director Vienna Tramways. It is only 13.1 ft. high, a feature which enables it to clear places that are too low for the ordinary double-deck bus. Its center of gravity, as explained in the ELECTRIC RAILWAY JOURNAL for Dec. 12, is also very low. The first five buses have a wheelbase of 14.75 ft. and an over-all length of 23 ft. The drive for the rear wheels is by means of a double-motor and inclosed gearing. The battery sets have a range of 18.6 miles and are provided in triplicate to permit quick exchanges.

The accompanying set of end views shows three styles of Vienna buses: The one at the left is an open top cross-seat of London type; the second, a double-deck electric bus with low-step entrance on each side, rear platform and safety stairway of Spängler design; third, the latest, a side-entrance double-deck bus, with rear overhang 5 ft. long, as described on page 49. One novelty of the electric design is that the stairway is completely under cover.

The first buses of this type were placed in service on Sept. 20, 1914. Their maximum speed is 13.64 m.p.h. and their average speed 8 m.p.h. If the buses prove a financial success, others will be installed to serve the line between the stations of the Northwestern and Southern Railways, which include a run of 705 ft. over a 4.1 per cent grade.

The bodies were built in the municipality's car shops. The Accumulatoren and Daimler Companies furnished the accumulators and driving mechanism.

Illinois Central Gas-Electric Motor Car

Service with a General Electric Company's gas-electric motor car has been begun by the Illinois Central Railroad Company on its Hopkinsville-Princeton, Ky., branch, a distance of about 30 miles. The car makes three round trips each day and takes the place of a passenger accommodation train which formerly made the run. This car, with a capacity for eighty passengers, is divided into four compartments with a vestibule for the engineer, a baggage and mail room, a section for negroes, a smoker and a women's section, and is 74 ft. long. It was put into service on Dec. 1 without previous announcement that it would be used.

Results of a Straw Ballot of Readers' Preferences

Subjects of Greatest Interest Indicated by Subscribers from Selected Lists of Topics

In order to indicate to the editors of the ELECTRIC RAILWAY JOURNAL the preferences of the readers for the several departments, and at their request, the circulation department recently selected at random a thousand or more names from the subscription list and sent out a card ballot requesting data. Each reader who received a card was asked to select five from a list of topics covering those discussed by this paper and to arrange these selections in order of their interest to him.

Approximately one-third of these cards were returned, and the data have been tabulated. The results were so interesting that it was considered worth while to print them in the statistical issue. These preferences can be considered as approximate only, as the total number of ballots returned represent but a portion of the total circle of readers. However, the method used is similar to that employed in sampling coal and other material for test, and the errors due to the method of sampling are probably no greater than others involved in an investigation of this sort. In selecting from a list there is, of course, a tendency on the part of the reader to favor the topics printed high on the list, although in the present case this tendency was discouraged as far as possible by the order in which the topics were arranged. A reader, also, has considerable difficulty in selecting topics in order of interest, because the focus of interest is not a fixed point but shifts with business and engineering conditions. Readers also hesitate to imply by selecting certain topics that they are not interested in others. These and other psychological factors must be kept in mind in analyzing the tabulated data.

In compiling the data the subscribers who returned cards were classified by occupations as shown in Table I, where they are listed in numerical order.

In order to put the data into form for comparison the votes were "weighted" by allotting ten points for each first choice, eight for the second choice, six for the

TABLE I – OCCUPATIONS OF SUBSCRIBERS WHO REPLIED

	Number	Per Cent
Mechanical and electrical engineers	71	19.5
Manufacturers and consulting engineers	65	17.9
Master mechanics and assistants	47	12.8
General superintendents and assistants	37	10.1
Transportation superintendents and assistants	24	6.6
Auditors, comptrollers, etc	22	6.0
General managers and assistants	20	5.5
Roadway and structural engineers and foremen	16	4.3
Teachers and students	16	4.3
Presidents and other general officers	12	3.3
No names signed to ballots	8	2.2
Draftsmen and designers	7	1.9
Public service commissions and staffs	7	1.9
Claim agents	6	1.4
Purchasing agents and storekeepers	4	1.1
Signal engineers	2	0.6
Supervisors of safety	2	0.6
Total	366	100.0

TABLE II—WEIGHTED PREFERENCES FOR THE SEVERAL SUBJECTS

	Number	Per Cent
Operating methods and records	1,070	10.02
Equipment and Maintenance Department	982	9.20
Track and overhead lines	865	8.11
Heavy electric railroading	836	7.84
Car design, construction and equipment	830	7.78
Power generation and transmission	826	7.75
Employees' training and welfare work	776	7.28
Safety first methods	587	5.50
General news, personals, construction news	530	4.97
Public relations	528	4.95
Accounting methods	485	4.55
Carhouse and repair shop design	477	4.47
Signal apparatus and methods	389	3.65
Annual and monthly reports	359	3.37
Labor matters	329	3.08
Public service commission news	326	3.06
Legal decisions	251	2.37
Foreign electric railway practice	219	2.05
Totals	10,665	100.00

TABLE III—CHOICES OF DIFFERENT CLASSES OF READERS WEIGHTED AS DESCRIBED IN ARTICLE

Choices of Mechanical and Electrical Engineers	
(1) Power gen. and dist	428
(2) Track and o. h. lines	287
(3) Heavy elec. r. r.	205
(4) E. and M. dept	204
(5) Oper. meth. and rec	198
All others	727
Total	2,049

Choices of Manufacturers and Consulting Engineers	
(1) Heavy elec. r. r	285
(2) Track and o. h. lines	181
(3) Gen'l news, etc	175
(4) E. and M. dept	165
(5) Oper. meth. and rec	157
All others	875
Total	1,838

Choices of Master Mechanics and Assistants	
(1) Car design	291
(2) E. and M. dept	245
(3) Carhouse, etc., des	211
(4) Empl. tr. and w	114
(5) Heavy elec. r. r	104
All others	445
Total	1,400

Choices of Gen'l Superintendents and Assts.	
(1) Emply. tr. and w	200
(2) Oper. meth. and rec	196
(3) E. and M. dept	126
(4) Safety first meth	118
(5) Track and o. h. lines	68
All others	392
Total	1,100

Choices of Transportation Supts. and Assts.	
(1) Empl. tr. and w	124
(2) Oper. meth. and rec	112
(3) Labor matters	74
(4) Safety first meth	72
(5) Public relations	62
All others	220
Total	664

Choices of Auditors, Comptrollers and Assts.	
(1) Acctg. meth	212
(2) Ann. and m. rep	138
(3) Oper. meth. and rec	64
(4) Empl. tr. and w	58
(5) Public relations	42
All others	138
Total	652

Choices of General Managers and Assts.	
(1) Oper. meth. and rec	126
(2) Public relations	54
(3) E. and M. dept	52
(4) Empl. tr. and w	48
(5) Safety First meth	46
All others	264
Total	590

Choices of Teachers and Students	
(1) Power gen. and dist	98
(2) Heavy elec. r. r	62
(3) Car design, etc	60
(4) Oper. meth. and rec	40
(5) Signal app. and m	34
All others	186
Total	480

Choices of Roadway and Structural Engineers and Foremen	
(1) Tr. and o. h. lines	138
(2) E. and M. dept	40
(3) Signal app. and m	34
(4) Public relations	30
(5) Empl. tr. and w	26
Gen'l news, etc	26
Heavy elec. r. r	26
All others	154
Total	474

Choices of Presidents and Other Gen'l Officers	
(1) Public relations	66
(2) Oper. meth. and rec	46
(3) Acctg. meth	32
(4) Empl. tr. and w	28
(5) Ann. and m. rep	26
Legal decisions	26
Safety first meth	26
All others	104
Total	354

Choices of Public Service Commission Staff	
(1) Car design, etc	32
(2) E. and M. dept	28
(3) Heavy elec. r. r	24
Oper. meth. and rec	24
(4) P. S. Comm. news	20
(5) Power gen. and dist	18
Tr. and o. h. lines	18
All others	44
Total	208

Choices of Draftsmen and Designers	
(1) Heavy elec. r. r	36
(2) Tr. and o. h. lines	26
(3) Carhouse des., etc	22
(4) E. and M. dept	20
(5) Safety first meth	14
Signal app. and m	14
All others	72
Total	204

Choices of Claim Agents	
(1) Legal decisions	40
(2) Safety first meth	38
(3) Public relations	20
(4) Labor matters	18
(5) Empl. tr. and w	16
All others	40
Total	172

Choices of Purchasing Agents and Storekeepers	
(1) Acct'g meth	26
(2) E. and M. dept	24
(3) Ann. and m. rep	16
(4) Car design, etc	10
Oper. meth. and rec	10
(5) Carhouse des., etc	8
All others	26
Total	120

Choices of Signal Engineers	
(1) Signal app. and m	20
(2) Tr. and o. h. lines	16
(3) Oper. meth. and rec	6
Safety first meth	6
(4) Empl. tr. and w	4
Heavy elec. r. r	4
Power gen. and dist	4
Total	60

Choices of Safety Supervisors	
(1) Safety first meth	18
(2) Car des., etc	12
(3) Empl. tr. and w	8
(4) Public relations	6
Carhouse design, etc	6
(5) Gen'l news, etc	4
Oper. meth. and rec	4
All others	2
Total	60

third, four for the fourth and two for the fifth. The weighted totals were first tabulated by topics in numerical order as shown in Table II.

Next the first five choices of each group were segregated and arranged as in Table III.

DEDUCTIONS

The most striking point brought out in the tables is that the ELECTRIC RAILWAY JOURNAL is a technical paper in the sense that its readers are primarily interested in those subjects which pertain to their own lines of work. For example, the mechanical and electrical engineers place highest on their list the subject of power generation and distribution, one to which naturally but a part of the paper can be devoted. Next, they are interested in the large problems of the industry, a fact shown by the large vote in favor of heavy electric traction.

The small showing of interest in foreign practice is somewhat surprising, but it can be accounted for, we think, to some extent at least, by the fact that it influences American practice but little. In scientific development of unusual electric railway equipment Europe undoubtedly leads, but it has little to teach of standard practice and methods.

The publishers of the JOURNAL have been much interested by the choice expressed by this portion of the readers of this paper, and it is believed that the readers also will be glad to learn of the different preferences named. Criticisms by readers of these lists of preferences will be welcomed.

Large Italian Order for Three-Phase Locomotives

In order to work the extensions of the electrically-equipped sections of the Italian State Railways now under construction, thirty-four 3000-volt, three-phase, 16 2/3-cycle locomotives have been ordered by the government—eighteen of the 4—6—4 type, weighing 84 tons, from Brown, Boveri & Company, and sixteen of the 2—6—2 type, weighing 68 tons, from the Italian Westinghouse Company. According to *Electrical Engineering*, both are driven by side-rods from two motors, jackshafts at the ends being employed in the former, but not in the latter. The motors develop 1300 hp each at 46.5 m.p.h. By a combined arrangement of pole-changing and cascade connection four economical speeds are obtained, namely 23.2, 31, 46.5 and 62 m.p.h. respectively.

Electric Railway Taxation in Indiana

The State Board of Tax Commissioners of Indiana has published its report for the calendar year 1914, regarding the assessed valuation of railway track, rolling stock and improvements on right-of-way of urban, suburban and interurban electric railways in that State, whether owned, controlled or operated by persons, companies, co-partnerships or corporations. The information contained in the report is summarized in the accompanying table, no distinction being made in regard to rolling stock operating over the company's own lines or over other lines under trackage rights.

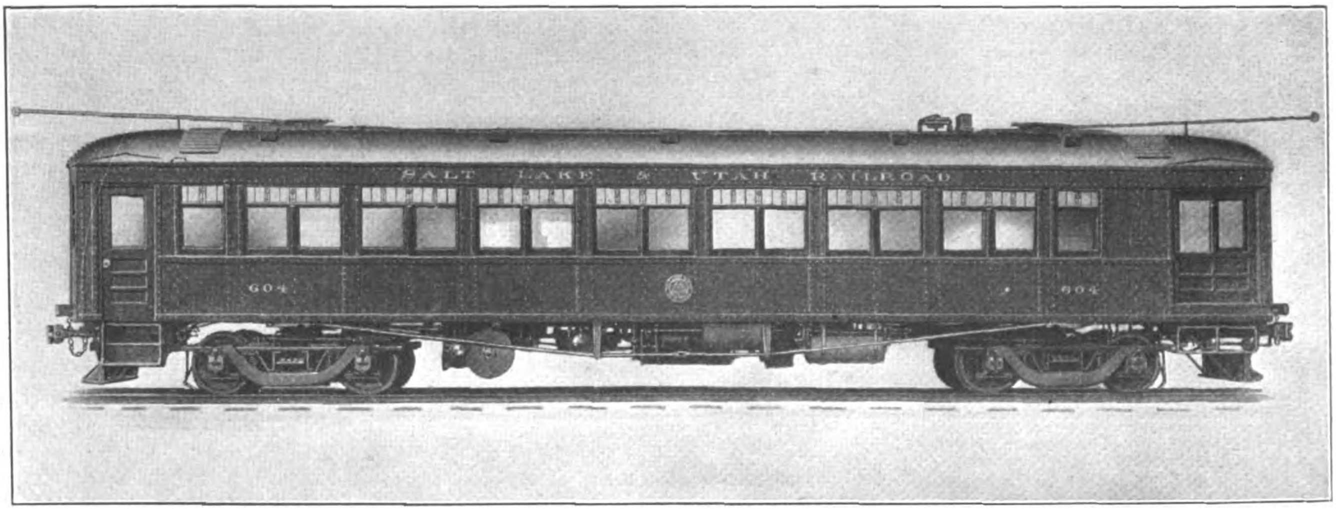
TABLE SHOWING ELEMENTS OF ASSESSED VALUATION FOR URBAN, SUBURBAN AND INTERURBAN ELECTRIC RAILWAYS IN INDIANA FOR 1914

	Main Track			Second Main Track			Side Track			Rolling Stock,	Improvements on Right of Way,
Names of Railways	Miles	Per Mile	Total	Miles	Per Mile	Total	Miles	Per Mile	Total	Total	Total
Beech Grove Traction Company	3.94	$8,000	$31,520	0.05	$3,000	$150	0.13	$1,500	$195	$4,180	$6,400
Bluffton, Geneva & Celina Traction Company	18.17	4,000	72,680	....	....	....	1.12	1,500	1,680	1,817	300
Broad Ripple Traction Company	2.64	9,000	23,760	0.21	4,000	840	....	....	....	....	....
Brownstown & Ewing Street Railway	1.00	1,500	1,500	....	....	....	....	....	....	500	....
Central Indiana Lighting Company	5.26	5,000	26,300	....	....	....	0.04	1,500	.60	2,630	....
Chicago, Lake Shore & South Bend Railway	71.01	8,000	568,080	10.68	3,000	32,040	5.06	1,500	7,590	71,115	40,120
Chicago, South Bend & Northern Indiana Railway	95.24	9,000	857,160	15.85	3,000	47,550	9.32	1,500	13,980	95,240	24,500
Cincinnati, Lawrenceburg & Aurora Electric Street Railway	9.38	7,000	65,660	....	....	....	....	....	....	4,690	....
Evansville Railways	55.02	6,000	330,120	....	....	....	4.70	1,500	7,050	28,204	5,560
Evansville, Suburban & Newburgh Railway	24.36	7,300	177,828	....	....	....	2.73	1,500	4,095	19,488	18,800
Fort Wayne & Northern Indiana Traction Company	187.04	8,800	1,645,952	21.81	3,000	65,430	11.59	1,500	17,385	149,632	78,830
Fort Wayne & Northwestern Railway	41.73	6,000	250,380	....	....	....	0.38	1,500	570	25,038	11,947
Fort Wayne & Springfield Railway	19.55	5,000	97,750	....	....	....	0.47	1,500	750	6,615	2,500
French Lick & West Baden Street Railway	1.90	5,000	9,500	....	....	....	....	....	....	950	....
Gary & Interurban Railroad	76.99	9,000	692,910	5.52	3,000	16,560	1.09	1,500	1,635	61,592	23,000
Gary & Southern Traction Company	11.31	8,000	90,480	0.77	3,000	2,310	10	1,500	150	5,974	2,500
Hammond, Whiting & East Chicago Railway	19.94	12,000	239,280	7.88	3,000	23,640	2.05	1,500	3,075	19,940	5,600
Indiana Railways & Light Company	59.66	7,150	426,569	0.40	3,000	1,200	1.40	1,500	2,100	47,728	29,800
Indiana Utilities Company	3.70	3,000	11,100	....	....	....	....	....	....	370	....
Indianapolis & Cincinnati Traction Company	101.38	5,900	598,142	3.75	3,000	11,250	5.15	1,500	7,725	50,991	47,770
Indianapolis & Louisville Traction Company	40.67	6,000	244,020	0.23	3,000	690	1.18	1,500	1,770	25,479	8,135
Indianapolis, New Castle & Eastern Traction Company	58.72	5,500	322,960	....	....	....	3.26	1,500	4,890	35,441	22,420
Indianapolis Street Railway	111.28	52,000	5,786,560	....	....	....	5.41	2,000	10,820	333,840	39,215
Indianapolis Traction & Terminal Company	23.50	60,000	1,410,000	....	....	....	0.89	2,000	1,780	425,640	248,250
Interstate Public Service Company	58.11	8,500	493,935	....	....	....	4.01	1,500	6,015	58,514	17,080
Lebanon Thornton Traction Company	9.33	4,000	37,320	....	....	....	0.05	1,500	75	1,923	75
Louisville & Northern Railway & Lighting Company	16.38	8,500	139,230	....	....	....	1.21	1,500	1,815	16,576	2,590
Louisville & Southern Indiana Traction Company	11.42	11,400	130,188	2.61	3,000	7,830	1.22	1,500	1,830	23,016	2,580
Madison Light & Railway Company	3.00	4,000	12,000	....	....	....	0.10	1,500	150	1,200	2,000
Marion, Bluffton & Eastern Traction Company	31.74	5,500	174,570	....	....	....	1.79	1,500	2,685	12,696	6,000
Muncie & Portland Traction Company	30.59	6,000	183,540	....	....	....	0.65	1,500	975	15,405	10,370
New Albany Street Railroad	8.97	11,400	102,258	....	....	....	0.60	1,500	900	8,970	1,550
Ohio Electric Railway	22.38	8,800	196,944	1.81	3,000	5,430	0.35	1,500	525	18,380	10,000
Public Utilities Company	53.82	9,000	484,380	0.68	3,000	2,040	2.69	1,500	4,035	53,820	18,200
St. Joseph Valley Traction Company	31.61	5,000	158,050	9.16	3,000	27,480	0.49	1,000	490	6,322	70
Southern Michigan Railway	5.05	8,000	40,400	....	....	....	0.44	1,500	660	5,124	200
Terre Haute, Indianapolis & Eastern Traction Company	397.21	9,500	3,773,495	....	....	....	12.70	1,500	19,050	320,019	218,690
Union Traction Company of Indiana	335.33	9,000	3,017,970	10.24	3,000	30,720	22.11	1,500	33,165	268,982	160,640
Vincennes Traction Company	7.61	9,000	68,490	....	....	....	....	....	....	6,088	....
Washington Street Railway	2.60	4,000	10,400	....	....	....	0.15	1,500	225	1,300	....
Winona Interurban Railway	65.88	6,000	395,280	....	....	....	2.95	1,500	4,425	39,698	21,695
Winona & Warsaw Railway	2.83	7,500	21,225	....	....	....	0.92	1,500	1,380	5,660	1,020
Total	2137.25	....	$23,419,886	91.65	....	$275,160	108.50	....	$165,655	$2,280,817	$1,088,407

The Salt Lake & Utah Railroad

A 1500-Volt D.C. Interurban Railway Running Between Salt Lake City and Provo, a Distance of 48.5 Miles—The Line Was Built to Develop Good Agricultural Territory—Seven Trains a Day Are Operated Each Way, Exclusive of Freight—The Arch-Roof Combination Cars for High-Speed Train Service Are Described in Detail

An important addition to the heavy interurban electric railways of the Far West is represented by the Salt Lake & Utah Railroad, which was placed in operation for passenger service between Salt Lake City and Provo, Utah, on July 24, 1914. Regular freight service was inaugurated Aug. 15, 1914. The franchises for this line were secured in 1912 by the citizens of Salt Lake and the territory south of that city, and shortly thereafter W. C. Orem, now president, became interested in the financing and construction of the road. Actual construction was begun early in 1913, and through the extraordinary efforts of the Westinghouse Electric & Manufacturing Company, which furnished the substation, line and traction equipment, service was started at the date mentioned. The new line taps a great deal of territory which had not been served by the steam railroads, although this section is amply irrigated and suitable for fruit raising or intensive farming. There is every prospect that the population, now about 50,000, exclusive of 110,000 at Salt Lake City, will increase very rapidly owing to the liberal service offered by the new railway. Preliminary construction notes on this property were printed in the ELECTRIC RAILWAY JOURNAL for Jan. 10, 1914, page 87.



SALT LAKE & UTAH RAILROAD—INTERURBAN STEEL CAR WITH ARCH ROOF

WAY, LINE AND POWER

The roadbed is constructed on steam railroad standards with 75-lb. rail, continuous joints and 2840 ties per mile. Standard switches with spring rail frogs are used on all main line turnouts. The rails are bonded with the twin terminal bond of the American Steel & Wire Company. The maximum grades are 1 per cent. except in one or two places where temporary grades have been used. Thus, for a stretch of about 2 miles on both sides of Provo Bench near Provo a grade of 1½ per cent is employed. It is expected, however, that when business requires double track for freight and express passenger trains a detour of this 1½ per cent. grade will be built.

The overhead construction is of the catenary type to permit operation at 750 and 1500 volts d.c. Poles with angle-iron brackets support the messenger and trolley and are so arranged that future double-track requirements can be made by adding a bracket on the opposite side of the pole. A No. 0000 trolley and No. 0000 feeder are used.

Energy is purchased under a fifty-year contract from the Utah Power & Light Company at 45,000 volts, sixty cycles and converted at the substations to 1500 d.c. by means of three 150-kw transformers and two 250-kw rotary converters. These rotary converters operate at 750 volts alone and 1500 volts in series. A third rotary converter is installed in each substation as a spare for series connection with either of the others.

SERVICE AND ROLLING STOCK

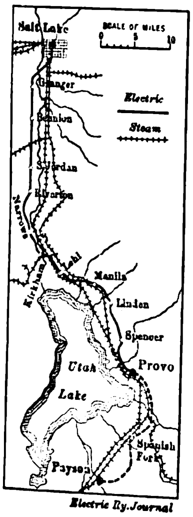
At this time the company is operating seven trains a day in each direction on telephoned train orders, special attention being given to convenient connections with the Salt Lake & Ogden Railway and the Ogden Rapid Transit Company in a joint depot at Ogden. Special Sunday and holiday excursions as well as theater trains are a popular feature of the company's service. The theater trains are operated from both Salt Lake City and Provo. the trains leaving at 11:45 p.m. A popular pleasure resort is Utah Lake, near Provo. Here fishing, boating, hot and cold bathing and dancing are the chief attractions.

The company sells unrestricted mileage books at the rate of $11.25 per 500 miles and $20 for 1000 miles. These books are also good on the Salt Lake & Utah Railroad, Salt Lake & Ogden Railway and the Ogden Rapid Transit Company. Children between five and twelve years of age are carried at half fare. The baggage allowance is 150 lb. for every full fare and 75 lb. for every half fare. Although the company has been operating only a short time, it has already made a strong bid for special excursions for clubs, lodges, Sunday Schools, colleges, churches and other organizations.

The rolling stock of the company consists of five 61-ft. steel cars with passenger, smoking and baggage compartments, two 50-ft. straight express cars and one locomotive flat car, all with the same motor equipment. The general data on the arch-roof passenger cars, as furnished by the Niles Car & Manufacturing Company, Niles, Ohio, follow:

Length over the spring buffers	61 ft. 8 in.
Length over the vestibules	59 ft. 8 in.
Length of the body over the end plates	49 ft. 3 in.
Length of the rear platforms	5 ft. 2⅝ in.
Length of the main passenger compartment	31 ft. ½ in.
Length of the smoking compartment	10 ft. 11 in.
Length of the baggage compartment	11 ft. 9 in.
Width over all	9 ft. 6 in.
Width over the outside sheathing at sills	9 ft. 4 in.
Width, inside	8 ft. 10¾ in.
Width of the seats	40 in.
Width of the aisle	25¾ in.
Height from the under side sills to the top of the roof	9 ft. 6 in.
Height from the track to the top of the trolley platform	13 ft. 4 in.
Seating capacity	66
Weight of the car body, exclusive of the electric power equipment and air brakes	38,392 lb.

The underframe is built up entirely of steel beams, channels and angles with hot-riveted gussets and angles at all joints. The two center sills are 8-in. 18-lb. I-beams, the side sills are 8-in. 13¾-lb. channels, while 5-in. and 6-in. channels are used for the cross-sills. There are also diagonal braces, 6 in. x ¼ in., between the drawbar anchor plates and the side sills at the bolsters. Each end of the underframe has a buffer of 8-in. channel riveted by angles to all sills and fitted on the outside with radial spring buffers built up of steel channels and plates. The floor consists of 13/16-in. x 3¼-in. yellow pine in two layers, with two thicknesses of waterproof building felt between. The toilet section has a "Flexolith" floor.



S. L. & U. R. R.—MAP

The body frame is of steel riveted at all joints with corners or gussets. For the side posts 2¼-in. x ¼-in. T's are used. Corner posts and each alternate side post separating twin windows are double. The double posts have steel panels riveted to the outside. The side plates are 3 in. x 2 in. x ¼-in. angles; the sheathing below the windows and cross bulkheads are No. 12 gage steel and the belt rails are 2½-in. x ½-in. steel bars. The side walls below the windows are double, with 2¼-in. air space between the outside steel sheathing and the inside lining of ¼-in. agasote.

The roof is of the single-arch type with continuous steel carlins fastened to the side plates; also with wooden carlins about 10 in. between centers for fastening the roof sheathing and ceiling. The outside is sheathed with ½-in. x 2¼-in. cypress and No. 8 cotton duck. Ventilation is supplied through eleven Lintern automatic roof ventilators with ceiling grills or registers. Each side has sixteen windows of twin style, the upper sashes being stationary while the lower sashes are arranged to raise between the double upper sashes.

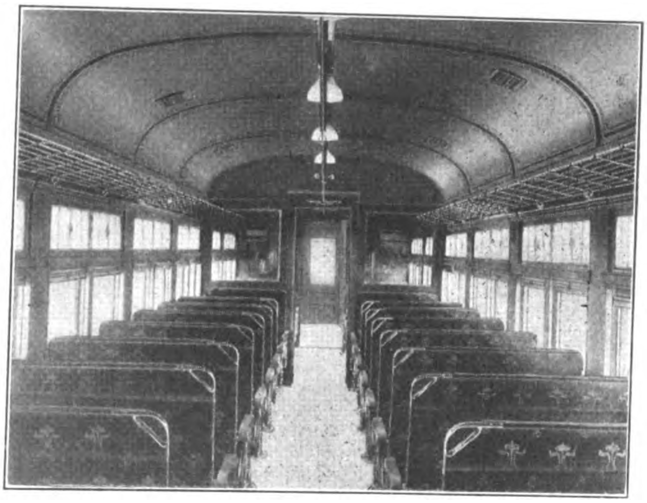
The main passenger compartment at the rear end of the car occupies a length of eleven side windows and the smoking compartment adjacent occupies four side windows. Swing doors are used throughout except that the baggage compartment has a 4-ft. sliding door at the side. The baggage door at the right-hand side of the motorman has a sliding sash in the upper part to enable the motorman to look backward.

The seating layout is as follows: Main compartment—seventeen 40-in. Hale & Kilburn No. 199-EE steel seats with 25-in. headroll, reversible backs, bronze grab handles, automatic foot rest, upholstered in dark green leather, and four corner seats with stationary backs; smoking compartment—four reversible and four stationary back seats, upholstered in canvas-lined rattan; baggage compartment—wooden slat seats, paneled underneath, with removable tops to form receptacles for sand, tools, etc.

The trucks are of Baldwin class AA type with 84-in. wheelbase, intended for operation over curves of 50-ft. radius. The center-plate capacity per truck is 34,196 lb. The weight on trucks, covering the car body only, including couplers, heaters, seats, etc, but without live load, is 38,392 lb. Other weights follow:

Electrical equipment with double-end control	2,600 lb.
Dynamotor	2,400 lb.
Air-brake equipment	2,500 lb.
Maximum load of 150 passengers at 150 lb. each	22,500 lb.
Maximum load on two-truck center plates	68,392 lb.
Weight on track of car body, including all equipment but without live load	45,892 lb.
Two trucks without motors, gears or cases	25,200 lb.
Motors, including gears and cases	14,800 lb.
Total weight of car on track without live load, ready for service	85,892 lb.

The trucks are fitted with 36-in. diameter Standard M.C.B. wheels, A.E.R.E.A. open-hearth axles, 7-in. diameter at the gear seat, and 5-in. x 9-in. journals. The bolster is of cast steel with Symington Ba center plates and quadruple elliptical springs. Perry roller side bearings are used on all cars.



SALT LAKE & UTAH RAILROAD—INTERIOR VIEW, SHOWING LOCATION OF VENTILATORS AND LAMPS

The motor equipment comprises four 115 hp Westinghouse 334-E 6 inside-hung motors, geared for 60 m.p.h. and capable of operation on either 750 or 1500 volts d.c. The control is of HL type suitable for single and multiple car operation. The air brakes are of Westinghouse automatic type with A.M.M. No. 24 valve, while the hand brakes include the Peacock No. 27-E drum and Pittsburgh bronze ratchet drop handle.

Each car is supplied with thirty-two Consolidated No. 393-T, single-coil truss plank heaters with thermostatic control. The lighting units for the interior consist of fourteen 94-watt lamps with Alba shades; also one circuit of 23-watt lamps for signs, vestibules, toilet, etc. A luminous arc headlight is used for operation over the 1500-volt section. Arrangement has also been made for one illuminated train number sign over each door. Among the miscellaneous equipment on the car the following may be noted: Janney automatic M.C.B. radial couplers, locomotive style pilots, steel alarm gong with air ringer and foot button for city service, whereas air whistles are used for interurban service, Lintern pneumatic sanders and Knutson No. 5 retriever.

Berkshire Semi-Outdoor Portable Substation

Last summer the Berkshire Street Railway, Pittsfield, Mass., whose out-door substation at Lee, Mass., was described in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, has added and placed in service a new semi-outdoor type of portable substation to supplement the power supply on certain sections favored with heavy excursion traffic. The substation was built by the General Electric Company and has a continuous capacity of 300 kw at 600 volts, transforming from a 33,000-volt, twenty-five-cycle, three-phase line supply.

This substation consists of an inclosed operating compartment containing the synchronous converter, the three-panel switchboard and the three-unit electric heaters; an inclosed central room for the multi-gap lightning arrester equipment; and an open section for the main transformer, the current transformer, automatic oil switch, choke coils, disconnecting knife switches, etc. Owing to the low overhead clearances the car has been kept within 11 ft. 6 in. above the rails, including the running board.

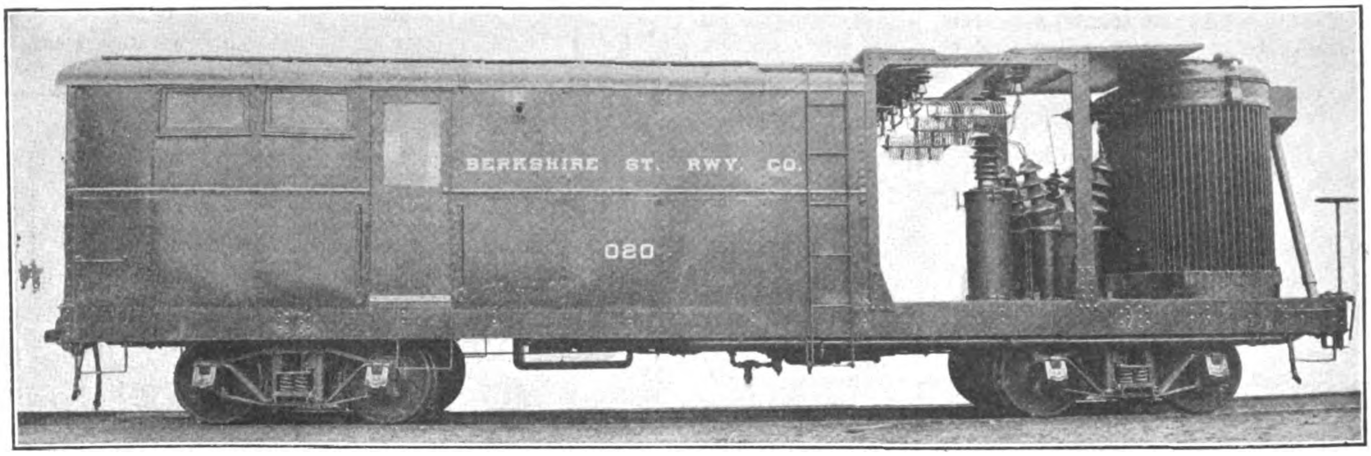
The car is an all-steel structure, the underframe including four 12-in. steel channels which extend the entire length of the platform. The two center channels, which form a box girder, are provided with 3/8-in. top and bottom plates, so that reliance is not placed on the floor plates to give the required strength. At the converter end, two pairs of 6-in. steel channels extending across the car are riveted on top of the underframing, the space between each pair being filled with concrete. These members constitute the foundations for the machine, which is set on wooden blocks, provided with leveling plates and secured by anchor bolts in the usual manner. Ventilating openings are located in the floor of the car under the converter to get cool air when the machine is in operation. The openings are fitted with removable sheet-iron covers and permanent wire mesh screens.

A snow shield formed of sheet steel and framed with angles extends from the center on top of the support over to a wooden block base on the transformer top. This protects the high-tension bushings to the transformer, which are brought out in a horizontal position because of lack of overhead clearance on the road, and also those to the oil switch units and the current transformer. A short cover likewise extends over the incoming line leads and those to the lightning arrester compartment at the other end of the supporting frame. The incoming insulators each side of the choke coils are suspended from cross-steel angles tied into the framing.

The operating compartment end of the car is bolted to the sides and roof so that it may be entirely removed for the installation or removal of the apparatus. The section of the roof over the converter is also bolted down so that it may be readily removed for installing or dismantling the apparatus when a crane is available. A galvanized sheet-metal ceiling is built on the interior so as to form air pockets between it and the roof sheathing to prevent any direct radiation of heat when the car is standing in the sun and also to drain any condensation or possible leakage to one side of the car away from the apparatus.

The electrical equipment includes a three-phase, twenty-five-cycle, 600-volt, commutating-pole, synchronous converter operating at 750 r.p.m. The transformer connections are arranged for a.c. starting from 50 per cent secondary taps, with series resistance to cut down the initial rush of current. The machine has a normal rating of 300 kw continuously, 450 kw for two hours and a momentary overload capacity of 900 kw. This high overload capacity is an important merit for interurban railway conditions.

The transformer is an oil-insulated, self-cooled, outdoor type, rated 330 kva, three-phase, twenty-five cycles. Voltage taps are arranged on the primary side for unusual flexibility, operating at either 33,000, 13,000 or 11,000 volts "Y" by using either series or multiple connections of the primary coils. The secondary, or low-tension winding, is designed for 385 volts and is provided with the 50 per cent starting taps previously mentioned. Series resistance is also used in starting. In order to make the secondary leads weatherproof at the point of entrance, they are inclosed in a small sheet-iron box, from which the connections are carried to the switch panels through conduit.



300-KW 33,000-VOLT PORTABLE SUBSTATION FOR THE BERKSHIRE STREET RAILWAY

The remaining apparatus is of standard General Electric design, including bell alarms for the automatic oil switch and for the d.c. 1000-amp circuit breaker.

The specific dimensions and important data applying to this portable substation are as follows:

Length over all	38 ft
Width over sides of car	8 ft. 4 in.
Maximum width (over side channels)	8 ft. 6 in.
Height over all (including running board)	11 ft. 6 in.
Height of floor above rails	3 ft. 8½ in.
Total length of inclosed cab	23 ft. 6 in.
Length of operating room	14 ft. 6 in.
Length of lightning arrester compartment	9 ft.
Length of outdoor section	14 ft. 6 in.
Truck base	25 ft.
Wheelbase	5 ft. 2 in.
Wheels	33 in.
Total weight	80,000 lb.

The Omaha & Council Bluffs Street Railway has found that red gum at $40 per thousand feet B.M., affords it a means of making a considerable saving for the panels under the windows of its cars where it had been using cherry at a cost of $125 per thousand.

COMMUNICATIONS

Motor Overloads and Flashing

SALISBURY HOUSE, LONDON WALL,
LONDON, ENGLAND, Dec. 15, 1914.

To the Editors:

In regard to the matter of motor overloads raised in a letter by William A. Del Mar, published in a recent issue of the ELECTRIC RAILWAY JOURNAL, I would state that it is extremely difficult in practice to define what amount of overloading in a shop test will be sufficient to cover the prevention of flashing over under actual conditions in practice, and I am not sure that I should hold a manufacturer blameless should his motors flash over in practice even though a shop test of the nature specified should have been complied with. My own practice has been to specify the nature of the work, the average output, the maximum tractive effort, the number of stops and the permissible rise in temperature, and then to specify that under all reasonable working conditions the motors must be free from both sparking and flashing. I have known motors that would comply with the conditions set down in the proposed Section 418 of the A. I. E. E. standardization rules, and still flash over in practice, and I have known motors that would not comply with the specifications of this section and which have proved entirely satisfactory.

I do not profess to criticise the section referred to, but only point out that it is extremely difficult to formulate any clause that will secure the desired result.

H. F. PARSHALL, Consulting Engineer.

The New Jersey Decision

WELSH BROTHERS, INVESTMENT BONDS
PHILADELPHIA, PA., Dec. 21, 1914.

To the Editors:

The editorial in your issue of Dec. 19 entitled "New Jersey Rate Decision" has caused me some bewilderment. You close this editorial with the following words: "We hope that the clear exposition of this entire subject by the New Jersey court will help to clarify public opinion on this important matter." I have already read with care the full decision of this case by the New Jersey Court of Errors and Appeals and have found my opinion very much confused by it instead of clarified.

The official summary of this opinion concludes with the following: "It is erroneous to assign no value, or a merely nominal value, to such franchise when a substantial value is fairly reflected in the total market value of its securities." In attempting to give a value to the property of public service companies for the purpose of rate making the court would, I think, have the commission proceed along the following line of reasoning:

1. Rates must be such as to yield a fair return upon the value of the property used in the service of the public.

2. In that value must be included a substantial amount for the value of franchises.

3. The value of the franchise is based, in part at least, upon the earnings of the company just prior to the valuation.

I hold that if the value of the franchise, as a matter of right, is to be based upon the earnings of the company just prior to the date of valuation, they should be based upon the full earnings. If the full earnings are not used for this purpose, a part of the value of the franchise to which the company would be entitled according to the reasoning of this court will have been confiscated and full justice to the company will not have been done. If, then, the full earnings are to be used for this purpose, the rates already in effect will have to be approved in their entirety and the power of the commission to regulate at all will have been rendered nugatory.

It seems to me that the court is in error when it employs a procedure of valuation for purposes of taxation and public condemnation to establish a method for valuation for the purpose of rate making. Valuation for the latter purpose, it seems to me, is quite different from valuation for the two former purposes. For example, take valuation for the purpose of taxation: In the year for which the tax is levied, the company has received a certain income based upon rates, which, because not questioned by the rate making power, are legal for that year. The taxation for that year should, therefore, I think, be based upon that income actually and legally received. If, then, the rate making body proceeds to inquire into the justice of the rates in effect in that year, and, finding them excessive, reduces them for the following year, the valuation in the following year for the purpose of taxation should be correspondingly reduced and the actual tax in that following year will be based upon the actual income received in that following year. Therefore, the value of the franchise as based upon actual income should, at all times, be included in the valuation for the purpose of taxation. If it is included in the valuation for rate making purposes, it will inevitably result, as indicated above, that rates cannot be regulated downwards at least.

From the chapter entitled "Franchise in Rate Cases" in Whitten's "Valuation of Public Service Corporations" I have found that among the numerous decisions cited therein, with a few exceptions, there is none which specifically allows, in valuations for rate making purposes, the inclusion of value for franchises in excess of the fair cost of acquiring the same. The strongly marked trend of legal opinion, as indicated in this chapter, had seemed to me to make the question of the value of franchises for this purpose entirely clear and to render justice to the companies and the holders of their securities.

In your editorial you draw an analogy between the value of the franchise and the value of property taken up many years ago by individuals under the government homestead act. I fail to find any analogy between these two cases. Many of the state commissions grant to public service corporations the benefit of the increase in value of the real estate and property owned by them when those commissions base rates upon the cost of reproducing the property of the companies at the time of valuation for rate making purposes. Many, or most, of these commissions also allow a considerable going-concern value to cover the cost of building up the business. If there is a substantial risk connected with building up the business, that should be, and often is, taken care of by allowing a sufficient return upon a fair value to attract the capital necessary for constructing the plant and building up the business.

I cannot see how such value can be covered by the value of the franchise without recognizing the full earnings of the company at the time being, as reflected by the market value of the entire capitalization of the company and thus in effect rendering the rate making power null and void. HERBERT S. WELSH.

[EDITORS' NOTE—We realize that judicial opinion on this point is divided but hardly believe that the principle laid down by the New Jersey Court could be used in a hypothetical case to justify reasoning in a circle; that is to say, that the value of the franchise is large because the rates are high, and the rates must be kept high so as not to reduce the value of the franchise. The New Jersey court did not say that the value of the franchise should be a controlling factor in the establishment of rates but condemned the policy of assigning no value to it or merely a nominal value when a substantial value is fairly reflected in the total market value of the securities. The comparison to the homestead act in our brief editorial was intended to show that the grant of the franchise, or the homestead, was a consideration in both cases for the recipient to undertake the risk and expense of developing the property. A good summary of the principle at issue, as well as the dictum of the New Jersey court, as we read the decision, is the wording used in Principle IX of the Code of Principles. This principle reads as follows: "In the appraisal of an electric railway for the purpose of determining reasonable rates, all methods of valuation should have due consideration."]

Publicity by Public Utility Commissions

STATE OF NORTH DAKOTA
OFFICE OF COMMISSIONERS OF RAILROADS
BISMARCK, Dec. 19, 1914.

To the Editors:

We have read with considerable interest the article on page 1240, of your issue of Dec. 5, on "Publicity by Public Utility Commissions."

While the North Dakota Railroad Commission is not, in the full sense, a public utility commission, I desire to express my concurrence with the views expressed in the article mentioned. In all proceedings of this commission, we seek the utmost publicity, and through official pamphlets and our State newspapers publish as news items practically all the proceedings of the board. We have found that this is not only beneficial to the board but highly appreciated by the people in general, as it has brought to common knowledge the powers and duties of the commission, which, a few years ago, were absolutely unknown. As a result, it has greatly strengthened the commission and broadened its field of usefulness to the people. As another result of this publicity, many things come before the board which heretofore have been settled with the public utility companies direct with satisfactory results.

I am a newspaper man and, naturally, appreciate the value of publicity in all its various phases and am very much impressed with the importance to the people of a complete knowledge of the acts of its public servants. The more publicity we can secure as to the proceedings of various public boards, I am thoroughly convinced, will be for the best interests of all concerned.

W. F. CUSHING, Secretary.

Education and the Code of Principles

PURDUE UNIVERSITY
LAFAYETTE, IND., Dec. 22, 1914.

To the Editors:

The editorial bearing the title "Poisoning the Wells," which appeared in the ELECTRIC RAILWAY JOURNAL of Dec. 5, was a very clear exposition of the views which have been lying more or less dormant in the minds of many technical educators for years. Attempts to obtain in the past the necessary data and co-operation from the railway and lighting officials to enable both sides of the problem of the proper regulation of public service corporations to be fairly presented to classes in economics and engineering have been met with indifference. Whatever the motive, therefore, that prompts this policy of publicity toward the educational institutions of the country, it will doubtless receive a hearty reception, at least from engineering schools.

The writer cannot agree with the editorial in the contemporary which you criticise that "No conclave of disinterested public scientists would presume to formulate a canon of correct principles on the relations of public utility corporations to the state." This is the very activity in which economists have been engaged for years. It is also but natural that with the intimate contact which exists in most universities between departments of political science, economics and history, the part of the state should be emphasized at the expense of the corporation. This condition has been aggravated by the lack of interest on the part of corporation officials.

The original editorial in question points out that all but one of the "Code of Principles" of the American Electric Railway Association are debatable. Does it desire to confine technical education to undebatable problems? If so, the very foundations of engineering education are to be undermined, and the first debatable problem in practice will be met by the technical graduate with much less success than at present.

It is not argued that all the principles set forth are ideal or even unprejudiced, but it is believed that students, under the guidance of able instructors, will be able to arrive at a more sane solution of the problem at issue between the public service corporations and the state if both parties to the controversy are allowed to present their arguments in whichever form they may consider desirable.

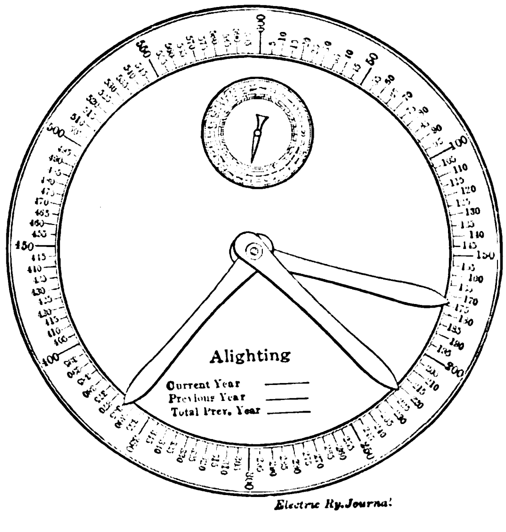
C. FRANCIS HARDING,
Professor of Electrical Engineering.

Graphic Comparisons of Accidents

BY EDWARD DANA, ASSISTANT SUPERINTENDENT OF SURFACE LINES BOSTON ELEVATED RAILWAY

It is quite difficult to present statistical information to many officials of a large railroad and to its trainmen in such a manner as to be quickly understood in its proper relation.

Recently during our "safety first" campaign diagrams of the type illustrated were used very successfully to show results by the month for six types of accidents. The hands were colored respectively red, green and black. The black was permanently set at the total number for the corresponding month of the year previous, the red was changed from day to day to indicate the total up to that date for the present year and the green was changed from day to day to indicate the total up to that same day for the previous year. The small dial shows the day of the month to which the chart was corrected. The plan may be used for a division of carhouses as well as for the entire system. We have found that it gives a very quick comparison of accidents.



BOSTON CHART USED TO SHOW COMPARATIVE ACCIDENT RECORD

American Association News

Committee Lists for 1915 Practically Complete Are Given—Meetings of American Executive, Valuation, Block Signal and Educational Committees Are Announced—Preliminary Mid-Year Meeting —Transportation Plans Are Described

COMMITTEE APPOINTMENTS FOR 1914-1915

The following list of committees is practically complete but is subject to extension due to the fact that a few committees are not yet complete.

AMERICAN ASSOCIATION STANDING COMMITTEES

Aera advisory—H. C. Donecker, chairman, Newark, N. J.; J. H. Hanna, Washington, D. C.; J. K. Choate, New York, N. Y.; Edwin H. Baker, New York, N. Y.; Daniel W. Smith, Detroit, Mich.; C. G. Rice, Pittsburgh, Pa.; L. T. Hixson, Indianapolis, Ind.; Ernest Gonzenbach, Syracuse, N. Y.; J. V. Sullivan, Chicago, Ill.; C. B. Wells, Denver, Colo.; Anthony N. Brady medal—A. W. Brady, chairman, Anderson, Ind.; Frank Hedley, New York, N. Y.; C. S. Sergeant, Boston, Mass.; award of bronze medal for best paper presented before a company section—O. T. Crosby, chairman, Warrenton, Va.; S. G. McMeen, Columbus, Ohio; James H. McGraw, New York, N. Y.

Company membership—J. E. Gibson, chairman, Kansas City, Mo.; F. W. Hild, Portland, Ore.; R. W. Spofford, Augusta, Ga.; J. J. Caufield, Minneapolis, Minn.; A. M. Patten, Topeka, Kans.; George L. Radcliffe, Cleveland, O.; M. S. Sloan, New Orleans, La.; Samuel Riddle, Louisville, Ky.; C. S. Ching, Boston, Mass.; company sections and individual membership—Martin Schreiber, chairman, Newark, N. J.; R. P. Stevens, Youngstown, Ohio; H. A. Bullock, Brooklyn, N. Y.; H. H. Norris, New York, N. Y.; E. J. Blair, Chicago, Ill.; B. C. Edgar, Nashville, Tenn.; George G. Whitney, Washington, D. C.

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Electrolysis—Calvert Townley, chairman, New York, N. Y.; R. P. Stevens, vice-chairman, Youngstown, Ohio; L. E. Woodbridge, San Francisco, Cal; federal relations —Arthur W. Brady, chairman, Anderson, Ind.; E. G. Connette, Buffalo, N. Y.; George H. Harries, Omaha, Neb.; Paul Shoup, Los Angeles, Cal.; E. C. Foster, Manchester, N. H.; L. S. Storrs, New Haven, Conn.; F. W. Brooks, Detroit, Mich.; H. H. Crowell, Grand Rapids, Mich.; Frank R. Ford, New York, N. Y.; L. S. Cass, Waterloo, Iowa; J. T. Wessels, Hagerstown, Md.; insurance—H. J. Davies, chairman, Cleveland, Ohio; F. A. Healey, Springfield, Ohio; E. J. Cook, Rochester, N. Y.; A. H. Ford, Portland, Me.; F. J. Spaulding, Brooklyn, N. Y.; 1915 convention—James D. Mortimer, chairman, Milwaukee, Wis.; C. L. Henry, Indianapolis, Ind.; Charles N. Black, San Francisco, Cal.; H. C. Donecker, Newark, N. J.; J. H. Handlon, San Francisco, Cal.; T. T. C. Gregory, San Francisco, Cal.

Organization of the International Electrical Congress, San Francisco, 1915, acting with American Institute of Electrical Engineers—Frank R. Ford, New York, N. Y.; Henry G. Stott, New York, N. Y.; Henry W. Blake, New York, N. Y.; Edwin B. Katté, New York, N. Y.; public relations—Thomas N. McCarter, chairman, Newark, N. J.; T. S. Williams, Brooklyn, N. Y.; James D. Mortimer, Milwaukee, Wis.; James H. McGraw, New York, N. Y.; Guy E. Tripp, New York, N. Y.; S. M. Curwen, Philadelphia, Pa.; E. W. Rice, Jr. Schenectady, N. Y.; Frank R. Ford, New York, N. Y.; J. H. Pardee, New York, N. Y.; Frank Hedley, New York, N. Y.; Charles N. Black, San Francisco, Cal.; T. S. Wheelwright, Richmond, Va.; C. K. Knickerbocker, Chicago, Ill.; Arthur W. Brady, Anderson, Ind.; E. G. Connette, Buffalo, N. Y.; Geo. E. Hamilton, Washington, D. C.; R. M. Searle, Rochester, N. Y.; H. G. Bradlee, Boston, Mass.; H. H. Vreeland, New York, N. Y.

Relations with Manufacturers' Association—(representing American Electric Railway Association) C. L. Henry, chairman, Indianapolis, Ind.; Arthur W. Brady, Anderson, Ind.; R. E. Danforth, Newark, N. J.; (representing Manufacturers' Association) W. L. Conwell, New York, N. Y.; C. R. Ellicott, New York, N. Y.; E. H. Baker, New York, N. Y.; relations with state and sectional associations—R. P. Stevens, chairman, Youngstown, Ohio; Patrick Dubee, Montreal, Que.; H. C. Donecker, Newark, N. J.; James F. Hamilton, Schenectady, N. Y.; C. L. S. Tingley, Philadelphia, Pa.; Ernest Gonzenbach, Syracuse, N. Y.; representing association at the American Good Roads Congress—E. C. Faber, chairman, Wheaton, Ill.; C. N. Wilcoxon, Michigan City, Ind.; C. D. Emmons, South Bend, Ind.

Standards for car loading—S. W. Huff, chairman, Brooklyn, N. Y.; E. J. Dickson, Buffalo, N. Y.; E. J. Cook, Rochester, N. Y.; M. C. Brush, Boston, Mass.; W. F. Ham, Washington, D. C.; subjects—C. L. Henry, chairman, Indianapolis, Ind.; R. E. Danforth, Newark, N. J.; H. C. Clark, New York, N. Y.; C. S. Mitchell, president Accountants' Association, Pittsburgh, Pa.; L. P. Crecelius, president, Engineering Association, Cleveland, Ohio; William Tichenor, president, Claims Association, Indianapolis, Ind.; M. C. Brush, president, Transportation and Traffic Association, Boston, Mass.

Taxation matters — T. W. Wilson, chairman, Wilmington, Del.; *Alabama*—J. P. H. DeWindt, Birmingham, Ala.; *Arizona* — R. G. Arthur, Douglas, Ariz.; *Arkansas*—C. J. Griffith, Little Rock, Ark.; *California* —H. A. Mitchell, San Francisco, Cal.; *Colorado*—B. M. Lathrop, Colorado Springs, Colo.; *Connecticut*—L. S. Storrs, New Haven, Conn.; *Delaware*—T. W. Wilson, Wilmington, Del.; *District of Columbia*—W. F. Ham, Washington, D. C.; *Florida* — Hardy Croom, Jacksonville, Fla.; *Georgia*—P. S. Arkwright, Atlanta, Ga.; *Indiana*—R. I. Todd, Indianapolis, Ind.; *Iowa*—W. G. Dows, Cedar Rapids, Iowa; *Kansas* — A. M. Patten, Topeka, Kans.; *Kentucky*—F. W. Bacon, Lexington, Ky.; *Louisiana*—Jos. H. DeGrange, New Orleans, La.; *Maine*—Howard Corning, Bangor, Me.; *Maryland*—J. J. Doyle, Baltimore, Md.; *Massachusetts*—H. S. Lyons, Boston, Mass.; *Michigan*—F. W. Brooks, Detroit; *Minnesota*—A. M. Robertson, Minneapolis; *Mississippi* —A. B. Paterson, Meridian, Miss.; *Missouri*—A. H. Rogers, Webb City, Mo.; *Montana*—W. C. Callaghan, Helena, Mont.; *Nebraska*—W. A. Smith, Omaha, Neb.; *New Hampshire*—E. C. Foster, Manchester, N. H.; *New Jersey*—George Barker, Newark, N. J.; *New Mexico*—W. P. Southard, Las Vegas, New Mexico; *New York*—B. E. Tilton, Syracuse, N. Y.; *North Carolina*—H. W. Plummer, Asheville, N. C.; *North Dakota*—C. P. Brown, Fargo, N. D.; *Ohio*—W. A. Draper, Cincinnati, Ohio; *Oregon*—C. N. Huggins, Portland, Ore.; *Pennsylvania*—C. L. S. Tingley, Philadelphia, Pa.; *Rhode Island*—D. F. Sherman, Providence, R. I.; *South Carolina*—F. H. Knox, Spartanburg, S. C.; *South Dakota*—F. M. Mills, Sioux Falls, S. D.; *Tennessee*—E. D. Reed, Chattanooga, Tenn.; *Texas*—W. J. Jones, Austin, Tex.; *Utah*—Simon Bamberger, Salt Lake City, Utah; *Vermont*—E. M. Addis, Brattleboro, Vt.; *Virginia*—A. B. Guigon, Richmond, Va.; *Washington*—J. B. Howe, Seattle, Wash.; *West Virginia*—W. W. Magoon, Huntington, W. Va.; *Wisconsin*—Dudley Montgomery, Madison, Wis.; Canada: *British Columbia*—George Kidd, Vancouver, B. C.; *Manitoba*—Wilford Phillips, Winnipeg, Man.; *Nova Scotia*—J. W. Crosby, Halifax, N. S., Can.; *Ontario*—J. D. Fraser, Ottawa, Ont.; *Quebec*—Patrick Dubee, Montreal, Que.

Valuation—L. S. Storrs, chairman, New Haven, Conn.; James D. Mortimer, Milwaukee, Wis.; J. N. Shannahan, Hampton, Va.; H. H. Crowell, Grand Rapids, Mich.; Gerhard Dahl, New York, N. Y.; B. E. Tilton, Syracuse, N. Y.; C. S. Sergeant, Boston, Mass.; W. H. Sawyer, Columbus, Ohio; Martin Schreiber, Newark, N. J.; ways and means—J. H. Pardee, chairman, New York, N. Y.; H. C. Donecker, Newark, N. J.; Harlow C. Clark, New York, N. Y.

AMERICAN ASSOCIATION SPECIAL COMMITTEES

Arrangements for midyear meeting—Charles L. Henry, chairman, Indianapolis, Ind.; M. C. Brush, Boston, Mass.; J. H. Hanna, Washington, D. C.; W. F. Ham, Washington, D. C.; Charles C. Peirce, Boston, Mass.; S. K. Colby, Baltimore, Md.; Bertram Berry, New York, N. Y.; conferring with other associations regarding meeting dates—H. C. Clark, chairman, New York, N. Y.; E. B. Burritt, New York, N. Y.; H. G. McConnaughy, New York, N. Y.; membership provisions (representing the American Electric Railway Association)—L. S. Storrs, chairman, New Haven, Conn.; C. L. Henry, Indianapolis, Ind.; C. S. Mitchell, Pittsburgh, Pa.; L. P. Crecelius, Cleveland, Ohio; James H. McGraw, New York, N. Y.; (representing the American Electric Railway Manufacturers' Association) Charles C. Peirce, Boston, Mass.; S. K. Colby, Baltimore, Md.

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Heavy electric traction—E. R. Hill, chairman, New York, N. Y.; E. B. Katté, New York, N. Y.; W. S. Murray, New Haven, Conn.; Hugh Hazelton, New York, N. Y.; J. M. Bosenbury, Peoria, Ill.; C. H. Quinn, Roanoke, Va.; power distribution—A. S. Richey, chairman, Worcester; G. W. Palmer, Boston; R. H. Rice, Chicago, Ill.; C. L. Cadle, Rochester, N. Y.; E. J. Blair, Chicago, Ill.; C. R. Harte, New Haven, Conn.; C. F. Woods, Boston, Mass.; D. E. Crouse, Annapolis, Md.; Gaylord Thompson, Trenton, N. J.; power generation—J. W. Welsh, chairman, Pittsburgh, Pa.; R. J. S. Piggott, New York, N. Y.; Fay Woodmansee, Chicago, Ill.; G. H. Kelsay, Anderson, Ind.; A. B. Stitzer, Youngstown, Ohio; W. H. Roberts, Akron, Ohio; E. H. Scofield, Minneapolis, Minn.; E. D. Smith, St. Louis, Mo.; way matters—C. S. Kimball, chairman, Washington, D. C.; H. F. Merker, East St. Louis, Ill.; E. H. Berry, Cincinnati, Ohio; E. P. Roundey, Syracuse, N. Y.; W. F. Graves, Montreal, Que., Can.; R. C. Cram, Brooklyn, N. Y.; C. W. Gennet, Jr., Chicago, Ill.; E. M. Haas, Chicago, Ill.; L. A. Mitchell, Anderson, Ind.

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Rules—W. H. Collins, chairman, Gloversville, N. Y.; L. H. Palmer, vice-chairman, New York, N. Y.; W. C. Callaghan, Helena, Mont.; C. E. Morgan, Jackson, Mich.; Sam W. Greenland, Fort Wayne, Ind.; W. R. W. Griffin, East Liverpool, Ohio; Edward Dana, Boston, Mass.; standards—L. H. Palmer, chairman, New York, N. Y.; C. V. Wood, Springfield, Mass.; J. N. Shannahan, Hampton, Va.; N. W. Bolen, Newark, N. J.; J. E. Gibson, Kansas City, Mo.; F. D. Norviel, Anderson, Ind.; W. H. Collins, Gloversville, N. Y.; C. S. Ching, Boston, Mass.; P. P. Crafts, Mobile, Ala.; Alexander Jackson, Newark, N. J.; George L. Radcliffe, Cleveland, Ohio; subjects—H. C. Donecker, chairman, Newark, N. J.; L. H. Palmer, New York, N. Y.; E. F. Schneider, Cleveland, Ohio; training of transportation employees—C. S. Ching, chairman, Boston, Mass.; W. J. Harvie, Syracuse, N. Y.; Bruce Cameron, St. Louis, Mo.; E. E. Strong, Rochester, N. Y.; F. I. Hardy, South Bend, Ind.; to develop uniform definitions—H. C. Donecker, chairman, Newark, N. J.; Frederic Nicholas, New York, N. Y.; William C. Greenough, Worcester, Mass.

JOINT COMMITTEES, ACCOUNTANTS' AND ENGINEERING

Engineering accounting—Accountants—F. H. Sillick, co-chairman, New York, N. Y.; M. W. Glover, Mobile, Ala.; Charles H. Lahr, Akron, Ohio; J. C. Collins, Rochester, N. Y.; H. A. Gidney, Boston, Mass.; engineers—Charles Rufus Harte, co-chairman, New Haven, Conn.; Martin Schreiber, Newark, N. J.; C. H. Clark, Cleveland, Ohio; J. P. Ripley, New York, N. Y.; J. P. Barnes, Rochester, N. Y.; life of railway physical property—engineering—Martin Schreiber, co-chairman, Newark, N. J.; Robert B. Rifenberick, Detroit, Mich.; J. H. Hanna, Washington, D. C. (Accounting members not yet appointed.)

JOINT COMMITTEE, ACCOUNTANTS' AND TRANSPORTATION AND TRAFFIC

Transportation accounting—accountants—M. R. Boylan, co-chairman, Newark, N. J.; G. W. Kalweit, Milwaukee, Wis.; I. A. May, New Haven, Conn. (Transportation & Traffic members not yet appointed.)

JOINT COMMITTEES, ENGINEERING AND TRANSPORTATION AND TRAFFIC

Block signals for electric railways—engineers—J. M. Waldron, co-chairman, New York, N. Y.; C. H. Morrison, New Haven, Conn.; J. Leisenring, Peoria, Ill.; G. N. Brown, Syracuse, N. Y.; transportation and traffic—J. W. Brown, co-chairman, Newark, N. J.; C. D. Emmons, South Bend, Ind.; H. A. Nicholl, Anderson, Ind.; A. E. Roome, Los Angeles, Cal.; transportation engineering—engineers—R. N. Hemming, co-chairman, Anderson, Ind.; W. E. Rolston, Michigan City, Ind.; R. D. Beatty, Cleveland, Ohio; transportation and traffic—P. N. Jones, co-chairman, Pittsburgh, Pa.; J. B. Stewart, Jr., Youngstown, Ohio; C. N. Wilcoxon, Michigan City, Ind.

AMERICAN ASSOCIATION CORRESPONDENCE COURSES OF INSTRUCTION

The International Correspondence Schools, with which the educational committee of the American Association has arranged for conducting the courses outlined in the 1914 report of the committee, has issued a special circular briefly describing these courses. Copies of the leaflet can be secured by addressing Secretary Burritt. It is the plan of the committee to have the courses in full operation at once, and the committee has been pleased to learn from the officials of the correspondence schools that enrollments are already being secured. At the committee meeting to be held next Monday, arrangements will be made for supplying full information to member companies and their employees regarding the part which the association will play in conducting the courses.

MID-YEAR MEETING ARRANGEMENTS

Secretaries Burritt and McConnoughy are in Washington at work upon the details of the mid-winter meeting program and will announce them in a few days.

The committee in charge of transportation matters held a meeting in New York on Dec. 21 to discuss the subject of special trains from New York and Chicago. The former will leave New York about 1 a. m. on Friday Jan. 29, arriving at Washington not later than 8 a. m. No arrangement for a special train returning will be made. A local sub-committee was appointed to make the arrangements for the special train from Chicago.

The general plan of procedure adopted by the committee for suggestion to the association secretaries was this: Notices regarding the dinner and special trains, and applications for dinner tickets will be sent to company and individual members of both associations. Upon receipt of an application a dinner ticket will be sent for each individual, with a circular giving information regarding special trains, and a post-card application form for train space. These cards, when returned, will be forwarded to the railroad company which will issue tickets, including an identification card admitting to a special train.

COMING COMMITTEE MEETINGS

Jan. 4, New York, 10 a. m., American Association educational committee, H. H. Norris, associate editor, ELECTRIC RAILWAY JOURNAL, chairman.

The meetings of certain sub-committees of the joint committee on block signals, scheduled for Jan. 4 and 5 have been postponed.

Jan. 7, New York 2 p. m., American Association valuation committee, L. S. Storrs, president The Connecticut Company, chairman.

Jan. 11, Chicago (Congress Hotel), sub-committees of the Engineering and Transportation & Traffic Associations' joint committee on block signals for electric railways, J. M. Waldron, signal engineer Interborough Rapid Transit Company, and J. W. Brown, assistant general superintendent Public Service Railway, co-chairmen, will meet as follows: on certain changes in phraseology in regard to standard light aspects, J. W. Brown, chairman; on revision of block signal rules for contactor signals, C. D. Emmons, Chicago, South Bend & Indiana Traction Company, chairman; on study of highway crossing protection, J. Leisenring, Illinois Traction System, chairman; to report on advisability of operating single-track interurban signal-blocked lines without dispatchers, H. A. Nicholl, Union Traction Company of Indiana, chairman.

Jan. 28, Washington (New Willard Hotel), 10 a. m., American Association executive committee, C. Loomis Allen, Allen & Peck, Inc., chairman.

REQUEST TO COMMITTEE CHAIRMEN

Secretary Burritt has requested that chairmen of committees have progress reports in his hands by Jan. 20 in order that they may be digested and presented to the executive committee at the above meeting in Washington.

Equipment and Its Maintenance

**Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading**

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Location of Trolley Wire on Curves—I

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

As long ago as 1895 the author evolved a plan for getting the exact location of the trolley wire on curves that proved extremely simple and satisfactory, and he had always supposed that others similarly situated had done as well or better. Of late there has been much in print on this subject, but as nothing has seemed to be as efficient as the results of the author's work of 1895, it may be worth while to present it.

Of course, the trolley wire location can be found by the use of a drafting table and a lot of instruments and time, and it can be calculated for each case from a complete set of essential measurements. However, in flat city work the writer's twenty-year old method calls for no mathematical work, neither mental nor written, by the linemen and but one official calculation is needed for each type of car.

The author's original formula is identical with the one presented to the American Electric Railway Engineering Association by the committee on power distribution at its annual 1914 convention, except that the latter formula omits consideration of the wheelbase of a double-truck car. This omission is not very serious but, as it causes an error of from ½ in. to 1½ in. in the accuracy of the trolley location, this factor would seem to be worth incorporating in the formula.

The 1895 formula was as follows:

$$O = R - \sqrt{R - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - L^2 + (H - I)^2} + \frac{EH}{G}$$

Where O = offset of trolley wire from center of track toward inside of curve
E = elevation of outer rail
H = height of trolley wire above rail
G = gage or distance between rails of one track
R = radius of curve
b = wheelbase of one truck
B = center to center of king pins of the two trucks
C = center of car to center of trolley base
L = length of trolley pole
I = height of car roof above rail.

The feature of interest of the author's method, however, is not in the formula but in the fact that from it was obtained the length of a chord that was common to all curves and that served for the lineman everywhere and forever as long as the type of car and height of trolley wire remained unchanged.

For example, in flat city work with a certain type of car the lineman needed only to be told to stretch a line 31 ft. long as a chord across the curve and to measure from the center, or 15½-ft. mark, the shortest distance or versed sine or middle ordinate to the nearest rail to get the distance to locate the trolley wire inside the center of the track on any and every curve.

In country work with 19-ft. height of trolley, the standard of the California State Railroad Commission, the lineman, of course, has to multiply each inch of elevation of the outer rail by 4 and add this product to his versed sine obtained by the common chord.

When new types of cars were added, the line foreman was given a new common chord length for each one. When several types of cars used the same curves the average length of the common chord was used, etc. The following is a more exhaustive presentation of this and other subjects connected with the location of overhead curves.

The proper location of the trolley wire on curves in American practice, where the usual trolley wheel harp is used, depends on—

First—The dimensions of the car used, the trolley pole and the height of the trolley wire.

Second—The gage of the track, the radius of the curve and the elevation of the outer rail.

Third—The distance between the ears or points of support.

In the following calculations it is assumed (1) that when there is but one trolley pole on a car it will be located at the exact center of the car roof, and (2) that when there are two poles on a car the rear pole only will be used and used trailing.

FORMULAS

In deriving a general formula for use in determining the exact proper location of the trolley wire for least trolley wheel friction the following letters will be used:

R for radius of the center line of the track
g for gage of the track—distance between rails on one track
b for wheelbase of one truck, that is to say, from center to center of the two axles on one truck
B for distance from the center of one truck to the center of the other truck
C for distance from the center of one trolley base to the center of the car roof
h for height of the trolley wire above the top of the rail
i for height of the base of the effective trolley pole or top of the car roof above the top of the rail
l for length of the trolley pole or distance from top of the car roof to trolley wire contact with trolley wheel measured along the line of the trolley pole
p for projection of the trolley pole on the horizontal plane in which the trolley wire lies.

All these measurements are in feet. When the trolley wheel is rolling along the wire on the straight track, it is doing so with the least frictional resistance compatible with sufficient electrical contact. The problem to be solved here is so to locate the trolley wire over the curved track that the trolley wheel with the usual American rigid harp, as distinguished from the English bed-caster type of harp, will still roll around on the curved wire with approximately the same small resistance as on the straight track.

In order to secure this result the trolley wire curve must be moved in or out, usually in, until the projection of the trolley pole makes a true tangent with this trolley curve. The trolley wire is then parallel to the sides of the trolley wheel and not at an angle with them as is the case when the curved trolley wire is not properly located and the wheel scrapes against the wire as it passes, wearing both rapidly.

Fig. 1 is a diagrammatic representation of the trolley pole extending from the car roof to the trolley wire at the usual angle of about 45 deg. From this figure it is clear that the projection,

$$p = \sqrt{l^2 - (h-i)^2} \qquad (1)$$

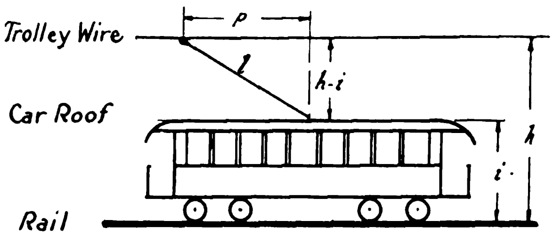


FIG. 1—STUDY OF TROLLEY POLE PROJECTION

Fig. 2 is a diagram representing a double-truck car on a curved track. In this figure

a, a, a = the center line of the curved track
K, K = the rails of curved track
b, b = the two four-wheeled trucks of the car
d = the center of the car
e = the location of the trolley base
f = the center of one truck
g = the gage of the track
m = the trolley wheel on the projection of the trolley pole when on the wire over the center of the track
n = the trolley wheel when the trolley wire curve is so located that the projection of the trolley pole is a tangent to the trolley wire curve, making an angle of 90 deg. with the radius.
O = the center of the curve
R = the radius of the center of the track curve
R' = the radius of the properly located trolley wire curve—s, s—that is sought.

We will determine the factors in the formula step by step as follows:

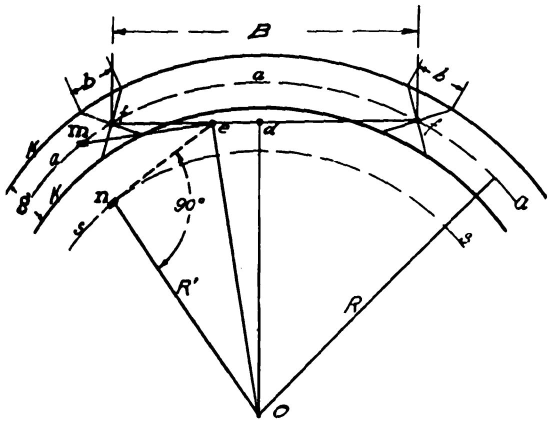


FIG. 2—DOUBLE-TRUCK CAR ON CURVED TRACK

Case A—The center f of one truck is distant radially from the curve a, a, a, a distance expressed by $R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$ as will be clear from Fig. 3.

In Fig. 3,

ACE = a short arc of the track curve to which the wheelbase of one truck is chord AE.
$\frac{b}{2}$ = half the wheelbase of one truck
R = radius of center of track curve

$$D = \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$$

$V.S.$ = Versed sine or middle ordinate or distance the center f of the truck is inside the center of the track =

$$R - D = R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2} \qquad (2)$$

Case B—The center d of the car is distant radially from the center of the track curve—a, a, a—a distance expressed by $R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$ as will be clear from Fig. 4.

In Fig. 4,

$A'C'E'$ = A short arc of a curve passing through the centers of the two trucks and to which the imaginary line joining the centers of two trucks is a chord $A'E'$.
$\frac{B}{2}$ = Half the distance between centers of trucks
D = Radius of an imaginary curve passing through the centers of the trucks and having the same centers as R in Fig. 3.

$$D = R - V.S. \text{ or } \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$$

$V.S.'$ = New versed sine or distance center of car is inside imaginary curve of radius D

$$D' = \sqrt{D^2 - \left(\frac{B}{2}\right)^2} = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$$

$$\text{Since } D = \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$$

$$V.S.' = D - D' = \sqrt{R^2 - \left(\frac{b}{2}\right)^2} - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$$

Adding this $V.S.'$ to the $V.S.$ obtained from consideration of Fig. 3 and combining the terms of this sum,

$$R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2} + \left[\sqrt{R^2 - \left(\frac{b}{2}\right)^2} - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}\right]$$

we get $V.S. + V.S.' = R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$ (3)

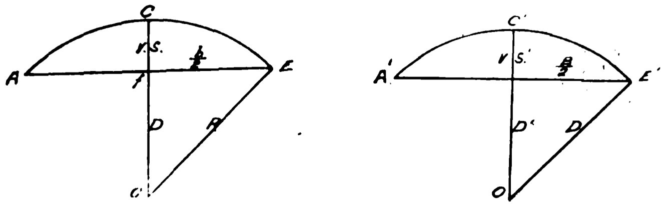


FIG. 3—RADIAL DISTANCE FROM CENTER OF ONE TRUCK; FIG. 4—RADIAL DISTANCE OF CAR CENTER "D" FROM CENTER OF TRACK CURVE

Case C—Returning now to Fig. 2,

$$do = R - (V.S. + V.S.') \qquad (4)$$

$$eo = \sqrt{(do)^2 + (ed)^2} \qquad (5)$$

ed = C or distance from the center of the trolley base to the center of the car roof.
en = Projection—p—of trolley pole.

$$R' = \sqrt{(eo)^2 - (en)^2} \qquad (6)$$

Substituting in equation (4) for $V.S. + V.S.'$ its value in equation (3) and combining, we get

$$do = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2} \qquad (7)$$

Substituting this value of do and value C of ed in equation (5) we get,

$$eo = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2} \qquad (8)$$

Substituting in equation (6) this value of eo and the value of en or p in equation (1) we get,

$$R' = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - l^2 + (h - i)^2} \qquad (9)$$

The distance the trolley wire should be inside the center of the track, if flat, is thus,

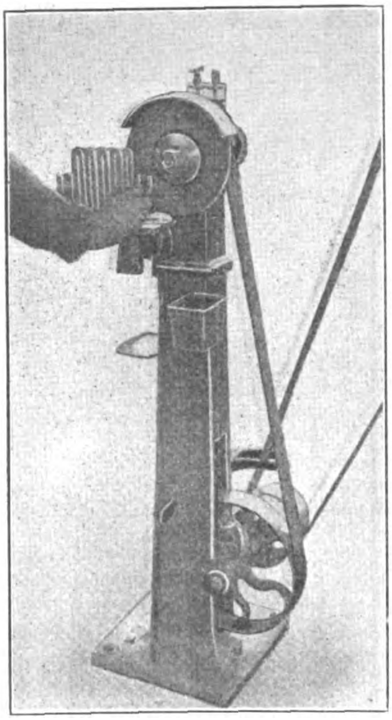
$$R - R' = R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - l^2 + (h - i)^2} \qquad (10)$$

We will leave formula (10) for the present and take up the subject of elevation of outer track rail.

Machine for Grinding Home-Made Grids

BY C. L. KELLER, ASSISTANT MASTER MECHANIC DETROIT UNITED RAILWAY

For several years the Detroit United Railway has found it could make quite a saving by manufacturing its own cast-iron grids. In preparing these grid castings prior to assembling, the only work necessary embraced grinding the contact faces smooth and parallel. In order to facilitate this operation, as well as to insure a full contact area, a special grid grinding machine has been devised.



DETROIT UNITED RAILWAY GRID GRINDING MACHINE

This machine was made from an old twist drill grinder by providing a rest with a groove of proper width to take the grid casting. The grinding operation consists simply of sliding the casting forward and back in this groove with the face against the wheel. The size and location of the groove in the rest is such as to insure a good contact between adjacent grid castings when mounted on the frame. The simplicity of the machine and the easy manner of carrying out the work are apparent from the accompanying halftone illustration.

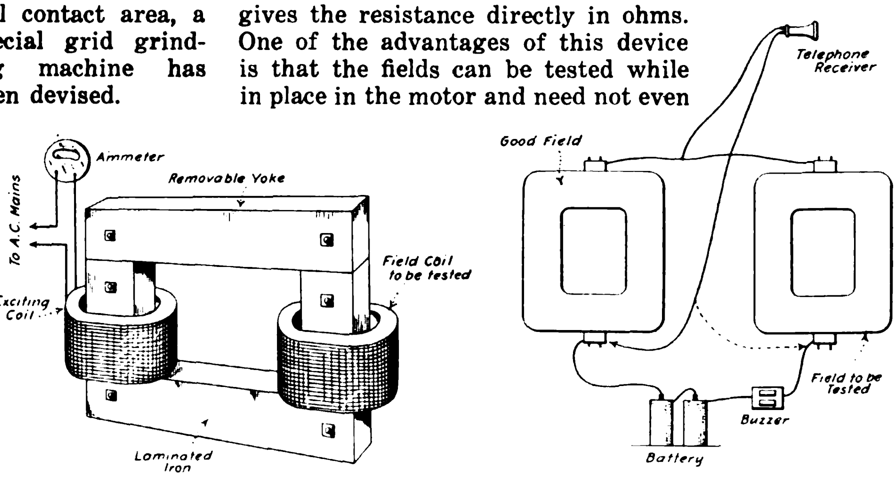
Methods of Testing for Short-Circuits in Field Coils

BY F. J. FOOTE, MASTER MECHANIC OHIO ELECTRIC RAILWAY, COLUMBUS, OHIO

There are several satisfactory methods of testing for short-circuits in field coils. The writer believes that where the fields are out of the motor case the most satisfactory field tester is the transformer type. A rough sketch of this style is given in Fig. 1. It consists of a heavy rectangle of laminated iron with an exciting coil on one leg and the coil to be tested on the other. An ammeter is connected in series with the exciting coil, which is supplied with alternating current of proper voltage. If there is no short in the coil the ammeter will show only a very small current. With a good field coil this current will be the same whether the field coil is on the free leg of the transformer or not. If there is a short in the coil under test the ammeter will indicate the short by showing a heavy current.

A very convenient circumstance in connection with the transformer method is that it not only indicates a short, but often cures it. If a short develops the repeated and rapid turning on and off of the current will often burn away enough metal at the point where the turns are in contact to remove the short entirely. If the field is afterward impregnated there is little chance that the short will return. While most satisfactory where the field is out on the bench, the transformer method has the following disadvantages: It cannot be used on fields installed in motor cases; the tester is somewhat expensive and not all carhouses are supplied with alternating current.

The next best field tester is one that measures the actual resistance of the field. This can be done by passing a known current through the field and measuring the drop with a low-scale voltmeter, and the resistance is then computed according to Ohm's law. A more convenient arrangement, however, and one which is on the market, is a modified form of Wheatstone bridge which gives the resistance directly in ohms. One of the advantages of this device is that the fields can be tested while in place in the motor and need not even be disconnected from each other, as one, two or four fields can be tested in series, as desired. To use this tester the correct resistance for each type of field must be known, but this information is readily obtained from the manufacturers, or it can be secured by measuring several types of fields which are known to be good and taking the average. As with the other methods, some judgment must be exercised because fields of the same type and number, even when new, will vary slightly in resistance. A field should not be condemned if it shows a few per cent high or low in resistance.



FIGS. 1 AND 2—TRANSFORMER AND BATTERY—TELEPHONE METHODS OF TESTING FIELD COILS

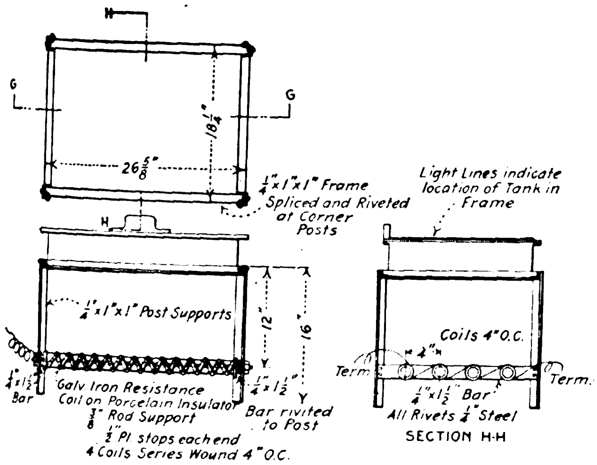
Several field testers on the market have proved more or less satisfactory, depending on the care and judgment of the operator. One inexpensive method that has proved very useful to the writer in many cases, largely because the necessary apparatus is nearly always to be found in any carhouse, is illustrated herewith. It requires one good field of the same kind as the one to be tested, a small doorbell battery, an ordinary telephone receiver and a buzzer. The two fields, the battery and buzzer are connected in series, which will cause the buzzer to "buzz"; the receiver wires are then applied repeatedly to the terminals, first of one field and then of the other, until there is no doubt in the mind of the operator as to which field gives the louder sound or if there really is a difference in the intensity of sound. If the field under test has a very weak sound, it is badly shorted and should be condemned. If the difference in sound is very slight, it is likely that the field is all right and merely of slightly different resistance. With a little practice this test gives very satisfactory results, especially on small motors and where only one kind of motor is handled by the same operator.

An Oil Bath Tank

BY R. H. PARSONS, ELECTRICAL FOREMAN

As a part of the equipment of an electrical repair shop an oil bath will be found useful if not positively necessary.

A recommended practice for the treatment of the wooden parts of controllers, etc., is as follows: "Use kiln-dried lumber and finish complete, taking care to remove all saw marks. Drill all holes except those for wood screws. Place in oven and heat for eight hours at a temperature of 100 deg. Cent. to 120 deg. Cent. While hot place in raw linseed oil at room temperature and soak for sixteen hours. Drain for four hours and place in oven and bake at a temperature of 120 deg. Cent. for four hours. Remove from oven and scrape. Then finish with coat of shellac."



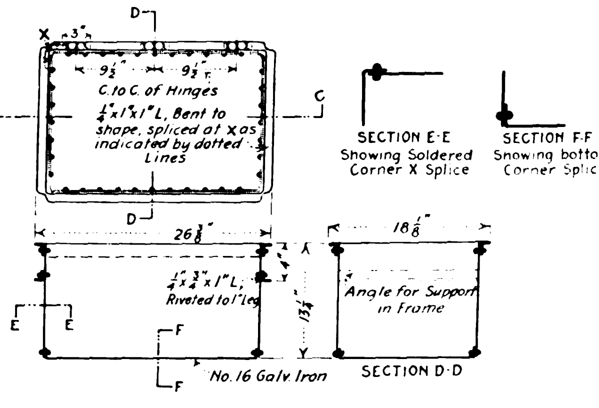
H
G
G
18¼"
26⅝"
¼"x1"x1" Frame Spliced and Riveted at Corner Posts
Light Lines indicate location of Tank in Frame
H
¼"x1"x1" Post Supports
12"
16"
Y
Y
¼"x1½" Bar
Galv. Iron Resistance Coil on Porcelain Insulator
⅜" Rod Support
½" Pl. stops each end
4 Coils Series Wound 4" O.C.
¼"x1½" Bar rivited to Post
Coils 4" O.C.
4"
Term.
Term.
¼"x1½" Bar
All Rivets ¼" Steel
SECTION H-H

FIG. 1—PLAN OF FRAME SUPPORT FOR OIL BATH TANK

For these controller parts the plain oil bath without heat is all that is required. Heat is desirable, however, in treating contact rods and other wood which is exposed to water and weather. In such cases the oil if heated to just below the boiling point and kept at that heat for about forty hours will permit much deeper penetration of hardwoods.

The oil bath tank herewith illustrated can be used for either condition mentioned, and it will also be found useful for other purposes. Fig. 1 illustrates the frame support for the tank, which is made of 1-in. x 1-in. x ¼-in. angle irons riveted together at the corners. The tank proper is so made that it can readily be lifted from the frame, for the purpose of cleaning, etc.

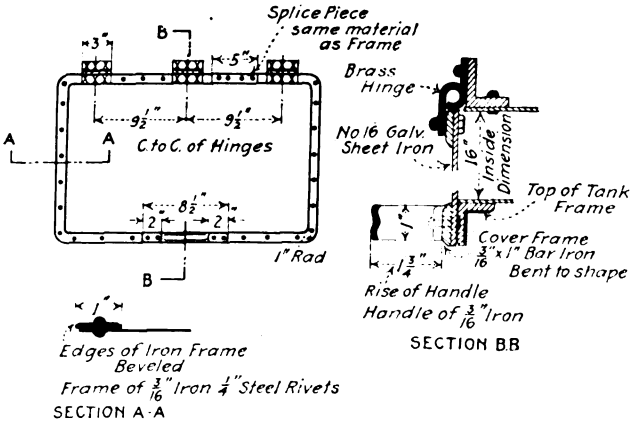
The four heater coils, made as part of the frame, are so placed that there is a clearance of about 2 in. between them and the bottom of the tank. These coils are made from the parts of obsolete car heaters. Each coil has a resistance of approximately 14 ohms, making a total of 56 ohms per set. In this way we get about 10 amp at the ordinary street railway voltage of 550 or a little more.



D
X
3"
9½"
9½"
C. to C. of Hinges
¼"x1"x1" L, Bent to shape, spliced at X as indicated by dotted Lines
C
C
D
SECTION E-E
Showing Soldered Corner X Splice
SECTION F-F
Showing bottom Corner Splice
26⅛"
18⅛"
¼"x¾"x1" L, Riveted to 1" Leg
13¼"
Y
Y
E
E
F
F
No. 16 Galv. Iron
Angle for Support in Frame
SECTION D-D

FIG. 2—PLAN OF OIL BATH TANK

The tank itself is shown more clearly in Fig. 2. It is constructed of No. 16 galvanized iron, riveted and soldered at the joints and made more firm by an angle rim around the top. It is supported in the frame by a 1-in. angle riveted at each end. The cover shown in Fig. 3 is made of No. 16 galvanized iron, strengthened by a 3/16-in. x 1-in. flat iron bent edgewise and riveted. This band around the cover makes a strong anchor for the hinges and the handle of the cover. The complete tank is not heavy and has capacity enough for all general purposes.



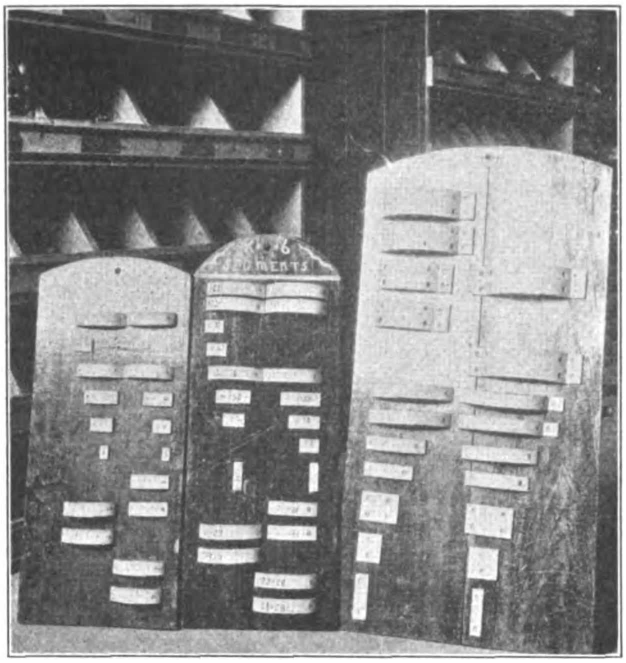
Splice Piece same material as Frame
3"
B
5"
9½"
9½"
A
A
C. to C. of Hinges
8½"
2
2
1" Rad
B
1"
Edges of Iron Frame Beveled
Frame of 3/16" Iron ¼" Steel Rivets
SECTION A-A
Brass Hinge
No 16 Galv. Sheet Iron
16" Inside Dimension
Top of Tank Frame
1"
1¾"
Cover Frame 3/16"x1" Bar Iron Bent to shape
Rise of Handle
Handle of 3/16" Iron
SECTION B.B

FIG. 3—PLAN OF COVER FOR OIL BATH TANK

Street railways in Kentucky have noted with interest the progress of litigation to determine the constitutionality of the workmen's compensation law recently enacted in that State. The lower court has upheld the validity of the measure and it is now before the Court of Appeals, whose judgment will be final. The traction companies have indicated that they will come under the law, as if they elect to remain out they lose the right to plead the common law defenses in damage suits. None of them, as far as has been learned, will enter the State insurance system, however, but the usual plan will be to carry their own insurance, as at present. Under the law the maximum payment for death is $3,750.

Controller Segment Sample Boards

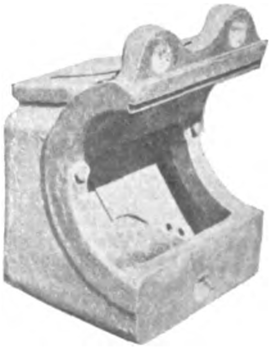
To insure the correct delivery or purchase of segments for the different types of controllers employed on the lines of the Chicago, South Bend & Northern Indiana Railway, a sample set of segments of each type of controller has been mounted on a board. Three of these sample sets are shown in the accompanying halftone illustration. These boards are hung on the wall convenient to the stockroom clerk's window so that when a certain segment is desired workmen may indicate it on the board. Each segment contains the bin number in which it is to be found in the stockroom, as well as the manufacturer's catalog number for use in making requisitions and orders.



BOARDS CONTAINING CONTROLLER SEGMENT SAMPLES

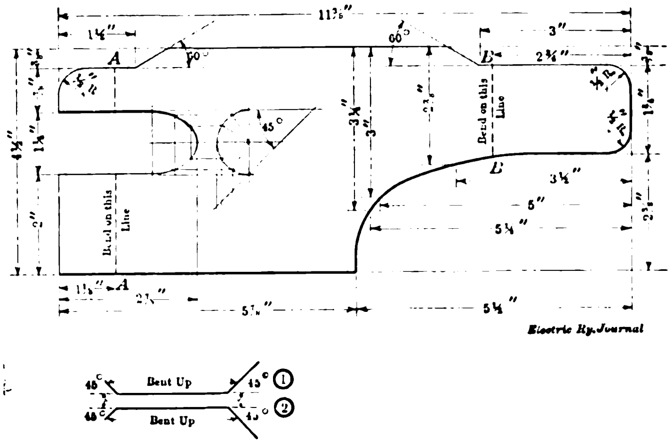
Oil-Saving Filler for Motor-Axle Cap

The high-speed cars of the Aurora, Elgin & Chicago Railroad Company are equipped with either two or four GE-66 motors, and W. J. Bowman, master mechanic, Wheaton, has devised special filler pieces which, when inserted in the axle caps, provide an oil-well space for approximately 3 pints of oil and improve the oiling arrangement. The special filler pieces have reduced the amount of packing about one-half. As they are on a 45-deg. angle the packing does not drop away from the axle, therefore giving good lubrication to axle and bearings and decreasing the wear on both.



AXLE CAP WITH FILLER

The dimensions of the filler pieces, one right and one left for each cap, are shown in the line drawing. The material is 1/16-in. sheet iron cut as shown, and drilled for bolting to the cap casting. When inserted, these two pieces form a 45-deg. baffle, behind which clear oil accumulates. Two ¾-in. pipes, 9¼ in. long, are set vertically under the cap cover and these permit filling and testing without admission of dirt to the oil chamber.



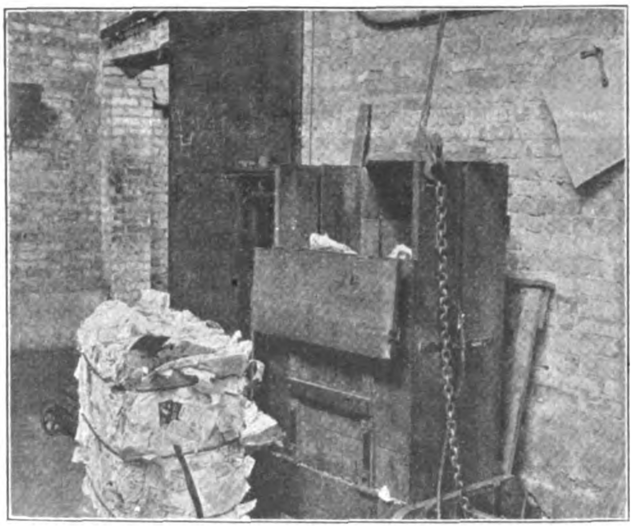
Electric Ry. Journal

DIMENSIONS OF SHEET-IRON FILLER

Since these special baffles have been installed Mr. Bowman reports a reduction in the amount of oil used and that hot motor axle bearings have been practically eliminated.

Baling Paper by Machine

While the waste elimination campaign of the larger street and interurban railways includes the collection of waste paper preparatory to baling and sale, smaller companies have not generally adopted this means of good housekeeping and economy because the savings have been considered too small and the cost of the baling outfit too large. Nevertheless, the general repair shops and storage yards of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., have a small baling equipment which has paid for itself many times. The baler proper was purchased from a manufacturer at a cost of about $12. All paper collected in the offices, stations, shops and cars is placed in the baler, which serves as a container until enough has been collected to make a 100-lb. bale. Heretofore this company has been burning paper rubbish, which not only was wasteful, but required the time of one workman as watcher during the burning. Now the time required to prepare a bale is much less than that necessary to burn the same amount of paper, while the paper finds a ready market at approximately 40 cents per 100 lb.



WASTE PAPER BALING OUTFIT

110-Ton D.C. 2400-Volt Locomotives for 15-mile Chilean Mine Railway

A remarkable deposit of iron ore is found at Tofo, Chile, where the Bethlehem-Chile Iron Mines Company is preparing to mine it for shipment to the United States via Panama Canal for use in the blast furnaces at South Bethlehem, Pa. These mines occupy the summits of two hills, approximately 2000 ft. above sea level and about 4 miles in an air line from the port of Cruz Grande.

An electric railway operating at 2400 volts direct current is now being built from the mines to the piers for a length of approximately 15 miles (within a 4-mile air line) with an average grade of 3 per cent for nearly the entire distance. This is also the maximum grade. The physical conditions made it desirable to use regenerative control and electric braking, thereby economizing energy, brakeshoes and wheels.

The General Electric locomotives designed for this service will weigh 110 tons on drivers and will be equiped with four 300-hp 1200/2400-volt motors operated two connected permanently in series on 2400 volts. The first installation will consist of three locomotives, each having a capacity to haul a 450-ton train up grade at 10½ m.p.h. and exerting the same braking effort when regenerating at 12 m.p.h. If the locomotives are operating with the maximum train weights down grade a portion of the braking will be done with air brakes, and when stopping air brakes will be used alone.

The trolley will be of No. 0000 grooved copper wire catenary suspended from a steel messenger supported by a mixture of bracket and cross-span construction on United States cedar poles, as Chile grows no timber suitable for this purpose. A duplicate 22,000-volt high-tension transmission line will in general follow the trolley and will be carried on the same poles when possible.

In the power house oil-fired boilers are to be used. The oil will be received in tank vessels and pumped to an oil storage tank above the power station. The generating room will contain two 3500-kw, three-phase, sixty-cycle, 2300-volt Curtis steam turbines with direct-connected exciters for supplying power to the railroad and the mines; two 300-kw, three-phase, sixty-cycle, 600-volt turbines for operating motor-driven auxiliaries, fire pumps, etc., and at night, lights for the piers, villages, and mines when the main turbines are shut down.

Street and Station Indicator Used at Los Angeles

The Pacific Electric Railway, Los Angeles, Cal., is now trying out the street and station indicator of the National Street & Station Indicator Company of that city, as hereinafter described.

The truck of the car carries two horizontal magnets spaced 36 in. apart, about 4 in. above the pavement, although it is possible to carry them higher. Half-way between these two magnets is an airtight and waterproof compartment, containing a miniature armature in the form of a vane held in normal position by a spring. Near places where it is desired to announce a new street or station, two 2-in. x ¼-in. bars of iron 1 ft. apart are installed parallel with the rails, each bar being 6 in. on either side of the center of the track. These bars range in length from 3 ft. in the downtown districts to 6 ft. on suburban lines. They may be covered with pavement.

When the truck magnets are brought close to the two iron bars, the bars form a magnetic field strong enough to attract the small armature to a different position. In moving to this new position, a switch is operated, supplying the indicator mechanism with an impulse which causes it to move ahead or back one more space. The indication is given a block ahead to give the passengers time to get ready to alight. The reverse series of indications is made automatically upon the reversal of the car motor.

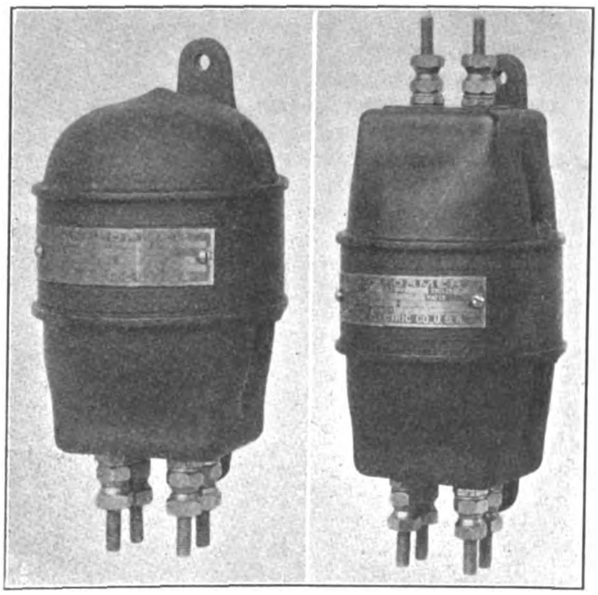
The indicator holds 200 to 400 plates. The device can be arranged to show the same name on opposite sides, to hang in the center of the car or to operate indicators at opposite ends of the car in series. A separate compartment on the end of the indicator case contains an oscillating armature with a spring to hold it in normal position. The upper end of this armature carries two pawls, one for driving in either direction. These pawls engage the teeth of a ratchet wheel, which is mounted on a shaft extending through the plate compartment. This shaft has two or more hexagon disks over which the plates are arranged.

The maker intends to lease these devices at a monthly rental and keep them in working order.

Signal Lighting Transformers

A new line of miniature air cooled transformers, known as type M, has been developed by the General Electric Company for railway signal lighting. These transformers are distinctive in application and design. They are inclosed in a neat and compact case, either for indoor use or in a weatherproof form for outdoor use.

The transformers are fitted with standard R.S.A. terminals, as shown by the accompanying illustrations, and are furnished in sizes for 25 to 125 watts, twenty-five and sixty cycles.



OUTDOOR SIGNAL LIGHTING TRANSFORMERS, 25 TO 125 WATTS, SIXTY CYCLES, 110 VOLTS PRIMARY, AND 10 VOLTS AND 6/12 VOLTS SECONDARY

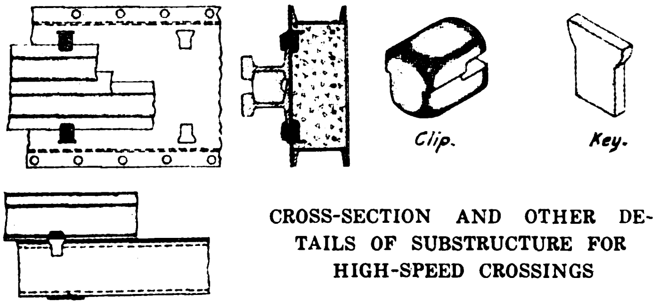
A lamp of from 2½ to 5 watts is generally considered sufficient for signal illumination; consequently, a transformer of this kind with 6 to 12 volt, 2½ to 5 watt, high efficiency Mazda lamps makes a very satisfactory, as well as economical, system of lighting.

A British Consular report states that there are now 250 miles of double-track electric lines in operation within a radius of 50 miles in Osaka, Japan, and that a further 80 miles of line are under construction.

Two Years' Maintenance Record of Track Crossing on a Steel Substructure

On Dec. 4 and 5, 1912, the Union Traction Company of Indiana installed on Ohio Avenue, Muncie, Ind., a steam railroad double-track crossing of the steel substructure type made by the International Steel Tie Company, Cleveland, Ohio. This crossing consisted of 90-lb. A. S. C. E. rail with a compromise joint of 80-lb. A. S. C. E. rail at the south end and of 72-lb. T-rail at the north end.

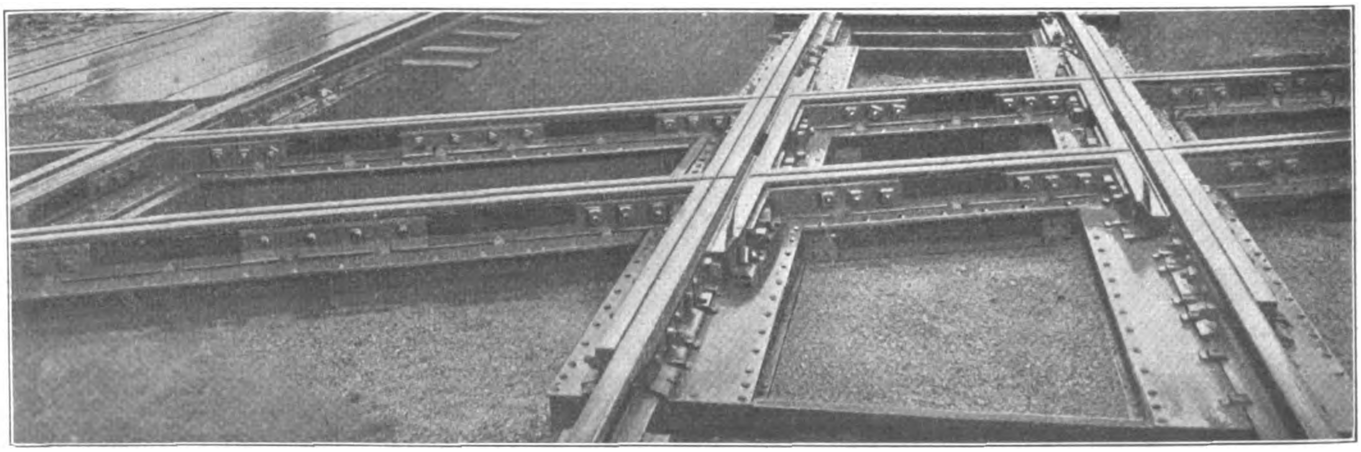
The report made by the user of this installation states that during the year 1913 the only charge against the crossing was one of $16.57 in labor for surfacing, while during the year 1914 the company spent $29.86 in labor for surfacing and tightening bolts. In two years, therefore, only $46.43 was spent for maintenance. Not a single bolt was renewed, and the frogs are stated to be as good as the day they were put in. The crossings installed later on Perkins Avenue, Muncie, also according to the International system, have cost nothing at all since they were placed.



CROSS-SECTION AND OTHER DETAILS OF SUBSTRUCTURE FOR HIGH-SPEED CROSSINGS

As the detail drawing shows, the substructure common to this form of construction is built up on much the same lines as the International steel twin ties, and the connection of the rail to the substructure is made with the standard rail clips. The latter anchor the crossing so firmly that creeping is practically impossible.

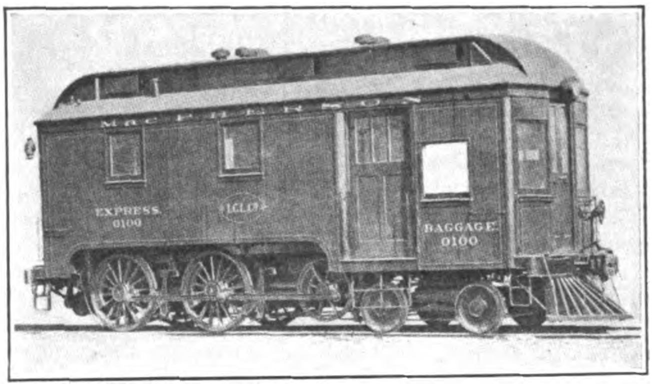
It is well known that ordinary wooden ties form an unsatisfactory support, and even the use of special length ties leaves much to be desired. On the other hand, a steel substructure of the section illustrated gives a firm, non-rocking and non-sagging support on a liberal bearing area. The tamping, which has the advantage of being entirely under the load, is done with a horizontal pick stroke from both sides of each supporting member, and the job is accomplished far more easily and effectively than under wooden ties.



STEAM RAILROAD CROSSING SUPPORTED ON STEEL SUBSTRUCTURE, OHIO AVENUE, MUNCIE, IND.

A One-Man Internal-Combustion Locomotive

The Internal Combustion Locomotive Company, Wilmington, Del., has just brought out an internal combustion locomotive for double-end operation similar to drivers, frame, and swing form pony trucks for negotiating sharp curves. The engine is a self-starting six-cylinder gasoline equipment which develops 450 hp the regulation steam, connecting-rod locomotive with on the rails. The transmission has a master clutch of the Hele-Shaw type, connecting with the engine and driving shaft of the variable speed transmission system. The driven shaft of the transmission carries an individual clutch for each speed to be applied, thus giving a transmission without gears to slide in and out of mesh. This transmission differs from the automobile form in having the same number of speeds for backward as for forward running. The application of power by this transmission is through chain and sprocket, although gears, constantly in mesh, may be substituted. The fuel may be gasoline, kerosene, ozoline, crude oil, compressed natural gas or distillates. The heating and lighting of the trailing passenger cars are provided by the locomotive.



ONE-MAN INTERNAL COMBUSTION LOCOMOTIVE

One of the strongest points asserted in favor of this locomotive is its remarkable per car-mile saving in operating expense, not to mention the large saving in the first cost of new interurban lines. For railroad service requiring 35-ton to 50-ton locomotives, and interurban service, requiring 15-ton to 25-ton machines, this internal combustion locomotive is considered ideal. It handles trains at a speed of 25 to 50 m.p.h.

LONDON LETTER

New Car in Glasgow—London Bill to Unify Electricity Control—Serious Interruption to London Surface Traffic

(From Our Regular Correspondent)

The Glasgow Corporation is experimenting with a new type of car designed by James Dalrymple, the general manager of the tramway department, in an endeavor to facilitate the egress and ingress of passengers at the stopping places. Passengers leave by the front platform on the near side of the road, while ingress is only possible at the rear end of the car on the near side. In order to provide head room for the exit on the front platform, the stairway has been moved forward to the dashboard and a vertical brake introduced. Hitherto, all the cars have been provided with ordinary seats on the upper deck, each capable of holding two passengers, with a gangway between. In the new car each passenger is provided with an independent chair with back rest. Each seat is mounted on a pivot, which allows it to be turned when the direction of the car is altered. The seats are staggered so that the shoulder of one passenger does not come against that of his neighbor, but overlaps to a certain extent, securing much greater comfort. The use of the car has been sanctioned by the Board of Trade.

The Edinburgh & District Tramways has offered to sell its undertaking to the corporation for £250,000, although the company places its present value at £292,742. The corporation tramways committee has decided to take no action in the matter, the city chamberlain having submitted to the committee a statement showing that the purchase of the undertaking at the figure put forward would involve a loss of £70,000 to the ratepayers, as compared with the price the corporation would have to pay on the expiration of the lease in 1919.

The military authorities at York have arranged with the corporation tramways committee to extend the tramways from Lendal Bridge to the railway goods station, and from Fulford Road to the Ordnance Stores, to give the military authorities facilities for carrying stores from the railway to the depot. The military authorities will advance the money for the extension, estimated at £4,700, and pay carriage on terms which are to be fixed. The work will be commenced at once.

The Sheffield tramways committee is recommending the City Council to promote a bill in the present session of Parliament authorizing the corporation to construct a tramway from the junction of Bawtry Road with Sheffield Road to the city boundary at Tinsley, and to give the corporation running powers over the Rotherham Corporation Tramways from Weedon Street to the city boundary at Templeborough; also for power to purchase the Rotherham Corporation Tramways within the city, and for power to run motor omnibuses from the city boundary at Handsworth Bridge to Aston. Rotherham Corporation, it is reported, is seeking similar powers in respect to its Sheffield service.

The Hove Town Council has not yet been able to agree with the Brighton Town Council as to the particular system of railless traction to be adopted on the through routes between the two towns. Hove favors the Cedes-Stoll system, which has an over-running trolley, while Brighton desires to adopt the under-running trolley system. It looked as if arbitration was the only way in which the matter could be settled, but the Hove Council has now entered into an agreement with the Brighton Corporation for an extension of time for the construction of the through routes for a further period of six months on condition that the Brighton Corporation agrees to defer making application to the Board of Trade for the appointment of an arbitrator for a like period.

The extension of the Baker Street & Waterloo Railway from Paddington to Queen's Park, where a junction is effected with the main line of the London & North-Western Railway, will probably be opened for traffic in January. Including Queen's Park, the new line will serve three stations and extend the benefit of the tube railway services to the populous district of Maida Vale and Kilburn. The complete scheme provides for through service from the Baker Street & Waterloo System over the new electric tracks of the London & North-Western Railway to Watford, and at Queen's Park, where the connection between the underground and surface railway is made, a new joint station is being provided. Through service of the kind contemplated between a London tube railway and a main line of an existing steam railway constitutes a departure, as hitherto, although the London Electric Railways have had underground communication with each other, and with surface lines there has been no physical junction which would permit through service. It will be necessary when the Queen's Park extension is first opened for passengers to change at Queen's Park into the steam-propelled trains of the London & North-Western Railway, which are serving the stations on the Watford electric route pending the completion of the work of equipment and of the power house at Stonebridge Park, but before the end of 1915 electric service will be in operation between Watford and the Elephant and Castle.

The London County Council is promoting a bill in Parliament to unify the control of the supply of electricity in and around the metropolis. The measure provides for the establishment of the London Electricity Authority, consisting of representatives of the County and County Borough Councils in the area, namely, the County Councils of London, Essex, Kent, Hertford, Middlesex and Surrey, and the County Borough Councils of Croydon and East Ham and West Ham. Assessable value has been adopted as the basis of representation, one member being appointed by each of the authorities, with the addition, in each case in which the assessable value exceeds £2,500,000, of one member in respect of each £2,500,000 of the excess. On this basis the membership would be: London County Council, eighteen; Middlesex, two, and Essex, Hertford, Kent, Surrey, East Ham, West Ham and Croydon one member each. The principle of the bill is that all existing power shall be conferred on the authority, but that the powers relating to supply and the construction of works, the purchase of lands, and the purchase of undertakings shall be delegated by the authority to an operating company. It is provided that the authority shall supply electrical energy only to authorized undertakers in the area of supply or contiguous to it, to any company or body or persons owning or working railways, tramways, canals, docks or waterworks, and for general purposes. The bill has been approved by the Parliamentary committee of the London County Council.

The most serious interruption which the London County Council has yet experienced on its vast tramway system occurred recently. The entire tramway service of London was stopped for nearly twenty-four hours. A transformer blew out in the power house at Greenwich. Extensions are being carried on there and much temporary work has been put up while the alterations were being made. The explosion set fire to a wooden staging in the vicinity of the switchboard which controls the whole system. This put out of service all the cables transmitting energy from the switchboard to the various substations.

The Stepney Borough Council has been advised by the London County Council that it intends to relay the lines in Burdett Road and Grove Road for horse traction, but in such a position that they would be suitable for electrification if desired.

Application is to be made to Parliament in the present session by the Bristol Tramways & Carriage Company, Ltd., with respect to the revival of powers and the extension of time for the compulsory purchase of lands, and an extension of time for the completion of authorized tramways. The tramways in question are proposed extensions of some of the present routes into the country beyond the existing city boundaries. The reference to compulsory purchase of land is with regard to acquiring strips of land in different parishes to provide the required distance between the rails and the sidewalks.

Edinburgh Corporation is applying for a provisional order for new tramways and a tram road in the Colinton and Corstorphine districts.

The Dunfermline Town Council has applied for a provisional order authorizing the construction of a tramway between Dunfermline and the new Rosyth dockyard, and for permission to link up tramways in the Inverkeithing and Forth Bridge districts with those of West Fife.

A. C. S.

News of Electric Railways

ST. LOUIS MILL TAX DECISION

Opinion of Judge Walker of the Missouri Supreme Court Upholds the Right of St. Louis to Tax Fares of the United Railroads by the 1904 Ordinance

On Dec. 19 the Missouri Supreme Court handed down an opinion confirming the validity of the mill tax ordinance and holding the United Railways, St. Louis, liable for the payment of taxes that have accumulated in the ten years since the ordinance was passed. The majority opinion was written by Judge R. F. Walker and was concurred in by Justices Lamm, Woodson and Brown. Judge Woodson filed a separate concurring opinion. Judge Graves dissented in an opinion in which Judges Farris and Bond concurred. Judge Walker held that the ordinance was the exercise of a separate and distinct power clearly within the authority of the city. The gist of the court's ruling was that the tax was not a double tax, Judge Walker declaring it to be a license tax and one upon a privilege and not upon the property itself and that it did not come within the letter or the spirit of the national or State constitution prohibiting double taxation. Judge Graves held that the validity of the ordinance was not settled in the Supreme Court of the United States and that the ordinance results in double taxation.

The St. Louis mill tax ordinance was drafted by William F. Woerner in 1902. It was finally enacted into law in 1903 and went into effect on Jan. 1, 1904. An injunction against the enforcement of the ordinance was at once sought in the Federal Circuit Court by all of the street railways in St. Louis and an injunction was granted by the lower court restraining the city from collecting the tax of 1 mill for every pay passenger carried. The Supreme Court of the United States reversed the holding of the lower court in May, 1908, and ordered the injunction dissolved. In the meantime the United Railways had absorbed all of the other street railways in St. Louis. Suits entered in the State circuit courts were delayed by a second appeal to the federal courts, which again declined to modify or reverse the prior decision. After some further delays the cases were then pressed for trial for the collection of the tax and judgment given in every instance for the city in the respective sums sued for, representing the amount for different quarters in question. All of the judgments rendered in the St. Louis Circuit Courts were then appealed by the United Railways to the State Supreme Court. The first of these is the one just passed on by that court. The amount which has been accumulating for more than ten years now totals between $2,000,000 and $3,000,000. The company assailed the validity of the ordinance on the following grounds:

First—That it was an impairment of contract obligations.

Second—That it was not within the charter powers of the city, for the reason that it was not a license tax, but was any one of a number of other things, such, for example, as a general tax upon property, a tax upon gross receipts, an occupation tax or an income tax.

Third—That if the city had power to levy the tax under the charter, that power had been taken away by the statutes of the State.

Fourth—That the ordinance was invalid because it contained more than one subject not expressed in the title.

Fifth—That the tax violated the provisions of the Missouri constitution requiring uniformity of taxation.

Sixth—That the ordinance was unreasonable.

Following the action of the Missouri Supreme Court refusing to grant an extension of time to Jan. 10 to attorneys for the United Railways in which to file a motion for a rehearing in the suit, Henry S. Priest, counsel of the company, issued a statement in which he said that the motions for rehearings would be filed in the time required by law, and that failing the granting of a rehearing the matter would be taken to the federal courts again. Mr. Priest said in part:

"I intend to prepare a motion for rehearing and by brief in support of it to demonstrate to the court that the majority opinion is predicated upon a misapprehension both of law and of fact in the record.

"I am sure I note in the majority opinion some misapprehension of fact and some omissions of fact and some calculations as to fact, and consequently some misapprehension of law, which I am sure the majority will be quite willing to correct, and possibly, upon correction, change its views as to the ultimate decision of the case.

"I cannot, of course, anticipate what action the Supreme Court will take on such motion for rehearing, as I may file. I shall call the attention of the court to many cases which I cited in my brief and some subsequently rendered, none of which were cited or commented upon in the majority opinion, and ask it to consider and distinguish those cases in their application to the issues which the court has before it.

"The opinion of the court based the affirmance of the judgment below wholly upon the fact or supposed fact that the precise and identical issues now before it were decided and determined adversely to the United Railways, in the suit brought by the company against the city and decided by the Supreme Court of the United States, reported in 210 United States Supreme Court Reports.

"A decision of the Federal Court is a federal law and the Supreme Court of the United States is the final interpreter of all federal laws that are drawn in question and form the basis of judicial judgment. From the fact, therefore, that the Supreme Court has predicated the city's right to recover in these cases upon a judgment of the Supreme Court of the United States gives the United Railways Company, upon that question alone, the right to appeal to the Supreme Court of the United States as the final interpreter of its own opinion."

WHAT BRITISH RAILWAYS DID AT THE OUTBREAK OF THE WAR

According to the *Tramway and Railway World* of Dec. 10, 1914, the members of the Railway Executive Committee of Great Britain were on Nov. 13 the guests of honor of the American Luncheon Club at the Savoy, London. H. A. Walker, general manager of the London & South-Western Railway, reviewed the way the railways handled the military traffic on the outbreak of war. Mr. Walker said:

"The government gave the railways a time limit of sixty hours to make ready for the despatch of 350 trains of, roundly, thirty vehicles each to Southampton, the port of departure for the expeditionary force. We delivered the goods, as Americans would say, in forty-eight hours. For practically every day of the first three weeks of the war, we handled at Southampton during a period of fourteen hours no fewer than seventy-three of these trains, including the running of them to the boat side and the unloading of the full equipment of guns, ammunition and horses. The trains arrived at intervals averaging twelve minutes. It was a matter of special pride to all the railwaymen concerned—and we general managers give credit for the feat to the efficiency of our disciplined staffs—that practically every train without exception came in on schedule time. Some of them came from remote parts of the kingdom—Wales and the north of Scotland."

H. W. Thornton, general manager of the Great Eastern Railway, and lately of the Long Island division of the Pennsylvania Railroad, in acknowledging a tribute which the previous speaker had paid to his zeal during mobilization, said that so far as his knowledge of transportation achievements went, there was no event in railway history to compare with what British lines had accomplished in August, 1914. Certainly in America, "the land of big stunts," there had never been anything which could be compared to it.

Sir Guy Granet, general manager of the Midland Railway, who also spoke, declared that primary credit for the really remarkable work performed by British railways during the days of mobilization was due to the energetic direction of the railway executive committee's labors by its chairman, H. A. Walker.

POINTED PARAGRAPHS ON PUBLIC POLICY

During nineteen years' experience in utility work D. L. Gaskill, Greenville, Ohio, has observed that there are certain definite factors which tend to produce congenial relations betwen the public and the utility companies. In his characteristic epigrammatic style Mr. Gaskill recently gave some of his thoughts on this subject to the members of the Indiana Electric Light Association at their convention in Indianapolis. The following paragraphs are excerpts from his address:

"To-day to the alert public utility manager the public policy of the company is a distinct and well-defined part of his organization, calling for expenditure of time and money and bringing greater results, both good and bad, than any other department.

"The interest of the public in the utility is confined to two things—service and rates. When the utility has made the first of these perfect and the latter reasonable, and has convinced the public that it has done so, the public policy of that company is a pretty well-settled question.

"I know of some cases in which regulations controlling service in Western towns are made by men in Eastern cities, and the fit they make is wondrous to behold. It is comparable to an elephant's blanket for a Shetland pony. Straightforward and open dealing, with few rules, will produce less discrimination than lots of rules and part of them broken.

"A disordered liver and a utility manager have no business being incorporated in the same man. They won't mix. The man who can receive a complaint as if it were a pleasure is the pearl we are seeking. No other is worth the price of his wages.

"Not all complaints are worthy, not all are well founded, but all persons having them think that they are, and to receive them, attend to them, and make the complainant think he has attained his end, is the art we should cultivate.

"I believe that it would be a good thing for utilities if a law could be passed requiring the public utility manager to call upon every business customer at least once a month and ascertain if his service is satisfactory."

THE NEW YORK PUBLIC SERVICE COMMISSIONS

Indications Point to Their Being Reorganized or Supplanted

The announced determination of Charles S. Whitman, the new Governor of New York, to take up at once the question of the Public Service Commissions of New York would indicate that important changes are likely to be brought about in New York State in the method of public service regulation. Some time ago agitation was directed chiefly at the commission for the second district, which has jurisdiction in the state outside of Greater New York. More recently it has been directed against the commission in Greater New York. It was admitted some time back that the work of the commission for the second district was considerably behind and that complaints and actions were greatly delayed. Following the appointment of Mr. Van Santvoord to that commission and the taking of office by Commissioner Emmet the work was greatly accelerated so that now there appears to be little complaint on the score of the workings of that body.

The most recent developments as regards the commission for the first district are the letter to Mr. Whitman from the president of the City Club, New York, and the defence of the commission given out on Dec. 29 by Mr. McCall. Mr. Spencer, the president of the club, says that "it is at least a matter of doubt whether the commission has used or is using its functions to the extent or in the manner contemplated at the time of its creation, or, indeed, properly." To which Mr. McCall has replied that while he "can readily see that the temper of the people may be sorely tried they must recognize that it would be much easier for all the companies to give the most complete service and obviate these complaints rather than to curtail their service wilfully and with malice and invite complaints." Added to all this is the statement of Mr. Whitman that he has been giving the commissions serious attention with a view to action at Albany of a practicable character and that "within the next month you will hear something from Albany which I trust will be appreciated by the public, who have every reason to be dissatisfied with present conditions."

Meanwhile the commissioner of health of New York City has demanded that steps be taken to ameliorate alleged overcrowding of cars. To this Mr. McCall rejoined that the jurisdiction of the commission did not extend to control over people sneezing and coughing in cars. Over in Brooklyn the matter of alleged unsatisfactory transit conditions has been put before the grand jury, and many witnesses have been called to testify, including the representatives of the commission.

At least three propositions regarding the commissions have been laid before the Governor-elect. The suggestions made are that the commissions be done away with altogether, that the two commissions be combined into one, and that the present double commission be practically done away with by legislation and promptly reestablished on much the same basis, with altered powers.

The original commissions, created during the Hughes administration in 1907, contained representation from both important political parties. At present the only Republican member of the commission for the first district is Milo Roy Maltbie, who was appointed by Governor Hughes. The Democratic members are Chairman McCall, J. Sergeant Cram, George V. S. Williams and Robert C. Wood.

CLEVELAND REPORT FOR NOVEMBER

The operating report of the Cleveland (Ohio) Railway for November showed an increase of $17,614 in the interest fund, making a total at the beginning of December of $222,600. The gross receipts were $89,872 larger than for the same month in 1913, but this is attributed, to some extent, to the blizzard in the early part of November last year. The transfer charges were $56,040, as compared with $60,542 in October, although the increase in the number of persons carried over the same month a year ago was 895,968. The ordinance surplus for the month was $15,901.

The ordinance introduced by Councilman Dittrick for the purpose of rendering the manner of paying fares uniform on all lines was defeated at this meeting. Mr. Witt opposed the movement.

A WORD ABOUT ELEVATED RAILROADS IN GENERAL

President Williams Shows That Elevated Railways Do Not Depreciate the Value of Abutting Property

The Brooklyn (N. Y.) Rapid Transit Company has reprinted and is distributing through the boxes in its surface cars the address made by T. S. Williams, president of the company, before the Brooklyn committee of one hundred on Dec. 7, 1914. This address had to do with the removal of sections of the company's elevated railroad. Mr. Williams referred to the consideration which the removal of the elevated railroads received at the time the dual subway contracts were being negotiated. He said that the project for the removal of the structure in lower Fulton Street now advanced after the contracts have all been executed was not the company's seeking, but that if the city had the money to spend for the work in the interest of beautifying lower Fulton Street he saw no reason why such a provision should not be incorporated in the transportation arrangements now under way, provided a decision was reached promptly. Otherwise the company's duty and its obligations require it to proceed as the city and the company had previously contracted. In his conclusion Mr. Williams quoted many tax values to show the property in streets where there are elevated structures to be more valuable than on parallel streets equally accessible. In regard to elevated railways in general he said in part:

"If we had not, in our own minds, identified subways with express and local service, and with frequency of service justified by the congestion of population through which they have heretofore been built, subways would not be so popular. A two-track subway of itself offers no advantage in speed or comfort over a two-track elevated. There is the same elevation to overcome in access and egress. The only difference in this respect is whether we climb at the beginning of our ride or at the end. Indeed in the matter of air, and light, and noise, and dust, and interest, and health, the advantage is all with the elevateds. When we consider that 5 track-miles of elevated can be built for the same money as 1 track-mile of subway, the number of people who can be benefited with the same amount of money may be quintupled. Our own elevated railroads, limited to two tracks and to a type of structure now not recommended, are not to be compared with the new and improved types such as we are erecting for our extensions and our third-tracking, with their provision for express service. From the point of view of the man who rides, therefore, the advantage is with the elevated railroads, provided the facilities for express and local service are equal to those of the subways. From the point of view of the pedestrian, the man who rides in trolley cars, carriages or automobiles the subways have the advantage.

"From the point of view of the abutting property owner the argument is by no means one-sided. There seems to be a common impression that elevated railroads depreciate the value of abutting property. I had occasion recently to procure from the assessment rolls the valuation of property along streets in Brooklyn and in Manhattan where there are elevated railroads and that of property on adjacent and parallel streets where all of the advantages of transportation are at hand with none of the apparent disadvantages. The fact seems to be that while elevated railroads change the character of property their construction and operation do not usually impair its value.

"Our duty as citizens and the duty of city officials seems to lie along the pathway of our contractual program. Let us all co-operate to complete speedily the undertaking to which we are now committed, and to make it the material and financial success which it should be, and in that way we shall be rendering the best service not only to our present fellow-citizens but to those who come after us. When a man with limited resources builds a home to live in he does not go out first to buy oil paintings—he concerns himself with walls, and floors, and light, and water, and heat, and furniture; and then later, as his resources permit, he may indulge himself in the luxuries of pictures and bric-a-brac. The parable is not inapplicable to the city's transit building."

SPEED-CONTROL FOR THE BROOKLYN SUBWAY

The speed-control system approved for installation on the lines of the New York Municipal Railway Corporation in Brooklyn, N. Y., and mentioned briefly in last week's issue, will be the first installation of the kind in the country. In the original plans for the lines in question a standard signal system was considered with speed-control only as an alternative, the installation involving some 103 miles of track and approximately 870 fixed signals. After the opening of the bids for the work, however, it was decided to adopt the speed-control system, and on this basis the quotation of the General Railway Signal Company was lower than that of the Federal Railway Signal Company, which was the low bidder for the original signal system, the Union Switch & Signal Company eventually withdrawing its proposal for the alternative system.

By the use of speed control the major part of the 870 fixed or roadside signals will be eliminated, as indications will be given to the motormen by means of lights in the cab. Fixed signals at interlocking plants, however, will be retained to indicate the position of the switches. The signal lights in the motorman's cab will be controlled by the engagement of shoes on the cars with ramps located at frequent intervals at the side of the track, a speed-recorder connected with the local circuits on the car providing the means for limiting the speed by brake-applications.

In general the system will follow the principles of the recently patented Simmen automatic speed-control, as the General Railway Signal Company has obtained an exclusive license to manufacture and sell this system in the United States. This speed-control system, however, should not be confused with the original Simmen system of signaling, which has been installed on several interurban roads and which includes continuous cab signals, centralized control of signals by the dispatcher and automatic recording of train movements. The Simmen Automatic Railway Signal Company will continue to install the latter system, and it is reported also that this company has reserved the right in its agreement with the General Railway Signal Company to use speed control wherever the Simmen signal system is installed.

POWER TO REVOKE CHICAGO TRACTION ORDINANCES STUDIED

The city of Chicago has obtained legal opinion from its corporation counsel on two franchise questions in the controversy between the City Council and the Chicago Surface Lines regarding the alleged non-fulfilment of contract obligations in the matter of service and extensions. One question concerned the annulling of the 1907 ordinances for specific refusals by the company to obey the Council's mandates. The other concerned the revoking of the traction ordinances for non-fulfilment of contract obligations. In the opinions rendered by the corporation counsel to the city the first was considered as a question of public policy and the second as a proposition in law. The fiscal year for the traction companies closes on Feb. 1, 1915. Under the compulsory provisions of the settlement ordinances the city ordered the company during this period to construct 20 miles of extensions to the surface lines. Under the provisions of the ordinance the companies are required to build an additional 20 miles annually, making a total of 40 miles in all. About 20 miles of these extensions have been completed.

Cleveland Rapid Transit Grant Approved.—Mayor Newton D. Baker, of Cleveland, Ohio, has signed the amended grant to the Cleveland Rapid Transit Railway.

Ohio Tax Values Increased.—Public utility companies of all kinds in Ohio will pay taxes on a valuation of $1,095,848,080 for 1914, an increase of $37,751,410 over 1913.

New Road in Alabama.—George I. Brown, general manager of the Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., recently announced that the company expected to have the line of the company in Tuscaloosa in operation shortly after Jan. 1.

The Lexington Arbitration.—Hearings of evidence in the controversy between the Kentucky Traction & Terminal Company and the local carmen's union are to be resumed at once and speedily completed. The sessions of the board of arbitrators, of which Charles Bagby, Danville, Ky., is chairman, have been interrupted by illness of George Macleod, a member of the board.

Chicago Elevated Stub Removal Case Continued.—The suit to force the removal of the Chicago Elevated Railways' stub structure on Market Street was up in the United States District Court on Dec. 17. Upon request of the attorneys for Samuel Insull, receiver for the Chicago & Oak Park Elevated Railroad, the owner of this portion of the structure, the case will be up for final hearing on Jan. 11, 1915.

Chicago Terminal Electrification Report.—The report of the Chicago Association of Commerce committee investigating smoke abatement and electrification of railway terminals has been completed by its engineering organization and is now being considered by the commission, which must pass on the report before it is made public. As originally outlined, this report will discuss the necessity for a change from steam to electricity as motive power on the railroads as a means of reducing air pollution. The change is being considered from the standpoints of physical and financial practicability.

Sale of Seattle Municipal Railway Rejected.—The resolution reintroduced before the city utilities committee of the City Council of Seattle, Wash., providing for the sale of the Seattle Municipal Railway to the Puget Sound Traction, Light & Power Company, has been defeated in the committee of the whole by a vote of seven to one. The other propositions pertaining to municipal railway matters, referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 26, page 1404, have also been rejected. Councilman Erickson moved that consideration of the resolutions be indefinitely postponed and this was carried.

New York Signal Contract Stands.—Joseph S. Auerbach, counsel for the Federal Signal Company, has requested the Public Service Commission for the First District of New York to reconsider its action awarding the contract for the new signal system on the New York Municipal lines to the General Railway Signal Company, Rochester, and that a public hearing be held on the matter, stating that he would advance reasons sufficient to convince the commission that the contract should be awarded to his clients, who, he said, were the lowest bidders on the initial bidding. After Mr. Auerbach's argument the commission by a vote of three to two declined to reconsider its action.

Western Massachusetts Transportation.—The legislative recess committee on transportation facilities in western Massachusetts has submitted a draft of its report to Governor Walsh, with a proposed bill giving the Public Service Commission authority to require street railways to extend their lines in the five western counties of the State. No recommendation is made by the committee in favor of state ownership of street railways, although sentiment favoring this course developed at the hearings. The committee favors extension of lines by private capital. It is expected that Governor Walsh will discuss the proposed building of new lines in his message to the next Legislature, which will convene on Jan. 6, 1915.

Reports of Maine Railways.—According to the annual report filed with the Public Utilities Commission the net income of the street railways of Maine for the year ended June 30, 1914, was $561,519, or $24,283 less than in 1913. The gross income increased $243,910 while the total charges were $263,204 greater than in the previous year. The operating expenses increased $117,306. Transportation earnings were $2,895,192 compared with $2,762,105 for the preceding year. Operating expenses were $1,956,123 compared with $1,838,817 for the previous year. The number of fare passengers carried was 51,024,110, an increase of 854,101. The total mileage of street railways in operation was 497.27, an increase of 9.18 miles for the year. During the year no passengers were killed and only fifty-three passengers were injured. One employee was killed and six injured. Seven other persons were killed and twenty-five injured, making a total of eight persons killed and eighty-four injured. The number of persons, excluding general officers, employed on the street railways, was 2004, an increase of 233 over the previous year. The wages paid amounted to $1,325,300. Forty-four general officers received $72,415 in wages.

Mobilizing a Million a Day.—William Clayton has contributed to the *National Magazine* for December, 1914, a fourteen-page illustrated article dealing with the handling of New York transportation by the Interborough Rapid Transit Company, which operates both elevated and the subway lines in Greater New York, and the New York Railways, which operates surface lines in the Boroughs of Manhattan and the Bronx. Various phases of the activities of both companies are taken up, including the establishment of the welfare department. The article is illustrated with a portrait of Theodore P. Shonts, president of both companies, and with photographs showing the signal post in the New York subway, the evolution of the street car as shown in the recent street car parade, the low center-entrance surface car, the double deck surface car, and the subway band. The writer say that fifty years ago the people of New York were considering transportation by subway, and that for more than forty years unsuccessful attempts were made by the city to secure underground rapid transit. The article is particularly interesting in the light that it sheds to the public on the efforts made by both companies to increase their transportation facilities. The writer says that manifestly the Interborough Rapid Transit Company has done everything that human ingenuity could do to increase the capacity of the subway.

PROGRAM OF ASSOCIATION MEETING

New York Electric Railway Association

A meeting of the executive committee of the New York Electric Railway Association was held at the Transportation Club, New York, on Dec. 22. Those in attendance were James F. Hamilton, Schenectady; John J. Dempsey, Brooklyn; S. Walter Mower, Cooperstown; Wilber C. Fiske, New York; William O. Wood, New York, and Charles C. Dietz, Brooklyn. It was decided to hold the next quarterly meeting at the Fort William Henry Hotel, Lake George, N. Y., on Tuesday and Wednesday, March 2 and 3. The program will be announced later. Other matters of importance were considered by the committee at the meeting on Dec. 22.

Financial and Corporate

IMPROVED EXPORTS AND STEEL TRADE

Although the trading has been comparatively dull on the Stock Exchange during the last week and not so conducive to optimism, the betterment now showing in that excellent barometer of general conditions, the steel trade, is a most hopeful feature at the beginning of the year. Already some advances in prices have been made, following a substantial increase in the volume of orders. This increase up to the present time has not included many demands from the railroads, but with the new year and its promise of more remunerative rates it can be expected that the carriers will feel free to order a little more widely. When this happens it is likely that the steel market will be rapidly strengthened as regards prices, but they are now very low and will still be low after a moderate advance over the figures now prevailing. The present, therefore, seems to offer profitable opportunities to electric railways for the placing of orders.

Another encouraging fact is that the excess of merchandise exports over imports has been accumulating a trade balance in favor of the United States in recent weeks at the rate of more than $1,000,000,000 a year, and this with but little more than 50 per cent of the usual amount of cotton going abroad. For thirteen districts through which 88 per cent of the imports and 85 per cent of of the exports pass the total imports for the fourth week of December were $19,259,000 and the exports $38,667,000, making a favorable balance of $19,408,000. For the four weeks ended December 26 imports totaled $91,068,000 as compared to exports of $179,846,000, an excess of exports amounting to $88,778,000. It is estimated by Secretary Redfield that for the full month the United States will have an excess amounting to well over $100,000,000.

WESTINGHOUSE ELECTRIC TO ABSORB MACHINE COMPANY

Charles A. Terry, Walter D. Uptegraff and H. H. Westinghouse, executors for the estate of George Westinghouse, have sent the following circular to the stockholders of the Westinghouse Machine Company:

"The undersigned have entered into a contract for the sale of their stock in the Westinghouse Machine Company to the Westinghouse Electric & Manufacturing Company upon the basis of one share of the common stock of that company being issued in payment for three shares of the stock of the machine company, and upon the condition that all other stockholders of the machine company shall have the privilege for thirty days, namely, until Jan. 26, 1915, to sell their stock upon the same basis.

"Our conclusion that this sale is advisable has been reached after very careful consideration of the present condition and future prospects of the Westinghouse Machine Company. The business of that company cannot be carried on profitably without a substantial amount of additional capital, which it has been impracticable to procure under present financial conditions and the large mortgage debt of the company. In view of this and other difficulties which confront the company, it seemed to us advantageous to exchange our shares for shares of a strong company which is doing a prosperous business and paying dividends.

"Stockholders of the Westinghouse Machine Company desiring to join in this sale should promptly send their stock certificates (indorsed for transfer in blank and properly stamped) to the Colonial Trust Company, Pittsburgh, or to the Franklin Trust Company, New York. The trust company receiving the stock will at once issue in exchange therefor transferable certificates of deposit, which will be exchangeable for the stock of the Westinghouse Electric Manufacturing Company upon the consummation of the sale, or for the deposited stock in case the sale should not be consummated."

The Westinghouse Machine Company has a total outstanding capital stock of about $7,500,000 and almost an equal amount of outstanding funded debt. The Westinghouse Electric & Manufacturing Company has outstanding preferred stock amounting to $4,000,000 and $36,700,000 of common stock. It also has $22,000,000 of funded debt.

ANNUAL REPORT

American Public Utilities Company

The statement of combined earnings of the subsidiaries of the American Public Utilities Company, Grand Rapids, Mich., for the year ended June 30, 1914, follows:

Gross earnings from operations	$2,319,594
Operating expenses	1,338,715
Net earnings from operations	$980,879
Miscellaneous income	45,303
Gross income	$1,026,182
Less expense	51,486
Net income	$974,696
Fixed charges:	
Interest on underlying securities	$554,659
Interest on collateral trust bonds	44,650
Total fixed charges	$599,309
Remainder	$375,387
Dividend on $3,914,000 of preferred stock	234,840
Balance	$140,547

According to an analysis of operation made by the directors, the gross earnings for the year increased 8.14 per cent, the operating expenses 13.59 per cent, and the net earnings from operation 1.59 per cent. The increase in operating expenses was largely caused by abnormal expenditures for maintenance on lighting properties at Indianapolis and La Crosse, made after their acquisition in order to bring them up to the proper operating efficiency, and also by the expenditure of nearly $20,000 for the acquisition of new business. In general, funds otherwise available for dividends or surplus were returned to the several properties in maintenance and acquiring new business. The fixed charges upon subsidiary obligations increased $28,350. There was expended for extensions and additions by subsidiaries $794,079, against which subsidiary bonds amounting to $567,000 were issued and sold. The sum of $300,401 was expended in enlarging the Indianapolis property alone.

In June the company acquired the Chippewa Valley Railway, Light & Power Company through the medium of the Wisconsin-Minnesota Light & Power Company, the successor to the La Crosse Gas & Electric Company. It is stated that the earnings of the Chippewa Valley Railway, Light & Power Company increased rapidly during the last five years. In 1905 the gross receipts were $122,093, and the net earnings $49,268, while in 1912 the gross earnings were $394,842, and the net earnings $230,235, an increase of $181,076, or 367 per cent. In discussing the possibilities of future growth of this company, the annual report calls attention to several undeveloped water power sites, and says that as these are brought into use and the product marketed, the public service commissioner will authorize additional securities to be delivered to the American Public Utilities Company in consideration of its having financed the merging of the properties and the building of dams, etc., thus materially increasing the assets and earning power of the company without further expenditure on its part.

NEW SAN FRANCISCO-OAKLAND NOTE ISSUE

The Railroad Commission of California has authorized the San Francisco-Oakland Terminal Railways to issue $246,666 of promissory notes to be secured by an issue of $370,000 of general lien bonds. The commission states that it has given its authorization for this temporary financing in order that the company may be preserved in the best possible operating condition. The order provides that the face value of the notes shall at no time be less than 66 2/3 per cent of the face value of the bonds pledged as collateral. The notes will mature in a period not to exceed one year from date and will bear interest at a rate not to exceed 7 per cent per annum. It is made a condition of the order that the notes shall be issued only to persons in direct interest in the corporation, who shall be fully advised of all the circumstances surrounding the company's finances and who shall agree to hold the bonds as collateral until the notes have matured or have been paid or refunded. The company proposes to use these notes for the following purposes: reimbursement for moneys expended from income, and after such reimbursement for the purpose of paying interest on outstanding bonds and notes, $148,922; purchase of new cars, $75,000, and construction of interlocking power at Stanford Avenue and Lowell Street, Oakland, $22,744.

TIME EXTENSION IN KANSAS CITY

The City Council on Dec. 28 authorized an extension of six months in the time in which the reorganization committee of the Kansas City Railway & Light Company may accept the terms of the new franchise voted by the people at the recent election. This was done in order that the officials of the company, as well as the reorganization committee, may have sufficient time to go over the franchise matter before its acceptance.

The plan for the reorganization of the property is rapidly approaching completion, and it is expected that an official announcement regarding the matter will soon be forthcoming. Frank Hagerman, counsel for the company, was in New York this week conferring with bankers in regard to the necessary financing incident to the plan. The earnings of the Kansas City properties are said to be highly satisfactory, and as soon as the necessary details are worked out in connection with the reorganization, it is believed that they will be again on a substantial operating basis.

Charlottesville & Albemarle Railway, Charlottesville, Va.—At a meeting of the directors of the Charlottesville & Albemarle Railway, held on Dec. 1, a semi-annual dividend of 3½ per cent on the preferred stock was declared payable on Jan. 1, 1915, to stockholders of record of Dec. 10.

City Railway, Dayton, Ohio.—A quarterly dividend of 1½ per cent was paid on the $2,400,000 of common stock of the City Railway on Dec. 31 to holders of record of Dec. 21. This compares with 2 per cent paid quarterly from June, 1912, to September, 1914.

Cleveland, Youngstown & Eastern Railway, Cleveland, Ohio.—Judge Estep in the Common Pleas Court of Cuyahoga County at Cleveland has appointed Robert Beatty receiver for the line of this company lying between the Cuyahoga County line and Garrettsville, Ohio, in the suit to foreclose the $52,000 mortgage of 1910 having a first lien thereon. The court ordered that after Dec. 28 the receiver should discontinue the operation of this portion of the road. The line from Chagrin Falls to Cleveland is in no way affected by this order, and its operation will be continued the same as before. The Cleveland, Youngstown & Eastern Railway took over the property of the Chagrin Falls & Eastern Railway and the Cleveland & Chagrin Falls division of the Eastern Ohio Traction Company some time ago. The complete lines connect Cleveland, Chagrin Falls and Garrettsville.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has been served with a writ of certiorari, obtained by the Dry Dock, East Broadway & Battery Railroad, for a review of the commission's action in refusing to approve an issue of $2,800,000 of bonds applied for by the company. The company contends that the finding of the commission was contrary to the evidence and that the laws authorizing the decision are unconstitutional because of the impairment of contract obligations.

Fresno (Cal.) Interurban Railway.—The Fresno Interurban Railway has filed an application with the Railroad Commission of California renewing its request for authority to issue 200 shares of capital stock at $80 a share and $14,700 of ten year 6 per cent bonds at not less than 90. The company was recently authorized to issue 100 shares of capital stock at not less than $80 per share in lieu of 100 shares of stock issued for incorporation purposes at $10 a share. The company contends that it has not the authority to release the 100 shares of old stock issued for incorporation purposes, it having been mutually understood by the subscribers that these shares would be held by the company solely for voting purposes.

Hudson Companies, New York, N. Y.—Holders of preferred stock of the Hudson Companies, formed originally to finance the construction of the Hudson & Manhattan Railroad, have formed a protective committee consisting of Charles P. Curtis, Allan Forbes, Arthur B. Silsbee and Charles W. Taintor, Boston, and Charles P. Cooley, Hartford. The committee has issued a circular calling for proxies to vote at the annual meeting on Jan. 12. The committee says: "The manner in which the company's affairs have been dealt with seems to evidence the need for a thorough examination of the methods whereby the cash paid in by the preferred stockholders, amounting to nearly $16,000,000, has dwindled to a quoted value of little more than one-twentieth of that amount, and it seems evident that if such examination is to be properly or seriously made, the management of the company's affairs should be taken from the hands of the interests which have hitherto controlled it." The company owns $25,000,000 of the $40,000,000 of common stock of the Hudson & Manhattan Railroad, $2,300,000 of its preferred shares, and a block of the tunnel concern's bonds. The Hudson Companies also holds $2,450,000 of 5 per cent bonds of the Greeley Square Realty Company.

Interborough-Metropolitan Company, New York, N. Y.—On Dec. 24 the directors of the Interborough-Metropolitan Company authorized the retirement on Jan. 1 of $1,000,000 of the outstanding $4,000,000 of five-year 6 per cent notes, maturing on July 1, 1915, from the proceeds of the 5 per cent extra dividend which was recently declared on the stock of the Interborough Rapid Transit Company. The board also authorized a new issue of $3,000,000 of ten-year 6 per cent notes to refund the remaining $3,000,000 of notes. All of the holders of the latter have, it is reported, agreed to take the new notes in exchange. Out of the new notes, $300,000 will be retired annually through sinking fund, through the use of which the bonds may be called at any time.

Minneapolis & Northern Railway, Minneapolis, Minn.—The Minnesota Loan & Trust Company, formerly receiver of the Minneapolis & Northern Railway, has resigned and its resignation has been accepted by the court, which has allowed its account. F. H. Hunter has been appointed receiver in place of the trust company.

Sunbury & Susquehanna Railway, Sunbury, Pa.—The receivers of the Sunbury & Susquehanna Railway have applied to the Northumberland County Court for an order for the sale of the property of the company under foreclosure. Argument will be heard on Jan. 8. The company is a consolidation of the Northumberland County Traction Company, Sunbury, Lewisburg & Milton Railway and the Sunbury & Selingsgrove Electric Street Railway.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—The Terre Haute, Indianapolis & Eastern Traction Company recently made the following announcement to stockholders: "In pursuance of the policy announced in our communications of March 10 and June 10, 1914, the directors have unanimously determined that the dividend payable on Jan. 1, 1915, should not be declared at this time."

Titusville (Pa.) Traction Company.—The Titusville Traction Company has filed at Harrisburg notice of an issue of $265,000 of bonds. The Titusville Traction Company is the successor of the Titusville Electric Traction Company, the property of which was sold at foreclosure in Titusville in August to Frederick W. Garvin, New York, N. Y., representing the bondholders.

Washington Water Power Company, Spokane, Wash.—A quarterly dividend of 1½ per cent has been declared on the $14,081,900 of stock of the Washington Water Power Company, payable on Jan. 2, to holders of record of Dec. 12. This compares with 1¾ per cent paid in October, 1914, and 2 per cent from April, 1911, to July, 1914, inclusive.

West Jersey & Sea Shore Railroad, Camden, N. J.—The directors of the West Jersey & Seashore Railroad have decided to call a meeting of the stockholders in thirty days, to consider the authorization of an increase in the capital stock to the extent of $3,000,000 and the creation of a $13,000,000 general and refunding mortgage upon the company's property. Stock amounting to $2,000,000 will be offered to shareholders at par and the proceeds used to retire certificates of indebtedness held by the Pennsylvania Railroad. The additional $1,000,000 will not be issued in the immediate future. Of the proposed new mortgage bonds $6,500,000 will be reserved to take up the present first consolidated mortgage bonds at maturity, and the proceeds of the remainder will be used to pay for improvements.

DIVIDENDS DECLARED

Cincinnati, Dayton & Toledo Traction Company, Cincinnati, Ohio, 2½ per cent, preferred.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Cincinnati, Ohio, 1½ per cent, preferred.

London (Ont.) Street Railway, quarterly, 5 per cent.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

New England Investment & Security Company, Springfield, Mass., preferred, 2 per cent.

Omaha & Council Bluff Street Railway, Omaha, Neb., quarterly, 1¼ per cent, common and preferred.

Porto Rico Railways, Ponce, Porto Rico, quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred.

Rome Railway & Light Company, Rome, Ga., quarterly, 1 per cent.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-fourths of 1 per cent.

Thirteenth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., quarterly, $6.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred; 1 per cent, common.

Western New York & Pennsylvania Traction Company, Olean, N. Y., 3 per cent, first preferred.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
ATLANTIC SHORE RAILWAY, SANFORD, MAINE.						
1m., Nov.,	'14	$24,267	$26,025	$1,758	$644	$2,402
1 " "	'13	25,797	22,139	3,662	661	3,001
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
1m., Oct.,	'14	$172,580	$116,793	$55,787	$43,044	$12,743
1 " "	'13	176,808	116,775	60,032	37,551	22,481
4 " "	'14	783,790	478,585	305,205	173,309	131,896
4 " "	'13	797,159	468,625	328,534	149,349	179,185
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO.						
1m., Nov.,	'14	$100,184	$61,066	$39,118	$32,159	$6,959
1 " "	'13	98,490	68,708	29,782	32,059	†2,276
11 " "	'14	1,158,384	694,551	463,833	355,934	107,899
11 " "	'13	1,149,871	696,580	453,292	348,843	104,449
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.						
1m., Nov.,	'14	$2,882,819	$1,054,344	$1,838,475	$1,077,575	$751,000
1 " "	'13	2,865,329	1,041,756	1,823,573	1,080,988	742,585
5 " "	'14	13,499,304	5,180,865	8,318,439	5,404,900	2,913,539
5 " "	'13	13,236,392	5,175,973	8,060,419	5,631,749	2,428,670
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.						
1m., Nov.,	'14	$149,940	$75,274	$74,666	$57,748	$16,917
1 " "	'13	191,199	71,199	119,999	71,331	48,668
12 " "	'14	1,841,034	905,246	935,738	699,311	236,477
12 " "	'13	1,764,998	881,941	883,057	578,144	304,913
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.						
1m., Nov.,	'14	$286,732	$186,009	$100,724	$65,366	$35,358
1 " "	'13	265,097	184,001	81,095	62,992	18,103
11 " "	'14	3,319,704	2,040,014	1,279,691	722,007	557,683
11 " "	'13	2,989,155	1,829,359	1,159,797	649,107	510,689
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1m., Nov.,	'14	$752,502	$396,674	$355,829	$228,924	$126,905
1 " "	'13	751,113	374,947	376,166	234,979	141,187
11 " "	'14	8,499,229	4,392,277	4,106,952	2,507,433	1,599,519
11 " "	'13	8,085,035	4,086,321	3,998,715	2,584,509	1,414,206
UNITED RAILWAYS COMPANY OF ST. LOUIS, ST. LOUIS, MO.						
1m., Oct.,	'14	$1,073,964	$796,643	$277,321	......	......
1 " "	'13	1,129,269	908,529	220,740	......	......
10 " "	'14	10,478,950	7,903,501	2,575,449	......	......
10 " "	'13	10,542,580	7,584,902	2,957,678	......	......

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*Includes taxes. †Deficit.

Traffic and Transportation

ASSISTING CHRISTMAS SHOPPERS

Conductors in White Gloves Assist Kansas City Passengers, Call Cars and Answer Questions

The Metropolitan Street Railway, Kansas City, Mo., went a little out of its way this Christmas season, as for the past two years, to accommodate the shopping public and the general traffic. A week before Christmas the company picked twenty especially gentlemanly and well-appearing conductors and stationed them at busy corners to assist people onto the cars. These men were in full uniform, and in addition wore white gloves—which were "kept white" through renewal when necessary during the day, that the clothing and especially the packages of passengers assisted might not be soiled. Their most valuable service was in helping the children, who thronged downtown to visit the stores. The conductors stood at the points where the rear ends of the cars would stop, and their only duties were to hold packages while people got on the cars, assist the passengers, expedite the movement by calling the names of the cars, and answering questions. They did not collect fares. They were on duty as late at night as shoppers crowded the streets, and until midnight Christmas Eve. The "front end collectors" were on duty also, as usual, at downtown corners, collecting fare from the street so that passengers could get on the front ends of the pay-as-you-enter cars; a few more were put on, and they were on duty during a greater part of the day than under normal circumstances.

BAY STATE AGREEMENT

Terms Reached Between Bay State Street Railway and Its Employees in Agreement Which Expires on Sept. 30, 1916

In agreeing to arbitrate the question of wages, the Bay State Street Railway, Boston, Mass., and branches of the Amalgamated Association represented in sixteen local unions of employees, came to terms upon a number of transportation matters which had been under discussion for about two months. It was agreed that the hours of labor of blue uniformed men are to be exempt from arbitration as they are established by law.

In the event of suspension or discharge, the agreement arranges for the taking up of the case with the division superintendent by the union, with appeal to the general superintendent and thence to the general manager followed by arbitration in case of disagreement. The arbitration provision does not apply, however, to conductors and motormen during their first six months of service. In the event of nine consecutive months without error, a trainman's record is to be considered clean. Seniority choice is to prevail for runs in both passenger and service car operation, with the exception of freight and express cars, but men are not to be permitted on runs which, because of age, disability or other disqualifications, they are not fitted to operate.

The company agrees to furnish employees free transportation over the division in which they are employed, and upon request will furnish transportation to a reasonable extent over other parts of the system. No discrimination is to be made against members of the association, and the company agrees to dismiss or suspend union employees from its service upon proof of violation of the association's constitution and general laws, where such violation has caused the dismissal or suspension of the employee from the union. In the arrangement of schedules the company agrees to recognize the principle of dividing the total number of hours in such schedules into runs of nine hours, to be completed in eleven consecutive hours, so far as possible. Not more than 20 per cent of all runs are to be completed in excess of twelve hours. Payment for time in excess of twelve hours' outside limit is to be determined by the arbitration board now sitting.

The present practice of requiring men to report and to remain to protect runs, or for extra work, is to remain in force. Any conductor or motorman promoted to the position of starter, inspector, foreman, or other official post, is to be given a year in which to try the work without loss of rating. Extra compensation at the rate of 3 cents an hour is to be allowed for breaking-in new men. Seniority is to prevail in the mechanical and miscellaneous departments, so far as consistent with qualifications, the latter being subject to arbitration in case of dispute.

The agreement is to continue until Sept. 30, 1916, with provision for extension and change upon due notice.

SERVICE QUESTION IN CHICAGO

Several newspapers, the local transportation committee of the City Council and Mayor Harrison's public service department are all agitating increases in transportation facilities in Chicago. The city has threatened to resort to the courts to enforce or annul the city traction ordinances, despite the fact that authorities are agreed that downtown track capacity is used to its limit during the rush-hour periods and that the only means of relieving congestion is to be found in the construction of a subway. The subway is again up for consideration, but definite action is being delayed until it is possible to determine whether the surface and elevated lines may be merged, as upon this merger will depend the character of the subway. If the merger takes place the subway would serve for both surface and elevated cars, but if the consolidation cannot be brought about the subway may be used to furnish additional capacity either for the surface or elevated lines. The Board of Supervising Engineers is making traffic checks to verify complaints and recommends as a cure the service standard which it submitted to the city in May, 1913. This standard provides for a maximum of seventy passengers to a forty-seat car during any thirty-minute rush-hour period, or any fifteen-minute non-rush hour period. This standard it is thought if adhered to would provide seats for all passengers during the non-rush hours and eliminate undue crowding during the rush-hour periods.

SPECIAL MESSAGE ON THE "JITNEY" BUS

Los Angeles Mayor Says Further Delay of Regulatory Legislation Would Be Gross Injustice

Mayor Rose of Los Angeles, Cal., issued a statement to the City Council on Dec. 23 in which he recommended that that body should enact drastic legislation to regulate the "Jitney" bus business in Los Angeles. The Mayor contended that the use of the streets by the "Jitney" buses was an additional burden not contemplated in the original dedication of the city streets and that the city had the indubitable right to regulate and restrict this form of traffic. He said that drastic rules and regulations were demanded "to cope with what has become in the last sixty days a grave menace to the community." In his communication Mayor Rose reviewed the tremendous growth of the "Jitney" bus business and pointed to the official police records to prove the increase in accidents recently. In this connection figures were cited to prove that the 5-cent buses had been involved in 22 per cent of the personal injury mishaps reported to the authorities. The Mayor suggested that both incompetence and recklessness on the part of the drivers were in a degree responsible for the unusual increase in accidents and that only drivers of proved ability should be licensed to enter the business district. In addition to this he would require all applicants for licenses to state the course intended to be traversed and compel them to maintain these courses and make designated station stops. The mayor said that he had plenty of sympathy for the bus drivers, but that the authorities must see that the drivers do not jeopardize life and property. A considerable part of the address was devoted to the consideration of the effect of the operation of the "Jitney" buses on street railway transportation. The Mayor said in part:

"Assuming that the 700-odd autobusses operating in Los Angeles are averaging $3 a day in fares, we have a total of $2100, or about $60,000 a month, subtracted from the earnings of the street railways. How does this affect the public? As is well known, the street railroads operate under franchises which entail heavy expense for street maintenance, taxes and public improvements. It is estimated that the street railways maintain at least one-third of the streets along which their tracks run, at a cost to them of upward of $350,000 a year. In addition, they have to bear their proportion of special assessments for street openings and for condemnation of lands for parks and other public purposes, for which their occupancy of contiguous streets renders them liable. Moreover, at least 2 per cent of the close partnership of the traffic-regulated street railways with the public. Besides this impost they must pay their regular taxes in support of the government, amounting to about 5 cents on the dollar.

"One of the executive officers of the Los Angeles Railway is authority for the statement that for every nickel collected in fares more than 3 cents is expended directly for labor in this city. Of the remaining 2 cents at least 1 cent goes for taxes, license, street improvements and material, or four-fifths of the whole is returned whence it came, to benefit the people of Los Angeles. The remaining fifth takes care of the interest charges on the bonded indebtedness, and as many of the bonds are owned in California, a share of this last fifth also remains here.

"In contrast to this showing is the 5-cent fare paid over to the 'Jitney' bus driver. Four-fifths of this sum must go for gasoline, oil, rubber tires and to pay for the machines, for few of them are owned outright by the men operating them. It is a direct reversal of conditions. In the latter case 4 cents in 5 goes out of the city; in so far as the street cars are concerned, that same proportion in the nickel stays here.

"I am thus explicit because I wish to show our people the partnership interest created by the franchise regulations that bind the street railways to certain specific obligations, directly benefiting the public, as opposed to the non-regulated auto-busses, having no such onerous liabilities imposed upon them. It is patent that if the street railways are losing what will amount to $750,000 a year the public service heretofore furnished by the street railways will be curtailed to comport with these new conditions.

"The people in the end will be compelled to depend upon the street railways for transportation. Meanwhile, the loss of revenues has affected the whole city as shown. Extensions have been necessarily blocked and the enforced economies have been reflected in a hundred different directions beyond the street railways themselves. It is they that have most seriously felt the pinch thus far, but it requires no seer's vision to perceive that the people so immediately concerned in the prosperity of the big corporations sharing their incomes with the city must suffer from the restricted revenues.

"To dally longer in our present state of irresolution and inaction as regards the 'Jitney' bus is to be guilty of gross injustice to the people."

THE AUGUSTA-AIKEN FARE CASE

Hearings on the application of the Augusta-Aiken Railway & Electric Company for permission to increase its fares were held before the South Carolina Railroad Commission on Dec. 10 and 16. The application to the commission briefly was for permission to increase the fares from 1 cent to 2 cents a mile. At the hearing on Dec. 10 J. H. Pardee, vice-president of the company, said that a fair income on the investment was imperative, and that last year, after deducting $41,000 for depreciation, there remained only $25,000 income, a return of approximately 3 per cent. Mr. Pardee agreed at the hearing to have S. B. Culley, auditor of the company, and R. W. Spofford, general superintendent, appear before the commission. He took the position, however, that neither Mr. Culley nor Mr. Spofford could testify to anything material except facts already sworn to by Mr. Culley in the last annual report of the company to the Railroad Commission.

On Dec. 16 James U. Jackson, formerly vice-president of the company, reviewed his association with the company from the time that the road was built until quite recently. Mr. Jackson did not consider the line an interurban one in the strict sense of the word, and said that two or three times each session of the South Carolina Legislature for eight years he opposed bills to force the Augusta-Aiken Railway & Electric Company to install water coolers, toilets and separate cars for the whites and negroes. Mr. Jackson said that he advanced the argument each time that the road was a trolley road with cheap fares and could not afford to better the equipment under the charge of 1 cent a mile for transportation.

Perhaps the principal contention of the opposition to the increase in fares was that the people had been induced to invest money in land, homes and factories in the territory served by the line, on the assumption that the present rate of fare would be continued, and that to put into effect the fare now proposed would practically amount to the confiscation of the investments of these people.

The commission set Dec. 29 as the date for the final hearing.

Chicago Tests Destination Sign Provisions.—A suit to test the right to force the Chicago (Ill.) Surface Lines to provide signs showing the destination of cars has been filed in the Municipal Court. In all there are 170 of these suits for violations.

Fare Case to Ohio Supreme Court.—The Supreme Court of Ohio has been asked to review the decision of the Hamilton County Circuit Court involving the payment of a 5-cent fare between Pleasant Ridge and the business section of Cincinnati over the lines of the Interurban Railway & Terminal Company and the Rapid Railway.

Suit to Force New Transfer Points.—The city of Chicago, Ill., has filed two suits for $1,000 each in the Municipal Court against the Chicago Surface Lines to force new transfer points. The specific purpose of the suit is to require the railways to accept transfers at any point where cars of several lines run on the same track.

Inquiry Into Seattle Service.—The Washington Public Service Commission has filed a complaint on its own initiative against the Puget Sound Traction, Light & Power Company alleging inadequate service in Seattle and ordered the company to have its officials appear at a hearing which it intended to hold in Seattle on Dec. 28.

Safety Zones in Cleveland.—Standards connected by chains have been secured to mark the safety zones at several of the stops in the business district in Cleveland where traffic is exceedingly heavy. According to Director of Public Safety Benesch the use of chains will be extended to other parts of the business district as rapidly as may be advisable.

Reduction in Schedules Asked in Atlanta.—The Georgia Railway & Power Company, Atlanta, Ga., has asked the Railroad Commission of that State for authority to diminish existing schedules on several lines. The petition sets forth that traffic in Atlanta has been decreasing steadily, and that the receipts for the month of November showed a decrease of $2,230 compared with November, 1913, and were actually less than those for November, 1912.

Puget Sound Fare Change.—The Puget Sound Electric Railway, Tacoma, Wash., has filed with the Public Service Commission a supplemental tariff naming a round-trip rate of $1 between Puyallup and Seattle. This gives patrons from Puyallup the same round-trip rate as is in effect between Tacoma and Seattle, while previously they have paid the one-way rates to and from Seattle amounting to $1.50. The change went into effect on Dec. 24.

Transfer Charge Under Consideration at Boston.—A special committee of the Chamber of Commerce of Boston, Mass., is investigating the financial side of electric railway operation with a view toward determining the feasibility of a charge for transfers on Massachusetts street railways. The investigation grows out of the 20 per cent maintenance and depreciation requirement of the Massachusetts Public Service Commission as set forth in the recent Middlesex & Boston fare decision.

Good, Bad and Indifferent Suggestions.—Many suggestions have been made to the United Railways, St. Louis, Mo., in connection with the effort to have passengers move forward in its cars. Some of the suggestions made for signs for use in the cars follows: "The best looking girls are in the front seats," "Follow St. Louis to the front," "Confer a favor upon those who follow by moving to the front," "Success is gained by moving to the front," "Consideration of others is a mark of good breeding," "Kindly move to the front."

Inquiry Into St. Louis Service.—The Missouri Public Service Commission has announced that the inquiry being conducted by it into the question of the adequacy of the service furnished in St. Louis by the United Railways will be continued on Jan. 13 at the Planters Hotel. John M.

Atkinson, chairman of the commission, says that on the hearing on Jan. 13 the company will have an opportunity to present evidence concerning its financial ability to carry out the extensions and improvements which have been proposed and of denying the need of such improvements.

Combined Steel and Wooden Trains Discontinued.—The Long Island Railroad has notified the Public Service Commission for the First District of New York that it is now complying with the terms of the commission's order to discontinue the use of wooden trail cars in trains made up in part of steel cars. The commission's order was issued to become effective on Dec. 1, 1914, but the company requested permission to continue the operation of the fifty-three wooden cars until new equipment could be purchased. This application the commission denied and compliance with the order followed this action.

Fare Zone Petition Denied.—The Public Service Commission of Maryland has dismissed the petition of F. L. Hawley to require the Washington, Berwyn & Laurel Electric Railway, Washington, D. C., which operates between Washington and Laurel, to establish three fare zones, instead of four as now, between Laurel and the District line. The present zone system of the road was established by authority of the Interstate Commerce Commission, and the local body decided that it could not act in the matter because the Supreme Court of the United States had held in the Shreveport case that where the jurisdiction of the Interstate Commerce Commission and a local regulatory body conflicted the former authority prevailed.

Transfer Greetings in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., expressed Christmas and New Year's greetings as usual to all the passengers that took transfers. On December 24, 25 and 26, and on Dec. 31, Jan. 1 and 2 the transfers bore the following on the reverse side: "It is our wish that you enjoy A Merry, Bright Christmas and A Happy New Year." These words were printed in red ink; and in a corner of the space was a picture, printed in green, of Santa Claus astride a reindeer bearing a big sack of toys and waving a miniature Christmas tree. The transfers were printed on stationers' bond. The change in the texture of the transfers aroused curiosity in the passenger.

Service Matters in Los Angeles.—The City Council of Los Angeles, Cal., has adopted a resolution ordering the Board of Public Utilities Commissioners of Los Angeles to conduct an investigation of the local surface railways and to submit recommendations at the earliest possible date regarding more direct routes, quicker running time and the construction of cut-offs. In line with this resolution Councilman Snowden has recommended stopping alternate cars at alternate blocks. Councilman Roberts announced recently that suits would be started against the Pacific Electric Railway to restore transfer privileges on the Edendale line. The company has granted the demand for a 5-cent fare and stop at Harriman Avenue.

Fare Readjustment Asked.—The Kansas City-Western Railway, Kansas City, Kan., has asked the Kansas Public Utilities Commission for permission to readjust rates. The schedules which have been proposed show some decreases, but provide for an average increase, including a higher round-trip rate between Kansas City and Leavenworth. The basis of the proposed schedule is a straight one-way fare of 2 cents a mile; round trip at 1.8 cents a mile, fifty-ride one-year books at 1.56 cents, fifty-ride ninety-day books at 1.25 cents, and twenty-five-ride sixty-day books at the rate of 1.35 cents a mile. The receipts of the company are understood to have suffered a decrease on account of the withdrawal of 3100 soldiers at Fort Leavenworth, who were called away eighteen months ago.

"Safety First" in Nashville.—The Nashville Railway & Light Company, Nashville, Tenn., is using advertising space freely in the newspapers in connection with its "safety first" campaign. A recent Sunday issue of the Nashville *Tennessean* contained a four-column display advertisement, the full length of the page, in which drawings by F. D. Spotswood, Lexington, Ky., were used. Included in the text of the advertisement was the following paragraph: "We beg the drivers of wagons, teams, buggies and automobiles to remember that the cars are bound to run on a fixed track and cannot vary their course, nor shut off their speed at once—but the drivers can, and the responsibility for a collision is generally with them. Drivers: Be deliberate and careful when crossing a track or driving beside it."

Service Complaints in Cincinnati.—W. Kesley Schoepf, president of the Cincinnati Traction Company, sent a long communication to Mayor Spiegel on Dec. 22, 1914, in which he explained in detail the efforts of the company to meet the complaints filed with the Director of Public Service. After suggesting a number of changes that would result in improvements, Mr. Scoepf concluded: "In general, I desire to say that, while the reduction in our traffic has been large, the service given by this company, as measured by the number of seats provided for the traffic during the rush-hour periods, has been maintained well above the service for the same days of last year." The transfer schedule worked out by representatives of the company and the street railway committee of the City Council was presented to Council on Dec. 22, but its consideration was fixed track and cannot vary their course, nor decrease their deferred until members have an opportunity to study it carefully.

Berkshire Petition Finding.—The Massachusetts Public Service Commission has refused to order the Berkshire Street Railway to remove its high-tension wires from poles in Cheshire or to discontinue the use of its local substation, as petitioned by the Selectmen. The board points out that the wires were attached prior to the passage of any act making the consent of the Selectmen mandatory upon the company in connection with the erection of transmission lines and that no provision of law was cited which required the company to obtain the consent of the Selectmen prior to building a local substation. The petitioners claimed that the substation is a local disturbance of the peace, but the commission points out that the company is endeavoring through the manufacturers to reduce the noise of the machinery and refuses to take action at present. Regarding the demand for lower fares, the board withholds action until the company shall submit a proposed new schedule of rates subject to public hearing.

Louisville's "Ruddy Runabouts" Rerouted.—After having passed through the heart of the retail section of Louisville for many years, turning into Fourth Street at Chestnut Street and running one block north before turning West on Walnut Street, the Brook Street cars of the Louisville (Ky.) Railway on Dec. 15 were routed straight down Chestnut Street to Fifth Street, thence north on Fifth street to Main street as usual after the Walnut Street intersection was passed. This routing has long been desired by the officials of the company, which in 1912 tried it, beginning at a time when construction work effectually blocked Walnut Street. Popular clamor, however, compelled restoration of the time-honored routing, and it has taken an order from the board of public safety, acting in the interest of pedestrians at that always busy corner, to divert the cars. This line has for years been the butt of the "village wits" and the cars have variously been dubbed the "Crimson Ramblers," "Red Rovers" and "Ruddy Runabouts" on account of the tortuous course they have taken through the city.

Pension Plan for St. Louis Employees.—Richard McCulloch, vice-president and general manager of the United Railways, St. Louis, Mo., announced on December 24 a pension system for old employees effective on Jan. 1, 1915. Under the plan about twenty-five present and former employees will receive from $240 to $600 a year. The pensions will be paid entirely by the company. Any employee of sixty years who has been with the company fifteen years or more continuously and is incapacitated for work may upon request retire from active service with a pension for life. Any employee seventy years old with the company twenty years continuously can be retired on a life pension unless exempted by special ruling of the general manager. The amount of the annual pension is to be 1½ per cent of the average annual wage received during the employee's last ten-year period of service multiplied by the number of years of the employee's continuous service. It is provided, however, that no pension shall be less than $240 a year or more than 40 per cent of the average annual wage. The largest salary considered for the purpose of computing the pension allowance will be $1,500 a year.

Personal Mention

Mr. Samuel W. Pennypacker, Philadelphia, has been designated chairman of the Pennsylvania Public Utility Commission to succeed the late Nathaniel Ewing.

Mr. Walter H. Gaither, Pittsburgh, Pa., private secretary to Governor Tener of Pennsylvania, has been appointed a member of the Pennsylvania Utility Commission.

Mr. Henry Clay Hall, Colorado Springs, Col., has been nominated by President Wilson for re-appointment to the Interstate Commerce Commission for a term of seven years from Jan. 1, 1915.

Mr. James W. Carmalt, Montrose, Pa., attorney for the Interstate Commerce Commission, has been appointed chief examiner of the commission. He succeeds Mr. Ross D. Rynder, New York, who resigned to become commerce counsel for Swift & Company, Chicago.

Mr. P. B. Sawyer, vice-president and general manager of the Utah Power & Light Company, Salt Lake City, and formerly general manager of the Union Electric Company, Dubuque, Ia., in charge of street railway and electric service interests, has resigned from the Utah Power & Light Company, with which he has been connected since its organization more than two years ago.

Mr. Harry W. Alexander, publicity and sales manager of the Federal Light & Traction Company, New York, has resigned his position to become manager of the editorial and advertising section of the Society for Electrical Development. He will begin his new duties Jan. 1, 1915. Mr. Alexander's first position was in the accounting department of the San Pedro, Los Angeles & Salt Lake Railroad, at Los Angeles. Later he was transferred to the passenger department. Some time later he became press representative of one of the large amusement holding companies, and for three years traveled for this corporation throughout the United States and Canada. He later acted as its resident agent at different times in Salt Lake City, Pocatello, Idaho, and Denver, Col. In 1909 he became connected with the Chicago *Inter Ocean.* Early in 1911 he became associated with the Federal Light & Traction Company's operating department, resigning a year later to go with the construction forces of the Kansas City, Clay County & St. Joseph Railway. He returned late in 1912 to the Federal company, in the sales department, and in May, 1913, became publicity manager. Later he was placed in charge of the sales department.

Mr. George M. Cox has been appointed vice-president of the Middlesex & Boston Street Railway and of the Norumbega Park Company, with headquarters at Newtonville, Mass. He will retain his title and official duties as general manager of the railway company and as assistant treasurer of the Boston Suburban Electric Companies. Mr. Cox is a native of West Newton, and was graduated from the Newton High School in 1884. After eight years in mercantile business in Boston he joined the Middlesex & Boston organization as a clerk in the bookkeeping department. He served successively as chief clerk, assistant treasurer and assistant general manager, succeeding Mr. Carl A. Sylvester as general manager shortly after the latter's departure for Rio Janeiro, Brazil. Mr. Cox has just been re-elected a member of the Newton Board of Aldermen, after four years' service in that body. He is a member of the New England Street Railway Club and the Massachusetts Street Railway Association. Mr. Cox has had immediate charge for the company of the campaign for the establishment of a standard fare of 6 cents on the system, which culminated in the recent favorable Middlesex & Boston rate decision of the Massachusetts Public Service Commission, providing a new outlook for street railway financial administration for the roads within its jurisdiction.

OBITUARY

Clarence L. Chapman, at one time superintendent of the Holyoke (Mass.) Street Railway, is dead. Mr. Chapman was born in Sanford, Maine, on Dec. 1, 1843. He served in the Civil War and was postmaster of Somersworth, N. H., for ten years. He was connected with the Springfield (Mass.) Street Railway for many years as a foreman.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Torrington (Conn.) Traction Company.—Application for a charter has been made by this company in Connecticut to build a 10-mile electric railway between Torrington and Thomaston. Incorporators: Hosea Mann, Torrington, George B. Goodwin, Torrington, and Howard Guernsey, Thomaston. [E. R. J., Dec. 19, '14.]

***Hartford, New Britain & Meriden Railway, Hartford, Conn.**—Application for a charter will soon be made by this company in Connecticut to build an electric railway from a connection with the tracks of the Connecticut Company in Meriden northerly along Broad Street or Colony Street and the Hartford turnpike, or on private right-of-way near the highway in the towns of Meriden, Berlin, Newington, Wethersfield and Hartford to the intersection of Fairfield and Maple Avenues in Hartford and to a connection with the tracks on Fairfield Avenue, Hartford. The petitioners also ask for a right-of-way at some convenient point or points on the route to extend a line or lines westerly to the center of Berlin and to the center of New Britain. John C. Warnock, Meriden, attorney.

FRANCHISES

Tucson, Ariz.—The Tucson Rapid Transit Company has received a twenty-five-year franchise from the Council for several extensions of its lines in Tucson.

Los Angeles, Cal.—The Los Angeles Railway has agreed to purchase the franchise for the extension of the Brooklyn Avenue line on Evergreen Avenue in Los Angeles to serve the Malabar district, on condition that the Trilby rail requirement be eliminated.

Lewiston, Idaho.—The City Council at a special meeting granted the Nortz Syndicate of Minneapolis a twenty-five-year franchise in Lewiston. The railway must be in operation by Aug. 1, 1915. As soon as R. C. Dahlkjeim, representing the syndicate, can secure a franchise in Clarkston, Wash., work will be begun. The matter of granting the syndicate a franchise is before the Clarkston City Council at this time.

Augusta, Maine.—The Lewiston, Augusta & Waterville Street Railway has received permission from the Public Utilities Commission to change the location of its tracks on Western Avenue and on Rhines Hill in Augusta.

St. Louis, Mo.—C. Brenner, John A. Robitch and F. Arnold have asked the Council for a franchise for an extension of the Bellfontaine Street line from its present loop to the city limits.

Orange, N. J.—The Public Service Railway has filed with the city clerk the acceptance of the franchise granted by the Council on Nov. 24, 1914, for the extension of the Central Avenue line in Orange.

Toronto, Ont.—Plans and specifications for the Eglinton Avenue section of the Forest Hill Railway are under consideration of the York City Council.

Dallas, Tex.—The Dallas Consolidated Electric Street Railway has asked the Council for a franchise for an extension to the proposed union interurban terminal station in Dallas.

Houston, Tex.—The Houston Electric Railway has asked the Council for a franchise to extend its tracks on San Felipe Street to the city limits in Houston.

TRACK AND ROADWAY

Mobile & Baldwin County Railroad, Mobile, Ala.—During 1915 this company will build 60 miles of new track to connect Volanta, Bay Minette, Pensacola, Fairhope and Yerkon.

Fresno (Cal.) Interurban Railway.—J. B. Rogers, president of this company, has agreed to change the routing of this line in Fresno to the southeastern city limits from K Street to L Street. The company will soon apply for a franchise along Inyo Street from K Street to L Street and along L Street to its southeastern limits, thence over private right-of-way to Hamilton Avenue in Fresno.

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company on the reconstruction of the line from San Bernardino to Highland and Patton. The improvements include new ties, heavier rails and complete reballasting of the line.

San Francisco, Cal.—The Fifteenth Street and Park Hill Improvement Association has filed a petition with the Board of Works in San Francisco to extend Alpine Street, widen Fifteenth and other streets in the neighborhood and to acquire a right-of-way from Masonic Avenue and Levant Street to Pluto Street, so that a route for an extension of the municipal railway may be provided. The board has referred the petition to the city engineer.

San Francisco (Cal.) Municipal Railway.—The Board of Works has awarded the contract for the construction of the California Street Municipal line in San Francisco to F. Rolandi, San Francisco. Plans are being made to begin work at once on Second Avenue and Geary Street in San Francisco.

Sausalito (Cal.) Incline Street Railway.—The contracts for surveys, general plans and specifications have been awarded by this company to A. E. Roberts, and plans are being made to begin work about Feb. 1 on this incline railway from the bay front in Sausalito to the summit of the heights, 1000 ft. above Sausalito. The company will operate two electric, compensating cable cars and the power station will be located at the top of the incline. Capital stock, authorized, $50,000. Capital stock issued, $3,000. Officers: Allen H. Vance, Sausalito, president; George H. Harlan, secretary; F. A. Robbins, treasurer and A. E. Roberts, chief engineer, all of Sausalito. [E. R. J., Nov. 14, '14.]

Connecticut Company, New Haven, Conn.—Plans are being considered by this company to extend its tracks in Norwich in five different directions, including the Maplewood, cemetery, Mohegan Park and Fitchville extensions.

Columbus (Ga.) Railroad.—This company is asked to consider plans to extend its lines to Riverdale.

***Boise, Idaho.**—C. J. Franklin, Boise, Idaho; J. G. Brown, Galion, Ohio, and E. A. Pack, Weiser, Idaho, contemplate the construction of a 75-mile electric line over Blue Mountain from Boise to La Grande, Ore.

Lewiston, Idaho.—Arrangements are being made to begin work about Feb. 1 on the 3-mile electric line to connect Lewiston, Idaho, and Clarkston, Wash. The repair shops will be located in Clarkston and power will be obtained from the Lewiston-Clarkston Improvement Company. It is planned to operate three cars. R. C. Dahlhjelm and A. G. Nortz are interested. [E. R. J., Dec. 12, '14.]

City Railway, Mount Vernon, Ill.—This company plans to build 2 miles of new track during 1915.

Peoria (Ill.) Railway.—Plans are being contemplated by this company to double-track its Jackson Street line to the city limits of Peoria.

Rockford (Ill.) City Traction.—About 50 miles of new track will be built by this company during 1915.

Kankakee & Urbana Traction Company, Urbana, Ill.—Plans are being considered by this company to begin work in the spring on the extension to Paxton and south from Paxton.

Fort Dodge, Des Moines & Southern Railway, Boone, Ia.—This company has purchased three 96-ft., deck-girder spans weighing approximately 176 tons from the American Bridge Company. These are to be used in replacing temporary structures with permanent ones in the roadway near Boone.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—During the year this company plans to build its 25-mile line to connect Linwood, Eudora and Lawrence.

Hutchinson (Kan.) Interurban Railway.—About 1 mile of track will be built by this company during 1915.

Manhattan City & Interurban Railway, Manhattan, Kan.—About 1 mile of new track will be built in Manhattan during 1915 by this company.

Louisville (Ky.) Railway.—Something over 1 mile of new street paving is to be done next spring on West Market Street in Louisville by this company. According to the terms of its charter, the company will be required to pave, with granitoid, the spaces between its double tracks, as well as a strip 2 ft. wide on each side of the tracks. The roadways will be of bituminous concrete and the gutters of brick. The cost of the improvement is estimated at about $65,000.

Kentucky Utilities Company, Somerset, Ky.—Plans are being considered by this company for an extension between Somerset and Burnside, 7 miles.

Southwestern Traction & Power Company, New Iberia, La.—This company plans to build its 60-mile line to connect New Iberia, Jeanerette, Berwick and St. Martinville during 1915.

New Orleans Railway & Light Company, New Orleans, La.—During 1915 this company expects to construct 10.50 miles of new track in New Orleans.

Orleans-Kenner Electric Railway, New Orleans, La.—Construction is well under way on this line to connect New Orleans, Southport, West Carrolton, Harlem, Shrewsbury, Harrihan and Kenner. The repair shop will be located at Harrihan and power will be purchased from the New Orleans Railway & Light Company. The company will operate four cars and will also furnish power for lighting purposes. Capital stock, authorized, $3,000,000. Capital stock issued, $250,000. Officers: E. A. Stanford, New Orleans, president; A. Fitzpatrick, vice-president; John Lorenz, 409 Tulare Newcomb Building, New Orleans, secretary and treasurer, and E. J. Morris, superintendent. [E. R. J., Dec. 19, '14.]

***East Kildonan, Man.**—The Public Utilities Commission of East Kildonan is considering plans for an electric railway from East Kildonan to Morse Place.

Detroit, Almont & Northern Railway, Detroit, Mich.—This company has awarded a contract to Frank Bishop, Almont, Mich., to build an extension from Almont north to Imlay City, 8.5 miles. The company has completed work on 9.35 miles of first track, and about 1 mile of second track between Romeo and Almont.

Minnesota & Central Minnesota Railway, Minneapolis, Minn.—This company, which is now building a line between St. Cloud and Kimball, is considering plans to build through Ramey to the iron range if certain concessions are made by those interested in the proposition. E. G. Potter, 433 Andrews Building, Minneapolis, president. [E. R. J., June 27, '14.]

Trenton, Lakewood & Seacoast Railway, Point Pleasant, N. J.—Completion by May 1 of the first link in a trans-State electric line is said to be assured through the awarding of a contract by this company to the Vandergrift Construction Company. The company has a capital stock of $1,500,000, and all but $250,000 is available for use in the construction of the proposed line. The right-of-way extends along the wagon road the greater part of the distance to Lakewood from Point Pleasant. It is announced that the right-of-way for the entire cross-State line has been acquired, and that it is planned to make the run from Point Pleasant to Trenton in fifty-five minutes. The line will take the most direct route from Trenton to the seashore. The intention is to make it a freight as well as passenger-carrying line.

Brooklyn, N. Y.—The Public Service Commission, First District, has sent to the Interborough Rapid Transit Company, for its criticism and suggestions, the form of contract for the construction of Section No. 2 of Route No. 12, the Eastern Parkway subway in Brooklyn. This section extends from the end of the present construction, at Prospect Park Plaza out Eastern Parkway to a point 635 ft. east of the center line of Nostrand Avenue, and includes the spur turning southeasterly into Nostrand Avenue for the Nostrand Avenue subway. The company will have ten days in which to consider the contract and return it to the commission with its recommendations, after which the Commission will adopt it and order advertisements for bids.

Hudson Valley Railway, Glens Falls, N. Y.—During 1915 this company plans to build about 1 mile of new track in Glens Falls.

Cincinnati (Ohio) Traction Company.—A 2-mile extension will be constructed by this company in Cincinnati during 1915.

Cleveland (Ohio) Rapid Transit Railway.—According to a statement by President Hopkins of this company the Ohio Public Utilities Commission will be asked to authorize an issue of $12,000,000 or $15,000,000 bonds to build the first two lines of the proposed subway system in Cleveland.

Toronto Suburban Street Railway, Toronto, Ont.—During 1915 this company plans to build 40 miles of new track between Toronto and Guelph.

Toronto, Ont.—A by-law will be submitted to the voters on Jan. 2, 1915, in Toronto for authority to build new civic lines in North Toronto and extend south from Earlscourt, Hill Crest and Wychwood districts, at an estimated cost of $455,000. R. C. Harris, City Hall, is Commissioner of Works.

Willamette Valley Southern Electric Railway, Portland, Ore.—Officials of this company state that the line will be in operation before Feb. 1, 1915. The trolley wires have been strung from Oregon City to a point about 2 miles southwest of Molalla, and it is expected that the line will be completed to Mt. Angel within two weeks. G. B. Dimick, president.

***Bristol, Tenn.**—Plans are being considered to build an electric railway from Kingsport, on the Holstein River, across the counties of Sullivan, Washington, Greene and Cooke to Newport, Tenn. No names are yet given of those interested in the project.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—Work will be resumed in the spring by this company on its 70-mile line between Kingsport and Greenville. Power will be purchased from the Tennessee Eastern Electric Company, Greenville. Capital stock authorized, $1,500,000. Officers: H. S. Reed, 205 Grant Building, Los Angeles, president; James L. Calahan, 111 Broadway, New York, N. Y., vice-president; A. M. Blauvelt, 61 Broadway, New York; secretary; E. R. Eston, Greenville, treasurer; Kirby Thomas, 43 Exchange Place, New York, general manager and purchasing agent, and F. A. H. Kelly, Greenville, Tenn., chief engineer. [E. R. J., Dec. 26, '14.]

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans are being made by this company to extend its lines in Knoxville.

Beaumont, Tex.—Two plans are under consideration for a line through Chambers County. One is to route the line through Chambers County direct and the other to route the line from Houston to Beaumont, through Liberty County and extend a spur from Liberty to Anahuac. Edward Kennedy and associates are interested. [E. R. J., Dec. 19, 1914.]

San Antonio (Tex.) Traction Company.—Work has been begun by this company on Trevino Street to connect Main Plaza and Military Plaza in San Antonio.

Southern Traction Company, Dallas, Tex.—Double tracks are being laid by this company through Trinity Heights near Dallas, and plans are being made to lay new heavy rails on Third Avenue in Dallas.

Southwestern Traction Company, Temple, Tex.—A 2.3-mile extension will be built in Temple by this company during 1915.

Texas City (Tex.) Street Railway.—Work has been begun by this company on the extension east on Eleventh Avenue to Second Street and south on Second Street to Eighth Avenue and thence to the passenger pier in Texas City.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Following the completion of the extensions between Lewiston and Smithfield and between Providence and Wellsville, through service was established recently between Lewiston and Wellsville by this company. Grading on the extension between Lewiston and Preston is more than half completed, and the construction work on the link between Wellsville and Brigham has been begun. It is estimated that the entire line will be completed and through service established between Ogden and Preston by June 15, 1915. The line will be about 190 miles long.

Hershey (Pa.) Transit Company.—This company has completed the first section of 5 miles of its line from Hershey to Elizabethtown, 10 miles. It is expected that the remaining 5 miles will be completed in 1915. H. N. Herr, Hershey, chief engineer.

Warren (Pa.) Street Railway.—During 1915 this company plans to lay about ½ mile of new track in Warren.

Regina (Sask.) Municipal Railway.—About 1½ miles of new track will be constructed in Regina during 1915.

Sioux Falls (S. D.) Traction System.—During 1915 this company plans to build 1 mile of new track and to pave 3 miles in Sioux Falls.

Ogden (Utah) Rapid Transit Company.—During 1915 this company plans to build its 33-mile northern terminus to connect Wellsville, Mendon, Collinston, Deweyville, Honeyville, Garland, Tremonton and Brigham City.

Norfolk (Va.) Southern Railway.—Plans are being considered by this company for an extension to Cape Lookout.

Tacoma (Wash.) Municipal Railway.—Rapid progress is being made by this company on its new line in Tacoma. All the material is on hand and being installed.

Charleston-Dunbar Traction Company, Charleston, W. Va.—About 18 miles of new track will be built by this company during the year 1915.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company is receiving bids for the construction of a new passenger and freight station in Gardena. The building will be a Type "A" structure about 72 ft. x 30 ft., and much of the construction work will be of concrete.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission, First District, has approved the plans and contract submitted by this company for the construction of the stations on the Sea Beach railroad, as reconstructed for the dual system of rapid transit. The stations to be built are designated as: Eighth Avenue, Fort Hamilton Avenue, New Utrecht Avenue, Eighteenth Avenue, Twentieth Avenue, Twenty-Second Avenue, Kings Highway, Avenue U and Eighty-sixth Street. The successful bidder will be required to give a bond of $50,000 to begin work within ten days after the delivery of the contract, and to complete the same within six months from that date. The work will include the erection of complete station buildings, passages and stairs, with newsstands, ticket booths, etc., although the specifications differ for different stations.

POWER HOUSES AND SUBSTATIONS

East St. Louis Light & Power Company, East St. Louis, Ill.—This company will add to its substation equipment a 1250-kw, 300-r.p.m., 2300-volt frequency changer set with synchronous motor panel. The order for the apparatus has been placed with the General Electric Company.

New Bedford & Onset Street Railway, Wareham, Mass.—This company will place in operation new substation apparatus consisting of 400-kw and 500-kw rotary converters, three 135-kva and three 165-kva transformers, switchboard and accessories. The equipment has been purchased from the General Electric Company.

New York Municipal Railway Corporation, Brooklyn, N. Y.—This company will make additions to substation equipment comprising three 2000-kw and three 4000-kw rotary converters, nine 750-kva and nine 1400-kva transformers, switchboard apparatus and accessories, the contract to build all the apparatus having been awarded the General Electric Company.

Toledo Railways & Light Company, Toledo, Ohio.—This company has ordered from the General Electric Company four additional 2000-kva, four 600-kva and four 300-kva transformers and switchboard euqipment.

Monongahela Valley Traction Company, Fairmont, W. Va.—All contracts have been awarded by this company for its new power house near Hutchinson, W. Va. The new station will have 8600-hp capacity. The gas engines will be furnished by the Bethlehem Steel Corporation and the generators by the General Electric Company.

Nashville Railway & Lighting Company, Nashville, Tenn.—This company will place in operation in one of its substations an additional 2000-kw three-unit motor-generator set which will be built by the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Chicago & Milwaukee Electric Railroad, Highwood, Ill., will buy immediately fifteen interurban cars.

Stockton Terminal & Eastern Railroad, Stockton, Cal., expects to use gasoline motor cars on its line.

Wilmington, New Castle & Delaware City Railway, Wilmington, Del., expects to purchase four semi-convertible cars.

Long Island Railroad, New York, N. Y., is asking for bids on twenty all-steel trailers for summer use, about 55 ft. over all, of light-weight and flat roof construction.

TRADE NOTES

Automatic Ventilator Company, New York, N. Y., is furnishing its "A. R. I. E." type intake-and-exhaust ventilators for the twenty-four arched-roof, all-steel interurban cars which the Pressed Steel Car Company is building for the Pacific Electric Railway.

P. & M. Company, Chicago, Ill., has appointed Fred N. Baylies as Eastern manager with offices at 30 Church Street, New York City. Mr. Baylies was formerly assistant sales manager of the Aluminum Company of America, with office in Chicago, but has been a director of the P. & M. Company since its incorporation.

Esterline Company, Indianapolis, Ind., has received an order to equip all the cars of the Mobile Light & Railroad Company with "Golden Glow" headlights. This equipment was adopted after a thorough test extending over considerable period. The installation replaces present arc and incandescent headlight equipment.

W. N. Smith, formerly electrical engineer of Westinghouse, Church, Kerr & Company, has just completed a report on the power generation and distribution system of the San Francisco-Oakland Terminal Railways. His headquarters are now in Watertown, N. Y.

Charles H. Dodge, general Western sales agent, Taylor Electric Truck Company, of Troy, N. Y., has resigned to take effect Jan. 1, 1915. Mr. Dodge has been general Western sales agent for the past ten years and is widely known throughout the Central West district. Immediately following his resignation he expects to devote the greater portion of his time to private interests.

Gifford-Wood Company, Hudson, N. Y., engineers, founders and machinists, will open an office in Room 1038 Hudson Terminal Building, 30 Church Street, New York City. This office will be managed by A. W. Berghoefer, who will also have associated with him Joseph A. Boucher. The territory covered by this New York office will include New York City and the Hudson River up to and including Westchester County, New Jersey, southeastern Connecticut and southeastern Pennsylvania, also including the southern states east of the Blue Ridge Mountains. This company is prepared to furnish machinery equipment for handling bulk material such as coal, boxes, barrels; also ice levelers and Eureka flange teeth for attachment to snow plows, etc.

Northern Equipment Company, Erie, Pa., manufacturer of the Copes boiler feed water regulator and the Copes pump governor, reports that 1914 was the most prosperous year in the history of its business. Its sales exceeded those of its next best year by 9 per cent. This company has purchased the plant, equipment and business of the Erie Pump & Engine Works. V. H. Dougherty, formerly with the International Steam Pump Company, has been engaged to take charge of the centrifugal pump design. A consolidation of the two companies is being perfected and the new combination will be known as the Erie Pump & Equipment Company. The officers of the new company are: E. W. Nick, president and treasurer; D. H. Du Mond, vice-president; V. V. Veenschoten, secretary. John G. Pfadt, former president of the Erie Pump & Engine Works, is not with the new company.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Catalog No. 21 describing its small d.c. and a.c. small motors.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued a catalog describing and illustrating its Class N-SO and N-SG fuel-oil and gas-driven compressors and their application to the unit system of air-power plants.

Edwards Manufacturing Company, Cincinnati, Ohio, has issued a folder describing and illustrating its iron and steel trucks for handling freight. A feature of the truck construction is the continuous-piece "V"-shaped frame, which gives unusual rigidity and strength.

Busch-Sulzer Bros. Diesel Engine Company, St. Louis, Mo., has issued a catalog which contains curves, data and other results of a number of tests recently conducted for the purpose of determining the efficiency of the fuel oil engines of this company with unchanging and constant loads and also for the purpose of comparison with loads under fluctuating conditions.

Roller Smith Company, New York, N. Y., has issued Bulletin sheet No. 86 which contains an illustrated description of its new a.c. portable signal system testing volt-ammeter. The case of this instrument is of oak and handsome in appearance. It is provided with a substantial leather handle, hinged cover and snap catch. The binding posts are heavy and have non-removable tops. Each binding post is legibly marked with a numeral corresponding to the scale value which is obtained when this binding post is employed. A zero adjuster convenient for manipulation is included. Particular attention is called by the manufacturer to the method of indicating by diagrams on the scale the proper connections for the various ranges and data covering the values per scale division.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 45602 dealing with the subject of protection of series lighting circuits by lighting arresters. The arresters described in the bulletin are two types, the horn type and the aluminum type. The former is designed for the protection of series transformers and rectifiers against lightning discharge and similar trouble, and the latter particularly for the protection of cable circuits running from series arc rectifiers. Bulletin No. 42300 describes this company's line of small direct-connected generating sets of sizes ranging from 2½ to 75 kw. These generating sets are adapted for power and lighting in isolated plants and as exciters for a.c. generators in central stations. Bulletin No. 42010 describes in considerable detail horizontal turbine sets of small capacities ranging from 7 to 300 kw., direct current, and 100, 200 and 300 kw., alternating current. They are adapted for supplying light and power in machine shops and for train lighting. The turbines can be furnished for either condensing or non-condensing operation and in general for any steam pressure of over 80 lb.

Western Electric Company, New York, N. Y., is distributing the first edition of its 1915 electrical supply year book. A new feature incorporated in the book is the adoption of a complete series of list prices upon which a uniform basic discount applies, such a discount indicating to the holder of the catalog his approximate price on all the articles listed. The adoption of this system in place of the many and confusing manufacturers' lists and their wide variety of discounts makes this publication of especial convenience for reference. The innovation enables the trade to determine at a glance approximate costs on any one of the many thousands of articles listed. It simplifies the complicated method of quoting prices and estimating costs, with which the industry has so long been burdened, and it should therefore materially reduce the cost of doing business to seller and buyer alike. To illustrate, no longer will the contractor who is called upon to estimate on jobs find it necessary to refer to one list price and carry in his mind one string of discounts for his wire, another for his porcelain, another for his schedule material, another for his fixtures, etc. With this book before him, he can open at any page, apply a uniform discount and arrive at a price which he can safely figure represents his cost, or he can group the quantities of material he needs together with the total list prices applying thereon and again apply the uniform discount and have a working basis upon which to figure his profits on the job.

Special effort has been made to render this book easy of reference as well as complete in its listings. Although containing 1200 pages besides an alphabetical index it is of unusually light weight for its completeness.

Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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THE MENACE OF THE BUS

Mayor Rose's message of Dec. 23, 1914, on the "jitney" (5-cent) bus to the Los Angeles City Council is a sane presentation of the danger and money loss that confront electric railway and municipality alike if the bus is allowed to engage in city transportation without making the same relative compensation to the municipality as does the electric railway. The figures presented by the Mayor, showing a possible loss to the railway of $750,000 a year, of which 80 per cent would return to the city in various ways, are startling. It is not often that a public official sees so clearly what the electric railway means to the people as a taxpayer, employer, purchaser and purveyor of a large amount of transportation at low cost. As in other cities where a similar service has been begun, the buses compete only for the cream of the traffic. They do not transfer to other routes for the same fare, and they change their courses at pleasure. They are practically irresponsible in regard to accidents, and they pay no taxes, either in the form of cash or pavement maintenance. The experience in Los Angeles is but a repetition of what has occurred in many foreign cities. In almost every case abroad the tramways suffered heavy losses before the law had caught up to the novel conditions introduced by the power bus. In many foreign cities the situation remains unameliorated. We hope that the American electric railways will not have to wait too long for city councils and state legislatures to protect them against such unfair competition, for in the end, as Mayor Rose, says, the people will be compelled to depend upon the street railways for the greater part of their transportation.

ENGINEERS AND ENGLISH

Style in writing has been compared to a window. The best window is one which is so clear that the light passes through it as through an opening. When the window begins to attract attention, there is something wrong with it. It is the same with style. It should be so clear as not to obstruct the flow of thought from the printed page to the mind of the reader. When the reader begins to notice the style, and his attention is distracted from the thought which the words are intended to transmit, the writing is at fault. Unfortunately, most of our engineering schools do not give sufficient attention to instruction in rhetoric, or the art of expression. The science of engineering in its various phases has developed so rapidly that the courses of study in the technical schools have had to be confined very closely to engineering studies, and that of English has been neglected. Again, after he leaves college, the average engineer does not have much opportunity to acquire ease in writing clear and concise English, and the work which he has to do in preparing contracts and specifications certainly does not help him in this respect. Yet an ability to write clearly is necessary if he is to impress his ideas upon a large number of other persons. In this issue we take pleasure in publishing a well-written letter on the subject of the use of English, by a professor who tries to teach engineering students how to write. Every reader of this paper who has letters, shop orders, reports, technical papers, addresses or anything else to write can profitably give this subject careful attention.

CRYSTALLIZING THE SAFETY MOVEMENT

Whether the safety movement is to be treated merely as an ephemeral incident or is to be an established factor in the electric railway industry is a question which those who have undertaken a comprehensive safety campaign should decide. Many roads have treated the safety crusade as a temporary proposition extending over a period of six weeks or more during which a most extensive canvass of the situation is made, but little or no effort is put forth to place the movement on a permanent footing. The real value of a safety campaign is to be had only by making it continuous and, to a certain extent, automatic. Of course, a permanent safety organization is a long step in this direction, but even with it interest will lag. It appears to us that the most enduring influence is to be had not only by providing mechanical remedies for the prevention of accidents that have occurred, but by compiling a permanent record of instructions for the benefit of the new employees. The new men are unacquainted with the conditions surrounding the causes of accidents in the past or the cures that were adopted for their elimination. The safety rule book recently issued by the Chicago Elevated Railways and mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1914, is an example of what may be termed the crystallization of a safety movement. Manifestly as the equipment and methods change, this book of rules will have to be amended so that it will form a record of past experience at all times which will be of benefit to the new employee. Further, it should become the duty of the employee in any of the departments to familiarize himself with the rules pertaining to the particular work he is to do and thereby profit by the experience of those who have gone before. In conclusion, we merely wish to warn against the ever-present tendency to join in these various crusades because they are popular. If any movement is worth while it should be undertaken only with a view of maintaining continued interest.

PROGRESS IN ELECTROLYSIS MITIGATION

During the past year the subject of electrolytic corrosion of underground pipes has had unusual publicity. This does not indicate necessarily more attention on the part of the interests involved, but it shows a desire to permit the experience of one to be available to all. The subject is taking on a more scientific aspect, always associated with the comprehensive solution of problems. As one surveys the past of the electrolysis controversy he is led to conclude that some of the reasons for the existence of a new epoch in this field are these: First, most of the more pressing technical electric railway problems have been solved and attention is available for those less urgent; second, the streets have become so filled, above and below ground, with tracks, pipes, conduits, etc., all of which form complicated return paths for railway return currents, that some understanding regarding the rights of all parties concerned must be reached; third, it is generally recognized that such an understanding must be based on the possession of full information. There has been, no doubt, an attitude of suspicion and distrust on the part of owners of pipes and conduits on the one hand and on that of railway managements on the other, based largely on lack of such information. Corrective measures involve expenditure, and neither side desires to make these unless convinced of responsibility and even then the methods proposed for relief must not be open to suspicion as to their effectiveness, reasonableness and permanence. Experts have differed in their plans for mitigating the trouble, hence their propositions have been considered experimental in character.

An unfortunate, but natural, temporary element at the present stage of development is a seeming division of opinion as to the merits of two remedial methods, the insulated return feeder system and the pipe drainage system. There is, however, a growing recognition of the fact that there is no one universal panacea. Conditions of soil resistivity and chemical composition, underground pipe layout, track and feeder distribution, etc., differ so widely that a plan successful and economical in one city might be quite the reverse elsewhere. Some cities are so fortunate as to be built upon soil which inherently prevents electrolysis, whereas other soils invite it. In order to seem up to date and progressive, however, it is quite possible that the governing boards in the electrolysis-proof city might be induced to prescribe regulations suited and necessary only elsewhere. Hence again, the need for full information.

That all pipe corrosion is not caused by stray currents would be generally admitted, but it is very difficult to prove that it was not so caused in any particular case. Conclusive statements, based on experiment, such as that printed in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 14, 1914, will do much to clarify this important phase of the question.

There is no doubt that the formation of the national joint committee on electrolysis, with its representation of most of the important involved interests, is the best omen of progress which has appeared in recent years. A report of this committee is now in preliminary form and will be issued shortly. If this report commands the respect which the standing of the members of the committee would lead us to expect, a potent influence for reasonableness and fairness will be exerted by it. A second factor, not distinct from the other, is the National Bureau of Standards, in its participation in electrolysis experiments on a commercial scale. The purpose of the bureau in these investigations is to secure data for the general welfare, and it enters upon them only when they promise scientific interest and data. Obviously the bureau advocates no particular method of return conductors. This great national institution can contribute materially to progress by occupying an influential, non-partisan position, furnishing accurate data upon the basis of which the several utilities can get together. With these co-operating agencies, the joint committee and the national bureau, at work, with the vast store of information heretofore locked up in the archives of railway, water, gas, telephone and other companies made available, and with the scientific, progressive spirit which is beginning to be manifest in full action, there is hope, not for a solution of the problem but for a normal attitude toward it.

ENGINEERING CHEMISTRY AND RAILWAYS

During the past decade the relations of the subject of engineering chemistry to the electric railway have broadened far beyond early conceptions of their scope. Operating men have become more interested in the qualities of material and supplies, and the keen search for more economical methods has opened new avenues of investigation in connection with the purchase of equipment and products used in quantity in various departments of company service. It is this varied usefulness of modern chemistry which is emphasized in the article printed elsewhere in this issue on the practice of the Bay State Street Railway. Whether a large system elects to maintain its own personal chemical staff or to retain an outside firm in a consulting capacity, as is done in this case, it is evident that the old conception of the chemist's duties must be widened before the full benefits of the policy can be reaped.

There are still many well-informed people whose conception of chemical engineering is limited to a vision of a narrow-chested, sallow-complexioned recluse whose only joy in life is to peer into beakers of malodorous, bubbling compounds in search of their contents, up in some dark cubbyhole under the roof where no one else will consent to work. It is a long stride from the attic to the conference room where the counsel of the chemical specialist is given in conjunction with the advice of the operating engineer and the invited criticism of the manufacturer, but the safeguarding of materials and of the company pocketbook which are the results of this work indicate that the resources of modern science are sure to be called upon more and more in public utility operation as time passes.

THE SUBWAY ACCIDENT

On the morning of Jan. 6 travel was interrupted in the New York subway and a number of passengers were injured, one fatally, as the indirect result of a cable blow-out. Smoke from a short-circuit in a splicing chamber forming part of the power distribution system and separated from the subway by asbestos-lined steel doors, found access to the subway and added to the excitement of passengers alarmed by the tying up of traffic. Undoubtedly a rigid inquiry will be instituted by the Public Service Commission and by the company to determine the best means of preventing a recurrence of a similar condition. Until this study has been made of the possibilities of the use of insulation other than that employed, methods of preventing the entrance of smoke or other noxious gases into the subway and their prompt removal when present, etc., it would be idle to give offhand opinions on the subject.

The occurrence of an accident of this sort naturally raises a query in the minds of some, not only in New York but in other cities, as to the safety of subway travel. No one can investigate the statistics on this subject without being impressed with the notable immunity from accidents enjoyed by these lines and the great degree of safety with which they are transporting vast numbers of people. For example, during each day the Interborough Rapid Transit Company on its subway and elevated lines hauls a very much larger number of passengers than all of the steam railroads in the United States haul during a year. For the year ended June 30, 1914, the Interstate Commerce Commission reported that as a result of train operation on the steam railroads, 265 passengers were killed and 15,121 were injured. During the previous year the figures were 403 and 16,539 respectively. On the other hand, during the same year, with 400 times as many passengers, the Interborough killed no one and had no serious accidents to passengers on its trains. We are stating these facts, not as an excuse for any possible neglect of the company to adopt precautions which will prevent accidents in the future, but because the public as a whole does not realize the small likelihood of accident to any individual passenger. Even a great many railroad men do not appreciate the remarkable extent of the safety precautions which have been thrown around rapid transit service in cities. It is true that the average steam railroad passenger travels a very much longer distance and is subject to a number of perils which are not present in urban operation. But, as opposed to this, passengers on rapid transit lines are subject to crowded conditions of cars and station platforms which are absent in steam railroad operation and underground transit is, of course, exposed to the peculiar dangers of this class of operation.

The subway cars in New York are equipped with emergency lighting circuits fed from storage batteries for use in case of accidents involving interruption of service, and the accident in question indicates the great value of lights of this kind as an element of insurance against the panic and the importance not only of sufficiency in their design but also of their frequent inspection and periodical tests. This is the most important lesson to be drawn from the information at present in hand. Only second in importance to the emergency car lighting is the lighting of the subway from a source of power independent of the main power supply.

TEACHERS AND THE INDUSTRY

Perhaps enough has already been said on the issues raised by the publication which criticised editorially the effort recommended by the public policy committee of the American Electric Railway Association to cooperate in sound public education on matters related to electric railways. From one point of view all that need be said was expressed in the editorial of the ELECTRIC RAILWAY JOURNAL of Dec. 5. Since then prominent representatives of five institutions of learning have expressed their approval of the plan of the committee and of the JOURNAL'S exposition and defense of this plan. None of these professors has evinced the slightest fear of contaminating influences on the part of railway men. On the contrary, they substantially agree in the statement of Professor Rood of LaFayette College, that "certainly no one can deny that there is needed closer and better understanding between the electric railways and the public they serve. Any movement that makes for this should in every way be helped and not hindered."

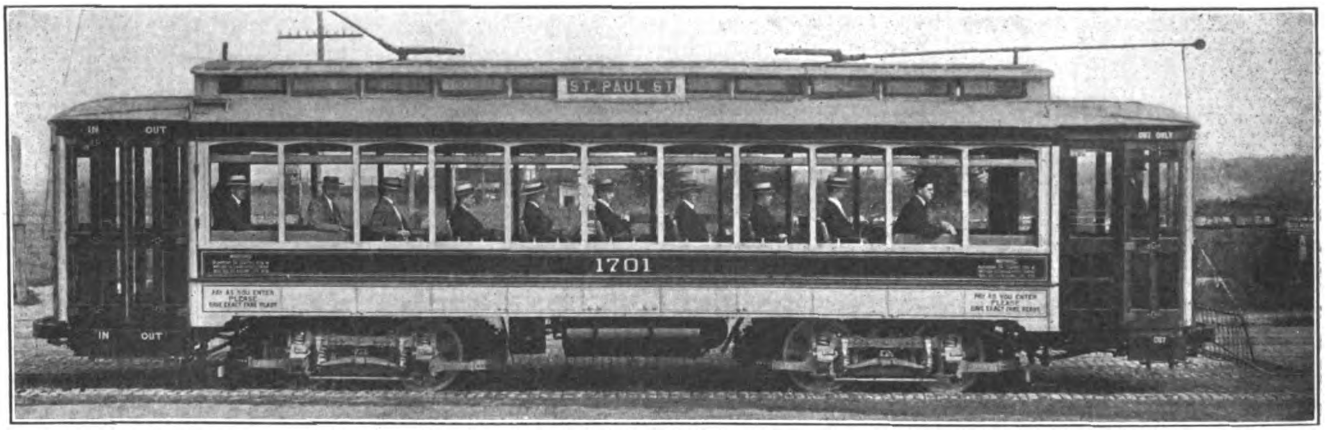
Professor Rood has also written at some length, and in the same vein, to the critic of the *New Republic* who, as though to prove that a correct statement of this matter cannot be secured in his columns, states that "it appears to be a fair inference that the association proposes that courses of instruction dealing with such matters as capitalism, rates and franchises should be turned over to men who are in the employ of the companies or, at least, have given much of their lives to such employment." No one has ever made such a proposition as this, so far as our knowledge goes. No courses of instruction were to be turned over to anybody outside of members of a faculty. It was simply proposed that as a part of courses of instruction there might be lectures which would frankly state the railways' point of view. Later on our critic announces that educational institutions must maintain "a strictly neutral position." Of course they must; so also must judges in our courts —yet we have never heard of a judge announcing that he wished to hear but one side of a case.

All of the above is fairly obvious, and as was stated at the beginning, from one point of view this whole matter might have been closed with our original editorial on the subject. This point of view, however, would ignore one of the most important principles of educational effort, and that is that no injurious charge or statement should remain unanswered, however unreasonable it may be nor how oft repeated after it has once been refuted. If this policy had been systematically followed by electric railways there would not now be so much misinformation to counteract.

Inclosed Prepayment Cars for Baltimore

The United Railways & Electric Company of Baltimore Has Placed in Operation Eighty-five Prepayment Cars Which Differ from Earlier Prepayment Designs Chiefly in the Change to the Fully Inclosed Platform

On Aug. 1, 1914, the United Railways & Electric Company of Baltimore began to place in service on the St. Paul Street, Linden Avenue, West Arlington, and Pikesville and Emory Grove lines a consignment of eighty-five prepayment semi-convertible cars received from The J. G. Brill Company and built under license of the Prepayment Car Sales Company. The general dimensions of the new car are as follows: Length of platform, 5 ft. 8½ in.; length over the corner posts, 30 ft. 8 in.; length over all, 43 ft. 9 in.; maximum width, 8 ft. 5 in. These cars, although similar in a great many respects to the large number of pay-as-you-enter cars now in operation in Baltimore, have several new features, among them fully inclosed platforms with mechanically-operated doors and folding steps, the operating mechanism of which works in conjunction with the doors. Furthermore, the end wall of the bulkhead, which in other types of prepayment cars now in use in Baltimore contains both the main entrance and emergency exit doors, has been supplanted by a large open archway extending from side to side of the car. This archway is finished off in cherry and adds greatly to the interior appearance of the car.



BALTIMORE INCLOSED CARS—SIDE VIEW OF CAR FULLY EQUIPPED AND WITH DOORS CLOSED

FOLDING DOORS AND STEPS, SEATS AND GENERAL FINISH

Entrance to the car is obtained by a set of folding doors of four sections which, when in a closed and locked position, fit against the side of the car platform and a casing located just beneath the edge of the platform hood extending from the car corner post to the vestibule. This main doorway, which serves the double purpose of entrance and emergency exit, affords a 47½-in. opening when the doors are thrown to open position. Each of the four sections comprising the door has two panes of clear wired plate glass secured in place with wooden beading. At the corner post and near the vestibule there is a 1-in. round steel rod extending from the top door casing to about 8 in. below the platform, where both rods connect with the door-operating mechanism. The four door sections are divided into two hinged pairs. About one-half the thickness of the rod is imbedded in one edge of each pair of door sections and is securely held at regular intervals by U-shaped plates about 2 in. wide. In other words, two door sections are literally hung on each of the rods. When the doors are opened the rods turn about 90 deg., causing the door sections to part in the middle, one pair moving close to the corner post and the other pair moving to the vestibule. The door sections fold outward instead of inward in order to obtain the maximum platform space.

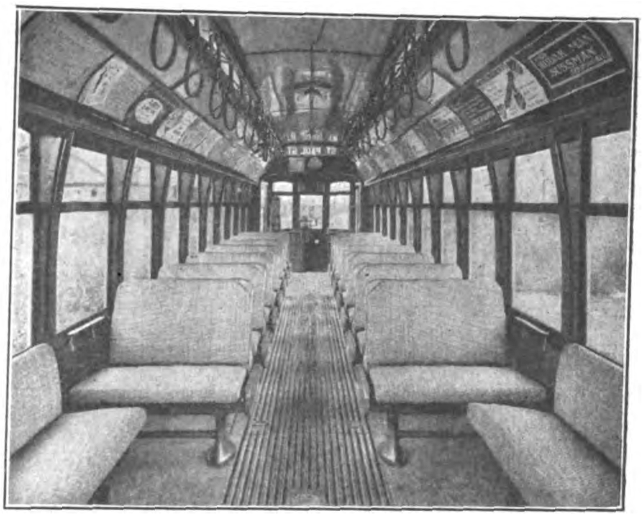
The edges of the door sections, which are hinged together, have an interlocking joint similar to a tongue and groove which keeps out the weather when the doors are closed. Where both pairs of doors meet, the edges of the same are fitted with heavy rubber tubing which acts as a resilient medium when the doors are closed. Each of the two door sections which meet on closing the doors is fitted at the top with a small case-hardened steel roller which passes between guide plates in the upper casing and plays an important part in the easy manipulation of the doors.

On the platform, securely bolted to the end sill and 4 in. off of the car floor center, is the conductor's combination door control stand and fare-box support. This stand consists of a piece of 2-in. pipe having a special casting on top and the lower end passing through the car platform. Through the center of this pipe passes a 1-in. round steel shaft with a system of bell cranks on the lower end to connect by means of rods to the door mechanism just described and to a large folding step. To the upper end of this shaft is fitted a handle similar in many respects to a controller handle and having a radius of 9 in. Near the top of the stand are two brackets upon which the fare box is hung. A folding step 12 in. wide and 4 ft. long works in unison with the doors at the main entrance. This step for about 4 in. back from the front edge is covered with abrasive material for its entire length. The door-operating handle, which moves in an arc of about 180 deg., is arranged to throw the cranks over dead center, thereby acting as a positive lock against anyone trying to open or close the doors without the aid of the proper handle.

On the opposite side of the platform (motorman's right hand) are arranged a pair of folding door sections, similar to those above described but affording a doorway 23½ in. wide when open. This is the regular exit door placed quite close to the vestibule and mechanically controlled by the motorman. The remaining distance to the car corner post is taken up by a stationary panel having clear glass in the upper half and four small beveled wood panels in the lower. The door when opened folds outward and back toward the car body. About 12 in. to the right of the motorman's air-brake valve and at about the level of the vestibule belt rail is located the motorman's door-operating handle. This handle fits the end of a vertical 1-in. round steel shaft which passes through the crown piece and is equipped on its lower end with a crank and rods to operate the exit door and folding step. The folding step just mentioned is 12 in. wide by 25 in. long. It is made of wood and has a step tread about 4 in. wide and 25 in. long. Both the motorman's and conductor's operating handles are removed to the opposite end of the car on changing the direction of running.

The vestibule from the belt rail to the floor is lined in natural cherry and has six large removable panels. The removable panel feature aids in repairing headlights or anything which is apt to fall out of adjustment between the dasher and vestibule lining. At the transverse center of the hood is located a motorman's curtain of pantasote 20 in. in width which can be drawn down and which hangs 3 ft. 6 in. above the car platform.

The seating of the car is an arrangement of four longitudinal seats extending the length of the first two windows at each corner, the rest of the car being furnished with fourteen transverse reversible spring rattan seats 36 in. wide. The aisle space between these rattan seats is 21¾ in. Out on the platform to the motorman's left a seat has been arranged capable of holding three passengers. This seat is 8 in. wide and 3 ft. 9 in. long. When not in use it folds off to the left of the controller and against the vestibule post where it is held by a retaining hook. When in use (which is only possible on the front platform) it drops down to a height of about 19 in. above the car platform, parallel to and within about 4 in. of the main entrance doors. A lug on the end of the seat fits into a casting on the car corner post, and the middle of the seat is in turn supported by a bracket which unfolds from the underside of the seat and rests on the platform. Unlike the rattan seats in the interior of the car, this platform seat is made up of a number of cherry wood strips heavily reinforced on the underside with ¾-in. channels. The total seating capacity is forty-seven passengers, twenty-eight on the transverse seats, sixteen on the longitudinal seats and three on the platform seat.



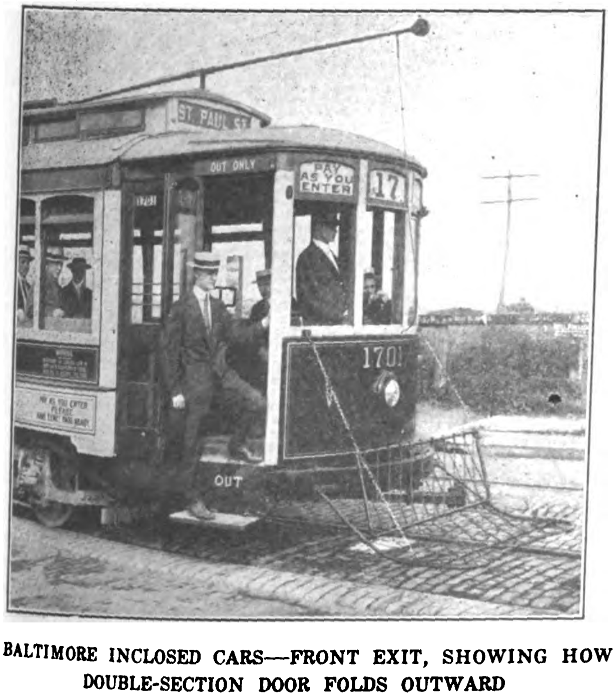
BALTIMORE INCLOSED CARS—INTERIOR SHOWING THE SEATING, ARM RESTS AND ARCHWAY

The use of pressed steel pedestals, wall and aisle plates in the Hale & Kilburn transverse seats represents a saving of approximately 25 lb. per seat over seats of similar dimensions which are made up with malleable iron castings.

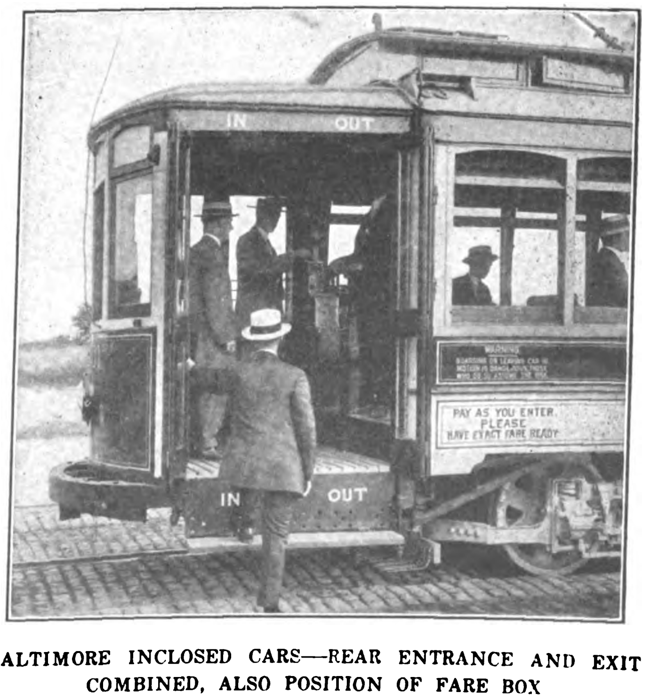
The ceilings are covered with agasote, which has been sanded smooth and, after being painted light buff color, has a ½ in. aluminum black-edged stripe. The interior finish is natural cherry. The interior moldings are very plain to require the least work in keeping the car clean.

CAR FRAMING

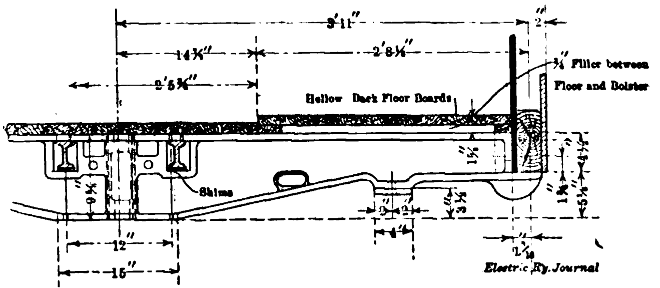
The wooden sills are 2¾ in. x 6⅞ in., and the steel sill plate 5/16 in. x 16½ in. The sill plate by means of a drop-forged corner iron is held by rivets to the end sill which is a 10-in. channel. The center knees are securely riveted to the end sill by means of a gusset plate, thus forming a very substantial and stiff underframe. A pair of 3 in. 5.5 lb. I-beam stringers extend from the intermediate crossing through the bolster to the 10-in. channel at the sill. These are securely riveted by means of angles and Z-shaped plates to a 10-in. channel and gusset plate near the platform. Where the



BALTIMORE INCLOSED CARS—FRONT EXIT, SHOWING HOW DOUBLE-SECTION DOOR FOLDS OUTWARD



BALTIMORE INCLOSED CARS—REAR ENTRANCE AND EXIT COMBINED, ALSO POSITION OF FARE BOX


3' 11"
2"
14¾"
2' 8¼"
2' 5⅝"
¾ Filler between Floor and Bolster
Hollow Back Floor Boards
Shims
12"
15"
Electric Ry. Journal

BALTIMORE INCLOSED CARS—SECTION AT CAST-STEEL BOLSTER

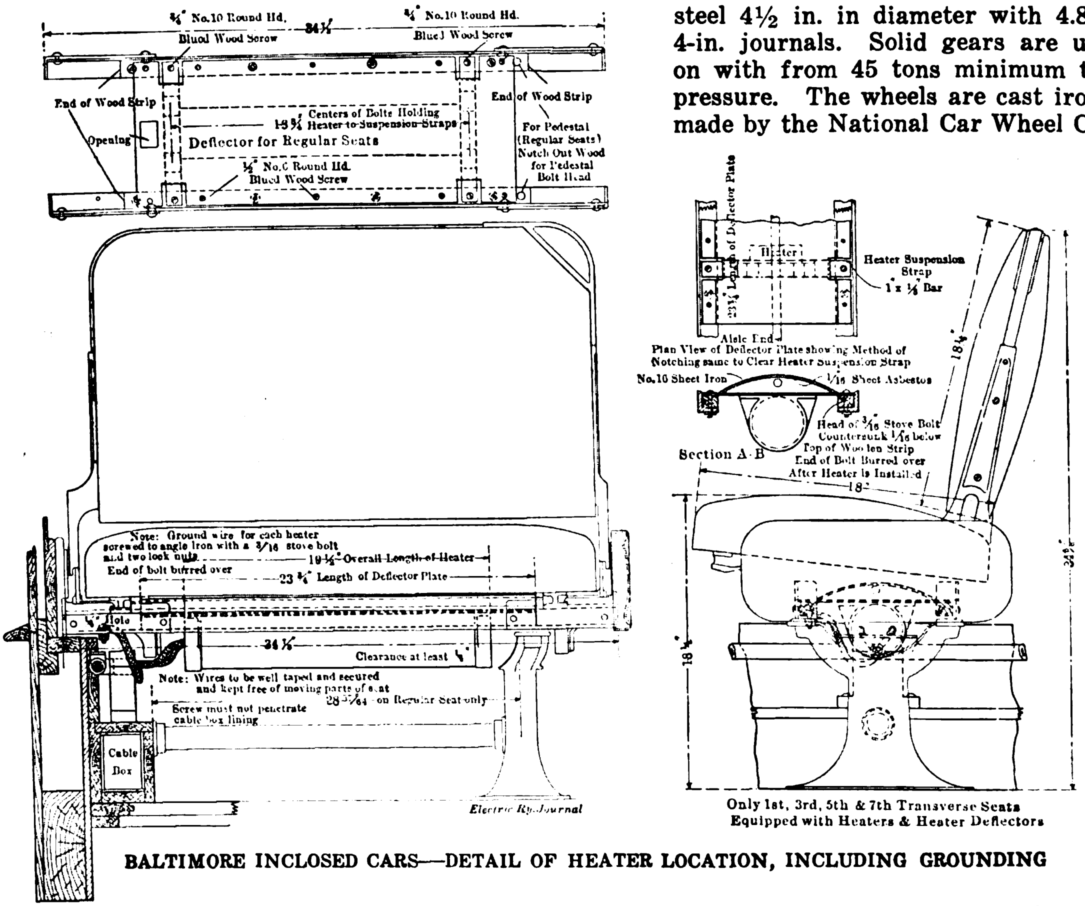
I-beam stringers meet the intermediate crossing fastening is made with angles riveted to the I-beams and then bolted to the crossing. The floor boards are all hollow back to reduce the weight.

The car body bolster is made of cast steel in one piece. The bolster was designed by the United Railways & Electric Company to carry a specified center-plate load and with a large factor of safety. Holes in the bolster admit air pipes, I-beam stringers and hand-brake pull rods. The platform supports are made of light channel irons.

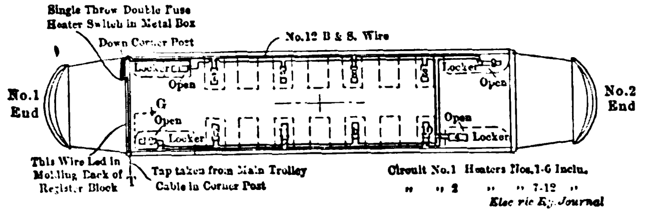
SANDERS, BRAKE RIGGING, BRAKES, TRUCKS, ETC.

The car has four sand boxes of the Dumpit type, two of which are placed beneath the platforms and two in the car under the longitudinal seats. The sand boxes at each end are operated simultaneously by means of a lever connected to a rocker shaft.

The hand-brake rigging is a system of chain sheaves which avoids an elaborate system of levers and produces excellent hand-brake operation with a slight saving in weight. The car body complete with foundation brake rigging, etc., weighs approximately 17,200 lb.


¾" No.10 Round Hd. Blued Wood Screw
34¼"
¾" No.10 Round Hd. Blued Wood Screw
End of Wood Strip
Opening
Centers of Bolts Holding Heater to Suspension Straps
18¾
Deflector for Regular Seats
¾" No.6 Round Hd. Blued Wood Screw
End of Wood Strip
For Pedestal (Regular Seats) Notch Out Wood for Pedestal Bolt Head
Note: Ground wire for each heater screwed to angle iron with a 3/16 stove bolt and two lock nuts
19¾ Overall Length of Heater
End of bolt burred over
23¾" Length of Deflector Plate
Hole
34⅛"
Clearance at least ¼"
Note: Wires to be well taped and secured and kept free of moving parts of seat
Screw must not penetrate cable box lining
28 5/64 on Regular Seat only
Cable Box
Electric Ry. Journal
Length of Deflector Plate
Heater
Heater Suspension Strap 1 x ¼ Bar
Aisle End
Plan View of Deflector Plate showing Method of Notching same to Clear Heater Suspension Strap
No.10 Sheet Iron
1/16 Sheet Asbestos
Head of 3/16 Stove Bolt Countersunk 1/16 below Top of Wooden Strip
End of Bolt Burred over After Heater is Installed
Section A-B
18"
18¼
18"
34½
Only 1st, 3rd, 5th & 7th Transverse Seats Equipped with Heaters & Heater Deflectors

BALTIMORE INCLOSED CARS—DETAIL OF HEATER LOCATION, INCLUDING GROUNDING


Single Throw Double Fuse Heater Switch in Metal Box
Down Corner Post
No.12 B & S. Wire
No.1 End
Locker
Open
G
Open
Locker
Locker
Open
Open
Locker
No.2 End
This Wire Led in Molding Back of Register Block
Tap taken from Main Trolley Cable in Corner Post
Circuit No.1 Heaters Nos.1-6 Inclu.
" " 2 " " 7-12 "
Electric Ry. Journal

BALTIMORE INCLOSED CARS—WIRING DIAGRAM OF HEATERS

The air brakes are the Westinghouse Traction Brake Company's SM-3 equipment in connection with a type F slack adjuster. This type of slack adjuster has made it feasible to change from daily to weekly inspections. Both the G governor and the D1-F compressor have a number of special details required by the railway's specification. The compressor is suspended from the underframing at three points. Three brackets are bolted to the compressor near the top, two on one side and the other on the side opposite. These in turn fit into supports bolted to the car underframing. The motorman's valve is the three section type SV2, which is very readily disassembled without disturbing the air pipes. This valve has a special guard of home manufacture to prevent grease getting on the clothing of passengers while standing on the rear platform. The brake cylinder is 10 in. in diameter. The total weight of the air-brake equipment, including all of the pipes and fittings, is about 1300 lb.

The cars are mounted on Brill 27-GE-1 trucks. The Symington journal boxes are of a type specially designed for the railway, using its standard check plates and bearings. The back of the box is fitted with an M.C.B. wooden dust guard. The journal box lids are of malleable iron. The axles are Cambria heat-treated steel 4½ in. in diameter with 4.885-in. gear seat and 4-in. journals. Solid gears are used and are pressed on with from 45 tons minimum to 60 tons maximum pressure. The wheels are cast iron 33 in. in diameter, made by the National Car Wheel Company. The brake shoes have separable heads and steel backs of the American Electric Railway Association's standard design. The truck brake rigging is for the United Railways & Electric Company's standard slide brake. The approximate weight of the two trucks is 12,700 lb.

ELECTRICAL EQUIPMENT AND LIGHTING

The electrical equipment consists of four GE 200-I motors operated by two K-32-U2 controllers. This motor is lighter in weight compared to those which are in service on other cars of this company's lines and is one of a new line of ventilated commutating pole motors. The motor is rated at 32 hp on 500 volts and 38 hp on 600 volts. Besides the ventilating features, these motors have some additional novelties required by the railway's specifications, the most prominent of which are the field coil terminals, brush-holder design and improved method of lubrication for the axle bearings. The controllers also include some special features, the most important being the rearrangement of the controller connections to prevent excessive burning of controller fingers and segments. Each controller finger also has a renewable copper tip secured with a hexagonal head slotted set screw and lock washer instead of being riveted. At the base of each controller finger is a casting fitted with set screws which comprises the ground terminal. The resistance as furnished consists of two boxes, one containing twenty-eight grids and the other eighteen grids. Fourteen tooth special grade hardened pinions made by the Tool Steel Gear & Pinion Company were used in connection with hardened sixty-nine tooth solid gears made by the same company. Both gear and pinion are 4½ in. in width of face.

The gear cases are of malleable iron. Two standard GE circuit breakers altered to meet the specifications of the railway are a part of this equipment. There are also one GE form A aluminum cell lightning arrester and one choke coil. The cables within the car are placed in a transit-lined cable box running the length of the car. The leads of the cables running to the controller, motor, resistance and ground are placed in conduit, extending below the platform or floor of the car. The complete electrical equipment, including conduit and fittings, weighs approximately 11,000 lb.

The cars have twenty-four 23-watt, 110-volt tungsten lamps, twenty of which are burning at one time. Each platform has two lights on the transverse center of the hood, arranged to burn simultaneously with the front headlight.

The cars have twelve Consolidated heaters, one under each longitudinal seat and one under every other transverse seat. Wires are run in conduit, having a condulet outlet at each heater. In addition to the two wires running to each heater a third wire running to ground is bolted to the iron work of each seat, so that should the insulation break down in any one heater, and therefore short-circuit it, the main heater circuit fuse will blow. Details relating to the electric heater installation under cross-seats and to the heater wiring are shown in two drawings on page 88. The main single-throw double-fuse heater switch is located out on the platform in a metal box. Each heater is protected on top by a No. 16 iron deflector plate lined on the underside with 1/16-in. sheet asbestos. At each intermediate foot a pearl push button is supplied in connection with a Faraday monitor buzzer at each end of the car for passengers' signals. The circuit is operated by a Patterson battery set model B-R-3 (three cells in series). The battery set, which is inclosed in a metal box and placed under one of the longitudinal seats, is kept locked at all times to prevent the stealing of the cells. All wires which form the lighting circuit are placed in grooved moldings.

FARE REGISTRATION, ETC.

Each car is supplied with one International Register Company's automatic coin-counting fare box of a type designed for Baltimore. The registration of fares is supplemented with two International R-7 registers. A register rod, which passes through the car, communicates by a small rod at either end with one of the registers; the standard practice of the railway company is to use the forward register. The fare box is supported near the top of the conductor's door control stand in such a way that when the car is reversed it can readily be lifted off and carried to the control stand on the other platform. The height of this stand above the platform is 4 ft.

The installation of the complete electrical and air-brake equipment was made at the shops of the United Railways & Electric Company. As promptly as the cars were received from the car builder they were turned out fully equipped at the rate of two cars a day. The complete car weighs without passenger load 42,200 lb., or a unit weight of 897.8 lb. per seated passenger. The complete specifications, covering all details in connection with the car body, trucks, electrical and air-brake equipments, were prepared under the direction of A. T. Clark, superintendent rolling stock and shops, subject to the approval of W. A. House, president.

Way Department Rule Book to Promote Standard Practice

In order to put in permanent, ready-reference form rules and instructions for the foremen and promising employees of the way department of the Chicago, Ottawa & Peoria Railway, one of the interurban properties of the McKinley syndicate, W. F. Carr, engineer maintenance of way, has compiled a 200-page illustrated booklet. The scope of the book is rather broad, since the way department supervises track and roadway, bridges and buildings, overhead trolley and transmission lines, as well as the signal system. The foremen and other employees are required to take a written examination every six months to prove their familiarity with the rules applying particularly to their work. After the examination papers have been corrected, the men are drilled on those rules in which they proved weak. Of course, this method of instruction is used on a number of steam railroads, but it has seldom been employed on electric interurban railways.

To give an idea of the scope of this rule book, it may be described as containing definitions of the terms used to designate the work and equipment of the different branches, general rules governing the duties of the department heads and their subordinates, instructions regarding the standards of construction, maintenance and materials for the various parts of the road under the supervision of the several departments. For instance, in the track and roadway division directions are given for maintaining the roadbed, the ditches, bridges and culverts. Specifications for ballast, cross-ties, tie-plates, rails, joints, spikes and the installation of special work are furnished in detail. The rule book also contains instructions for lining, surfacing and gaging track, maintaining and adjusting switch lamps and derails, precautions against the approach of cold weather, interference with signal and interlocking track circuits, fire protection and patrolling the right-of-way. This information is followed by safety precautions regarding hand signals, accident instructions and the proper way to operate hand and push cars.

The data for other branches are of like nature. Standard methods of guy anchoring, cable splicing, tying-in transmission and telephone lines to insulators and overhead line crossings are illustrated. These illustrations are necessarily small but show enough to refresh a man's memory. Full detail drawings to a larger scale also are furnished with the rule book to be retained in the foreman's office.

Although this property has only 106 miles of track, requiring ten track foremen, one bridge and building foreman and one line foreman, it is believed that the rule book represents an economy measure. It assures the engineer of maintenance of way that the foremen have for ready reference rules governing the standards of their work, a practice which has the merit of decreasing correspondence regarding instructions and of holding each foreman to strict account regarding the character of the work.

Chemical Engineering on the Bay State Street Railway

Features of Practice in Connection with the Specification of Materials, Tests and Investigations of the Properties of Supplies—Results of Chemical Analyses Applied to Problems Bearing Upon the Efficiency of Equipment and Proper Use of Materials

Through the courtesy of P. F. Sullivan, president of the Bay State Street Railway, the following account is given of some of the results obtained in turning over the problems of the company in the field of engineering chemistry to an outside organization in which are centralized functions of testing and research outside the scope of the usual transportation company. The relations of the chemist to the electric railway have greatly broadened within the past decade and have been referred to from time to time in these columns. In the ELECTRIC RAILWAY JOURNAL of Nov. 29, 1913, the services engineering chemistry is performing in the field of electric traction were described comprehensively in an abstract of a paper read by Carl F. Woods at a meeting of the New England Street Railway Club. Many of the features of the work outlined by the author applied with particular force to the Bay State company, whose principal chemical problems have been cared for since 1906 by Arthur D. Little, Inc., of Boston, a large organization of chemists and engineers devoted to advisory, research and testing work in industrial chemistry. In subsequent paragraphs some of the detailed results of the services performed for the company are given.

SCOPE OF SERVICE PERFORMED

The Little organization consists of a staff of experts specializing in various branches of chemical engineering and familiar with the problems of various electric railway departments, such as power supply, distribution, line work, maintenance of way, construction and operation of equipment, and the purchase of material and supplies of all kinds. Some of these problems include the selection of fuel and the treatment and testing of water for boiler feeding and other purposes; the study of bonding, investigation of electrolysis, choice of wires and cables, study of insulation, rails, structural material, timber preservation, and the purchase of everything from castings and bearing composition to motors, conduit, paint and varnish. Since the relations between this organization and the company began, the field of service has steadily grown larger, both by reason of the development of the staff organization and its increasing familiarity with the requirements of the company. A point has now been reached where the organization is virtually regarded as a company department, and the standardization of equipment and material which has been accomplished and the framing of scientific specifications brought about through co-operative work has placed the purchase and acceptance of material on a most efficient basis. Not only does the company purchase its material fully as cheaply as before these services were inaugurated, but it has the added advantage of getting entirely satisfactory material with a vast saving in time to the company's officers. All new materials and supplies are submitted to the consulting chemists before being passed upon by the officials of the company; samples of materials purchased in insufficient quantities to justify specifications are tested and reported upon before action is taken by the purchasing department; and the service includes the preparation of numerous special reports upon investigations undertaken on behalf of the railway.

STANDARDIZATION OF SPECIFICATIONS

The preparation and maintenance of specifications is one of the most important features of the work. At the beginning of these relations the railway company had practically no standard specifications, but in the past few years a large number of these have been prepared. These cover almost every variety of material used on the system, and they are filed in loose-leaf books. Before they are finally drafted it is customary to consult with representative manufacturers and to receive their suggestions and comments, every effort being made to formulate final specifications of a common-sense character which are sufficiently inclusive to admit general bidding and at the same time be expressive of the latest practice. So far as possible all specifications are drawn to conform to the published standards of the American Electric Railway Engineering Association, the American Society for Testing Materials, and the American Institute of Electrical Engineers, but they are altered freely, when necessary, to conform to scientific advance or other conditions.

An example of the thoroughness with which the specifications are written is given in the title of a set "Preparation of Cross-arms for Painting." These provide for two coats of the company's standard gray paint. The priming coat is required to be mixed in the proportions of 1 gal. standard paint, 3 qts. of the company's standard raw linseed oil, and 1 qt. of the company's standard turpentine. Another representative specification deals with the application of reinforcing sleeves to iron poles that have been weakened by corrosion near the surface of the ground. The sleeve consists of a standard lap-welded iron pipe 36 in. long, 1 in. greater in inside diameter than the pole exterior diameter, cement being grouted into the space between pole and sleeve and the top calked with lead. Cross-arm braces formerly gave the company trouble through breakage, and analysis showed that poor grades of iron or scrap steel were being supplied. Steel or wrought iron is new specified as the proper material, and this is galvanized before going into service. The company now requires that flat braces shall have a tensile strength between 48,000 lb. and 60,000 lb. per square inch, angle braces ranging from 55,000 lb. to 65,000 lb. To prevent the application of brittle material the company prescribes a cold bending test of 180 deg. around a diameter equal to the thickness of the brace without fracture on the outside of the bent portion, bending by pressure or by light blows. Analyses of sample braces, with this simple physical test, now protect the company from inferior material. Also the specifications for eyebolts in line construction provide that the tensile strength shall be at least 48,000 lb. per square inch, including the strength of the eye, nut and thread, and that the bolt shall bend cold 180 deg. around a diameter equal to its own without outside fracture. As a result of these investigations the company is enabled to buy suitable steel at no greater cost than was charged for the scrap material.

SPECIAL RESEARCHES AND ROUTINE ANALYSES

Examples of the service rendered the company through tests and investigations are indicated by the following points drawn from reports: A certain make of steel track bolt was purchased by the company at an advanced price, with the expectation of improved service. It was found on test that the bolts did not receive proper heat treatment in the mill, and there was a wide variation in physical characteristics. The tensile strength varied as much as 100,000 lb. per square inch for different bolts, with corresponding fluctuations in yield point and elongation. Some of the bolts were so hard that they could hardly be machined. In this case the small tonnage prohibited inspection at the mill and it was essential in this case that each bolt should have satisfactory qualities—not the average of the shipment. In its settlement, the company, on advice of its consulting chemists, paid the price for untreated bolts, of which the new bolts were at least the equal in point of service, and the manufacturer bore the expense of the treatment that had proved unsuccessful.

In another case the chemists recommended the acceptance of rails with a carbon content of from 0.65 per cent to 0.80 per cent instead of from 0.70 per cent to 0.85 per cent as specified by the American Society for Testing Materials, grade B. The reason was that the lower permissible carbon content was offset by nickel and chromium in the steel which was offered.

WIRE AND CABLE TESTS

Two samples of steel binding wire for armatures were tested, the respective diameters being 0.027 in. and 0.045 in. The former had a tensile strength of 268,500 lb. per square inch, and the latter, 314,310 lm., the respective elongation in 10 in. being 1.9 per cent and 1.5 per cent. The laboratory reported that this material did not meet the specifications, as the elongation was less than 2 per cent in 10 in. It pointed out that the determination of elongation on this small wire is difficult, but it was done with great care and in view of the high tensile strength of the wire the chemists were of the opinion that the wire was not of the grade contemplated in the specifications, previous wire having shown an elongation of 3 per cent and 4 per cent, the tensile strength being around 200,000 lb. This was reported a more ductile wire than the former material, and while excessive tensile strength was not objectionable in itself if accompanied by proper ductility, it was very difficult to obtain a wire with great strength which would not tend to be brittle and consequently to cause trouble in use.

A three-conductor, rubber-insulated, armored submarine cable was found to be 1 per cent undersize. This was not serious. The specific gravity of the rubber compound was 1.64 against a requirement of 1.75. This was considered objectionable, not so much in relation to the life of the cable as to the fact that the cable contained less rubber per foot than was specified. Closer adherence to the specifications was recommended. In another case a No. 0000 19-strand, waterproof, rubber-covered cable which was accepted was found to have had but one braid although two were specified. Again, a 13,000-volt paper-insulated cable was found to be 1/32 in. thin in insulation, due to an error in the factory. The discovery of this condition prevented serious trouble.

Some flameproof No. 12 and No. 14 wire was found to have a tensile strength of insulation much below that ordinarily purchased by the railway company, the rubber tearing readily along an apparent seam. The wire was considered capable of giving good service, but acceptance was not advised on competitive bids. An investigation of the deterioration of rubber-covered wire and cable in stock disclosed samples with a marked tendency to open along the seam. The dielectric strength was satisfactory. The investigation confirmed the claims of manufacturers using the strip process in insulation production. In many of the samples the insulation split through at the point of the seam on bending the rubber back upon itself, because the rubber on ageing takes a permanent set, so that any attempt to fold back the rubber on itself brings severe strains on the rubber. The splitting was found to be a condition unlikely to occur in service. The tests showed a reasonable maintenance of electrical qualities in the samples of old cable tested, contradicting the claims of another manufacturer to the effect that a large part of the wire was deteriorating at a dangerous rate in the stock department.

An analysis that was made on resistance wire for car heaters indicated that the material was "Monel" metal, made from a natural alloy of 70 per cent nickel, 1.5 per cent iron and 28.5 per cent copper, well adapted to service as resistance wire, strong and ductile, comparatively free from corrosion. Another test was a comparison of canvas-jacketed wire and weatherproof cable, in the 500,000-circ. mil size. The canvas-jacketed wire resisted abrasion (against an emery wheel at a stated pressure) better than the cable. On account of the tight weave and the hardness of the compound the material wore slowly through but did not rip apart. It was equal to the weatherproof cable on the bending test. The weight per thousand feet was also less with the canvas-jacketed wire. A two-braid canvas jacket was considered equivalent to a three-braid covering of the weatherproof type, but the insulation, like that of weatherproof wire, could not be depended upon after lengthy service, so that a trial installation was advised of the canvas-jacketed wire.

Extended studies of trolley wire have been made for the company, parallel with the investigations of the American Electric Railway Association. It was found that 99 per cent of the breaks occurred at the ear due to stoppage of wave motion at that point. A representative of the consulting chemists rode for many days on the car-top, studying the behavior of the wire in service, and it was found that the breaks could be greatly cut down by purchasing wire under specifications that called for proper strength and ductility. It was found that with frequent feed taps, phosphor bronze trolley wire of 45 per cent conductivity was satisfactory, 60 per cent conductivity wire being used where the feeds were less frequent, and 97 per cent conductivity for country service.

ELECTROLYSIS

In the field of electrolysis an important investigation took place recently which absolved the railway company from responsibility in a neighboring city where an iron gas pipe passing beneath the track developed a leak. The local gas company attributed the leak to stray current from the railway. Surrounding the pipe was found a heavy incrustation, and it developed that the company had made a practice of salting a switch immediately above the pipe. The pipe was found to have a very poor butt-weld. The railway company was called upon to settle for damages. An analysis of the incrustation showed it to be mainly composed of sodium carbonate, the presence of which could only be explained by electrolysis of the salt solution soaking down from the tracks. However, the chemists pointed out that when an electric current passes through a salt solution the chlorine migrates to the positive and the sodium to the negative pole. The chlorine is liberated and corrodes the steel. The sodium when liberated at the negative pole, unites with water to form sodium hydrate, which in turn is finally converted into sodium carbonate. In the case in point the sodium carbonate was found at the pipe or negative pole, which proved at once that current was passing, not from the pipe to the rail, but vice versa, so that the leak had to be attributed to some other cause than to the escape of stray railway currents.

BOILER COMPOUNDS

Analyses of boiler compound were made which showed a composition of 97 per cent water and 3 per cent molasses, costing 50 cents per gallon. In another case a boiler compound was found to contain about 50 per cent of soda ash, 30 per cent of tannin and 20 per cent of water. The compound was capable of removing scale, but it sold for 8 cents per pound, whereas the ingredients could have been purchased at not over 2 cents per pound. Another compound turned out to be a mixture of seaweed pulp and caustic soda. As a result of such investigations the proper chemical treatment of feed water has been standardized, and the company now buys suitable chemicals in bulk, samples being regularly tested at the laboratory.

TIMBER PRESERVATION

Under timber preservation, the chemists have inspected creosoting plants in other states, consulted with the U. S. Forest Service, reported on the large economies offered by the preservation of wood and prepared drawings for a proposed creosoting plant. In a creosote test the oil showed 2.8 per cent more distillation up to 250 deg. Cent. than was specified, and a residue at 360 deg. or about 3.5 per cent in excess of the specifications. The report pointed out that if it had been possible at the time to obtain plenty of oil to meet the exact requirements, it would have been inadvisable to accept the sample offered, but in view of the difficulties existing it was thought best to accept the tender, the oil tested giving fair evidence of its adaptability to the required service.

PAINTS AND LUBRICANTS

The study of paints is another field in which a large amount of work has been done for the railway company. The public demand for clean, well-kept cars necessitated durable colors and long-wearing varnish. Chemical investigations have shown whether the body color is brightened up with an aniline dye which will rapidly fade in service; whether the chrome yellow, supposedly of high grade and imported, is really lead chromate or a mixture of this with clay and barytes; whether the turpentine is produced by steam distillation of gum or is refined kerosene; whether the varnish is composed of pure linseed oil, high-priced gums and turpentine, or is a solution of rosin in cottonseed oil thinned with naphtha. Again, chemical investigation has insured that varnish is not rapidly dulled by washing with cleaning powders that contain free alkali, or by pasting signs on the dasher with paste cut with borax.

As a result of studies of graphite paint under storage, the company was led to specify 15 per cent of graphitic carbon, with an increase of silica, to prevent trouble from the packing down of paint in barrels during extended periods of non-use in which opportunity for settlement occurred. In an analysis of red lead, which contained 67.83 per cent of red lead and 30.1 per cent of litharge, the report pointed out that while the lead was not adulterated with any foreign substance, the large amount of litharge was undesirable. A second sample was sought for analysis before taking final action.

In the same way journal brasses were found to contain 76.85 per cent copper, 11.45 per cent lead, 10.07 per cent tin, 0.75 per cent phosphorus, and 0.3 per cent zinc. Although the brass did not meet the strict requirements, being 0.46 per cent in lead above the specification, acceptance was advised. Another brass analyzed, however, showed 2.6 per cent excess zinc and was rejected for this reason. Wiping solder containing 0.67 per cent antimony, 59.05 per cent lead and 40.28 per cent tin was accepted, as it met the specifications except in impurities, which were 0.17 per cent in excess. A soldering salt containing 0.43 per cent ammonium chloride, 82.61 per cent zinc chloride and 12.70 per cent common salt was rejected on account of the use of common salt instead of ammonium chloride in adequate amount.

Even index cards for office service have been compared at the request of the railway company. The acceptable card was of better stock, containing 80 per cent rag against 20 per cent in the poorer card. The former was very hard, had little flexibility and while no stronger than the poorer card, was better adapted to frequent handling.

The foregoing illustrations represent but a small part of the service rendered the company, but they show how varied the work is and demand a wide range of capacity in the consulting organization. A certain amount of team play is as essential in dealing with the chemical problems of the electric railway as is a staff embracing specialized qualifications. The problems of the railway operator are more and more to be solved by scientific methods, and the increasing interest of public utilities in research and in routine testing and the growing reliance of the storekeeper and the purchasing agent, the executive officer and the engineer upon the findings of the laboratory are evidence of the value of the appeal to physical and chemical analyses, the ultimate object of which is to enable the railway company to give a better service at a reduced cost.

Statistics on Coal and Metal Production in 1914

The United States Geological Survey in the *Press Bulletin* for January, gives interesting statistics covering the production and consumption of coal, lead, copper, zinc, gold and silver in the United States for 1914. The reports covering coal, lead and copper are for the entire country, while those for gold, silver and zinc cover individual states. Thus, in the entire country, there were produced 510,000,000 short tons of coal, which is a decrease of 60,000,000 tons, as compared with 1913. The production of lead was 537,079 short tons, which is nearly 100,000 tons in excess of any previous year. In Arizona, Utah, Montana and Nevada the reports covering gold, silver, copper, lead and zinc showed increases in some and decreases in others, as compared with the 1913 yield.

The Honolulu Rapid Transit & Land Company operates the entire line through the principal streets and suburbs of Honolulu, Hawaii. In the early construction of the line red cedar ties were laid, but since 1903 redwood has been used exclusively after treatment with a preservative, since it was found the redwood decayed quickly unless protected. Red-cedar poles have given satisfaction, a butt preservative treatment being applied. The company also has successfully used Douglas fir paving block in the business district of the city. An extension of the line 4 miles to the United States naval station at Pearl Harbor is contemplated.

COMMUNICATIONS

Teachers and the Industry

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
BOSTON, MASS., Dec. 28, 1914.

To the Editors:

I have been interested in the discussion in your columns, based upon the editorial in your issue of Dec. 5, on "Poisoning the Wells." It seems to me that there can be no just ground for criticism of teachers of engineering and economics making the closest study of the practical difficulties which must be overcome in operating electric railways or other public service plants. Purely theoretical considerations in either engineering or economics are not adequate to enable any man to work out the relationships which should exist between public service companies and the public.

But such relationships can only be worked out by engineers, economists and sociologists who will study the ideal considerations, and who, at the same time, will study the practical limitations under which the ideal considerations must be applied. These practical limitations are mostly determined by the limitations of physical plant but also relate to the limited possibilities of human effort.

I am not sure what the public relations committee of the American Electric Railway Association, to which the editorial refers, may have had in mind, but it may be accepted as an axiom that the study of the operating conditions of actual electric railways by engineers, economists and sociologists who are members of the faculties of our educational institutions will be good for both the public and the companies, but mere social intercourse cannot bring the desired results. That is to say, hard study, performed for the purpose of trying to arrive at all the facts which affect the relations of the public and the public service companies, is the only way to accomplish any desirable result.

DUGALD C. JACKSON,
Professor of Electrical Engineering.

Effects of Incorrect Starting Resistances

BOSTON ELEVATED RAILWAY COMPANY
BOSTON, MASS., Dec. 21, 1914.

To the Editors:

The article by F. Castiglioni in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, page 1382, recalls to the writer an experience of about seven years ago with car starting resistances. These were mentioned in a discussion at the 1907 convention of the American Electric Railway Association and were referred to in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 2, 1907, page 916.

In the early days, and indeed up to the relatively later years of progress in the means and methods of electric traction, the somewhat retarded state of development of the motor and control equipments, coupled with the rapidly increasing duty required of them, brought on numerous operating troubles that kept the maintenance man in "hot water" continually. Not the least of such troubles were the results of an incorrect adjustment of starting rheostats, magnifying as it did an already overloaded condition of the motors, and overbalancing the relation between etching and polishing of the commutator so necessary, especially in motors of the older types, for operation free from flashing troubles.

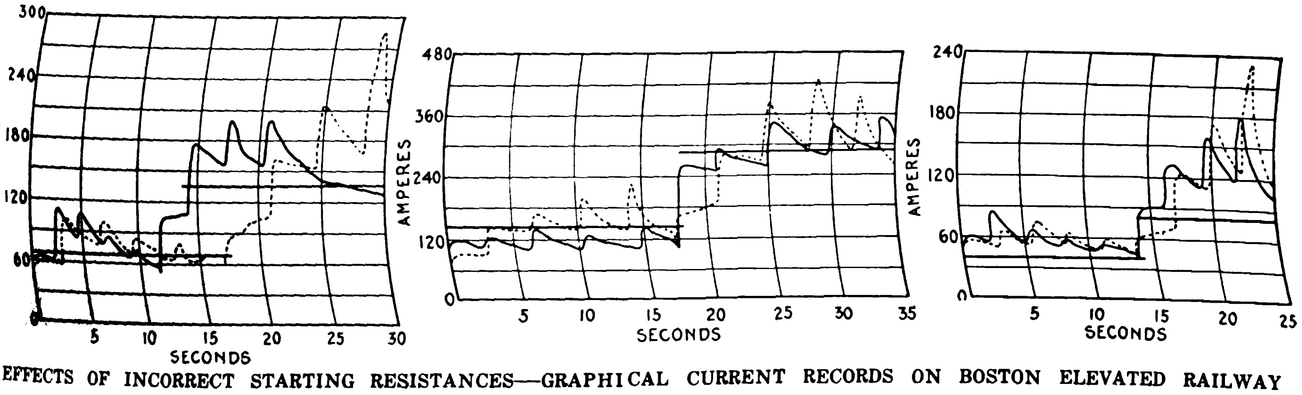
The limitations of the old packed or coiled-ribbon rheostat, after many years of use, were forcibly brought to the attention of the engineers of operating and manufacturing companies, with the result that the present form of cast-grid rheostat was developed and quickly supplanted the older type. The new type, being of the unit form of construction, lent itself most readily to variations in adjustment of steps, and so it came about, especially where the equipment units were divided up and under the charge of a large number of maintenance men, that rather wide divergences from the proper resistance arrangements crept in.

About seven years ago conditions on the surface lines of the Boston Elevated Railway system with respect to motor flashing began to be so severe on the older equipments that, after an investigation, it was decided to inquire thoroughly into the resistance arrangement on each type of equipment, especially as very uneven accelerations were being experienced on some equipment. A graphic ammeter was purchased and used with very interesting results. The corrections which we were able to make in the resistance arrangements through the aid of the records obtained with this device amply repaid the efforts and expense involved, by the great improvement in car acceleration, motor commutation, motor maintenance, etc., that resulted.

Three examples of how we were enabled to smooth out the accelerating current peaks are given by the curves shown herewith. In these the dotted lines show the former current consumption and the solid lines the consumption after revision of the grid connections.

The horizontal heavy lines on these curves in the series and multiple positions refer to the one-hour current ratings of the motors at 500 volts and, taken in connection with the average currents during acceleration, serve in a general way to show the duty on the motor in comparison with its rating.

The first comparison considers a closed car, equipped with two GE-58 motors and K-10 controller, on which the gear ratio had been reduced in order that the car might maintain its place on a route with higher speed motors. It furnishes a marked example of an incorrect resistance arrangement. The current peaks encountered in accelerating on a hill, as this curve shows, were so severe that the rate of acceleration had to be considerably reduced and the time protracted in order to keep the current peaks within the fuse capacity. After the arrangement was changed a reduction on the



EFFECTS OF INCORRECT STARTING RESISTANCES—GRAPHICAL CURRENT RECORDS ON BOSTON ELEVATED RAILWAY last step in multiple from 285 amp to 200 amp, or 30 per cent, was effected and in addition the current in first multiple position was increased.

The second comparison refers to a closed car with a trailer, the motor car being equipped with four GE-70 motors and K-28-A controller with normal gear ratio of 4.06. In this case the high current peak in multiple appeared on the point next to the last. By the change it was considerably reduced, as were also the peaks on the two points on either side of it. Again in the chart a very material increase will be noticed in the current on the first multiple position.

The third comparison is that of the improper and the proper adjustments of rheostat steps for a nine-bench open car with two WP-50 motors and a K-10 controller. The motors on this car had been geared to a higher speed in order to enable them to keep up with a faster schedule and this, with the poor arrangement of resistance, resulted in extremely high current peaks, especially on hills, which this and the other two curves show. It will be seen that in this case, correcting the resistance arrangement has brought the current peak on the last step in multiple down from 232 amp to 180 amp, a reduction of 22.4 per cent. This was largely accomplished by raising the current on the first position in multiple, which it will be noticed has been raised from about 60 amp to 90 amps, an increase of 50 per cent.

The writer remembers one particular case in which the resistance arrangement in use was such that the commutators of the motors rapidly became so bad that the armatures had to be taken out and the commutators sand-papered every two weeks to keep the motors running. After the resistance arrangement had been corrected the motors continued in service indefinitely and the trouble from this cause was entirely eliminated.

JOHN W. CORNING, Electrical Engineer.

Bettering the Use of English

TUFTS COLLEGE ENGINEERING SCHOOL

TUFTS COLLEGE, MASS., Jan. 1, 1915.

To the Editors:

Although it is no longer difficult to find engineers who write notably well, or whose evident desire at least it is to use good English, there are still many in the profession who, if they were to speak frankly, would confess that they do not think the game worth the candle. The grounds on which such writers justify their attitude are almost always the same. May I have space in your columns for a word about each of what I have found to be the four stock excuses?

1. Words, they tell us, at best are poor means of expressing technical ideas. Inevitably the engineer compare verbal language with the mathematical calculations, tables, drawings and graphs of various sorts that he uses, and in contrast with the directness and accuracy of these forms of expression "English" may seem uncertain, coy and hard to please. In such comparison two things may be overlooked. First, ideas expressed in mathematical or graphical forms, and ideas that should be expressed in English are of distinctly different sorts. Second, while the engineer has spent many hours of hard labor learning to use mathematical language, for instance, he has very likely contented himself with such powers of expression in English as he was "born to." Unquestionably all ideas that can be best expressed in mathematical or graphical form should be so expressed, and not in English. But there are ideas that can be adequately expressed only in verbal language. The writer on technical subjects needs first to select carefully the proper form in which to express each idea, then to treat those to be expressed verbally with the same painstaking respect he shows those given the more peculiarly engineering forms. If he is still troubled by limitations, he will find them in his powers of expression rather than in the English language.

2. Others tell us that technical writing is too difficult for the ordinary engineer. Unquestionably it is no easy matter for one who has special knowledge so to put himself in the place of those who have not as to make himself clear. Neither is it easy to reconcile the amount one feels should be said with the inevitable time or space limitations. Yet the problems that arise in these ways are no more serious for engineers than for others; and aside from these difficulties engineering writing is relatively an easy matter, simple and obvious the moment the problems of expression are squarely faced. One who does not believe this needs but to compare the technique of any form of scientific writing with that of poetry, of the short story, or of the drama. Considering that written language is the means by which the engineer markets his most valuable product, is there any greater necessity for a poet to learn to write poetically than for an engineer to master the art of writing accurately and effectively?

3. Most commonly, perhaps, we are told that "any engineer will understand." Perhaps he will; engineers are accustomed to crack hard nuts. But misunderstandings occur more frequently than we like to admit, for engineers, like the rest of us mortals, at times deceive even themselves into thinking they get the meaning, lest they confess themselves to be dull. Even if the reader gets the meaning fully, that is by no means enough. He should not be asked to go back and reread or otherwise to labor over the subject simply because of the inability of the writer to put it, from the start, accurately and clearly. It is much easier to hit at an idea than to work out exact expression, but generally when a writer has taken the pains to find the best way of saying just what he means, he is fully repaid for his efforts in the increased accuracy of his own understanding. Even if it were not so it would be poor economy, in order to save time in composition, to put an unnecessary burden on each individual one of his readers. The subject on which one is writing may be itself difficult for the reader to understand, just as a complicated piece of machinery may be difficult to learn to operate; but the writer is no more justified than the manufacturer in putting his product on the market in such shape that it has to be reconstructed in order to be mastered.

4. In the last place, a variety of misuses have been allowed to pass current in technical writing for the reason that it has been assumed that engineers do not care for style. Similarly, business men used to fill their letters with unwarranted abbreviations, ellipses of words grammatically necessary, and incomplete or wobbly-constructed sentences, and glory in these things because they thought them to express that distinctly American quality of "snappiness." But what was rugged strength in a frontier country becomes mere boorishness in a more highly-developed community. In these days the best concerns send out letters that bespeak business firmly enough established to do whatever is undertaken in the best form. The rapid advance this country is making is nowhere more notable than in the more perfect finish of the material output of American engineers. Should any engineer be satisfied at present with a shirt-sleeves style of writing?

The general problem of bettering our American use of English is serious. Our schools grasp at the shadow of the latest fads and lose the substance; they have confused work and play till often athletics is the only thing eagerly entered into, the one thing efficiently managed. The literature read by the largest number of our people takes its chief delight in the vulgar and in the abuse of slang which parades vain repetition to cover absence of thought. Everywhere there is need for a strong stand for good English. The familiar words of Henry of Navarre are to the point: "Go hang yourself, brave Crillon. We have fought at Arles and you of all men were not there!" The fight for accurate thinking, for exact and adequate expression is a strong man's battle. To whom should it be a greater reproach than to an engineer if we could say, "And you of all men were not there!"

Samuel C. Earle,
Professor of English and Modern Languages.

General Crop and Business Conditions

In Spite of the European War a Steady Improvement Is Expected

The committee on statistics and standards of the Chamber of Commerce of the United States of America has just issued a report on "General Crop and Business Conditions, as of Dec. 12, 1914." The report contains a map giving graphic illustration of conditions in the various industries and of the prospects for business during the first three months of 1915. This map is reproduced in the accompanying form, together with a few notes from the report, for the reason that the financial condition of electric railways is so intimately connected with the general prosperity of the communities served.

While acknowledging the widespread and depressing effects of the European war on industrial and commercial conditions, the report is generally reassuring. Conditions in the South, while slowly improving, still present a serious problem. Elsewhere the feeling gathers strength that a steadily improving future is immediately ahead. Crops in general have been good. The entire wheat crop shows an increase of 12½ per cent over that of last year. Some sections are planting winter wheat for the first time, and if the war continues until spring, the acreage planted in grains will exceed that of all former years. The sugar cane crop promises to be a good one and to command remunerative prices. The fruit yield was unusually large, but a large portion is being held in many localities as prices have been low.

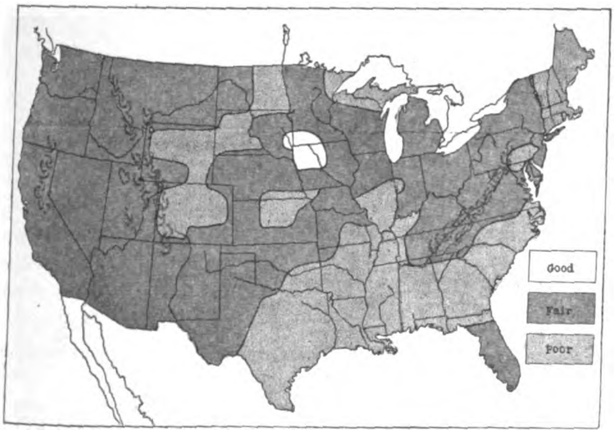


CHART FORECASTING GENERAL UNITED STATES BUSINESS CONDITIONS FOR FIRST THREE MONTHS OF 1915, BASED ON REPORTS OF DEC. 12, 1914

The cattle business is confronted by a serious handicap in the fact that there is great difficulty in obtaining loans on cattle. The industry is further unfavorably affected in the Central West, owing to the quarantine resulting from the foot and mouth disease. The sheep and wool industry is reported as in excellent shape. Large purchases of horses at good prices have been made by European governments.

Many factories which have been idle are preparing to start up and more men are being taken on by factories which have been running with decreased forces. The flour mills have been fortunate in being affected only slightly by the general depression. Some cotton and textile mills are also favored to a lesser extent in this connection, although cotton mills, while fairly busy, are said to be accumulating goods.

General mining conditions are poor. This is especially true of the phospate mines of Florida, which formerly shipped most of their product to Europe. Many mines are closed down and the remainder running from one-quarter to one-half time. Exceptions to this general depression are zinc and lead. The oil business varies from poor to fair because of low prices and the falling off in demand. The lack of building has caused many lumber mills to close down and others to run only two to four days a week, and has likewise closed many of the stone, slate and marble quarries. These conditions, however, are now beginning to mend and orders are showing some increases.

Subway Accident

The most complete tie-up in the history of the New York subway occurred at 8 o'clock on the morning of Jan. 6. It lasted until 4 p. m. when partial service was recommenced, the full service not being restored until the early morning hours of the next day. The accident was caused primarily by a short-circuit in the Interborough Rapid Transit Company's high-tension cables laid along the south side of Fifty-third Street at the point where they cross the subway tracks under Broadway. The dense smoke from the resulting fire in the cable manholes alongside of the tubes made its way into the subway and caused a serious panic, together with many cases of partial suffocation in three south-bound trains which had been stalled through lack of power just north of the blaze. One woman passenger died on the way to the hospital.

Near the point where these trains became stalled is a ventilating opening, and through this most of the trapped passengers were carried to the surface by the city firemen. The latter were called to the scene of the accident one hour and fifteen minutes after the short-circuit occurred.

Power at reduced voltage was supplied to outlying sections of the line for about half an hour after the first short-circuit, and then all power went off. This indicates the gradual progress of the fire in the cable manholes, the latter communicating with the subway tube by means of steel doors which were insufficient to keep the smoke from the burning insulation out of the subway. The final cutting off of all power put out the emergency lights that are mounted on the subway walls, although these are supplied from a circuit separate from that supplying propulsion current. All of the cars in the subway are equipped with emergency lights operated by storage battery. These were thrown in circuit in the cars stalled at Fifty-third Street and assisted the egress of passengers. Investigations into the causes of the accident have been begun both by the District Attorney's office and by the Public Service Commission, First District.

A student branch of the American Institute of Electrical Engineers was inaugurated at the West Virginia University, Morgantown, W. Va., on the evening of Jan. 7. The exercises consisted in a demonstration of the electromechanical equipment of the Engineering Building and an address by V. Karapetoff on "Some Recent Developments in the Field of Electricity." W. E. Dickinson, professor of electrical engineering, is in charge of the branch.

Census Report on Electric Railways

Statistics on the Development of the Industry Are Given—There Was a Decrease of 10 Per Cent in the Number of Railways Generating Their Own Power—Track Statistics

Statistics of the electric railways in the country for the forthcoming census report were obtained by the Census Bureau, Department of Commerce, for 1912. This census was taken in accordance with the policy of the bureau to make a five-year census of the industry, the two preceding counts having been made in 1907 and 1902. Since the last census was taken the bureau has been compiling and analyzing the figures, and its report will soon be published. Through the courtesy of the bureau some advance figures from the forthcoming report are presented, the statistics being subject to some slight changes and corrections by the bureau if found necessary upon revision. The figures represent all railways, other than steam roads in operation, during any portion of 1912 in continental United States. The canvass did not cover Alaska or the insular possessions.

In 1912 there were 21 cable roads, 13 using cable exclusively and 8 cable in conjunction with other powers. Of the 13 exclusively cable roads, 2 were street railway lines in San Francisco; the others were inclined plane roads in different parts of the country. There are only 9 lines using animal power exclusively. The longest has but 3 miles of track.

Statistics of the electrified steam roads are not included in the general statistics for electric railways. The statistics also exclude those of the Chicago Tunnel Company, a narrow-gage electric tunnel mining line at Bingham, and a short electric road owned by the state of North Dakota. The latter is the only line owned by any state. During 1912 the only lines owned by municipalities were one in Monroe, La., and one in San Francisco. The latter went into operation just before the close of 1912.

Where a railway company was engaged in other business and it was possible to separate the results of operation, this plan was followed. A notable case where it was not possible to do this was in the case of the Hudson & Manhattan Railroad, which owns the Hudson Terminal Buildings.

The reports as a rule are for the calendar year. This was the case with 817 of the 975 operating companies; 114 were for the year ended June 30, 1912. It was impossible to draw any sharp line of demarkation between the urban and interurban roads. For this reason while track has been divided into "city and suburban" or "interurban," no attempt has been made to classify the traffic under these divisions.

DEVELOPMENT OF THE INDUSTRY

Electric power is used on 99.7 per cent of the total trackage. There has been a large increase in horsepower capacity during the year. In 1907 there was 6,618,011 hp and in 1912 11,903,699 hp, or an increase of 69.1 per cent. In 1912 the horsepower of steam engines and steam turbines was 8,116,086; of gas and oil engines, 135,225; water power, 2,942,388. The kilowatt-hours generated during the year were 17,585,662,014, or an increase of 65.4 per cent over 1907. The miles of track were 41,064 as compared with 34,381 in 1907. The employees were 282,461 as compared with 221,429 in 1907, and the number of passenger cars were 76,162 as compared with 70,016 in 1907. Some other general figures made up from the first report issued by the census were published in the issue of this paper for March 21, 1914.

The bureau reports that the number of revenue passengers carried per mile of track indicates a steady increase in density of traffic, being 232,556 in 1912, 216,522 in 1907 and 212,258 in 1902. The expenditure for power purchased almost doubled, being $24,546,530 in 1912 and $12,342,258 in 1907. The income per pas-

TABLE I—INCOME AND EXPENSE PER REVENUE PASSENGER

	1912 Cents	1907 Cents	1902 Cents
Gross income	6.14	5.78	5.25
Transportation revenue	5.45	5.25	4.95
Passenger revenue	5.27	5.14	4.90
Other transportation revenue	0.18	0.11	0.05
Nontransportation income	0.69	0.53	0.30
Operating expenses	3.49	3.38	2.98
Gross income less operating expenses	2.65	2.40	2.27
Deductions from income	2.00	1.86	1.63
Net income	0.65	0.54	0.64

TABLE II—TEN LONGEST ELECTRIC RAILWAY SYSTEMS

	Miles of Line	Miles of Track
Bay State Street Railway, Massachusetts	754.73	941.79
Ohio Electric Railway, Ohio	601.00	669.10
The Connecticut Company, Connecticut	592.80	803.09
Pacific Electric Company, California	552.48	970.80
Public Service Railway, New Jersey	484.90	809.50
Philadelphia Rapid Transit Company, Pennsylvania	436.62	649.72
New York State Railways	337.05	576.95
Pittsburgh Railways, Pennsylvania	334.58	594.30
Chicago Railways, Illinois	244.00	515.00
Boston Elevated Railway, Massachusetts	237.78	500.52

TABLE III—RELATION OF TRAFFIC TO POPULATION, BY GEOGRAPHIC DIVISIONS: 1890 TO 1912

Division	Census	Average number of revenue passengers per inhabitant: Total Population	Urban Population	Increase since prior census: Total Population	Urban Population
United States	1912	100	252	15	8
	1907	85	244	25	68
	1902	61	176	28	67
	1890	32	109	..	..
Geographic Divisions:					
New England	1912	155	226	16	8
	1907	139	218	28	40
	1902	111	178	67	96
	1890	44	82	..	..
Middle Atlantic	1912	174	271	18	14
	1907	156	257	35	52
	1902	121	205	48	66
	1890	73	139	..	..
East North Central	1912	115	250	24	15
	1907	91	235	31	84
	1902	60	151	33	60
	1890	27	91	..	..
West North Central	1912	66	249	11	10
	1907	55	239	22	84
	1902	33	155	14	58
	1890	19	97	..	..
South Atlantic	1912	49	237	7	5
	1907	42	232	15	73
	1902	27	159	16	88
	1890	11	71	..	..
East South Central	1912	31	215	4	*
	1907	27	233	12	93
	1902	15	140	7	54
	1890	8	86	..	..
West South Central	1912	29	177	5	*
	1907	24	193	11	80
	1902	13	113	3	29
	1890	10	84	..	..
Mountain	1912	54	215	6	*
	1907	48	239	15	82
	1902	33	157	11	51
	1890	22	106	..	..
Pacific	1912	158	309	26	*
	1907	132	320	45	98
	1902	87	222	25	43
	1890	62	179	..	..

*Decrease in average number.

senger has also shows an increase, as indicated in Table I.

The average operating company had 52.12 miles of track and 78 cars. It operated 1,938,202 passenger-car-miles, carried 9,810,436 passengers and employed 290 men. Of 975 operating companies, 406 operated less than 10 miles of track, 421 more than 10 and less than 50 miles of track; 89 more than 50 and less than 100 miles, and 59 companies operated 100 miles or more. Table II shows the ten railway companies reporting the greatest mileage for 1912, ranked according to length of line.

TABLE IV—PER CENT DISTRIBUTION OF INCOME BETWEEN EXPENSES AND INVESTED CAPITAL

	1912	1907	1902	1890
Gross income of operating companies	100.0	100.0	100.0	100.0
Expenses other than interest and rentals	65.1	61.6	62.4	72.5
Operating expense	56.8	58.5	56.8	67.6
Other expenses	8.3	6.1	5.6	4.9
Returns on invested capital	33.1	32.2	31.7	22.7
As interest on funded and floating debt and mortgages	16.7	14.8	15.2	8.8
As rent of leased lines and terminals	7.6	11.2	10.2	2.8
As dividends	8.8	6.2	6.3	11.1
Surplus	1.8	3.2	5.9	4.8

TABLE V—TRACK MILEAGE, CLASSIFIED BY CHARACTER OF MOTIVE POWER, OWNERSHIP, AND LOCATION

Kind	1912	1907	1902	PER CENT OF INCREASE[1] 1907–1912	1902–1907
Total	41,064.82	34,403.56	22,572.52	19.4	52.4
Main track	38,333.62	32,485.87	21,681.94	18.0	49.8
Road or first track	30,437.86	25,547.19	16,651.58	19.1	53.4
Second (including third, etc.) tracks	7,895.76	6,938.68	5,030.36	13.8	37.9
Sidings and turnouts, including track in car barns, storage yards, etc	2,731.20	1,917.69	907.53	42.4	111.3
Classification					
By character of motive power:					
Electric	40,808.39	34,059.69	21,901.53	19.8	55.
Electric line transmission	40,704.91	34,034.19	21,899.06	19.6	55.5
Overhead trolley	38,958.06	32,501.71	21,290.09	19.9	52.4
Third rail	1,395.13	1,209.78	342.91	15.3	252.7
Conduit trolley	351.72	322.70	266.06	9.0	21.8
Gas-electric motors	38.81	22.50	....	72.5	3
Storage batteries	64.67	3.00	2.47	....	....
Cable	56.41	61.71	249.69	−8.6	−74.
Animal	57.52	136.11	259.10	−57.7	−47.4
Steam	76.34	105.06	169.61	−27.3	−38.5
Gasoline motors	66.16	40.99	26.06	61.4	1
By ownership:					
Owned	33,416.86	27,458.97	19,038.98	21.7	44.
Leased[3]	7,647.96	6,922.54	3,534.78	10.5	95.2 8
Operated under trackage rights	1,284.82	692.28	559.68	85.6	23. 7
From electric railway companies	1,051.19	692.28	559.68	51.8	23.
From steam roads[4]	233.63	(5)	(5)	....	7
By location:					
(a) Surface	40,532.02	33,966.40	22,263.58	19.3	52.
Elevated	420.10	366.59	308.94	14.6	18.6
Subways and tunnels	112.70	70.57	(6)	59.7	7
(b) On public thoroughfares	26,271.10	23,431.72	18,774.92	12.1	24.8
On private right of way	14,793.72	10,971.84	3,802.07	34.8	188.6
(c) City and suburban lines	24,699.02	(7)	(7)	....	....
Interurban lines	16,365.80	(7)	(7)	....	....

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[1] A minus sign (−) denotes decrease.
[2] Compressed air.
[3] Includes trackage rights from steam roads.
[4] Included under "Leased track."
[5] Figures not available.
[6] Figures not available; included under "Surface."
[7] Reported in 1907 and 1902 as within and without city limits; figures not comparable.

TABLE VI—PER CENT DISTRIBUTION OF MILES OF TRACK, ACCORDING TO LOCATION

Division	ON PUBLIC THOROUGHFARES 1912	1907	1902	ON PRIVATE RIGHTS OF WAY 1912	1907	1902
United States	64.0	68.1	83.2	36.0	31.9	16.8
New England	83.4	88.3	90.9	16.6	11.7	9.1
Middle Atlantic	66.3	68.9	84.7	33.7	31.1	15.3
East North Central	52.4	55.3	76.6	47.6	44.7	23.4
West North Central	70.0	73.6	86.4	30.0	26.4	13.6
South Atlantic	65.6	67.1	73.1	34.4	32.9	26.9
East South Central	73.1	76.8	84.3	26.9	23.2	15.7
West South Central	73.9	88.3	89.3	26.1	11.7	10.7
Mountain	67.8	81.2	94.5	32.2	18.8	5.5
Pacific	54.0	61.8	84.6	46.0	38.2	15.4

Table III shows the average number of revenue passengers per inhabitant, the urban population being based on the population of cities of 8000 and more, including New England towns.

In the analysis of gross income there has been a notable increase in "operating income other than passenger," due to the growth of freight, mail and express business and the sale of current. In 1907 the passenger business amounted to 91.4 per cent of the total but in 1912 the percentage was only 88.6. Table IV shows the percentage of distribution of the income between expenses and invested capital.

POWER EQUIPMENT

In 1912 50.8 per cent of the railways had their own power plant equipment as compared with 61 per cent in 1907. The average capacity per unit for steam engines increased from 602 hp to 947 hp and of turbines from 2125 hp to 3166 hp between 1907 and 1912. Of the total power capacity of generators those supplying alternating current increased from 45.4 per cent to 69.3 per cent, but those supplying direct current decreased from 54.6 per cent to 30.7 per cent. Statistics based on companies which neither bought nor sold electrical energy show a kilowatt-hour consumption per car-mile in 1912 of 3.80 as compared with 3.26 in 1907, and a cost of generation per kilowatt-hour of 0.55 cent in 1912 as compared with 0.65 cent in 1907.

TRACK

Table V gives statistics of the track classified by character of motive power, ownership and location. Of this track 95.5 per cent was operated by overhead trolley, 3.3 per cent by third-rail, 0.9 per cent by conduit trolley, 0.2 per cent by storage batteries and 0.1 per cent by gas-electric motors.

In addition to the figures given in Table V, 1284 miles were operated by the electrified divisions of the steam railroads. Of these 669 miles were operated by overhead trolley and 515 miles by third-rail. Table VI shows the percentage distribution of miles of track according to location.

Abstracts of other statistics for the census reports will be published in later issues.

Address on Safety Work

In an address before the Louisville Commercial Club recently, Frederick H. Elliott, secretary of the Safety First Society of New York, made some interesting comments regarding the elimination of the accident hazard in street traffic. He described the efforts of the society to secure legislation prohibiting the crossing of streets by pedestrians except at intersections, explaining that most accidents are caused by attempts to cross in the middle of the block. He approved the plan of "safety zones" recently adopted in Louisville and described in the ELECTRIC RAILWAY JOURNAL. He favored the pay-as-you-leave system, saying that the plan which is in use in Cleveland had expedited street railway traffic 20 per cent.

The Commercial Club of Columbia, Mo., received recently a letter from William B. McKinley, president of the Illinois Traction System, as a result of which the members have expressed their purpose to help in the repeal of a Missouri law limiting the ownership by foreign corporations of stock in Missouri concerns. The letter stated that this law was the most effective barrier against the development of interurbans.

Moving Picture Films in Safety Education

The Public Service Railway is Using Original Films in Training Employees and the Public

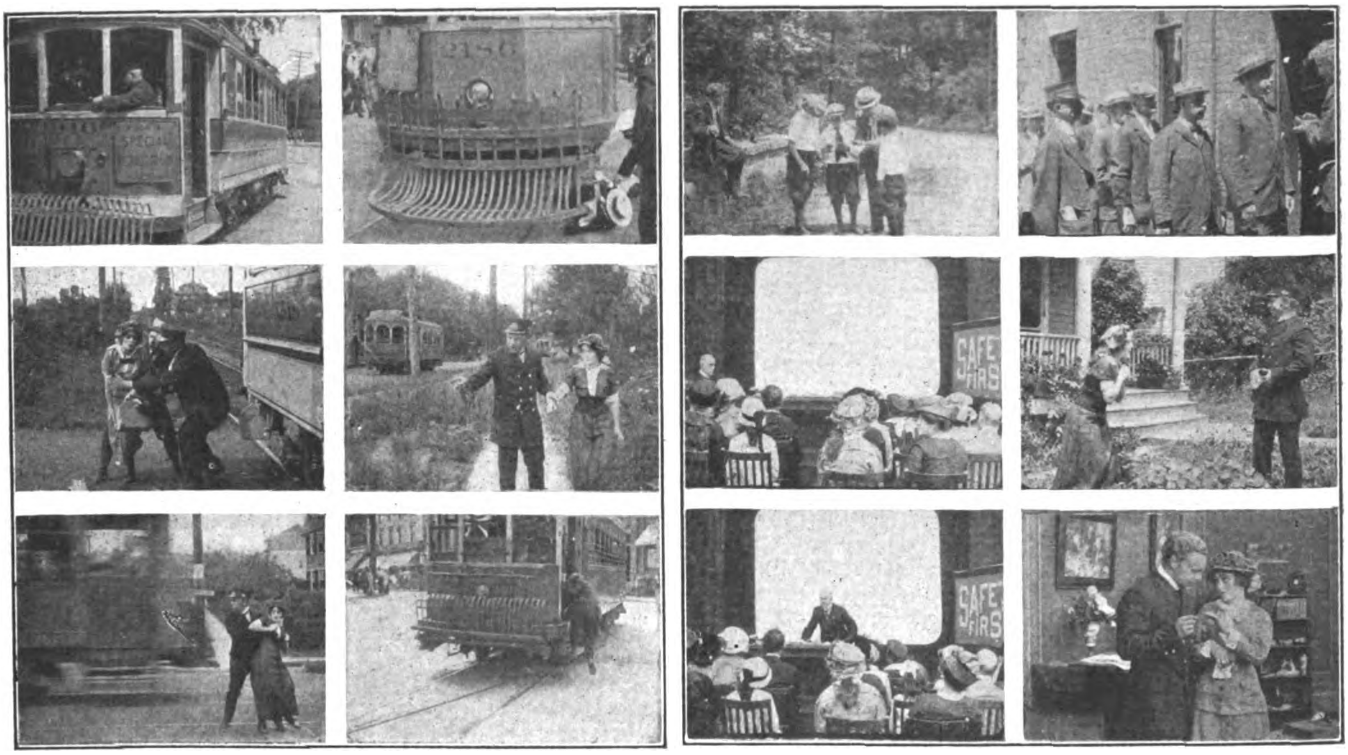
In the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 19, 1914, on page 523, mention was made of the new reels of moving picture film which have just recently been made by the Edison Company for and in co-operation with the Public Service Company of New Jersey. These films were shown at the close of the first regular meeting for the season of the Public Service Company section of the American Electric Railway Association and at the Atlantic City convention also.

The films were designed for use in an educational campaign which the company has been conducting in connection with the "safety first" movement. The Public Service Company was one of the first, if not the first, of the Eastern street railway companies to take up the "safety first" idea in a comprehensive and systematic manner. For about two years it has maintained a department for the education of its trainmen and of the public at large along lines that tend to the elimination of preventable accidents and the conservation of life and limb.

An effective part of the work accomplished by the company has been through the medium of lecturers who discuss safety measures in the public schools and before civic and church societies. The talks of the lecturers are illustrated with stereopticon views and motion pictures. The latter have been found to be far the more popular, and taking advantage of the possibilities thus opened up the railway people engaged the Edison Company of New York to stage a series of "accidents" and incidents which would bring home the "safety first" idea, in a graphic manner, to young and old alike. The character of the reels may be gleaned from their titles, "The Life of a Motorman" and "How Most Accidents Occur."

The first-named reel is of particular interest to trainmen and also has points of appeal to the public. It portrays the life of a motorman from his application for a job, through the phases of instruction until he is put in charge of a car. The other reel shows boarding and leaving accidents, mishaps due to disregard of traffic regulations, and the price paid by the thoughtless who jump on or off moving cars or cross in front of speeding vehicles without looking where they are going.

The pictures are unusually faithful as to detail and teach a powerful lesson. The Public Service Company controls the films and, as its problems are duplicated on every large railway system, it is ready to co-operate with other companies in arranging for the showing of the pictures wherever they may be of service in the promotion of safety.



MOTION PICTURES IN SAFETY EDUCATION—SCENES SELECTED AT RANDOM FROM THE PUBLIC SERVICE RAILWAY FILMS

Influence of Titanium on Segregation

According to a recent article by F. A. J. FitzGerald in *Metallurgical and Chemical Engineering*, a recent examination of data from reports on 155 heats of rail steel, of which about one-half were titanium-treated, showed that there was comparatively little difference between the carbon contents of the rail-head and of the web in the treated rails. In the untreated rails, however, no less than 64 per cent of the heats showed an excess of carbon in the web amounting to more than 12 per cent over that in the head. This difference of 12 per cent was suggested as a limit above which rails should be rejected on account of segregation, when applied to "A" rails, or those taken from the heads of the ingots after a 9 per cent crop. With seventy-seven heats of titanium-treated rail it was found that 87 per cent would fall within the 12 per cent limit.

A more detailed examination of the seventy-seven heats in which titanium was used clearly showed the influence the amount of titanium added has on the results. According to the advice of the Titanium Alloy Manufacturing Company the amount of ferro-carbon-titanium used should be such that the quantity of metallic titanium added to the steel is 0.10 per cent. This, however, was not followed, as in some heats only 0.075 per cent was added and in some as little as 0.053 per cent. The following table shows the effect of the amount of titanium added:

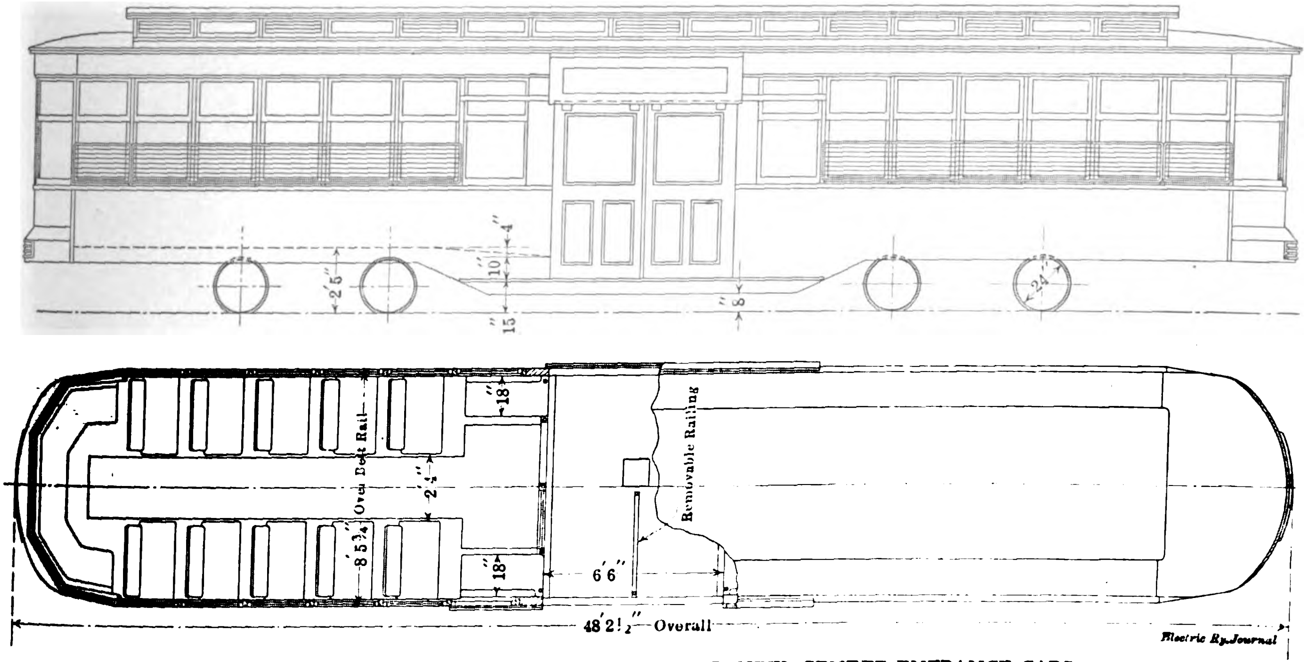
Titanium added, Per cent	Total heats	Heats within 12 per cent limit Number	Per cent
0	78	28	36
0.053	7	3	43
0.077	39	33	84
0.10	31	31	100

This seems to show that in order to get the best results at least 0.10 per cent of metallic titanium should be added to the rail steel.

Boston Elevated Center-Entrance Trailer

This Car Contains Several New Features, and was Designed Specially for Service During Rush Hours

A new type of rolling stock will shortly be placed in service by the Boston Elevated Railway in the shape of 100 center-entrance surface trail cars, largely for use in rush hours. The design of such large trailers for city service is unusual, although the utilization of existing equipment in handling peak-load traffic on the trailer plan is common to many companies and was tried experimentally by the Boston company a number of years ago. The decision to add specially designed trailers to the present motor-car equipment was reached a short time ago, following conferences with the Massachusetts Public Service Commission and after an investigation of the feasibility of utilizing this class of rolling stock in Boston. The board has given its approval to the general design illustrated herewith.



BOSTON TRAILERS—PLAN AND ELEVATION OF NEW CENTER-ENTRANCE CARS

The center-entrance feature will consist of a well extending across the car for the full width of the door openings, the floor being 15 in. above the rail and being connected with the floor of the car body proper by ramps which have a rise of 4 in. in a length of 4 ft. The low-step feature and central compartment will be similar in appearance to the design used in the articulated cars now in service at Boston. No end or vestibule doors are to be provided. The cars will have straight sides from sill to window rail, but the sides will be tapered toward the center of the car from window rail to eaves. The entire underframe will be of steel, the posts and siding being of composite construction. The roof is to be of wood supported at the well by stanchions and at the ends of the monitor by headers, with a steel truss between stanchions and headers. The end construction is to be reinforced to resist crushing in case of collision.

The general dimensions of the cars are given in the following table:

Length over bumpers	48 ft. 2½ in.
Length over end posts	46 ft. 10 in.
Distance center to center of bolsters	24 ft. 0 in.
Width over eaves, lower deck	8 ft. 0½ in.
Width over eaves, upper deck	5 ft. 5¾ in.
Width over window rails	8 ft. 5¾ in.
Width inside at seats	8 ft. 2¼ in.
Width of aisle	2 ft. 4 in.
Height from rail to top of roof	10 ft. 11⅜ in.
Height from rail to car eaves	9 ft. 5⅞ in.
Height from rail to top of floor	2 ft. 5 in.
Height from rail to floor of well	15 in.

Safety treads are to be provided between stanchions on the car floor and they will extend the full width of the door opening, 6 ft. 6 in. The cars will be equipped with air brakes, and double sliding doors pneumatically operated, and two illuminated signs, one over each side door, will be provided. The interior finish will be of mahogany and each car will be equipped with fourteen Perry ventilators. There are to be ten cross-seats and two longitudinal seats on each side of the car, stationary end seats also being planned as shown. There are to be twenty-eight cross-seat heaters and four panel heaters per car, the latter being placed in risers from the well to the main floor of the car. A removable railing of white enameled wrought-iron pipe is to extend from the permanent stanchion at the center of the door opening toward the center of the car. Wiring will be in conduit, with heater switch cabinets under the longitudinal seats. The Consolidated push-button signal system will be installed. The upper deck will have no headlining, but the lower deck will be lined with 3/16 in. agasote.

Out of the 1000 or more employees of the Insull traction lines of the Middle West Public Utilities who competed in the contest to suggest the best "safety first" design for use in the company's campaign to reduce accidents, Herbert Hobsom, of Jeffersonville, motorman on the city line of the Louisville & Southern Indiana Traction Company, has won the second prize, which is $15. His design was in the form of a circle, in the outer ring of which appears the words, "In Time of Safety Prepare for Accidents." In the center was a design fashioned like the dial of a clock with the letters in "Safety First" being distributed around the edge of the dial as on the face of a watch.

American Association News

Biographical Sketches of the Officers of Two Company Sections Are Given—Program for Mid-Winter Meeting Is Being Completed—Activities of Various Committees—Coming Committee Meetings

PUBLIC SERVICE RAILWAY COMPANY SECTION OFFICERS

P. F. Maguire, who was recently elected president of company section No. 2, has been active in company section work for several years, having served on a number of important committees. He has had a varied experience in electric railway work, having entered the employ of the Plainfield (N. J.) Street Railway as conductor in December, 1896. After three years' service he was appointed an inspector and four years later was made assistant division superintendent of the E. T. & C. J. Division. One year later he was promoted to the position of division superintendent. In April, 1906, Mr. Maguire entered the employ of the maintenance of way department of the Public Service Railway Company, Newark, N. J., where, after three years' service, he was appointed executive clerk, which position he still holds. Mr. Maguire has taken up his duties with energy and enthusiasm, and he had the encouraging and record-breaking attendance of 418 persons at his first meeting. In addition to his electric railway association interests Mr. Maguire is a member of the New York Railroad Club.

P. F. MAGUIRE
President Public Service Company Section

A. T. WARNER
Secretary Public Service Company Section

W. W. COOK
President Milwaukee Company Section

H. G. ABENDROTH
Secretary Milwaukee Company Section

The secretary of the Public Service Railway Company Section is A. T. Warner, who is also secretary of the Public Service Railway Athletic Association. Mr. Warner graduated from Lafayette College in June, 1910, as an electrical engineer and immediately thereafter entered the employ of the Public Service Railway as a cadet engineer. He completed the two-year course which is laid out by the company for the purpose of training young men for service in the department for which they are best fitted, and was in due course assigned to work as traffic investigator in the transportation department in 1912 and still holds that position.

OFFICERS OF THE MILWAUKEE COMPANY SECTION

W. W. Cook, who was recently elected president of The Milwaukee Electric Railway & Light Company Section, is thirty-three years of age. He was a Connecticut boy, but began his electric railway career at the age of twenty-three with the Manhattan Elevated Railway Company in New York City, serving in various capacities until he resigned in 1906 to become instructor of motormen for the Long Island Railroad. He did this at the time of the installation of the third-rail system on that company's branch operating between Brooklyn and Jamaica and Rockaway Beach, L. I. In 1907 Mr. Cook was promoted to the position of foreman of repair shop of the same company, being located at Morris Park, L. I. He resigned this position in 1909 preparatory to becoming master mechanic of the Eastern Division of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., operating an interurban line between Indianapolis and Dayton and the street railway lines in Richmond and Newcastle, Ind. He severed his connection with this company in 1912 to become general foreman of shops and production with The Milwaukee Electric Railway & Light Company.

The secretary of The Milwaukee Electric Railway & Light Company section, H. G. Abendroth, achieved fame last year by winning the medal for the best paper delivered before a company section during the association year 1913-1914. As will be remembered the title of this paper was "Overhead Charges in Valuation." Mr. Abendroth was a Milwaukee boy, receiving his primary education in schools of that city. He graduated from the University of Wisconsin with the degree of Bachelor of Arts in 1911. Like many graduates of the university he secured practical experience with the Railroad Commission of Wisconsin, serving in the statistical department from September, 1911, to June, 1913. At the latter time he joined the accounting force of The Milwaukee Electric Railway & Light Company and has since been a member of the valuation staff.

MID-WINTER CONFERENCE AND ANNUAL ASSOCIATION DINNER IN WASHINGTON

The program is rapidly assuming its final form. President Woodrow Wilson has agreed to take part in the program and Andrew J. Montague, representing the third district of Virginia and formerly governor of that state, will address the associations. As previously announced, Timothy S. Williams, president Brooklyn Rapid Transit Company will speak upon the Code of Principles.

As this issue of the ELECTRIC RAILWAY JOURNAL goes to press the details of President Wilson's participation in the program have not been definitely settled, but he has agreed to speak either at the conference or at the dinner. At least one other prominent government official will also speak. It is expected that this will be determined on Monday.

An important feature of the dinner will be the announcement of the names of the company and individual winners of the Brady medals. While the detailed announcements and the distribution of the committee report will be deferred until a short time later it has been considered fitting that the first statement should be made to the Railway Association at this time. The announcement of the winners will be made by a prominent representative of the American Museum of Safety.

President E. H. Baker of the Manufacturers' Association, has sent letters to all members urging the attendance of executives and other representatives of member companies. Secretary H. G. McConnaughy has sent out application forms for use in making dinner reservations. The dinner will be held in the grand ballroom of the New Willard Hotel, at 7 p. m., Friday, Jan. 29. The tables will seat eight each. The price of the dinner will be $10 per plate.

MEETING OF AMERICAN ASSOCIATION EDUCATIONAL COMMITTEE

This committee met on Jan. 4 in New York with the following in attendance: H. A. Bullock, secretary New York Municipal Railway Corporation; A. M. Buck, railway electrical engineering department University of Illinois; V. Karapetoff, electrical engineering department Cornell University, and H. H. Norris, associate editor, ELECTRIC RAILWAY JOURNAL, chairman. A representative of the International Correspondence Schools was also in attendance by invitation. The committee went over plans for co-operating with the schools in carrying on the courses of instruction outlined in the committee's Atlantic City report. The schools reported that students are already enrolling in the new courses. The committee particularly discussed plans for familiarizing the students with parts of the engineering manual of the association. A study was also made of the ways in which the American Association committee can cooperate with the corresponding committees of the affiliated associations.

JOINT COMMITTEE ON BLOCK SIGNALS

In the list of appointments to sub-committees of the joint committee on block signals for electric railways, printed in the issue for Dec. 12, the names of G. N. Brown and C. H. Morrison were given as those of the sub-committee to consider the A. I. E. E. standardization rules. The sub-committee consists of G. N. Brown and J. M. Waldron.

SPECIAL COMMITTEE ON LIGHTNING PROTECTION

President L. P. Crecelius of the Engineering Association has appointed the following to serve on the committee on lightning protection: D. E. Crouse, representing the committee on power distribution, Maryland Electric Railways, chairman; F. R. Phillips, representing the committee on equipment, Pittsburgh Railways; E. J. Blair, representing the committee on electrolysis, Metropolitan West Side Elevated Railway, and J. Leisenring, representing the joint committee on block signals for electric railways, Illinois Traction System.

NATIONAL JOINT COMMITTEE ON LINE CONSTRUCTION

The national joint committee on overhead and underground line construction has just announced its plans, which were formulated at the last meeting, mentioned in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 19, page 1350. The committee plans to prepare specifications, suggest lines of practice or recommend modifications of existing regulations relating to: (1) Underground and undergrade crossings; (2) crossings of electric wires over electric railway tracks; (3) crossings of trolley contact wires; (4) overhead crossings of wires or cables of telegraph, telephone, signal and other circuits of similar character over steam railroad rights-of-way, track, or lines of wire of the same classes; (5) overhead crossings of electric light and power lines, and (6) parallel lines.

Specifications covering subject No. 4, already prepared by an earlier joint committee representing various interests, are now being considered for adoption by the national joint committee. Subject No. 5 has been covered by the present standard specifications, the edition adopted and published by the American Electric Railway Engineering Association being the latest revision. The other subjects are new, and specifications relating thereto will have to be prepared by the committee.

Both the American and the Engineering Associations are represented in the joint committee, of which G. W. Palmer, Jr., Bay State Street Railway, is vice-chairman. The chairman is Farley Osgood, Public Service Electric Company, and the secretary is R. D. Coombs, 30 Church Street, New York.

MEETING OF AMERICAN ASSOCIATION COMMITTEE ON VALUATION

The new committee on valuation met for organization, as announced, on Jan. 7 in New York. Committeee members present were: H. H. Crowell, Grand Rapids, Mich.; Gerhard Dahl, New York; J. G. Mortimer, Milwaukee, Wis.; C. S. Sergeant, Boston, Mass.; Martin Schreiber, Newark, N. J.; J. N. Shannahan, Hampton, Va.; B. E. Tilton, Syracuse, N. Y., and C. G. Young, New York.

Messrs. Allen, Doolittle and Clark, representing the Association, were also present.

After discussion of the scope and plans of work before the committee two sub-committees were appointed as follows: On scope, Messrs. Dahl, Crowell and Young, with Mr. Mortimer as adviser; to consider a bibliography of the subject of valuation, Messrs. Shannahan, Schreiber and Tilton.

COMING COMMITTEE MEETINGS

Jan. 11, Chicago (Congress Hotel), 10 a. m., sub-committees of the joint committee on block signals for electric railways will hold meetings as outlined in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 2, page 61. J. M. Waldron, Interborough Rapid Transit Company, and J. W. Brown, Public Service Railway, are co-chairmen of this committee.

Jan. 26, 27, New York, 10 a. m., meetings of the sub-committees of the block signal committee, postponed from Jan. 4 and 5, as outlined on page 1393 of the issue of this paper for Dec. 26, 1914, will be held at association headquarters.

Jan. 27, New York, 10 a. m., Engineering Association committee on equipment, W. G. Gove, Brooklyn Rapid Transit Company, chairman. (See outline of work, ELECTRIC RAILWAY JOURNAL, issue of Dec. 26, 1914, page 1393.)

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Equipment Defects—Hand-Operated Controllers—Contacts, Fingers, Springs and Bases—I

BY C. W. SQUIER, E.E.

In the writer's seven articles on control connections, only different arrangements of resistance and various schemes of control have been considered, and an effort has been made to show how different operating requirements have necessitated the great variety of control connections.

The equipments on cars as operated to-day have developed from the single motor to two and four-motor equipments, and from single car to train operation. This has necessitated changing from hand-operated to power-operated controllers and from non-automatic to automatic types. The connections previously discussed may apply to any of these manually-operated or automatic types. In the discussion of the diagrams the terms switch or contacts were used to designate the apparatus necessary for carrying and breaking the required current, and these may be either a contact finger rubbing against a segment or a power-operated switch as conditions may require.

The next consideration will be the apparatus itself together with a discussion of some of the troubles that have come to the writer's attention. This apparatus falls into two classes—hand or manually-operated and automatic. Automatic acceleration is a desirable thing to have. In some cases it is a necessity while in others the complication which it involves is not warranted. It should be understood that manually-operated apparatus cannot produce automatic acceleration although such apparatus may be either remote or locally controlled. After it has once been set in operation automatic acceleration can be produced only by apparatus over which the operator has no further control other than the ability to shut it off entirely.

MANUALLY-OPERATED CONTROLLERS

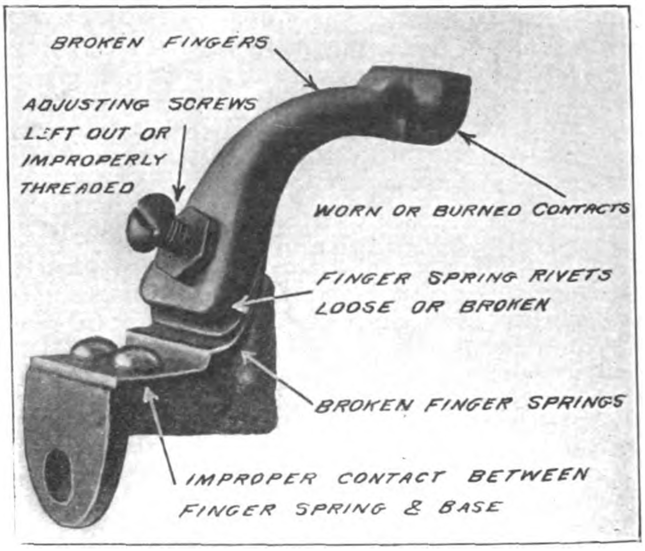
The most common form of hand-operated controller is that which is generally known as the drum controller. This has been built in many different forms and sizes, has given good results and has done wonderful work when the abuse to which it is continually subjected is considered. The different connections are made by fingers which come in contact with copper segments on a drum as it is rotated by the controller handle. The segments are connected together in the various combinations necessary to close the circuit from one finger to the next.

As the fingers and contact segments make and break all the connections, they are the foundations about which all the other controller parts are built. Thus the operating mechanism is for the proper operation of the drum, the star wheels and pawls insure the stoppage of the drum in the definite positions necessary for the proper combinations, the blow-out coils and arc shields prevent excessive arcing at the fingers and contacts, the interlocking mechanism prevents improper combinations and the connection boards and terminals facilitate making the outside connections to the fingers.

To insure proper contact between the fingers and the contact segments, it is necessary that the fingers be pressed firmly against the contacts. For this end the finger springs provide the necessary pressure as well as the required flexibility for making and breaking the circuit. The accompanying halftone shows a contact finger with spring, shunt and base such as is most commonly used with "K" and "L" controllers. The principal troubles experienced consist of excessive wear or burning on the ball of the finger, broken fingers, weak tension in the finger springs, broken or cracked finger springs, loosening or bad threading of adjusting screws, poor contact between the finger springs and base and broken or loose finger bases.

FINGER ADJUSTMENT

The burning of the fingers may be caused by lack of sufficient contact pressure or by improper adjustment. Fingers should be adjusted so that they will have about 3/32-in. lift as they come in contact with the segments, and care should be taken to see that uniform pressure and contact is maintained throughout the complete rotation of the drum. The contact tips take the arcing caused by opening the circuit when the drum is thrown to the "off" position and these require more frequent renewal than the remaining contact segments. Hence it sometimes occurs that after new tips have been installed, the fingers if adjusted to give the proper lift and tension on the tips will be found to have improper contact on the remainder of the segments, due to their being worn thinner than the new tip.


BROKEN FINGERS
ADJUSTING SCREWS LEFT OUT OR IMPROPERLY THREADED
WORN OR BURNED CONTACTS
FINGER SPRING RIVETS LOOSE OR BROKEN
BROKEN FINGER SPRINGS
IMPROPER CONTACT BETWEEN FINGER SPRING & BASE

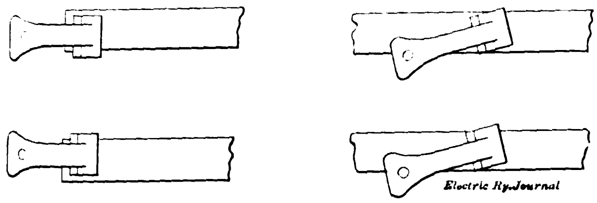
CONTACT FINGER, SPRING AND BASE

The practice of tapping the ends of the contacts with a hammer to bend them down should never be resorted to as this is liable to start cracks in the contacts which later will cause them to break at the weakened points.

The tapping also is liable to strip the threads on the segment screws or those in the casting to which the contacts are fastened. Where it is found that proper contact pressure on the worn part of the segment cannot be obtained with ⅛-in. lift of the finger on the tip, it is better to replace the segments also, as these are worn beyond their useful life. If this cannot be done due to lack of material, the segments may be shimmed up by using thin soft copper strips such as those employed for finger shunts.

Fingers should also be adjusted so that they will line up vertically with each other. In most hand controllers there are at least four fingers, and sometimes more, that should make and break the circuit at the same time on the first point. In order to secure this condition as the contacts burn away, the controller man frequently changes the adjustment of the fingers so that some will have scarcely any lift and give too light contact pressure, while others may have from 5/16-in. to ⅜-in. lift and as a result may be liable to stub and break or tear off. This practice should be discouraged, and the contacts should be fitted to make contact uniformly with all fingers having approximately the same lift.

Fingers should also be adjusted to line up horizontally with their respective contacts, and not project either above or below the contact surfaces, as indicated in one of the accompanying drawings, nor make contact across the contacts as shown in the sketch alongside. They should also make contact across their entire width and not, as sometimes happens, rest simply on one edge.



IMPROPER ALIGNMENT OF FINGERS

Care should be taken that the fingers make and break contact in their proper order, and that they register properly on each notch. Fingers or springs which do not extend far enough, or which extend too far, do not permit proper clearance between the finger tip and the end of the contact segment immediately preceding or following this finger.

For ordinary hand controllers the pressure of the fingers against the contacts should be not less than 5 lb. nor more than 9 lb. A small spring balance should form a part of every controllerman's outfit, but a man soon becomes accustomed to testing the contact pressure with his fingers and will not need to use the spring balance except when there is some doubt as to the necessary pressure. Emery cloth should never be used for cleaning burned contacts or blistered fingers. Sandpaper is far better, because the emery if not carefully removed is liable to cause short-circuits and burn-outs.

In replacing controller contact tips care must be used to make sure that the tips fit the ends of the contact segments properly and do not leave a wide crack, as this causes excessive wear and burning at such points.

Contact segments on both main and reverse drums should be lightly lubricated on each inspection with vaseline or compressor oil applied with a felt pad. In one special method of keeping the contacts lubricated, as used on some controllers, use is made of a felt pad which is saturated with oil, the contact segments rubbing against the pad as the drum is operated. One of the principal objections to this method is that dirt and copper dust from the contacts accumulate on the pad, thus making it a partial conductor of current and a promoter of short-circuits and grounds.

BROKEN FINGERS

Fingers are broken, in most cases, when their contact surfaces become pitted and fused so that they stub when making contact. A few operations of the controller drum then bend the finger or spring so that it catches under the contacts and is broken. Cracks are sometimes started by straightening fingers in order to lengthen them. The controllerman, for example, finds a finger that does not make contact quite soon enough bcause the end of the contact tip is burned away. Instead of putting on a new tip, he finds it much easier to rotate the drum until the finger rests on the contact. Then by striking the finger a sharp blow on the curved portion, it is lengthened by straightening it slightly. This practice is bad even though it is accomplished without cracking the finger, because the next time a contact tip is installed, the finger will be found too long to make contact properly.

A Study of Car-Heating Requirements

BY AN EQUIPMENT ENGINEER

Very few data on the heating of street railways cars electrically are available in technical literature. The following facts obtained from tests made on the heating equipment of a modern city car may, therefore, be of interest. The car tested was of the monitor-roof, pay-as-you-enter type, having in addition to the heaters in the car body, one in each vestibule attached to the center bulkhead between the body end doors. The platform heaters were so connected that they were in service when the car-body heaters were taking the maximum current. All heating was by direct radiation. The following are the essential data with respect to the car tested:

Cubical contents of car body	1930 cu. ft.
Total exposed surface, body only	1125 sq. ft.
Total capacity heaters in body at 500 volts	7200 watts
Platform heater capacity, each at 500 volts	800 watts
Percentage of glass area to total exposed surface	18.5 per cent

During the tests the body end doors were closed, and the platform doors were arranged as during the operation of the car on the street, that is to say, one platform was closed completely and the other had its folding doors open. The outside walls of the car were of wooden sheathing and the inside finish of cherry with an air space between. The roof was of ⅜-in. poplar boards with a painted canvas outer covering. The upper and lower deck ceilings were of a prepared headlining material. The floor in the aisle was of a single layer of ⅞-in. pine, and on each side of the aisle was a double floor of ⅞-in. material with building felt between.

Two tests were made, one with and one without double windows. An ammeter and voltmeter were in circuit during both tests to measure the energy consumption of the heaters. The average of both tests was substantially 7430 watts which varied only with the fluctuation of the line voltage. Both tests were made with the car at rest and no passengers. In the first test, made without the double windows on the car, the following results were obtained:

Temperature rise heaters working continuously at maximum capacity, 33 deg. Fahr.

Time to reach maximum temperature, about two hours.

In the second test made with double windows on the car, the following were the results:

Temperature rise heaters working continuously at maximum capacity, 39 deg. Fahr.

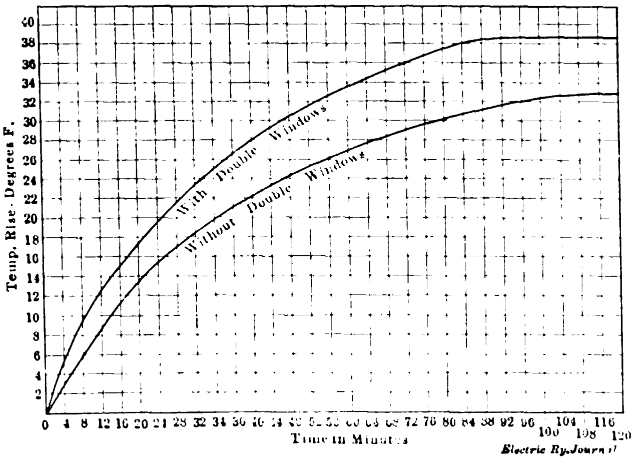
Time to reach maximum temperature, about one hour and thirty-eight minutes.

All temperature readings were taken with accurate thermometers. In both tests the car was placed with the long axes north and south. The wind velocity during the tests ranged from 10 m.p.h. to 14 m.p.h.

During the first test the direction of the wind at the beginning was from the southwest, shifting after one hour from the west and at the end of the test it was from the northwest. During all of the second test the wind was from the north. The average barometer reading was 29.26 in. during both tests. The wind and barometer data were obtained from the local government weather bureau. The wind data were important since observations have shown that the velocity and direction of the wind have a very material effect on the temperature rise possible with any given heating equipment. The effect of the wind was greatest when blowing at right angles to the car and least when blowing in the direction of the car movement.

The graphs shown in the accompanying illlustration give the general shape of the time-temperature rise curves. The loss of heat from a car occurs by reason of conduction, radiation and direct loss, as when the warm air escapes through open doors or the cracks around sashes and floor trap doors. The graphs show that the temperature in the car rises rapidly at first, then the rate of rise decreases until the maximum is reached. At this point the heat losses are equal to the heat input and the temperature of the car remains relatively constant. The amount of heat loss depends to a large extent upon the "temperature head" or the difference in temperature between the inside of the car and the outside air. The rate of temperature increases with constant energy input and is affected by the conductivity of the walls, floor, roof and windows of the car. The conductivity in turn depends upon the composition and thickness of the materials employed and the amount of air space between them.

Referring to the graphs further, it is believed that the temperature difference increases rapidly at first, because the "temperature head" is small and therefore practically all of the heat units are available for heating the inclosed air, the temperature of which quickly rises. As the "temperature head" becomes larger, the amount of heat available for heating the inclosed air, and thereby raising its temperature, decreases, because of the increasing loss through the walls of the car. Thus the rate of rise in air temperature falls off till the point is reached where the "temperature head" is sufficient to force through the walls of the car all of the additional heat generated. At this point the temperature of the air in the car becomes practically constant and the maximum temperature rise possible with the heating equipment is obtained.



COMPARATIVE TIME-TEMPERATURE CURVES FOR CAR WITH AND WITHOUT DOUBLE WINDOWS

From the results of the tests the following data are secured:

	Without Double Windows	With Double Windows
Watts per cubic foot of car body	3.85	3.85
Watts per square foot of exposed surface	6.60	6.60
Degrees rise per kilowatt of total heater capacity as per test	4.44	5.25
Heat loss factor, standing test	0.68	0.58

These data can, of course, be applied only to cars having substantially the same volume and exposed area as the one tested. By heat loss factor is meant the B.t.u. loss per square foot of exposed surface per 1 deg. Fahr. temperature difference per hour.

It will also be observed that under the conditions of the tests, it is possible for the heating equipment to maintain a temperature difference 6 deg. Fahr. greater with double windows than without them. Moreover, the maximum temperature difference is reached sooner in the car with double windows. While these data are correct only for the conditions under which the tests were made, they are, however, useful in indicating what, in a general way, may be expected of electric car heating equipment (direct radiation) with particular reference to the possible temperature rise.

As an example, suppose it is desired to equip a car with direct radiation of the electric type, sufficient in capacity to maintain a temperature in the car of 45 deg. Fahr. when the lowest outside temperature to be expected is 10 deg. Fahr. and moderate winds prevail. In the example the car selected is generally similar in construction to the one tested and has an exposed car-body surface of 1000 sq. ft.; a percentage of glass area to total area of 18.5 and double windows. From this statement of the problem the temperature difference is 35 deg. Fahr. Applying the heat loss factor in the foregoing table for a car with double windows, the total B.t.u. loss per hour is as follows: $35 \times 1000 \times 0.58 = 20{,}300$ B.t.u. Dividing by 3412, the equivalent of 1 kw-hr., it is found that 5.92 kw of electric heater capacity is required to maintain 35 deg. Fahr. temperature difference under the conditions set forth.

Since this result is based on the heat losses obtained from a standing test, it would not be quite correct for a car in regular service. Observations indicate, however, that the effect of the ordinary opening of doors on the car temperature is practically offset by the heat units given off by the average passenger load. If this is true very little additional capacity should be required to take care of this factor, and to this should be added enough to make the total capacity necessary an even multiple of standard heat units. In this example 6.4 kw may be selected. To utilize this capacity sixteen heaters of the ordinary 400-watt, 500-volt rating would be required.

As previously stated, however, care must be taken in applying the data derived herein to the solution of any car heating problem. If the conductivity of the walls, floors and roof, the percentage of glass area to total exposed area and wind velocity are materially different from those in the tests described, the heat loss factor and other derived data will have to be modified accordingly. It should also be noted that observations show that cars constructed with the arch roof are capable of being kept warmer with a given amount of heater capacity than cars of substantially the same volume but with the monitor roof. This is accounted for by the reduction in the area of exposed glass and the elimination of the cracks around deck sash which cause a direct loss of heat.

Location of Trolley Wire on Curves—II

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Elevation of Outer Rail—The trolley wire on curves where the outer rail has been elevated for safety at high speeds should be moved in from the center further than the height of the trolley wire and the dimensions of the car and trolley pole alone require. The reason for this will be clear from an inspection of Fig. 5, where

r, r = the rails normally at the same level
r' = the outer rail elevated
g = the gage of the track
T = the trolley wheel when the outer rail has no elevation
T' = the trolley wheel when the outer rail is elevated.

By lifting one side of the car by the elevation of the outer rail the trolley wheel tends to be thrown over toward a point above the inside rail of the track curve. If it is prevented from following this tendency its sides will assume an angle to the trolley wire and scrape it as the car proceeds around the curve. If the trolley wire is moved the same amount as the elevation of the side of the car tends to move the trolley wheel, the sides of the wheel will still remain parallel to the trolley wire and the wheel will roll along the curved wire with the same friction as it did before the elevation of the side of the car.

In Fig. 6 in the similar triangles ABC and abc let AB be the amount that the trolley wheel will be moved away from the center of the track by elevating the outer rail and which the trolley should be moved for least friction. Then

BC = the height—h—of the trolley wire above the rail in feet
ab = the elevation of the outer rail, e, in inches
bc = the track gage, g, in feet,

and we get

$$AB : ab = BC : bc$$

or

$$AB = \frac{eh}{g} \text{ in inches.}$$

To reduce this expression to feet it must be divided by 12, giving $\frac{eh}{12g}$.

The accompanying table has been calculated on the assumption that 4 ft. 8½ in. is the track gage.

ADDITIONAL DISTANCE IN INCHES NECESSARY TO MOVE THE TROLLEY WIRE ON CURVES ON ACCOUNT OF THE ELEVATION OF THE OUTER RAIL

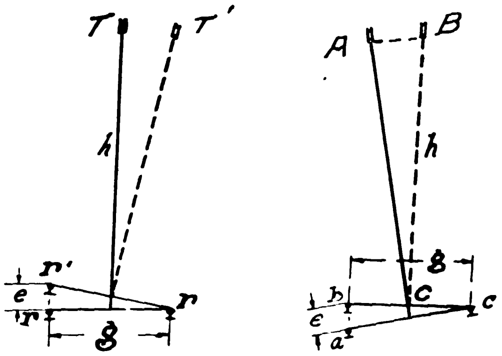
Elevation of Outer Rail in In.	Height of Trolley Wire Above Rail					
	18 Ft.	18.5 Ft.	19 Ft.	19.5 Ft.	20 Ft.	20.5 Ft.
1	4	4	4	4	4	4½
1½	6	6	6	6	6½	6½
2	7½	8	8	8½	8½	8½
2½	9½	10	10	10½	10½	11
3	11½	12	12	12½	12½	13
3½	13½	14	14	14½	15	15
4	15½	16	16	16½	17	17½
4½	17	18	18	18½	19	19½
5	19	20	20	20½	21	22
5½	21	21½	22	23	23½	24
6	23	23½	24	25	25½	26
Constant	3.82	3.93	4.03	4.14	4.25	4.35

The constant given at the bottom of each column and which is equal to the height of the trolley wire above the rail divided by the gage of the track, is the factor by which the elevation of the outer rail must be multiplied in each case in order to get the table figure. Where the conditions are uniform throughout a line or system the proper constant can be given the lineman with a 5-ft. level, and he can readily determine the necessary additional movement of the trolley wire required on account of the elevation of the outer rail.

The full distance that the trolley wire should be moved from the center of the track on a curve in which the outer rail is elevated is thus:

$$R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - l^2 + (h - i^2)} + \frac{eh}{12g} \tag{11}$$

The quantity under the radical except R^2 is peculiar to the conditions that will probably be general on all curves in all parts of the city system involved and can be calculated once for all and called K or constant. The formula then becomes,



FIGS. 5 AND 6—EFFECT OF ELEVATION OF OUTER RAIL; SHIFT OF TROLLEY WHEEL POSITION DUE TO RAIL ELEVATION

$$R - \sqrt{R^2 - K} + \frac{eh}{12g} \tag{12}$$

or in city work where there is usually no elevation of the outer rails on curves,

$$R - \sqrt{R^2 - K}. \tag{13}$$

Where

$$K = \left[\left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 - C^2 + l^2 - (h - i)^2\right]$$

Example: Take a double-truck car in which

b (wheelbase of each truck) = 4.0 ft.
B (center to center of trucks) = 23.0 ft.
C (trolley base to center of car roof) = 5.6 ft.
l (length of the trolley pole) = 13.6 ft.
h (height of trolley wire above the rail) = 19.0 ft.
i (height of trolley base above the rail) = 12.0 ft.
g (gage of the track) = 4.71 ft.
R (radius of the center line of track) = 150.0 ft.
e (elevation of the outer rail) = 5.0 in.

Thus

$$K = \left(\frac{b}{2}\right)^2 + \left(\frac{B}{2}\right)^2 - C^2 + l^2 - (h - i)^2$$

$$= 4 + 132.25 - 31.36 + 184.96 - 49 = 240.85.$$

It should be noted here that the items in the formula by whose change the most rapid variation in the total can be brought about are C and l, these factors varying as their squares.

The distance the trolley wire should be inside the center of the track $\left(R - \sqrt{R^2 - K} + \frac{eh}{12g}\right)$ is

$$150 - \sqrt{(150)^2 - 240.85} + \frac{5 \times 19}{12 \times 4.71}$$

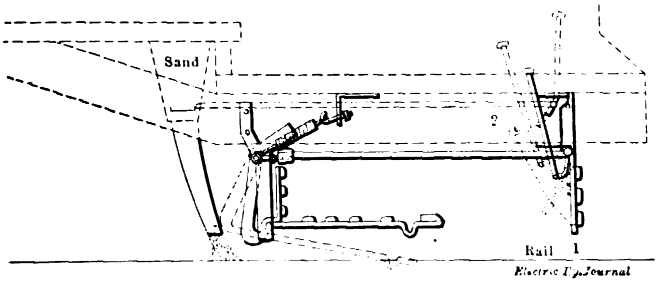
or 0.81 + 1.68 = 2.49 ft. or 2 ft. 6 in.

It should also be noted at this point how important the elevation is. In this case it was the basis for moving the trolley wire three times as far in as would have been the case had there been no elevation of the outer rail.

Sandbox Opened By Fender Trip

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT, THIRD AVENUE RAILWAY, NEW YORK

As a practical contribution to safe operation, the Third Avenue Railway, New York, has installed on its cars a simple mechanism which automatically opens the sandbox when the fender gate is tripped. This device calls for a ¼-in. x 1½-in. strap, clamped to the gate bar and hung close to the gate, as shown at "1" on the accompanying sketch, and a second strap attached to the sand plunger bar as shown at "2." When the fender gate is tripped strap "1" springs up, striking strap "2" and thereby forces the sandbox rod forward to release sand. The sand continues to flow until the fender is reset, which operation also closes the sandbox.



SKETCH SHOWING TRIPPING LEVERS FROM FENDER TO SANDBOX

Use of Metallic Salts for Pyrometric Purposes

A new method for measuring temperatures wherever heat is applied has just been developed by the Carl Nehls Alloy Company, Detroit, Mich. This consists in the use of different metallic salts which are made into molecular mixtures that will melt down at different temperatures throughout the range between 200 deg. and 1330 deg. Cent. They may be used in place of the more costly pyrometers and also to check pyrometers. Then a cylinder is placed at the end of the thermo-couple and when it melts the pyrometer should read the same as the temperature marked on the "Sentinel."

One way is to cast the salts into solid cylinders, 7/16 in. in diameter and ¾ in. long. Each one is wrapped in a paper on which is printed its correct melting temperatures in degrees Centigrade. For all temperatures below 932 deg. Fahr. these "Sentinel" pyrometers can be used in an airtight glass tube. The salts can be used over and over again, as they melt each time the temperature rises above the one marked on the cylinder and become solid again the moment the temperature falls below this degree.

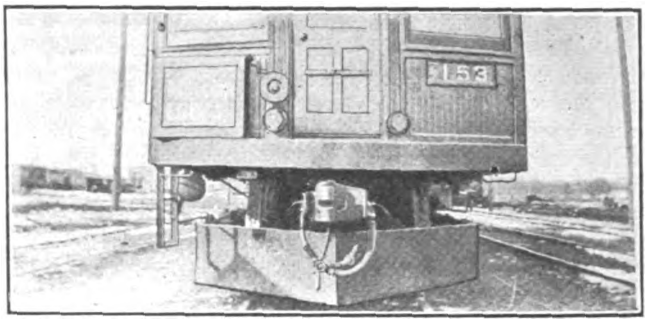
The salts are also canned in the form of a paste. Pastes with various melting temperatures can be daubed along a steel bar and inserted into furnaces, ovens, retorts, flues, steam pipes, etc., to find the temperature at which they are operating. The salts that melt down and those that remain solid will indicate the temperature. which will be between the two. By using a long bar one can determine whether the temperature is uniform in the front and back, top and bottom, or corners of a furnace, ovens, kiln, etc.

This is asserted to be the only method that will give the exact temperature of tools heated in a forge fire. A paste is selected that represents the correct hardening temperature for the tool, daubed on the tool and when the latter is heated to this temperature the salt will melt and the tool can be taken out of the fire for quenching. This work is made easier if the tool is surrounded by a piece of sheet steel or is inserted in gas pipe, as that keeps the paste from coming in contact with the fuel.

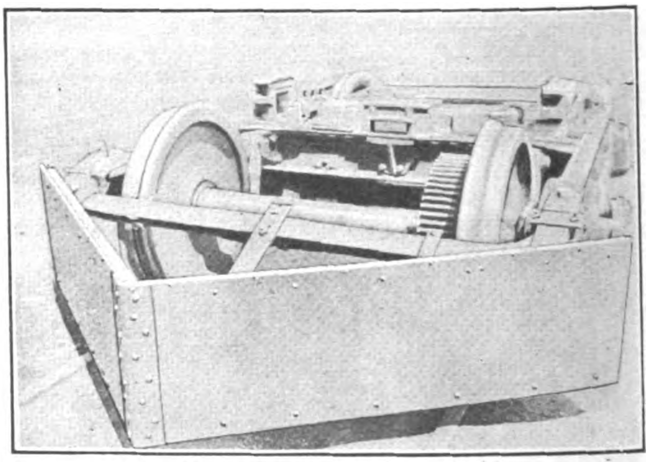
A handy way of using the cylinders is to plug one end of a tube or rod and drop in a cylinder. A small rod can then be lowered into the tube and made to rest on the salt. When the salt melts down the rod will lower and thus indicate that the melting temperature of the salt has been reached. This is very useful for finding the temperatures of molten metals like babbitt mixtures, etc.

Sheet-Steel Pilot for Interurban Cars

Sheet-steel pilots have been in service for more than seven years on the trucks of the Chicago, Lake Shore & South Bend Railway's cars. During that period not a single pilot has been replaced, although some have been bent slightly out of shape, but were restraightened at small cost. These pilots are made of ¼-in. boiler plate, 20 in. wide, mounted on a ¼-in. x 2-in. x 2½-in. T-iron frame. Three strap-iron brackets ⅝ in. x 4 in. in section support the pilot on the front end of the truck frame, connection being made by using the truck pedestal bolts. As the pilot is mounted on the truck it follows the track in a way similar to the life guard on a street car. Its substantial construction causes it to resist a heavy impact and deflect the body from the track. Since it is mounted about 4 in. above the top rail, it also serves as a snow plow until the snow has drifted badly. In one of the accompanying illustrations the method of mounting this steel pilot on the truck is shown, and in another illustration the location of the pilot relative to the rail and drawbar is illustrated.



SHEET-STEEL PILOT—VIEW OF CAR WITH STEEL PILOT



SHEET-STEEL PILOT—VIEW SHOWING METHOD OF MOUNTING ON TRUCK

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Arkansas.—"Jim Crow" Cars—Conductors Authorized to Compel Compliance with Rules.

Under the law as given in Kirby's Dig., Sec. 5658-5663, street railway companies are required to operate separate cars for the white and colored races or else to separate the white and colored passengers in cars operated fcr both by setting apart a portion thereof for each race, and the conductor may "require" any passenger to change his seat when necessary, and a passenger so spoken to must take the seat so assigned, and any person refusing to do so shall leave the car, or, remaining thereon, shall be guility of a misdemeanor, etc. It was held that a street railway company may designate what portion of cars shall be occupied by white passengers, and what portion by colored passengers, and that a conductor may use necessary force to compel a passenger to comply therewith, the word "require" being synonymous with "compel." (Little Rock Ry. & Electric Co. v. Hampton, 165 Southwestern Rep., 290.)

Georgia.—Ejectment—Force Justifiable.

The presiding judge charged that the conductor on an electric car had authority to arrest disorderly persons, according to Sec. 926 and 927 of the Penal Code of 1910, and that then he had a right to strike them or use other such force as was necessary to protect himself from injury; held, that in the light of the pleading and evidence, the giving of this charge furnishes no ground for a reversal. (Georgia Ry. & Electric Co. v. Wheeler., 80 Southeastern Rep., 993.)

Illinois.—Difference Between Elevated and Street Railways So Great that City Cannot Regulate Fares Under Statute.

Corporations organized under the Railroad Law (Hurd's Rev. St. 1912, Chap. 114) to operate elevated railroads for the carriage of passengers only are not street railroads, within the purview of Cities and Villages Act (Hurd's Rev. St. 1912, Chap. 24, Sec. 62) Art. 5, Sec. 1, Cl. 42, authorizing municipalities to regulate hackmen and other carriers using the street, and to fix their compensation. Even though part of the right-of-way of elevated roads is through the city streets, they differ from the other means of transportation mentioned in that they maintain regular stations for the reception and discharge of passengers and do not stop at any point, as is the custom with street railways and hackmen. Hence the municipality cannot, on the theory that the elevated railroads are street railroads, regulate their charges. (Metropolitan West Side Electric Ry. v. City of Chicago, Northwestern Electric R. R. v. Same. South Side Electric R. R. v. Same, 104 Northeastern Rep., 166.)

Indiana.—Power of Street Railway to Condemn Land for Interurban Passenger and Express Terminal.

While one public service corporation may not condemn property for the use of another in the absence of express legislative authority, a street railway company which has been required to permit cars of interurban companies to be transported over its lines, pursuant to Burns' Ann. St. 1908, Sec. 5632, may condemn property for a terminal thereby rendered necessary.

Since it is lawful for an express company to transport property over an interurban railroad company, the latter may condemn property necessary for a terminal to handle such business. (Eckart et al. v. Ft. Wayne & N. Y. Traction Co., 104 Northeastern Rep., 762.)

LIABILITY FOR NEGLIGENCE

Alabama.—Assumption of Risk by Passenger of Jerks.

Passengers on electric street cars assume the risk of injury from ordinary jars and jolts incident to car operation, when conducted with due care and in the usual manner. Where a lady passenger left her seat and stepped into the aisle, while the car was in motion, and then fell down and injured one of her knees, held, that she cannot recover damages from the railway company, where the preponderance of the evidence shows that the motorman operated the car with due care, and that it came to a stop, with no unusual jar or jolt. (Vincent v. New Orleans Ry. & Light Co., 64 Southern Rep., 654.)

Illinois.—Liability for Injuries to Animals When Fences Are Not Installed.

Where a railroad company neglects to fence its road as required by Hurd's Rev. St. 1911, Chap. 114, Sec. 62, it is not contributory negligence defeating a recovery for an owner of adjoining land to permit stock to go upon the land adjacent to the right-of-way. (Hartzell v. Alton, Granite & St. Louis Traction Co., 104 Northeastern Rep., 1080.)

Kansas.—Contributory Negligence of Passenger Not Bar to Recovery in Some Cases.

A finding that the conductor of an electric street car was guilty of such wantonness as to authorize a recovery against the company, regardless of any question of contributory negligence, is authorized by evidence that he ran his car, without stopping, past a station and upon a bridge, knowing that a man was riding outside of the car in such a position that he would necessarily be struck by a beam of the bridge and severely, and probably fatally, injured. (Harbert v. Kansas City Elevated Ry. Co., 138 Pacific Rep., 641.)

Massachusetts.—Termination of Relation of Passenger and Carrier When Passenger Leaves Car.

Defendant elevated railway company maintained an ascending track leading to a station, the incline being bounded by a wall constructed of stone blocks 26 in. wide. The top of the wall was level, but there was no railing on the incline between the track and the edge of the wall. There were steps leading from the station platform to the incline. A preceding car having become disabled on the incline, decedent, a passenger, left the following car and started to walk up the incline to the station platform, and in some way fell or was pushed over the wall and received injuries from which he died. There was evidence that passengers had occasionally so alighted before, but there was nothing to indicate that the steps at the end of the platform or the incline were intended for the use of passengers. Held that, when decedent left his car before it reached the station platform, he ceased to be a passenger, and was at most a bare licensee, and hence no recovery could be had for his death because of alleged simple negligence of the railway company in failing to protect the wall by a barrier. (Hyams v. Boston Elevated Ry. Co., 104 Northeastern Rep., 370.)

Massachusetts.—Injuries from Controller Blow-out.

Plaintiff's decedent, a passenger, was burned by a shower of sparks from the controller box, causing the car to come to a sudden stop and hurling her from her feet against a seat. Plaintiff sued in three counts, for negligence (1) in operating the car, (2) in permitting the use of a defective, unsafe and dangerous mechanism, and (3) for failing to properly inspect the car. Held, that it could not be ruled as a matter of law that such an occurrence was one of the things which might be expected to happen if the mechanism was in proper condition, and that plaintiff was entitled to go to the jury on the second and third counts, but that the evidence did not show negligent operation and that the court, therefore, erred in submitting that count to the jury. (Bresnahan v. Boston Elevated Ry., 103 N. E. Rep., 300.)

Massachusetts.—Negligence Imputed to Boy Six Years Old.

In an action for an injury to a boy six years old, run over by a street car while playing in the street, the evidence was held to sustain a finding that the boy was guilty of contributory negligence. (Godfrey v. Boston Elevated Ry. Co., 102 N. E. Rep., 652.)

Massachusetts.—Contributory Negligence—Act Caused by Fright—"Due Care."

St. 1907, chap. 392, authorizes recovery from a street railway company, whose servants in the conduct of its business negligently caused the death of a person not a passenger or employee who exercised due care. But there could be no recovery for the death of a boy who, without actively exercising care, ran in front of a street car, even though he was at the time suffering from fright, since under the statute the injured person must be actively and actually in the exercise of diligence; "due care" in the statute meaning something more than negative and passive freedom from fault, and requiring reasonably intelligent and energetic attention to safety. (Bothwell v. Boston Elevated Ry. Co., 102 N. E. Rep., 666.)

News of Electric Railways

RAPID TRANSIT PLANS FOR CINCINNATI

Four Plans Presented, All Involving Use of Canal Bed—Comments by Professor Swain and President Schoepf

City Engineer Krug of Cincinnati, on Dec. 31, presented to Mayor F. S. Spiegel four schemes for rapid transit in that city, with the canal bed as an important feature of each.

Scheme No. 1, or the Canal Street Belt Line, suggests that the two-track line start at Canal and Vine Streets and follow the canal in a subway to a point about 1000 ft. north of Ludlow Avenue, with the exception of three short sections which would run in the open because of sharp bends in the canal line. Wherever the line crosses the canal as a result of the deflections it is to be built as a subway in order to allow the passage of the proposed boulevard over it. The length of the line is 15.56 miles, with 6.50 miles in subway, 0.63 mile in tunnels and 8.43 miles in the open. There will be twenty bridges of a total length of 2206 ft. and 6100 ft. of concrete trestle along the Ohio River bluff. Fourteen stations, about 1 mile apart, are specified, of which the Canal Street station is the largest, as it is intended for baggage and small packages.

Scheme No. 2 proposes a two-track subway, auxiliary to No. 1, 1.31 miles in length. It leaves the main line at Canal and Plum Streets, runs south on Plum to Fifth Streets, east on Fifth to Main and north on Main to Canal Street, where it would connect with the main track. Two stations are planned for it.

Scheme No. 3 includes No. 1, except that part east of Plum Street on Canal Street and under Mt. Adams to near Eden Park reservoir. Instead, it is suggested that from the intersection of Plum and Canal Streets the line run south on Plum Street to Fifth, east on Fifth to Walnut, north on Walnut to Ninth and east on Ninth Street and under Mt. Adams to connect with Scheme No. 1 near Eden Park reservoir. This has been designated as the Ninth Street belt line and would make the entire line 16.31 miles in length. There are a number of changes in stations mentioned also.

Scheme No. 4, or the Pearl Street belt line, also includes Scheme No. 1 with the exception of the portion east of Walnut Street on Canal Street and under Mt. Adams, and in its place suggests that from the intersection of Canal and Walnut Streets the line run south on Walnut Street to Pearl, east on Pearl and Martin Streets and private property to a point near Eden Park reservoir. A portion of this substituted part would be subway and the remainder would be a steel trestle, with the necessary changes in the location of the stations. It would be 16.46 miles in length. It is said that this last plan will give about the same service as Nos. 1 and 2 combined and that its construction will entail a smaller cost, with the added advantage that the Kentucky lines may use the subway if this becomes necessary.

Engineer F. B. Edwards estimated the cost of Scheme No. 1 at $10,959,895. Scheme No. 2, if built in connection with No. 1, will involve a cost of $1,609,475. Built as a separate unit, the cost would be about $3,504,109. The estimate for Scheme No. 3 is $11,993,880 and of No. 4, $11,033,528. Engineer Ward Baldwin has fixed the cost of rolling stock, power station and equipment at $2,160,000, but if the downtown loop is built it will bring the cost up to $2,456,000.

Professor Swain, Boston, consulting engineer, reviewed the report before it was made public. He considers it reasonable throughout. He has further given his approval to scheme No. 1 and has expressed the opinion that it will serve the purpose of the special committee and the city as well as any other that can be devised. Professor Swain agrees with the committee that Schemes Nos. 1 and 2 taken together will make an ideal transit plan. No. 3 he considers out of the question and No. 4 omits so much of the downtown loop that it cannot be considered in any way equal to the combination of Nos. 1 and 2, notwithstanding the fact that it costs less and has the redeeming feature of extending further down into the city than the others. Professor Swain suggests that a combination of Nos. 1, 2 and 4 be considered, with the omission of certain portions that duplicate. A better plan than that suggested by Nos. 1 and 2 might be worked out with no increased cost, he says, and this is the object of the investigation. Professor Swain discusses the ways in which the cost may be reduced and suggests that the engineers study the plan to discover minor changes that will tend to this result.

The Rapid Transit Commission, appointed by Mayor Spiegel, consists of E. W. Edwards, president; William Cooper Proctor, Dean Herman Schneider of Cincinnati University, George F. Dieterle and George Puchta. The investigation was made under the direction of the commission, and the purpose is to find a way for bringing all interurban cars to the center of the city and provide a better service on existing roads. For this reason Professor Swain suggests that any line that is built should be operated by the Cincinnati Traction Company.

W. Kesley Schoepf, president of the Cincinnati Traction Company, is quoted as saying that the cost of construction at this time, in his opinion, is practically prohibitive. He added, however, that he would not be able to express a positive opinion until he had had time to study the report in detail. Some time ago he expressed the belief that such an improvement, to cost about $6,000,000, might be financed and that it would be a success if it could be made to solve some of the problems of local transportation.

SERVICE IN BROOKLYN

President Williams on the Grand Jury—Commission Report of Service—Company's Reply

Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, issued a statement on Dec. 31 dealing with the investigation of the company by the Grand Jury. He said that the basis of the information obtained by the company in regard to the investigation was secured through the newspapers despite the fact that Grand Jury proceedings were secret and that it was a misdemeanor to divulge any information as to what transpired in the Grand Jury room. Not having been served with any subpoenas the company did not feel that in making its statement it could be charged with divulging information which the law holds sacred. Mr. Williams assumed that the Grand Jury was acting under its general power to investigate any statement of facts which it deemed of importance to the community. If any pertinent facts bearing upon the transportation problem which were not already generally known to the public could be elicited at the inquiry, or if any measures could be suggested to alleviate admitted discomforts of the present period of transition from inadequate facilities to facilities adequate to Brooklyn's needs, the company would be the first to welcome such disclosures or suggestions. On the other hand, if it should appear that those charged with the duty of providing transportation for Brooklyn had endeavored consistently and as successfully as the conditions permitted to fulfil their obligations, Mr. Williams felt that a presentment should appear certifying the facts. Mr. Williams remarked parenthetically that, as the company was not advertising its statement in the newspapers, the accusation could not be brought against it that it was trying to influence the newspapers of Brooklyn by paid advertising.

Subsequently, Joseph Johnson, chief of the transit bureau of the Public Service Commission of the First District of New York, made public his conclusions in connection with the inquiry which the commission had been conducting into the service of the Brooklyn Rapid Transit Company. These were summarized under twelve heads, and to each one Mr. Williams replied specifically, giving such facts and figures as seemed to him to be necessary to substantiate the case of the company.

In answering Mr. Johnson, Mr. Williams said in part:

"The report now given out, so far as we know, has not been considered or approved by the commission. It is entirely an ex parte statement of the former campaign manager for the chairman of the commission, who is receiving a large salary from the city, and who, according to our information, feels that he should begin to give some public evidence of his official existence. The commission, however, is responsible for Mr. Johnson's report being made public in advance of its consideration by them or in advance of the completion of their formal hearing, and the inference is plain from such a procedure that even they are somewhat desirous of meeting the present avalanche of public criticism against them by an appearance of official activity. Indeed, we have been told, in substance, that the commission dislikes any voluntary attempts on our part to satisfy public complaint but would prefer to have the public credit of correcting the evils by their official orders. Their action, therefore, in publishing this partially untruthful, entirely ex parte, and generally unfair report, is evidently an attempt to divert against the Brooklyn Rapid Transit Company the public indignation that seems likely to wipe the present commission out of existence. To any person who has known the general policy and practice of procrastination and indecision, as I have known it in my experience with the Public Service Commission in the carrying out of the formalities required by the dual system contracts, in order to get into operation as speedily as possible some substantial measure of transportation relief, it is laughable to hear the commission or its employees talk of any lack of co-operation on our part or of any unnecessary delays on our part in trying to furnish that relief."

This statement provoked Mr. Johnson to retort that if his report had done no more than to show the keen hostility of Mr. Williams to any set of men who presumed to criticise his management it had served a good purpose. He said that the Brooklyn Rapid Transit Company would have a fair opportunity before the commission to try to disprove the conclusions.

On Jan. 4 Mr. Williams gave out another statement, supplementing his reply to the criticisms of the Brooklyn Rapid Transit service by Mr. Johnson. He said that the grievance of the company against the publication of Mr. Johnson's report was, first, that it was not based upon facts in all cases; second, that it condemned the company for evils for which the commission itself was responsible; third, that the summary of it as given out by the commission was not justified in many cases by such of the supporting figures as had been furnished to the company. Mr. Williams said that the company had not up to that time received a copy of the report, but that if the figures were as inaccurate as some that had been brought to the company's attention, they would illustrate unpleasantly some of the methods of the commission.

The Brooklyn *Eagle* quoted Chairman McCall of the commission in its issue of Jan. 5 in part as follows:

"The report of Mr. Johnson was prepared in absolutely good faith by the head of our transit bureau and its findings are a result of the investigations of paid experts who have been in our employ for a long time. It is now before the commission for its judicial consideration and I decline to comment upon it in any way. When the question comes before us Colonel Williams will then be given an opportunity to present his case in the regular way. If we find that the weight of evidence is that Chief Johnson's report is in error then we will throw it out completely."

MR. DOHERTY TO RETURN TO TOLEDO

City Solicitor Thurstin, of Toledo, Ohio, announced on Jan. 4 that he will ask the Council for an ordinance to provide for a bond issue of $4,000,000, the proceeds to be used for the purchase of the local street railway under the municipal ownership ordinance adopted by referendum vote last August. Some time ago the franchise committee announced the completion of another franchise which its members asked the Toledo Railways & Light Company to consider, and on Jan. 4 members of this committee received a communication from Henry L. Doherty, chairman of the board of directors of the company, stating that he will be in the city soon to consider the draft of the ordinance which the committee prepared.

Federal Judge Killits has set Jan. 23 as the date for rendering his decision in the case of Negley D. Cochran and the Toledo Newspaper Company, recently tried before him on the charge of contempt of court in connection with the publication of statements to which the court took exception. Counsel for the defense have until Jan. 9 to file briefs.

SEATTLE MUNICIPAL OWNERSHIP VOTE ON MARCH 2

In committee of the whole the City Council of Seattle, Wash., decided on Dec. 30 to submit to the voters at the general election on March 2 a proposition to purchase the Seattle, Renton & Southern Railway within the citiy limits. The proposition provides for an initial payment to the receivers of the company of $200,000 in 4½ per cent street railway bonds and subsequent payments each year for twenty-eight years of 20 per cent of the gross earnings of the property. For the first ten years, the receivers are to pay annually into the city treasury from the 20 per cent of gross earnings received by them the sum of $15,000 and for the next eight years $20,000 a year. For the remaining ten years, the receivers are to be paid the full 20 per cent of the gross earnings, unless the total payments to them amount to $1,500,000, in which case all payments are to cease, and the property be finally deeded to the municipality. By this agreement, the city will obtain the property without any investment except of bonds and receive from the company during the first eighteen years of the contract, a total of $310,000 divided into annual payments, with which to pay and retire the bonds and to make such extensions and betterments to the line as may be necessary. The proposition of purchase further provides for the dismissal of suits instituted by the city and counter suits brought by the receivers. After the corporation counsel has passed upon the terms of the proposition the Council will pass an ordinance accepting the offer of the receivers. This will be followed by the adoption of a resolution submitting the question to the voters on March 2.

UNION STATION SERVICE IN KANSAS CITY—OTHER MATTERS

At a recent Council committee hearing held to consider the subject of providing adequate traffic facilities around the new Union Station, P. J. Kealy, representing the Metropolitan Street Railway on the board of control which, under the new franchise, will eventually manage the property, said the prospective street railway traffic should be considered in planning streets. He was quoted as follows:

"The South and Southeast are developing very rapidly, especially in that district where small homes may be built on 25-ft. lots. Transporting those people by street cars will soon become a serious question. We now have only Main Street as a street leading straight through the business district from the extreme north to the far south. I believe that within five years a part of this traffic will have to come downtown over a line on McGee Road. We now have as much street car congestion at Thirty-first and Main Streets as at Fifteenth Street and Grand Avenue. As this traffic comes north through the Main Street cut and by way of the station it cannot all be carried over the Main Street Viaduct. Some of the cars will have to go over Twenty-third Street to either Grand Avenue or McGee Street and thence downtown. The building of a line on Twenty-third Street will be necessary in a comparatively short time. The rounding of the corner at Twenty-third Street and Westport Road to permit the cars to get through that narrow throat will be necessary."

Street cars in Kansas City ran on the evening schedules New Year's Eve until 3 a. m., when the owl car service was begun. Heretofore the owl car schedules began at 1 o'clock on New Year's Eve as on other nights. The traffic during the later hours this year was heavy, indicating, it is said, the advance in cosmopolitanism of the city. The holiday traffic otherwise was about normal, considering the steadily increasing business.

It is expected that cars will run over the new Twelfth Street viaduct to the stock yards and implement jobbing district in the West Bottoms about Jan. 15. Tracks were laid on the viaduct as it progressed, and the approaches are now being installed. The "stock yards" electric line has helped to serve the district by a circuitous route during construction.

The Metropolitan Street Railway in its newspaper display space on Jan. 1 used the face of a clock with the hands close to 12, with the injunction "A good new year's resolve: Wait till the cars stop! Look before crossing car tracks!" There are pictures of a crowded street corner and two cars bound in opposite directions.

C. W. Green, Mayor of Kansas City, Kan., has announced that a bill will be prepared for presentation to the Kansas Legislature giving the city power to purchase or acquire street railway tracks and lease them to public service corporations. The franchise of the Metropolitan Street Railway in Kansas City, Kan., has eight years to run; public ownership of the system is said to present difficulties because of the close relation of the Kansas City, Kan., system with that in Kansas City, Mo., where a new franchise has been granted but waits the fulfilment of its terms by the company.

RATE INJUNCTION ASKED IN MISSOURI

Springfield Gas & Electric Company Carries Rate Case to Federal Court on Ground of Constitutionality and Unfairness of Public Service Commission

The Springfield Gas & Electric Company, Springfield, Mo., has begun a contest against the order of the Missouri Public Service Commission establishing lower electric rates. The original brief in this case and the decision of the commissioner were abstracted in the ELECTRIC RAILWAY JOURNAL of May 2 and July 11, respectively. After the denial of an appeal by the commission, the company has omitted the prescribed course of appeal through the state courts and is now asking the federal court for an injunction against the enforcement of the order. The proceedings involve the question of the commission's fairness in its conclusions and the constitutionality of the act creating the commission. The application for injunction was made to Judge Van Valkenburgh at Kansas City, who called in Judge Hook and Judge Pollock. Judge Hook presided at a hearing on Dec. 29, the result of which was the granting of ten days' time for the filing of a brief by the commission.

The company contends that the valuation placed upon the property by the commission was ridiculously low and that the commission made no allowance in the valuation for going concern value. A question is raised as to the right of the commission to exclude from valuation of property items which the company asserts are necessary to its successful operation. The company has a steam power plant, held for emergencies but seldom used, the current being bought from a hydroelectric concern. The exclusion of this plant from the valuation, and the exclusion of other items such as administration expenses paid to a New York holding company, is alleged to have reduced the valuation to such a point that the company making ostensibly 7 per cent actually can earn on the prescribed rates only 3 per cent.

The question of constitutionality arises over the right given by the law to the commission to consider, in preparing a decision, information outside the evidence presented at the hearings. The allegation is made that the commission in this case considered evidence that the company had no opportunity of answering. Whether or not proof can be adduced of the weight given such outside information, the fact that the commission may use such outside information warrants the reasonable assumption that such outside information was used.

W. G. Busby, counsel for the commission, stated that the commission hoped the court would not find it necessary to grant the restraining order, because the commission had given the matter careful consideration and believed it was justified in its decision. J. T. Neville and E. C. McAfee of Springfield also appeared for the commission. The company was represented by John M. Olin, Madison, Wis., and W. D. Tatlow, Springfield.

This Springfield case was the first the Public Service Commission decided involving the methods of valuation and principles to be followed in valuing a property. It established a precedent as to what the commission deemed was a fair return on invested money and the direct power of the commission to fix rates. The commission, after an exhaustive hearing, cut down the claimed valuation of the company materially and ordered an outright reduction in electric light rates from 15 cents per kw-hr. to 8 cents. Although only the electric light rates of Springfield were involved, the order was construed as blazing the way for rate making in all Missouri cities.

SIGNAL AND STEEL CAR RESOLUTIONS ADOPTED BY NEW YORK COMMISSION

The following resolutions were adopted by the Public Service Commission of the First District of New York on Jan. 5:

"Resolved that it is the sense of the commission that the elevated railroad lines of the Interborough Rapid Transit Company should be equipped with a signal system which will prevent collisions, and that the Interborough Rapid Transit Company be required to make an investigation and report to the commission within sixty days on such speed control, cab signaling or other improved signaling devices that will allow the minimum headway on the elevated railroads and provide the greatest factor of safety.

"Resolved that Mr. Gibbs, consulting engineer to the commission, and Mr. Wilder, electrical engineer, be asked to advise the commission whether an all-steel car body, having approximately the dimensions of the wooden cars operated on the elevated roads in Manhattan and the Bronx by the Interborough Company and having three doors on each side of the car, with the necessary couplers, curtains, etc., but without trucks, electrical equipment or air brakes, can be built for operation on the elevated lines having a weight not to exceed the weight of the heaviest wooden cars now operated on such lines."

CHICAGO ELEVATED VALUATIONS

In response to a request from the Chicago local transportation committee, the commissioner of public service has made a valuation of the elevated railway system. Little significance attaches to the valuation, however, since a controversy has arisen between the local transportation committee and the commissioner of public service because he has failed to prepare the valuation in accordance with the committee's request, namely, to bring it up to date and to omit intangibles. This valuation as submitted is entirely new, and intangibles have been included. The purpose of this valuation was for use in connection with the merger of the surface and elevated lines, upon which actual steps toward the beginning of the subway system is said to depend. The public service commissioner's figures on the physical value of the property are as follows

	Cost new	Present value
Metropolitan	$19,591,973	$16,323,744
South Side	14,871,381	12,215,138
Northwestern	15,127,558	12,575,892
Chicago & Oak Park	4,282,672	3,044,510
Total	$53,873,584	$44,159,284
Taxes	150,000	150,000
Total	$54,023,584	$44,309,284
Overhead charges, 18 per cent	9,724,245	7,975,671
Grand total	$63,747,829	$52,284,955

In connection with intangible values the report states that they will vary between $5,000,000 and $20.000,000. A comparison of this valuation with that made by the harbor and subway commission in 1912 shows that there is approximately $1,500,000 difference, the public service commissioner's cost now being that much greater and its present value being that much less than the figures included in the harbor and subway commission valuation.

CINCINNATI SUBURBAN FRANCHISE

The street railway committee of the City Council of Cincinnati, Ohio, and representatives of the Cincinnati, Newport & Covington Railway conferred on Jan. 2 on the proposed new franchise. The committee informed the company's representatives that it would recommend to council a rate of fare of 3 cents between the suspension bridge across the Ohio River and Fourth Street in Cincinnati. The rate on the Newport division and between all points in Newport and Covington and Cincinnati will be 5 cents. The committee insisted on the payment of $65,000 to the city in settlement of the claim against the company for car license fees. The company offered to compromise at $40,000. The company is to pay $12,000 as a franchise tax during the current year and 3½ per cent is then to be added to this amount during the life of the franchise. The city desires to reserve the right to allow any other company to use the company's tracks on terms to be agreed upon between the companies or by arbitration.

CLEVELAND RAILWAY MATTERS

On Dec. 29 members of the Cleveland City Council made a trip over the North Randall Street Railway, which the Cleveland (Ohio) Railway has asked permission to purchase for $146,000. The line was built with private capital and connects the Broadway line with the Forest City fair grounds at North Randall. It is 3½ miles in length. The Cleveland Railway, under the present arrangement, is guaranteed 6 per cent on the investment required in operating cars on the line. The North Randall line is said to have earned 14 per cent on the investment last year.

Councilman Stolte entered objections to the purchase of the North Randall line by the Cleveland Railway on the ground that the city will never be able to purchase the property if its value continues to increase so rapidly.

The street railway committee recommended a reduction in fare from 5 cents to 3 cents between London Road and Dill Road. This leaves the fare between London Road and the Public Square 6 cents. London Road is in Nottingham, a village that has been annexed since the Tayler ordinance went into effect. Mr. Witt explained that special school tickets may be provided under the ordinance, where difficulties are encountered in the annexation of suburban towns.

An ordinance was introduced in the City Council on the evening of Dec. 28, authorizing the company to build a double track on Euclid Avenue between East Twenty-second and East Fortieth Streets, known as "Millionaires' Row." The measure was referred to the committee on street railways. Peter Witt, street railway commissioner, and Director of Public Safety Sidlo have obtained consents of a number of owners of abutting property, and Mr. Witt believes that cars will be in operation over the proposed new section of track by July 4, 1915.

SEATTLE MUNICIPAL RAILWAY SUIT

On a charge that officers of the city of Seattle have illegally expended thousands of dollars on the Highland Park & Lake Burien Line of the Seattle (Wash.) Municipal Railway, known as Division "C," lying outside the city limits of Seattle, and that the city is about to expend more of the public funds unlawfully Attorney-General W. V. Tanner has asked for an injunction against further dissipation of the moneys in the general fund of Seattle for the purpose of maintaining or operating the Lake Burien line. The necessary papers were served on the city comptroller and the city treasurer on Dec. 28.

Mr. Tanner begins his complaint by stating that C. W. Clausen, state auditor, who is ex-officio chief inspector and supervisor of the bureau of inspection and supervision of the public offices of the State of Washington, as such officer received during 1914 from George A. Liebes, a state examiner under his jurisdiction, a report in which Mr. Liebes detailed the facts upon which the suit is brought by the attorney-general. According to the report of Mr. Liebes, he went thoroughly into the records and accounts of the Lake Burien line and found that 4½ miles is outside of Seattle; that between March 7, 1911, and June 30, 1914, Seattle expended $20,491 for construction, part of which was spent on the portion of the road beyond the corporate limits.

Mr. Tanner alleges that the money so spent was derived from the sale of the general bonds of Seattle and from loans from the general fund, but that the books of the city failed to show the exact amount so expended and that, therefore, the exact amount is unknown. He says that between March 7, 1911, and June 30, 1914, $9,000 was transferred from the general fund of the city for the purpose of meeting the operating expenditure of Division "C," of the Municipal street railway system, but that the books of the city also fail to show what sums were spent inside and what outside of the corporate limits. Mr. Tanner finally cites in his complaint a paragraph from the state examiner's report which states that the sums expended exceed the revenues of the car line and that the warrants issued and cashed are illegal because the city has no authority to operate or maintain a street railway outside of its corporate limits. The attorney-general, however, does not ask that the warrants heretofore issued and paid be nullified, but prays that the city comptroller and the treasurer be enjoined from expending other public money on the Lake Burien line outside of the city limits of Seattle.

PUBLICITY IN ATLANTA

A Figure of Speech Recently Expressed Put Into Effect by Georgia Railway & Power Company

The policy of discussing the company's affairs frankly with the public has been developed by the Georgia Railway & Power Company, Atlanta, Ga., through a series of advertisements designed to continue indefinitely, appearing once each week in each of the three Atlanta newspapers and in the local labor journal. The seventh of the series was published in the week between Christmas and New Year's day. In the advertisements the company confines itself to some specific topic which it discusses with an air of intimacy and without reserve, emphasized typographically by the intermittent use of italics or bold-face type. The definite motive is to interest the public through subject and style, to win its confidence through sincerity, and to cement its good-will by logic. In one sense, "The Window," as the discussion has grown to be termed, is the company editorial; in another, it is an expression of the company's personality; in another, it is the brick-on-brick building of a barrier against unintelligent criticism and unsympathetic suspicion.

The opening of "The Window" was a concrete expression by W. T. Waters, advertising manager of the Georgia Railway & Power Company, of a figure of speech by Ivy L. Lee, executive assistant of the Pennsylvania Railroad, who said in the ELECTRIC RAILWAY JOURNAL of Oct. 10: "What the public wants is a window through which it can look into the affairs of public service corporations, and so long as this vision is denied the public will be very suspicious as to what is going on in the windowless houses."

Further than the time schedule and the underlying policy, no plan was prearranged for "The Window" series of the Georgia Railway & Power Company. The topics were left to be selected each week from the matters then in the public mind. A drawing was made, in stipple and line, of a window without sashes or panes, with "The Window—Look In" sculptured in the stones at the top. Etchings measuring two columns by 6¼ in. were made from this, the one for the labor journal being three columns in proportion. In the mortise representing the window space was given the setting for the body of the advertisement, its hand-set caption, and the company's signature. The cut and type style have not yet been perfected to a point accepted as permanent, the effort being to select the best of each and adhere to them without variation thereafter. A uniformity with its own effect is being sought in these advertisements.

The first of the series was published on Nov. 19, under the caption "Are You Looking?" It was the introductory, the keynote. The caption of the second was "Serving You," and that was a declaration of the vital connection between good service and good-will. The caption of the third was "An 1894 Nickel." The text of that was reproduced in the ELECTRIC RAILWAY JOURNAL of Dec. 19, page 1366. The fourth was headed "Baiting Corporations"; the fifth, "Pleasing Everybody" (in the matter of heat in cars); the sixth, "When the Cars Stop," and the seventh, "Our Business, Too," the relation being to petitions then pending before the State Railroad Commission for authority to curtail expenses by reductions in extra or tripper car schedules. Each of these was rewritten under a different caption for the labor journal columns appearing each week-end.

The effect of the series was noticeable before it had been running a month. The impression seems to be growing in the public mind of Atlanta that there is no disposition on the part of the company to hide anything; that it feels no fear of publicity; that it is seeking publicity, in fact; that it wants to make known its side of matters under discussion; that it asks nothing but fair play and a hearing of all the evidence. The effect of the series has been manifest even in a direction not deliberately anticipated. The newspapers themselves have realized that the company will rent the papers' own megaphones to address the realers, and that therefore it is to the best interest of the papers to be accurate whenever they discuss the company's affairs. "The Window" is distinctive by the very reason of its appearance on a newspaper page. It "stands out," in newspaper parlance, no matter what its surroundings.

SAN FRANCISCO MUNICIPAL RAILWAY

Stockton Street Municipal Tunnel Completed and New Line Opened to Exposition Grounds

On Dec. 29 regular service was inaugurated on the Stockton Street line of the San Francisco Municipal Railway system, and an elaborate program was carried out in celebration of the completion of the tunnel that made the line possible. The new line has 2.56 miles of double track, and runs from Market and Stockton Streets through the Stockton Street tunnel and via North Beach to the Van Ness Avenue entrance to the exposition grounds. From this point it makes a wide loop through Fort Mason military reservation over the same track that is to be used by the Van Ness Avenue line of the Municipal Railway.

The tunnel is 911 ft. long. It was built by the municipality at a cost of about $500,000 to eliminate grades on a direct route from the business district to Chinatown and the North Beach section of the city. It has a width of 55 ft., and is arranged to accommodate pedestrians and vehicular traffic as well as the double track railway. The ceremonies which marked the inauguration of service through it were under the auspices of the Down Town Association, and the Mayor, city engineer and other representatives of the city and civic bodies took part. Eight of the new municipal cars were required to accommodate the official party and bands. Luncheon was served en route to the Fort Mason terminus of the line, where Major-General Arthur Murray received the party with a military band and detachment of troops.

Ten cars were put on the new line, and receipts for the first and second days were $293.75 and $297.55, respectively.

Crosser Bill at This Session.—It is reported that the Crosser bill authorizing the District of Columbia to take over the electric railway systems within the district will be taken up at the present session of Congress.

Catalogs Wanted.—A. Lancelevée, Rues Louis Blanc and Marguerite, Oran, writes that he is anxious to secure from American manufacturers catalogs and bulletins of railway material, wheels, air brakes, springs, trolleys, etc., for possible use in connection with electric railway undertakings in Algiers and Tunis.

Covington Ordinance Unconstitutional.—The city ordinance of Covington, Ky., prohibiting cars of the Cincinnati, Newport & Covington Railway, which cross the Ohio River to Cincinnati, from carrying one-third more passengers than the seating capacity, was annulled as unconstitutional by the Supreme Court of the United States on Jan. 5. The court held that the ordinance was a burden on interstate commerce.

Montreal Franchise Extension Urged.—By a vote of 176 to 159 the members of the Montreal Board of Trade have reaffirmed a resolution that the city should take immediate steps to extend the franchise of the Montreal Tramways on an equitable basis. The opponents of this resolution argued that the time is inopportune and that a commission of experts should be appointed to report on the question. The Montreal Builders' Exchange has also passed a resolution in favor of a speedy settlement of the question.

Chicago Railways Expenditures.—The City Council of Chicago, Ill., has authorized the city comptroller to certify the certificates for construction work completed by the Chicago Railways. The company has done $1,140,000 of construction work, against which temporary bond certificates have been issued. Certification of the work accomplished was withheld by the city comptroller because of a controversy which has now been settled. Bonds of the company to cover the expenditures made will be issued as usual.

Franchise Values in New Jersey.—A meeting of the mayors of a number of cities in New Jersey was held at the Newark City Hall on Jan. 4 to decide upon what steps, if any, could be taken to secure a change in the ruling of the Court of Errors and Appeals on franchise valuations in rate making. Among the suggestions made was one that if these values are to be included in the establishment of rates they were proper subject for taxation by the municipalities. Another meeting will be held Jan. 15 to consider legislation to secure this result.

Bill Filed for Dorchester Tunnel.—Representative Sullivan of Boston has filed a bill with the Secretary of State of Massachusetts for the construction by the Boston Transit Commission of a tunnel from Andrew Square, Dorchester, to the junction of Dudley Street, Columbia Road and Stoughton Street, and thence to the intersection of Bowdoin Street and Geneva Avenue, and from that point to Codman Square. The proposed tunnel will provide a rapid transit route looping from Harvard Square, Cambridge, through Boston proper to Codman Square, Dorchester.

Change in Rules of Procedure.—The Public Service Commission of the Second District of New York has just adopted the first changes in its rules of procedure since the organization of the commission in 1907, designed to provide for the new functions imposed on the commission by the Legislature when such activities as those of the telegraph and telephone companies, auto-bus lines, the steam corporations and the baggage transfer companies were put under its jurisdiction. The changes do not in any way detract from the general simplicity and effectiveness of the thirty-four rules.

Texas Interurban Retrenching.—J. F. Strickland, president of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., issued the following statement recently: "The general decrease in business and the falling off in receipts of late have made it necessary for the companies to follow out a retrenchment policy. We have, therefore, decided to cut the salaries of executive officers beginning with the president and including the heads of departments only. There will be no reductions in other salaries." The reduction will amount to $25,000 or $30,000 per annum.

Mr. Thornton Rises to the Occasion.—H. W. Thornton, general manager of the Great Eastern Railway, London, England, and formerly with the Long Island Railroad, is reported by cable from London on Jan. 3 to have received great praise at the hands of the British press in connection with the facilities which he afforded to newspaper men in their work of covering the wreck which occurred on the line of the Great Eastern Railway at Ilford on Jan. 1. His attitude is said to have been in striking contrast to that previously taken in Great Britain of treating newspaper men generally as annoying interlopers in cases of this kind.

Plea for Rehearing in St. Louis Mill Tax Case.—On Jan. 2 the Supreme Court of Missouri instructed its clerk not to file the motion of the United Railways, St. Louis, for a rehearing in the mill-tax case referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 2, page 70, because the company had not presented the petition within ten days after the court had rendered its decision. H. S. Priest, counsel for the company, then announced that he would present his argument to the court at Jefferson City, saying that the court has the power to allow a motion for rehearing to be filed at any time during the term in which the original decision is handed down. If he fails to secure consideration before the Missouri court for a rehearing Mr. Priest says the case will be appealed to the United States Supreme Court.

Mayors' Utility Bureau Organized.—Preliminary plans for the organization of the national agency through which all American cities may co-operate in exchanging information about public utilities were made at the University Club, Philadelphia, Pa., on Dec. 28, when the trustees appointed at the recent convention of American Mayors held their first meeting. After perfecting their own organization the trustees outlined the activities which will be essayed in 1915 by the new utilities bureau. The election of officers resulted as follows: President, Charles R. Van Hise, president of the University of Wisconsin; secretary, Clyde L. King of the University of Pennsylvania; treasurer, S. S. Fels. Morris L. Cooke, director of public works of Philadelphia, was chosen acting director of the bureau. The problems discussed at the conference of mayors in Philadelphia were reviewed at length in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1914, page 1144.

Modification of Missouri Utility Law Proposed.—The repeal of that provision of the public utilities act of Missouri which prohibits a stock corporation from purchasing or owning to exceed 10 per cent of the stock of any steam or electric railroad will be recommended to the Legislature by the Public Service Commission, according to John M. Atkinson, chairman. Mr. Atkinson is reported to have said that the commission will ask for the repeal of this section because it is regarded as a serious obstacle to the proper development of transportation facilities in Missouri. As stated in the ELECTRIC RAILWAY JOURNAL of Aug. 8, 1914, page 272, William B. McKinley, head of the Illinois Traction Company contends that this 10 per cent statute is practically a bar to the construction of railroads in Missouri and that it would prevent a company like the Illinois Traction Company from owning the stock of a corporation organized in Missouri to construct electric railways.

Extension of Cambridge Subway Nearly Ready for Service.—The Boston Transit Commission has practically completed the section of the Cambridge subway extension in Boston between Park Street and upper Summer Street and within a few weeks it is expected that train service will be extended to a temporary terminal near Chauncy Street, giving rapid transit connections between the Harvard Square line and north and south-bound Washington Street tunnel trains, through a transfer station near the point where the two rapid transit lines cross one above the other. A small amount of station work is being completed by the commission, and the Boston Elevated Railway is installing tracks, signals and other equipment prior to the inauguration of traffic. The opening of the line to this point in advance of its completion to the South Station will be a great convenience to the public on account of the transfer arrangements above outlined, and it is probable that later in the year service will be extended to the railroad terminal.

The Subway Labor Problem.—The Public Service Commission for the First District of New York has announced that it will appeal immediately from the decision of the Appellate Division, First Department, handed down on Dec. 31, holding unconstitutional the alien labor provisions of the State labor law, in order that a final construction of the statute may be obtained from the highest court in the State. The commission's counsel will move for an appeal and will endeavor to get the case before the Court of Appeals at once. The State labor law provides that none but citizens of the United States shall be employed upon public work and that, so far as possible, preference in such employment shall be given to citizens of the State of New York. The question having arisen in the case of one of the contractors for the new subways, a taxpayer's action was begun in the Supreme Court for an injunction to restrain the commission from declaring forfeited any subway contract because of the employment of aliens by the contractor. The commission demurred to this complaint, and the demurrer was sustained by the lower court; but on appeal the Appellate Division reversed this decision and held the law unconstitutional. It is this decision from which an appeal will be taken.

Auto Bus Franchise Hearing Concluded in New York.—The franchise committee of the Board of Estimate and Apportionment of New York held a final hearing on Dec. 31 in regard to the tentative routes for the establishment of additional bus lines in New York City. James L. Quackenbush, counsel for the New York Railways, defined the relations of the New York Railways to the Fifth Avenue Coach Company, which operates buses on Fifth Avenue and other thoroughfares. He said that the Interborough-Metropolitan Company, which owns the stock of the New York Railways, holds in addition about 100,000 shares of the 235,000 shares of stock of the Fifth Avenue Coach Company. According to Mr. Quackenbush a deficit was likely to occur in the earnings of the coach company when the new subways were placed in operation because the present congestion would not continue to exist with the new rapid transit lines in operation. Edward A. Maher, vice-president and general manager of the Third Avenue Railway, said that 58 per cent of the street accidents in London were the result of motor bus operation. He asked the city to protect the interests of the surface railway companies. Briefs are to be submitted by Jan. 9 and the committee will then formulate a tentative motor bus scheme for further criticism.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railway Association

The Illinois Electric Railway Association will hold its annual meeting on Jan. 15 at the Auditorium Hotel, Chicago. The session will be devoted to committee reports and the election of officers and will be followed by the regular association luncheon.

Chamber of Commerce of the United States

The annual meeting of the Chamber of Commerce of the United States will be held at the New Willard Hotel, Washington, D. C., on Feb. 3, 4 and 5, 1915. A considerable part of the program will be devoted to foreign trade, the elimination of undue restrictions, the upbuilding of the merchant marine, and the aid that can be rendered by the Federal Reserve Board

Western Association of Electrical Inspectors

The tenth annual national convention of the Western Association of Electrical Inspectors will be held at the Hotel Raddison, Minneapolis, Minn., on Jan. 26, 27 and 28. The program this year includes only one subject of interest to electric railways, namely, the report of the committee on electric traction systems. This committee was instructed to advise the members concerning electrical hazards involved in the operation of electric traction systems and to propose safeguards.

Wisconsin Electrical Association

President P. H. Korst announces that the annual convention of the Wisconsin Electrical Association and the Wisconsin Gas Association will be held in Milwaukee, Wis., on Jan. 20, 21 and 22, at the Hotel Pfister. This is the first year that a joint meeting of the associations has been arranged. Secretary George Allison announces the following program for that part of the association's work which is of special interest to central station and electric railway companies:

Jan. 21

Paper, "Financing of Public Utility Properties," by Andrew Cooke, consulting financial expert, Chicago, formerly vice-president of the Harris Trust & Savings Bank.

Paper, "The Continuous Meter Reading and Discount System," by F. J. Maxwell, auditor of the Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.

Paper, "Advertising Influence of Public Service Employees," by R. O. Jasperson, advertising agent Milwaukee Gas Light Company.

Paper, "The Wisconsin Railroad Commission's Method of Rate-Making," by a member of the commission.

Paper, "Practical Effect of the Workmen's Compensation Act," by Carl Muskat, attorney, Milwaukee, Wis.

Paper, "Increased Taxation in Wisconsin and Its Effects on Public Service Companies," by Edwin Gruhl, assistant to president of the Watertown Gas & Electric Company, Watertown, Wis.

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Paper, "One-Man Electric Car Operation in a Small City," by R. M. Howard, general manager of the Minnesota division of the Wisconsin Railway, Light & Power Company, Winona.

Paper, "Latent Water Powers and Difficulties of Development under the New Wisconsin Water Power Law," by Daniel W. Mead, Madison, Wis.

Paper, "Latest Tendencies and Developments in Street Lighting and Incandescent Lamps," by S. L. E. Rose, illuminating engineer of the General Electric Company, Schenectady, N. Y.

Paper, "How to Overcome Some Operating Difficulties of Small Electric Utilities," by J. N. Cadby and C. B. Hayden, electrical engineers of the Railroad Commission of Wisconsin.

Paper, "Experience and Suggestions for the New Business Departments of a Small Electric Utility," by C. M. Axford, of the commercial department of the Wisconsin Public Service Company, Green Bay, Wis.

Paper, "Practical Suggestions for Increasing the Efficiency of Small Steam-Electric Power Plants," by W. F. Lathrop, of the Wisconsin Gas & Electric Company, Racine.

Financial and Corporate

FINANCIAL REVIEW AND FORECAST

According to a review of the 1914 financial situation, both domestic and foreign, made by John Moody, the last year has marked the culmination of the era of high finance which set in more than fifteen years ago. Practically all the "bubbles" growing out of that extraordinary period have now burst, and security values as a whole have returned to approximate bases of actual values. Moreover, public opinion, which for ten years has generally been antagonistic to corporate interests, has now definitely veered, and the pendulum is about to swing the other way. The federal reserve banking system has for the first time in history given legitimate business opportunity a firm basis on which to build, and has eliminated all dangers of financial panics of the style of 1873 and 1907. The European war has caused a severe setback in the progress towards prosperity for which the country was directly headed six months ago, but it is not a lasting disaster for this country.

Mr. Moody takes the unusual view that the final effect of the destruction of capital and of general impoverishment throughout Europe on account of the war will cause a sharp fall in per capita consumption of goods and average commodity prices. This will reduce the demand for new capital much more than the supply is reduced, which will cause interest rates to fall. This condition will be maintained for five or six years, or even longer. With money cheap it pays better to buy bonds than to loan money, and this buying will tend to maintain and raise bond prices. As a sure result, high grade bond prices will tend to rise steadily until the point of equalization is reached with the general price of capital. Following this will logically come a more cautious rise in bonds and securities of junior grade, the values of which are more directly affected by the trend of interest rates than by earning power and profits. Speculative securities, however, will not be benefited to a large extent by this general factor. There will be dullness rather than weakness in ordinary stocks, as most prices have already discounted a period of unusual depression.

A prominent authority in the electric railway field states that money is getting easier and this will continue during the next three months. At the end of the war, however, high interest rates will prevail for a considerable period on account of the demand for capital to make up the destruction caused by the war. It is expected that during the spring and summer there will be a considerable amount of refunding and financing, as companies will take this opportunity for changing short-time loans to long-term securities. Not much new investment, however, is looked for this year in the electric lighting, power and railway business. All necessary maintenance work will be done and probably a few extensions will be made, but all work will be kept down to a reasonable minimum. There will be less investment in hydroelectric schemes, because investors now realize that the steam turbine is more reliable than water power, requires far less investment and under most conditions is as economical. The tariff situation was initially responsible for the present depression and that it still had something to do with it, but its effect is now overshadowed by the war. In the wheat district the farmers are feeling prosperous because of the high prices secured for their product, although there are a great many men out of work even in that district. This money in these districts will go into refinancing rehabilitation and short extensions, but very little into new construction.

Another electric railway operator believes that these carriers will not give out large orders for supplies until about April; but by that time he expects to see either a considerable business expansion or the exact reverse. The construction period, therefore, will be later this year than usual and the total amount of expenditures will be curtailed. At the same time a slight increase in railway business may be expected, with a corresponding increase in expenditures for maintenance. The primary difficulty is to secure money, which is not due to a shortage but to a feeling of panic resulting in the hoarding of cash in banks. In general the business condition is inherently sound and not so bad as popularly believed.

HUDSON & MANHATTAN RAILROAD EARNINGS

Banking Firm in Letter to Security Holders Reviews Railroad's Progress in 1914

Harvey Fisk & Sons, New York, have issued a statement to the bondholders and stockholders of the Hudson & Manhattan Railroad, New York, N. Y., reviewing the company's record during 1914. The following comparison of income is included:

	1914	1913
Passengers carried	*59,800,000	59,434,152
Gross revenue, all sources	$5,550,000	$5,512,762
Operating expenses and taxes (including depreciation)	2,491,000	2,515,637
Gross income applicable to fixed charges	$3,059,000	$2,997,125
Income deductions other than bond interest	250,000	261,435
Net income applicable to bond interest	$2,809,000	$2,735,690
N. Y. & New Jersey 5's	250,000	250,000
Balance	$2,559,000	$2,485,690
First lien and refunding 5's and H. M. 4½'s	1,870,605	1,870,605
Balance available for income bonds	$688,395	$615,085

*November and December partly estimated.

It is stated that, in view of the fact that company's business was showing a steady increase up to the time of the outbreak of the European war, it is probable but for that event and its immediate general effect, and particularly upon the shipping trade of Hoboken, that this year's business would have been markedly the best in the company's history. As it is, the company more than held its own and reports an excellent year's business with the 5 per cent interest upon its first mortgage bonds earned one and a third times, leaving a surplus, after making proper allowance for the upkeep of the property, depreciation, renewal and amortization, sufficient to permit of the payment of 2 per cent interest upon the adjustment income mortgage bonds.

The statement continues:

"The fact should be kept in mind that these results have been obtained with the use of only about 40 per cent of the capacity of the tubes. There are now being carried in the cars of the company over half of the number of passengers who used the ferries in 1907, the year before the uptown tubes were opened for business. The total number of people crossing under or over the Hudson river in 1914 closely approximated 160,000,000, of which the Hudson tubes carried say 60,000,000, or 38 per cent. Without the expenditure of another dollar for equipment 15,000,000 more passengers could be carried through the tubes and 75,000,000 more, or 150,000,000 in all, could be carried by the expenditure of a moderate amount of capital for additional equipment. These figures of the capacity of the tubes are arrived at after making due allowance for rush hour service. In other words, they do not represent theoretical capacity, but actual capacity, based upon normal and usual operating conditions."

NORTHERN ELECTRIC RAILWAY FINANCES

The bankers' committee which, under A. Bonnheim, chairman, has been working on a plan of rehabilitation for the Northern Electric Railway, Chico, Cal., is sending to security holders of the company a letter outlining its plans and asking signatures to the agreements necessary to make the plan effective. Most of the features of the proposed arrangements were noted in the ELECTRIC RAILWAY JOURNAL of Dec. 5.

The new agreements do not differ greatly from the original draft, except as to the release of the Sloss family from liability as endorsers on the delivery of securities aggregating $500,000. The agreements provide for the purchase from the Northern Electric Railway of $1,400,000 of underlying bonds at 90, now held as security by banks and individuals at about 70. The proceeds will pay off obligations of about $980,000 and give the company about $280,000 new money, of which $130,000 will go to the payment of coupon interest and sinking fund on the underlying bonds. This will leave about $150,000 in the treasury of the company for working capital.

In connection with its letter and copies of the proposed agreements the committee has made public a report made on Feb. 6, 1914, by the J. G. White Engineering Corporation with respect to the physical condition and values of the

Northern Electric Railway, including the main trackage and all subsidiaries. This report shows that the net earnings from the operation of the system have grown from $73,365 in 1907 to $381,914 in 1914. The J. G. White Engineering Corporation estimates that $527,103 net ought to be earned in 1915 and $577,935 in 1916. The estimate of the reproduction cost of the road follows: Vallejo & Northern, right-of-way, lands and construction, $1,012,215; Northern Electric, right-of-way, lands and construction and equipment, $5,562,930; Sacramento & Woodland, right-of-way, lands and construction, $707,610; Marysville & Colusa, right-of-way, lands and construction, $903,762; total $8,186,517. Add legal and organization expenses, engineering and supervision, miscellaneous and general expense, interest during construction (20 per cent), $1,637,303. Approximate reproduction cost, exclusive of enhanced value of lands, $9,823,820.

DISTRIBUTION OF PACIFIC GAS & ELECTRIC STOCK

On Aug. 15, 1914, the Pacific Gas & Electric Company, San Francisco, Cal., announced the sale of $8,750,000 par value of its new issue of first preferred 6 per cent stock. The present distribution of this issue, the sale of which has been followed in previous issues of the ELECTRIC RAILWAY JOURNAL, is as follows for stock issued and subscribed for:

	Number of Subscribers	Par Value of Shares Taken
Employees	1621	$548,600
Customers	1162	1,325,600
Stockholders	712	6,875,800
Total	3495	$8,750,000

The participation of employees and consumers in the purchase of the securities is particularly noteworthy. Employees numbering 1621, constituting about 40 per cent of the permanent staff, have become stockholders, and 1162 consumers have purchased $1,325,600 of the new stock. Additional sales to investors in the company's territory are being made at the average rate of about $10,000 per day, and the allotment of stock set aside to meet anticipated demands of consumers promises to become exhausted in the very near future.

The company now has outstanding about $51,000,000 par value of stock, including its common, junior preferred and first preferred. As shown in the following statement, almost one-half of all this stock is owned on the Pacific Coast:

	Number of Holders	Shares	Par Value
Pacific Coast	3976	234,751	$23,475,100
Middle West	768	65,874	6,587,400
Eastern Coast	665	165,459	16,545,900
Europe	383	42,509	4,250,900
Total	5792	508,593	$50,859,300

The proportion of Pacific Coast holdings has increased almost 10 per cent during the last six months, and with the continuing distribution of first preferred stock among local investors it will probably show further increase. Of the total number of individual stockholders, 3976, almost 70 per cent of the total number, are residents of California, having first hand knowledge of the company's properties, business and management.

Alabama Traction Light & Power Company, New York, N. Y.—The holders of certificates of option to purchase shares of the Alabama Traction Light & Power Company, Ltd., at $15 (at current rate of exchange) were lately informed that the option expired on Dec. 31. Any holders desiring to extend the option to Dec. 31, 1915, can do so on payment of ten shillings per share. As an alternative a holder may have the option extended until twelve months after the conclusion of peace or until the expiration of the Court's Act of 1914 on the payment of £2 per share.

Arkansas Valley Interurban Railway, Wichita, Kan.—It is reported that the Arkansas Valley Interurban Railway has been asked to take over the operation of the proposed Newton, Kansas & Nebraska Railway, but no definite response is announced. This new steam railroad has the backing of $20,000 of bonds recently voted by the city of Newton, Kan., and township elections are planned for like purposes. The first unit proposed is 28 miles, from Newton northward to Canton. It is said that the operation of so short a road by steam might not be profitable, and advances have therefore been made to the electric line.

Bay State Street Railway, Boston, Mass.—A semi-annual dividend of 2½ per cent was paid on Dec. 31 on the $20,517,200 of common stock of the Bay State Street Railway. This compares with 2¼ per cent on June 30, 1914, 3 per cent on Dec. 31, 1913, 2½ per cent on June 30, 1913, 3 per cent on Dec. 31, 1912, 2 per cent on June 26, 1912, and 3 per cent on Dec. 30, 1911.

Boston Suburban Electric Companies, Newtonville, Mass.—The trustees of the Boston Suburban Electric Companies on Dec. 31 declared a quarterly dividend of $1 on the preferred stock. This restores the dividend to the usual basis, from which it had been reduced to 50 cents at the last quarter. The reduction was due in part to the increase of $100,000 in wages by arbitration. Since then the company's principal subsidiary, the Middlesex & Boston Street Railway, increased its fares, thus giving larger dividends to the holding company.

British Columbia Electric Railway, Vancouver, B. C.—A dividend at the rate of 8 per cent per annum has been declared on the deferred ordinary stock of the British Columbia Electric Railway for the half year, making 8 per cent for the year. The same amount was paid last year.

Chicago (Ill.) Elevated Railway.—E. H. Rollins & Son, Boston, are offering on a 4¼ per cent basis a small portion remaining unsold of the $2,050,000 of the equipment trust gold 5 per cent certificates, series A, issued by the Commercial Trust Company, Philadelphia, as trustee, with payments jointly and severally guaranteed by endorsement on each certificate by the Metropolitan West-side Elevated Railroad, the Northwestern Elevated Railroad and the South-side Elevated Railroad. These certificates are dated Aug. 1, 1914, and are due in semi-annual installments from Feb. 1, 1917, to Aug. 1, 1926, $102,000 each Feb. 1 and $103,000 each Aug. 1. They are secured by one hundred and eighty-four all-steel passenger motor cars and sixty-six all-steel passenger trailer cars.

Cincinnati, Lawrenceburg & Aurora Electric Street Railway, Cincinnati, Ohio.—On Dec. 28 Frank B. Shutts tendered his resignation as receiver of the property of the Cincinnati, Lawrenceburg & Aurora Electric Street Railway to Insolvency Judge Warner of Cincinnati. C. E. Hooven, who was president of the solvent company, was appointed in his stead, under a bond of $25,000. Mr. Shutts resigned on account of business in the South that required much of his attention.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—At a meeting of the board of directors of the Cincinnati, Milford & Loveland Traction Company on Dec. 29, 1914, Charles C. Harris, superintendent, was elected president to succeed B. H. Kroger, who disposed of his interest recently. Mr. Harris and A. C. Wenzel, auditor of the company, were elected members of the board of directors to represent the interests that purchased Mr. Kroger's stock. Thorne Baker was elected vice-president; C. W. Baker, treasurer, and J. N. Roberts, secretary.

Citizen's Traction Company, Oil City, Pa.—A semi-annual dividend of 3 per cent has been declared on the $1,000,000 of 6 per cent cumulative preferred stock of the Citizen's Traction Company, payable on Jan. 5 to holders of record of Dec. 31. In July, 1914, 2½ per cent was paid; in January, 1914, and July, 1913, 2 per cent., and in January, 1913, an initial payment of 2½ per cent.

Columbus, Delaware & Marion Electric Railroad, Columbus, Ohio.—The Ohio Supreme Court in a recent final ruling confirmed the claim of Newton J. Catrow against the Columbus, Delaware & Marion Electric Railroad. This claim was for $72,963, which he contended was due him on a note originally made to John G. Webb of Springfield, Ohio, who promoted the road, and assigned to him by the latter. This ruling sustains the Common Pleas and Appelate Courts of Franklin county. The case had been in the courts since August, 1919. When the suit was brought, a petition was also filed for a receiver, and Eli M. West was appointed to that position, which he still holds.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The stockholders of the Columbus Railway Power &

Light Company are to vote at the annual meeting on Jan. 26 on the question of purchasing all the property and assets of the Columbus Light, Heat & Power Company. Previous references to the consolidation of these companies were made in the ELECTRIC RAILWAY JOURNAL of Nov. 7, Nov. 14 and Nov. 28.

Gary & Interurban Railroad, Gary, Ind.—The directors of the Gary & Interurban Railroad, which operates four electric railway companies consolidated in January, 1913, have filed a motion through their attorney to dismiss the bill of complaint filed in the Federal Court by J. T. Kinsley, of Philadelphia. The suit is an effort to test the validity of the consolidation of these roads, and follows a denial of a similar order in the State courts, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 14. The motion by the company's attorneys for a dismissal is based on the fact that the consolidation was made under the Indiana statutes, and dissolution can be brought about only by the State of Indiana.

Havana Electric Railway Light & Power Company, Havana, Cuba.—The Guaranty Trust Company, New York, is offering at 99 and interest the unsold portion of a total authorized issue of $2,000,000 of two-year 6 per cent secured gold notes of the Havana Electric Railway Light & Power Company, dated Sept. 1, 1914, and due on Sept. 1, 1916. The notes are redeemable at the option of the company at any time upon thirty days notice, at 101 and interest prior to Dec. 1, 1915, and at 100½ and interest if redeemed on or after that day. These notes provide funds to complete the new powerhouse of the company. A new mortgage has been filed with the Guaranty Trust Company as trustee to secure not exceeding $25,000,000 of general mortgage 5 per cent sinking fund gold bonds, of which the entire amount now issued ($4,000,000) has been pledged to secure the above $2,000,000 of notes. The new bonds are dated Sept. 1, 1914, and due on Sept. 1, 1954. They are subject to redemption at the option of the company at any time at thirty days notice at 105. An amount of $14,100,000 is reserved to be used in exchange for or to take up certain outstanding obligations, $2,500,000 is reserved to assist in refunding certain issues, and $4,400,000 is reserved for improvements and extensions.

Lorain (Ohio) Street Railroad.—The Public Utilities Commission of Ohio has authorized the Lorain Street Railroad to sell $200,000 par value of its three-year collateral trust promissory notes or bonds, such securities to bear interest at the rate of 6 per cent. They are to be callable at par and interest at the option of the company upon fifteen days written notice, with the privilege of conversion into bonds of the $750,000 issue dated Nov. 1, 1897, on the basis of 92½. The company is also authorized to secure the three-year notes or bonds by depositing under a collateral trust agreement the $200,000 par value of the $750,000 issue which had been retained by the Guaranty Trust Company, New York, trustee, for exchange into the first mortgage bonds of the Lorain Street Railway, maturing on Jan. 1, 1915. There is also to be deposited $100,000 of the $117,000 par value of the bond issue certified by the Citizen's Savings & Trust Company, trustee, on July 1, 1906. The company is authorized to sell the three-year notes or bonds at not less than 95, the proceeds to be used for the payment and redemption of the before mentioned first mortgage bonds of the Lorain Street Railway, maturing on Jan. 1, 1915. Authority is granted to the Lake Shore Electric Railway, the owner of all of the capital stock of the Lorain Street Railroad, to guarantee the payment of the notes, with interest, at maturity.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The California Railroad Commission has issued a supplemental order approving the form of a trust deed between the Los Angeles & San Diego Beach Railway and the Southern Trust & Savings Bank of San Diego, dated Dec. 31, 1914, and securing an issue of $375,000 of bonds recently approved by the commission, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 5.

Massachusetts Northeastern Street Railway, Haverill, Mass.—N. W. Harris & Company, Inc., and Merrill Oldham & Company, Boston, are offering jointly at 97 and interest, to yield 5¼ per cent, $707,000 of first and refunding mortgage 5 per cent gold bonds of the Massachusetts Northeastern Street Railway, dated July 1, 1914, and due on July 1, 1934, but callable at 110 and interest on any interest date upon forty-three days notice. These bonds are part of a total issue of $2,000,000, of which $356,000 is reserved to retire existing bonds and $1,000,000 for additions and improvements.

Norwood, Canton & Sharon Street Railway, Canton, Mass.—The Massachusetts Public Service Commission has authorized an issue of $30,000 of twenty-year 5 per cent bonds by the Norwood, Canton & Sharon Street Railway to be used in reducing the company's capital stock to $32,500. The application for the issuance of these bonds was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 5.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Wallace Alexander, chairman of the meeting of the security holders of the Oakland, Antioch & Eastern Railway on Dec. 11, has announced the choice of Louis Rosenthal, chairman, J. F. Koster, James S. Wallace and Wallace Alexander as a special committee to act with a committee appointed by the board of directors. This committee will pass upon the reports of experts who are examining the present status of the company and determine the right course for future development.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has declared a quarterly dividend of 1¾ per cent on its common stock, payable on Feb. 1 in scrip, redeemable at the option of the company on or before Feb. 1, 1918, to bear interest at the rate of 7 per cent. This is the second quarter the company has paid scrip. The first scrip dividend was paid on Nov. 2 and matures in eighteen months, while the present issue will not mature in three years. Lengthening the life of the present scrip, it is pointed out, is for the purpose of diversifying the obligations so they may be retired out of earnings.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The California Railroad Commission has rendered a decision authorizing the San Francisco-Oakland Terminal Railways to renew two promissory notes in the sum of $5,890. These notes will bear interest at 6 per cent per annum and will be payable ninety days after date to the Railway Improvement Company.

Southern Traction Company of Illinois, East St. Louis, Ill.—The receivers of the Southern Traction Company of Illinois on Dec. 31 filed suit against the Lorimer-Gallagher Construction Company for $364,789. The claimants allege that the amount involved is the difference between money actually expended in constructing the partly completed lines of the company and the sum realized on $1,090,000 of securities hypothecated by the construction company with the suspended La Salle Street Bank, Chicago.

United Railways of St. Louis, St. Louis, Mo.—The United Railways of St. Louis has sold to the Mississippi Valley Trust Company and the Altheimer & Rawlings Investment Company $600,000 of St. Louis & Suburban Railway consolidated first mortgage 5 per cent gold bonds. These were held in escrow for the retirement of the $600,000 of St. Louis, Cable & Western Railway first mortgage bonds, which became due and were paid on Nov. 1.

United Traction Company, Pittsburgh, Pa.—It is reported that a preliminary meeting of preferred stockholders of the United Traction Company of Pittsburgh was recently held at the office of the Philadelphia Trust, Safe Deposit & Insurance Company for the appointment of a committee to take action in regard to the anticipated passing or payment in script of the semi-annual dividend of 2½ per cent usually paid on Jan. 1, on the company's $3,000,000 of 5 per cent cumulative preferred stock. The company in a letter to the preferred stockholders had previously stated that under the operating agreement of 1902 between the company and the Pittsburgh Railways, the latter paid ordinary maintenance expenses and the former the expenses for extraordinary repairs. It might, and probably would be necessary to use during 1915 the rental received from the Pittsburgh Railways in payment for such extraordinary repairs and improvements, etc., to the lines of railway and the property of the company, and possibly to issue some form of script to the stockholders. The company's $17,000,000 of common stock, upon which no dividends have been paid since 1912, is all owned by the Pittsburgh Railways.

DIVIDENDS DECLARED

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Bay State Street Railway, Boston, Mass., 3 per cent, preferred; 2½ per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Citizen's Traction Company, Oil City, Pa., $1.50, preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¼ per cent, second preferred; 2 per cent, common.

Kentucky Securities Corporation, Lexington, Ken., quarterly, 1½ per cent., preferred.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent; bonus, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	$64,570	*$30,293	$34,277	$17,484	$16,793
1 " " '13	65,372	*28,704	36,668	17,354	19,314
12 " " '14	777,888	*376,192	401,696	209,010	192,686
12 " " '13	758,775	*344,605	414,170	207,571	206,599

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Nov., '14	$84,896	*$55,377	$29,519	$29,122	$397
1 " " '13	97,032	*59,424	37,608	26,072	11,536
12 " " '14	1,096,462	*694,357	402,105	336,185	65,920
12 " " '13	1,200,004	*713,936	486,068	295,931	190,137

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Nov., '14	$261,656	*$150,457	$111,199	$42,584	$68,615
1 " " '13	267,661	*165,022	102,639	......	......

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Nov., '14	$1,239,728	*$668,055	$571,673	$361,226	$210,447
1 " " '13	1,237,366	*689,531	547,835	325,395	222,440
12 " " '14	14,757,391	*8,344,910	6,412,481	4,185,446	2,227,035
12 " " '13	14,045,728	*8,133,070	5,912,658	3,807,765	2,104,893

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Nov., '14	$196,249	*$121,462	$74,787	$62,385	$12,402
1 " " '13	195,100	*110,630	84,470	63,576	20,894
12 " " '14	2,515,657	*1,448,814	1,066,843	759,912	306,931
12 " " '13	2,324,384	*1,298,822	1,025,562	707,207	318,355

EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.

1m., Nov., '14	$207,713	*$122,761	$84,952	$58,401	$26,551
1 " " '13	236,850	*137,148	99,702	49,940	49,762
12 " " '14	2,648,458	*1,650,308	998,150	676,854	321,333
12 " " '13	2,690,543	*1,572,337	1,118,206	590,451	527,755

GRAND RAPIDS (MICH.) RAILWAY

1m., Nov., '14	$98,208	*$68,834	$29,374	$13.701	$15,673
1 " " '13	101,387	*66,017	35,370	11,787	23,583
12 " " '14	1,283,116	*837,226	445,890	162,037	283,853
12 " " '13	1,283,466	*797,441	489,025	168,462	320,563

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m., Nov., '14	$49,437	*$37,253	$12,184	$15,670	†$3,486
1 " " '13	51,794	*34,835	16,959	15,338	1,621
12 " " '14	677,269	*466,270	210,999	186,121	24,878
12 " " '13	672,493	*422,884	249,609	178,637	70,972

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Nov., '14	$184,099	*$104,308	$79,791	$41,899	$37,892
1 " " '13	189,660	*106,246	83,414	39,828	43,586
12 " " '14	2,240,922	*1,352,859	888,063	508,520	379,543
12 " " '13	2,198,393	*1,313,999	884,394	461,300	423,094

PORTLAND (MAINE) RAILROAD

1m., Nov., '14	$76,066	*$52,241	$23,825	$20,436	$3,389
1 " " '13	75,113	*50,468	24,645	21,695	2,950
12 " " '14	1,043,651	*644,979	398,672	252,771	145,901
12 " " '13	1,033,142	*698,666	334,476	167,636	166,840

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Nov., '14	$494,626	$257,639	$236,987	$183,066	$53,921
1 " " '13	576,244	272,250	303,994	176,425	127,569
12 " " '14	6,366,154	3,284,272	3,081,882	2,165,187	916,695
12 " " '13	6,703,123	3,301,122	3,402,001	1,984,520	1,417,481

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*Includes taxes. †Deficit.

Traffic and Transportation

ROCHESTER FARE CASE

Final Arguments Before Commission in Rush-Hour 3-Cent-Fare Case

Final arguments on the petition of the city of Rochester for 3-cent street car fares were heard before the Public Service Commission of the Second District of New York at Albany on the afternoon of Jan. 6. For the city Assistant Corporation Counsel Cunningham made the principal address, summing up the arguments he has made throughout the hearings and supplementing his written brief. For the New York State Railways D. M. Beach made the principal argument, supplemented by Horace E. Andrews, president, and Walter L. Kernan, vice-president.

Both sides agreed that for the purposes of the proceedings the capital sum on which the company was entitled to earn a return should be considered as $10,000,000. A disagreement arose over certain items of running expenses as alleged by the company, and the commission has instructed its accountants to examine these and report to the commission. Commissioner Decker, who presided at the session on Jan. 6, stated that should all of the contentions of the company in these respects be sustained by the accountants there would be no grounds for reducing the fare in Rochester. Should the contention of the city authorities that these items are excessive be sustained, Mr. Decker said there might be grounds for reducing the fare in view of the prospective increase of business which such a reduction might under certain circumstances be expected to entail.

The items contested were the company's allowances for damage and accident claims, for the rent of the subways in which it carries all its wires in the Rochester 5-cent-fare zone, for the cost of power, and for the increase in wages granted by the recent decision of the arbitration committee.

The deductions from revenues which the company wanted and the allowance of which will depend on the report of an examiner of the commission were $48,000 for increased wages, $108,000 for increased damages and accidents, and $19,000 for conduit rental.

The city was represented by Mayor Edgerton, as well as Mr. Cunningham, but the Mayor announced that he was present only as a spectator. At the opening of the hearing Mr. Cunningham presented to the commission a copy of an alleged interview with Commissioner Devoe P. Hodson, printed in a Rochester paper on April 17, 1913, in which the commissioner was quoted as saying that a 3-cent fare in Rochester for workingmen "would be discriminatory." Commissioner Hodson, who was sitting, read the printed interview through and then said: "I have never prejudged a case and I have had considerable judicial experience. No one in Buffalo would believe that I would do such a thing. I may have said offhand that a report might be so drawn as to appear unjust, but to express such an opinion deliberately for publication, I never have. If this is presented as a reason why I should be unfit to sit in this case, however, I shall withdraw at once, though I did not express myself as conveyed in this interview."

Mr. Cunningham asserted that he merely submitted the facts to the commission without asking for the withdrawal of the commissioner, and Commissioner Decker, presiding, ruled that they did not constitute legal grounds for the withdrawal of Mr. Hodson. Mr. Hodson nevertheless insisted on withdrawing from the case and announced that he will take no part in the decision of the commission.

Mr. Cunningham suggested that pending the decision of the commission on the general 3-cent-fare proposition the company be ordered to charge only 3 cents for passengers who were not supplied with seats. He said this idea might be further carried out until the decision of this case by charging a 3-cent fare for those in seats and only 2 cents for standees.

D. M. Beach, for the company, declared that if street railways and other large enterprises were to be operated successfully they must get an even larger return than 6 per cent on their stock. As an instance of the difficulty of the Rochester railways he cited their failure to sell bonds authorized by the commission last year at the price specified, and said that unless stock could be made an attractive purchase for the investor it would be increasingly difficult to finance extensions and improvements. He declared that the Rochester railways had expended more for extensions and improvements in the last few years than any other business enterprise of like magnitude in the city, but said that with a 3-cent fare these expenditures would have to stop.

Mr. Beach met the assertion of Mr. Cunningham that Rochester had to pay more for power than other cities deriving it from the same source by explaining that the other cities bought the power "raw" or the high tension voltage, transforming it themselves, while Rochester bought it already transformed to low voltage direct current for use in the cars. He concluded his argument with the assertion that even on the reduced figures for which Mr. Cunningham contends the company is entitled to return, that return would be only 1 per cent under a 3-cent fare ruling of the commission.

Mr. Kernan answered the contention of Mr. Cunningham that the street railway properties had been consolidated into the New York State Railways to stifle competition. He said that the whole proceeding was conducted under the supervision of the commission and had been approved by it as a proper means for financing the properties involved.

TWIN CITY PENSION ANNOUNCEMENT

Fifty Per Cent of Former Wage for All Employees Who Retire on Pension

C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., made the following announcement on Jan. 1 regarding the establishment of a pension plan for the employees:

"For some years past it has been the desire of the management of the companies comprising the Twin City Lines to adopt some plan providing for faithful employees when they had reached the age when they could no longer stand the physical strain incident to their employment, and when it was desirable that they should be relieved of their active work and at no expense whatever to them. We believe that our companies are now financially able to carry out this plan and have worked out one which we hope will meet with the approval of our employees.

"Briefly, the plan provides for the organization of an employees mutual benefit association, in the management of which our employees shall participate, and for the payment of disability, sickness and death benefits, as well as free medical services at the stations. Membership in the association is to be divided into three classes as follows:

"Class A—Employees whose monthly wage is $100 and not more than $208.33.

"Class B—Employees whose monthly wage is $60 and less than $100.

"Class C—Employees whose monthly wage is less than $60.

"The company will pay the entrance fee of every employee who joins the association during the first three months of its organization.

"The monthly dues of the association will be:

"Class A members, 90 cents; Class B, 60 cents; Class C, 30 cents.

"The company will pay into the association for its use and benefit monthly an amount equal to 50 per cent of the monthly dues of members. In addition the company will also pay the entire cost of management and administration of the affairs of the association, including the salaries and expenses of the medical staff. The company will also continue to furnish clubrooms to employees, as in the past. The Employees Mutual Benefit Association will pay accident benefits as follows: Class A members, $12.25 per week for fifty-two weeks; Class B members, $10.50 per week for fifty-two weeks; Class C members, $7 per week for fifty-two weeks.

"It will pay sick benefits as follows: Class A members, $12.25 per week for fifty-two weeks; Class B members, $10.50 per week for fifty-two weeks; Class C members, $7 per week for fifty-two weeks.

"It will pay death benefits as follows: Class A members, $600; Class B members, $500; Class C members, $300.

"The pension system established at this time provides for the payment of pensions to old employees who may be retired at the age of sixty-five years, and draw a pension thereafter. The pension system is based on 2 per cent per year of service of the average annual wage for the last ten years, with a maximum of 50 per cent. Practically speaking, this means that all of our employees who retire on pensions will draw 50 per cent of their former wage. No part of the pension payments is to be contributed by employees, the company paying the entire pension.

"We believe when the employees of our companies have familiarized themselves with the provisions of the constitution and by-laws of the Employees Mutual Benefit Association and the rules governing it that the plan will meet with their cordial endorsement and that the association will have practically all of the employees enrolled in its membership within a few months."

ST. JOSEPH RATES RESTRAINED

An order restraining the Missouri Public Service Commission from enforcing its decision establishing lower commutation rates on the Kansas City, Clay County & St. Joseph Railway was issued on Dec. 30 by Federal Judge A. L. Van Valkenburgh at Kansas City. The lower rates had been ordered to go into effect on Jan. 1. The company had asked a rehearing by the commission, which had been denied. The injunction will be effective against the lower rates until such time as two other federal judges may hear the case with Judge Van Valkenburgh, who intimated that this might occur within three weeks.

The application for the restraining order was based upon the confiscatory nature of the commission's order. The complaint alleged that the valuation arrived at by the commission, on the basis of which the new rates were figured, was so low that apparently reasonable earnings upon it would not allow a living income upon the operation of the property. Among the items of the complaint displaying the allegations of deficient valuation by the commission were many affidavits by persons formerly connected with the railway and by officials of other interurban railways serving Kansas City. The court gave the commission ten days in which to file a brief. The company's case was presented by Judge J. M. Olin, Madison, who has conducted the company's affairs before the commission, and Bowersock, Hall & Hook, Kansas City.

AUGUSTA-AIKEN FARE INCREASE ALLOWED

Full Text of the Resolution Allowing the Company to Increase Fares from 1 Cent to 2 Cents a Mile

The Railroad Commission of South Carolina on Dec. 29 adopted a resolution reaffirming the order of Nov. 18, which allows the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., to increase its passenger rates from 1 cent to 2 cents a mile. B. L. Caughman and G. McDuffie Hampton voted for the resolution. John G. Richards, Jr., chairman, voted against the resolution. Commissioner Hampton offered the following resolution, which was adopted:

"After carefully weighing all the testimony during the hearing held Dec. 10 in Columbia and continued to Augusta on Dec. 16 and 17, inclusive, I am more than ever convinced that the resolution adopted by the majority of the board on Nov. 12, 1914, should stand in its entirety, with the addition to the resolution of the words, 'the minimum fare shall be 5 cents.'

"My decision is arrived at for the following reasons: First, the testimony, especially at the Augusta hearing, convinces me that the Augusta-Aiken Railway & Electric Corporation did not get a fair return on its investment; secondly, that as an interurban line operating in South Carolina it should be entitled to the same rate and privileges enjoyed by similar roads. For the last twelve years this road has operated under a passenger rate of 1 cent per mile voluntarily put in. It has applied to the Railroad Commission for a flat rate of 2 cents, which I sincerely think is just and equitable. Should the Railroad Commission refuse to grant the petition it would be a decided case of discrimination and would deny the Augusta-Aiken Railway & Electric Corporation the right to be placed on a parity with similar roads in the State. To my mind, this would create a distinct discrimination and establish a precedent by the commission that would be far-reaching and lead to a change of rate-making in the future that would be hard to adjust, in my judgment.

"Complaint of service, which incidentally developed at these hearings, has nothing to do with rate-making. The commission will investigate this matter in the usual form and have the proper service rendered in a reasonable time.

"Section 3174, code of South Carolina, 1912, reads, in part, as follows: 'The commissioners . . . shall make reasonable and just rules and regulations to be observed by all railroad companies doing business in this State, as to charges to any and all points for the necessary hauling and delivery of all freights; shall make just and reasonable rules and regulations as may be necessary for preventing unjust discrimination in the transportation of freight and passengers on the railroads in this State.'

"Well-established statistics all over the United States have shown conclusively that no interurban road can successfully operate and maintain itself under a passenger rate of less than 2 cents per mile.

"Therefore be it resolved, That the Augusta-Aiken Railway's petition be granted to increase its maximum passenger rate to 2 cents per mile, minimum fare to be 5 cents, to become effective on Jan. 1, 1915, with the distinct understanding that in the meanwhile the physical condition of the road shall be improved as rapidly as possible and continue to be kept in a safe condition, and that competent and efficient service shall be rendered on all cars and enough cars must be put into operation comfortably to care for the patrons, the above improvements to be subject to the approval of the Railroad Commission.

"Resolved, further, That the company shall submit its tariff to the Railroad Commission for approval within thirty days in order that said tariff, when approved, may be included in the commission's annual report."

REDUCTION ORDERED IN SEATTLE-EVERETT FARE

The Public Service Commission of the State of Washington has prescribed a passenger rate of 2 cents a mile instead of 3 cents on the Seattle-Everett line of the Puget Sound Traction, Light & Power Company. The order of the commission sets forth that in the opinion of the commission the fair value of the line is $1,500,000 and that on that investment the earnings have been 13 per cent a year. The commission rejects the contention of the company that the losses sustained in operating the Bellingham-Mt. Vernon line should be set off against the profits of the Seattle-Everett line. The commission, in its order, also requires the road to carry children between the ages of five and twelve years at half fare and to furnish at least one car in each direction daily to carry checked baggage up to a limit of 150 lb., free of charge. No ruling is made on freight rates, the commission urging that the company and patrons endeavor to effect an amicable arrangement on this subject. The commission says that it has no power to prescribe the issuance of commutation tickets.

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, in a statement to the press, said: "All of the evidence submitted plainly showed that the earnings of the line were not sufficient to provide a fair return on the investment. The earnings for 1913 came nearer to a suitable return on the investment, but those of 1914 have fallen far below the total of last year. There was nothing introduced at the hearing to sustain such an order as the commission has made, in reducing passenger rates from 3 cents to 2 cents a mile."

In the absence of the official order from the commission, neither Mr. Leonard nor James B. Howe, counsel for the company, would intimate the attitude of the corporation toward an appeal.

CHRISTMAS ENTERTAINMENT IN WASHINGTON

Children and parents to the number of about 2200 crowded the New National Theater, Washington, D. C., on the afternoon of Dec. 29, at the fourteenth annual Christmas celebration of the Washington Railway & Electric Company and the Potomac Electric Power Company, given by the public service companies for their employees and employees' children. The feature of the afternoon was a dancing and singing act in which thirty-five children, ranging in age from nine to fourteen years, participated. After the children finished their act several vaudeville numbers from local theaters delighted the spectators—and then Santa Claus himself arrived. He lit with electricity the two large trees, one either side the stage. All the children and parents were then invited upon the stage, where fruit and candy and other gifts were handed to each child. Not only were the children thus provided for, but car tickets were distributed for the trip home.

Change in Local One-Way Fare.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has announced that the local one-way fare in both directions between Irving and Silver Creek will be advanced from 7 cents to 10 cents, effective on Jan. 24, 1915.

Curtailing Free Tickets in Topeka.—The Kansas Public Utilities Commission has issued an order calling in complimentary tickets on the Topeka Street Railway, and announcing that after Jan. 1, 1915, no street car passes should be issued to members of the commission or employees.

Savings Accounts in Columbus.—In order to encourage thrift the Columbus Railway, Power & Light Company, Columbus, Ohio, as a Christmas present opened a savings account for each of its employees in the Citizens' Trust & Savings Bank, starting with $1 for the single men and $2 for the married men. The clerks received turkeys.

"Safety First" New Year Resolution.—Several days before New Year's the Louisville (Ky.) Railway placed in its cars, as one of the series of "safety first" cards it is using, a big yellow affair with this slogan: "Let your New Year's Resolution for 1915 be 'Safety First.'" Credit was accorded on the card to Motorman J. M. Hinkle, the author of the sentence.

Community Christmas Tree Stimulates Traffic.—The Jovian Order at Erie, Pa., this Christmas gave Erie its first community Christmas tree. The tree was mounted on a platform in the center of Perry Park, the crowning adornment being a 4-ft. electric star. It was incidentally discovered that the electric railways in Erie took in probably $300 more than their regular Christmas revenue in moving the extra crowd to the park.

Reduction in Fare Asked.—A complaint has been filed with the Public Utilities Commission of Kansas by patrons of the Missouri & Kansas Interurban Railway at four stations asking for a round-trip fare of 25 cents and tickets on the return trip good for five days. The one-way fare is 15 cents. It is also asked that the company be required to extend the time on its thirty-day commutation books so that they shall be good for a year.

Car Step Order in New Hampshire.—As a result of an inquiry into the height of street car steps in New Hampshire the Public Service Commission of that State on Jan. 4 issued an order that the steps of street cars operated in New Hampshire should not be more than 15 in. in height. The order does not apply to the Concord & Manchester Electric Branch of the Boston & Maine Railroad, which has already complied with an order of the commission in regard to steps.

Increase in Fare in Effect in Vermont.—The increased fare on the Barre & Montpelier Traction & Power Company's lines, running between Montpelier and Barre, Vt., went into effect on Dec. 28, in accordance with the new schedule filed with the Public Service Commission. The new fare is 15 cents between the two cities, or 25 cents for a round trip. For the last eight years the fare has been 10 cents. Last summer the company raised the fare to 11 cents, but the Supreme Court ruled that the company could now collect more than 5 cents in either Barre or Montpelier.

Extension of "Copper Zone" System of Fares in Indiana.—The Indiana Railways & Light Company, Kokomo, Ind., applied to the Public Service Commission of Indiana on Jan. 2 for permission to place in effect the "copper zone" system of passenger fares on the 2 cent a mile basis. As previously announced in the ELECTRIC RAILWAY JOURNAL, this system of fares went into effect on the lines of the Union Traction Company of Indiana on Jan. 1 and it is stated that the officials of the Terre Haute, Indianapolis & Easton Traction Company have signified their intention of applying to the State for permission to install a similar system on their line.

Accidents in Greater New York.—According to the reports of accidents on railroads and street railroads in Greater New York received by the Public Service Commission for the First District the number of killed in November, 1914, was only eighteen as against thirty-one in November, 1913, and thirty-two in November, 1912. The total number of accidents also decreased from 5860 in November, 1913, to 4726 in November, 1914. The decrease in the number of accidents was largely upon the surface car lines, and one of the causes is believed to be the operation of the "near-side stop" rule, which went into effect on Sept. 1. The report shows that the boarding accidents decreased from 827 to 652 and the alighting accidents from 717 to 451 for November.

New Ventilating Ordinance for Chicago.—Past heating and ventilating ordinances governing the Chicago Surface Lines' cars have specified 350 cu. ft. per passenger per hour, based upon the maximum seated and standing load, or approximately 28,000 cu. ft. of air per hour with an eighty-passenger load. In addition to specifying the quantity of fresh air, the location of the intakes and outlets were also defined, the former being beneath the seats and the outlets in the ceiling. The new ventilating ordinance just passed does not specify the character of ventilation, but provides that the carbon-dioxide content shall not exceed twelve parts in 10,000. The new ordinance was passed because the combined ventilating and heating requirements included in the old ordinances were not practical under extremely low outside temperature conditions.

Annual Atlanta Luncheon.—Officials and employees of the electrical department of the Georgia Railway & Power Company, Atlanta, Ga., observed a custom more than twenty years old when they gathered on New Year's Day in the Davis Street plant of the company in Atlanta as its guests at the annual feast. Five hundred covers were laid by the proprietor of an Atlanta restaurant, and the viands were kept hot in improvised ovens. At the conclusion of the luncheon the guests gathered outside, where P. S. Arkwright, president, welcomed them, introducing H. M. Atkinson, chairman of the directors. Twenty years ago the New Year's Day luncheon custom was inaugurated by Mr. Atkinson, then president of the Georgia Electric Light Company. The first luncheon was served, as have been all others since, in the Davis Street plant, then the main station of the old company.

The Louisville I. C. C. Case.—Local shippers at Louisville, Ky., have taken the announcement of the Interstate Commerce Commission that it would at once reopen the case against the Indianapolis, Columbus & Southern Traction Company and other Insull lines, by which they were ordered to make a division of the through rates between Louisville and Indianapolis, and other northern Indiana points, as indicating that these companies having failed to put the order into effect, the commission will now determine how these rates shall be divided. In this connection the Louisville Board of Trade, complainant in the case, points out that the relief ordered in the matter of better provisions for handling freight at the local terminals has not been provided. The Louisville & Indianapolis Company owns tracks of its own between Seymour and Sellersburg, but for the rest of the distance operates over tracks of the Indianapolis, Columbus & Southern Traction Company and the Louisville & Southern Indiana Traction Company.

Reduction in Southern Pacific Company Rates Asked.—The city of Palo Alto, Cal., and the Palo Alto Chamber of Commerce have filed a complaint with the Railroad Commission of California against the Southern Pacific Company, in which it is alleged that that company's rates from San Francisco, San José and intermediate points to Palo Alto are excessive and discriminatory. As evidence of discrimination, the complaint points out that the distance from San Francisco to Palo Alto is 30 miles and that the distance from San Francisco to Niles, via the Oakland ferry, is approximately the same; yet the single fare from San Francisco to Niles is 75 cents, while the single fare to Palo Alto is 95 cents. The monthly daily commutation ticket from Niles to San Francisco is $8.50, while the monthly daily commutation ticket from Palo Alto to San Francisco is $9.50. Richmond and Melrose are cited as other points enjoying lower fares than Palo Alto in proportion to distance. The commission's attention is also called to the fact that the Palo Alto rates include the transportation of baggage, although most of the patrons do not desire this privilege. Complainants ask, therefore, that the company be compelled to publish a schedule of non-baggage fares less than rates that include the baggage privilege.

Personal Mention

Mr. W. E. Mandelick, secretary of the Underground Electric Railways, Ltd., London, England, who has been on a short visit, has returned to London.

Mr. J. A. Wright has been appointed auditor of the Dallas Traction Company and the Southern Traction Company, Dallas, Tex., to succeed Mr. W. L. Davis.

Mr. J. W. Simons has been advanced from the position of trainmaster to be superintendent of transportation of the Chicago & Milwaukee Electric Railroad, Highwood, Ill.

Mr. H. I. Gahagan, in addition to his duties as treasurer of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., succeeds Mr. Burr Martin as superintendent of safety.

Mr. G. S. Henry, formerly superintendent of transportation of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., has been appointed general superintendent to succeed Mr. E. J. Bock, resigned.

Mr. J. W. Lee, Jr., publicity agent, will have charge of the publicity department of the Pennsylvania Railroad, Philadelphia, Pa., succeeding Mr. Ivy L. Lee, whose resignation from the company was announced recently in the ELECTRIC RAILWAY JOURNAL.

Mr. R. B. Stichter, who has been general manager of the Texas Traction Company and the Southern Traction Company, with offices at Dallas, Tex., has been elected vice-president of both companies. Mr. Stichter has been general manager of the companies since March, 1909, when he succeeded Mr. Theodore Stebbins.

Mr. Edward Horner, superintendent of the Danville Railway & Light Company, Danville, Ill., has resigned, effective on Jan. 15. Mr. Horner entered the service of the company in 1904 as a conductor and in 1910 was promoted to be superintendent. He will be succeeded by Mr. Jesse F. Smalley, dispatcher in the office of the Illinois Traction System at Danville.

Mr. Guy E. Mitchell, for some years associated with the late Ralph D. Gillett in electrical construction work in connection with the building of electric railways in the Berkshire district of Massachusetts, and formerly chief draftsman of the motive power department Boston & Maine Railroad, has been appointed manager of the Westfield (Mass.) electric lighting department.

Mr. E. J. Bock, who for the last four years has been general superintendent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., has resigned on account of ill health. Prior to becoming general superintendent of the company, Mr. Bock served as superintendent of transportation for two years, and previous to that he was chief dispatcher of the Metropolitan West Side Elevated Railway, Chicago, Ill., for twelve years.

Mr. Burr Martin, who has been superintendent of safety and way and structures of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., has been appointed general manager of the companies to succeed Mr. R. B. Stichter, who, as announced elsewhere in this column, has been elected vice-president of the companies. All departments will report to Mr. Martin except the auditing department and the claim department, both of which will report direct to the president.

Mr. Joseph B. Eastman has been appointed a member of the Public Service Commission of Massachusetts by Governor Walsh, succeeding Hon. George W. Anderson, who resigned recently to become United States District Attorney. Mr. Eastman was born at Katonah, N. Y., in 1882. After he was graduated from Amherst College in 1904 he spent some time at the South End House, Boston, in sociological work, later becoming counsel and secretary of the Boston Public Franchise League. For the last nine years he has played a prominent part in many commission and legislative matters affecting electric railway, lighting and gas companies and assisted in drafting the bill which established the Public Service Commission in 1913 upon its present basis. Among the matters of street railway interest which have occupied Mr. Eastman's attention have been the renewal of tunnel leases at Boston, the investigation of holding companies and the study of railroad and street railway relations. During the last eighteen months Mr. Eastman served as counsel for the unions in the arbitrations of wages on the Boston Elevated Railway and the Middlesex & Boston Street Railway, and is at present counsel for the union in the arbitration between the Bay State Street Railway and local branches of the Amalgamated Association. He is a member of the Boston Chamber of Commerce and the Boston City Club.

D. D. CURRAN

Mr. D. D. Curran, whose election as president of the New Orleans Railway & Light Company, New Orleans, La., was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 26, 1914, will assume his duties with that company on Feb. 1. In a statement which he issued Mr. Curran said that he accepted the presidency of the company with the full knowledge that it was a local institution; that large sums of New Orleans money were invested in the securities of the company, and that his best efforts would be put forth to reconcile any differences which might exist between the corporation and the public. Mr. Curran has long been a resident of New Orleans and is thoroughly familiar with local traditions. The company with which he now becomes connected controls and operates more than 200 miles of electric railway in New Orleans and furnishes current for both power and lighting service. Mr. Curran's previous experience has all been in steam railway work, but in this he has been eminently successful and is most highly regarded in New Orleans and in the territory through which the lines of the company with which he has so long been identified operated. He entered railway service in 1873 as a brakeman on the Pennsylvania Railroad, which position he held for five years. He was then successively freight conductor of the Mobile & Montgomery Railroad, passenger conductor of the same road, yard master of the Louisville & Nashville Railroad at Montgomery and trainmaster of the same road at Birmingham, Ala. From 1887 to 1893 Mr. Curran was connected with the Central of Georgia Railroad successively as superintendent of the South Carolina Division, superintendent of the Southwestern division, superintendent of the Columbus & Western division and superintendent of the Savannah & Western division. He was appointed to the last mentioned position in 1892. From February, 1893, to August, 1907, he was superintendent of the New Orleans & Northeastern Railroad. In August, 1907, he was elected president of that company, of which he is also general manager.

OBITUARY

D. E. Budd, one of the pioneers in street railway development in Portland, Ore., is dead. He is said to have obtained the first franchise for the operation of street cars in Portland.

A. W. Westman, superintendent of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., was electrocuted at the company's carhouse at Kingsville on Dec. 21 while preparing to put the snow plow in action.

Giles S. Allison, long associated with the Security Register Company, St. Louis, Mo., and for many years prominent in the electric railway manufacturing field, died on Dec. 24 in St. Louis. The cause was throat trouble. Mr. Allison was sixty-two years old.

Mr. Joseph Donlan, at one time superintendent of the New Haven (Conn.) Street Railways, now included in the system of the Connecticut Company, is dead. After leaving the New Haven Street Railway Mr. Donlan became connected with the National Casket Company at New Haven, and subsequently entered the main office of that company in Brooklyn.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***United Public Service Company, Rochester, Ind.**—Incorporated in Indiana presumably to build electric railways and other public utilities in Rochester. Capital stock, $250,000. Incorporators: John E. Beyer, Earl E. Beyer and Charles A. Davis.

***Portland, Vancouver & Northern Railway, Vancouver, Wash.**—Application for a charter has been made by this company in Washington to build an electric line between Vancouver, Wash., and Portland, Ore. Headquarters: Vancouver, Wash. Officers: Henry Crass, Mayor of Vancouver, president, and George W. Ford, secretary.

FRANCHISES

Fresno, Cal.—The Fresno Traction Company has received a franchise from the Council along Fresno Avenue and on Fresno Street from Belmont Street along J Street, Stanislaus Street, O Street, Tulare Street and P Street to the Southern Pacific reservation in Fresno.

San Jose, Cal.—Blaming the European war for its failure to begin construction upon the electric line from Alviso to San Jose, the San Jose Terminal Railway, through Lee H. Landis, its president, at a recent meeting of the Council surrendered its deposit of $500 which guaranteed construction would be started before Jan. 1, and asked for a new franchise for that portion of the railway which will lie within the city limits. Mr. Landis addressed the Council and an ordinance for the granting of the new, or renewed franchise, was given first reading. That portion of the line which lies in San Jose will run on Second Street between Julian Street and the northerly city limits. Mr. Landis promised that actual construction would be begun immediately after the first of the year and that the line would be in operation before the end of 1915.

Macon, Ga.—The Macon Railway & Light Company has asked the Council for a franchise to extend, relocate and remove different sections of its tracks in Macon.

Carbondale, Ill.—The Murphysboro & Southern Illinois Railway has asked the Council for a franchise in Carbondale. This is part of a plan to build an electric line between Carbondale and Murphysboro. A. B. Minton, Murphysboro, president. [E. R. J., Oct. 3, '14.]

New Orleans, La.—The Orleans-Kenner Electric Railway has purchased the franchise from the Council to build an interurban line between New Orleans and Kenner.

Camden City, N. J.—The Public Service Railway has asked the Council for a franchise over White Horse Pike. The company proposes to reroute the Haddon Heights line.

Saratoga Springs, N. Y.—On the condition that it erect a trolley station at a cost of $50,000 and meet other requirements asked by the village officials of Saratoga Springs, the request of the Hudson Valley Railway for a franchise to maintain tracks across Broadway in Saratoga Springs to connect the Glens Falls line with the Troy division will be granted. Whether or not the proposition will be received favorably by the Hudson Valley Railway officials is not known.

Cincinnati, Ohio.—The Cincinnati, Newport & Covington Street Railway has asked the Council for a renewal of its franchise in Cincinnati.

Urbana, Ohio.—The Ohio Electric Railway has received a twenty-five-year franchise from the Council in Urbana.

Easton, Pa.—The Easton Transit Company has received a franchise from the Council to reconstruct all of its lines on the South Side, laying new track, etc. The company has also received permission to lengthen several of the switches in Easton.

Waco, Tex.—The Southern Traction Company has asked the Council for a franchise to extend its tracks south from Elm Street about 1 mile in Waco.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company plans to expend $105,000 for betterments on its lines from San Bernardino to Highland and Patton.

Bristol & Plainville Tramway, Bristol, Conn.—Plans are being made by this company to ask the next General Assembly for the right to amend its charter to extend its lines on Main Street, South Street, East Road, Wolcott, Crown, Earl, View and Divinity Streets, making a circuit which will take in the entire south section of Bristol. The company will also ask for permission to discontinue its tracks on Park Street in Bristol.

Wilmington, New Castle & Delaware Railway, New Castle, Del.—Plans are being made by this company to rebuild and install a new roadbed on about 5½ miles of its lines.

Columbus (Ga.) Railroad.—Plans are being considered by this company and the Girard City Council for an electric line in Lower Girard, presumably to connect at some point in the western part of Lower Girard with the present Girard line and complete a loop or belt, crossing the new Dillingham Street bridge into Columbus.

Savannah (Ga.) Electric Company.—Work has been begun by this company on the extension of its Habersham line from Thirty-Seventh Street in Savannah giving a direct service from the business section to the Chatham Crescent in Savannah.

Caldwell (Idaho) Traction Company.—Citizens of Caldwell have agreed to take bonds of this railway to finance the construction of the Wilder branch of the Oregon Short Line. The estimated cost of electrifying the branch is $50,000.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—This company has perfected plans to remove its tracks on Franklin Avenue in the center of the street. When the old horse car line from Bloomington to Normal was established many years ago the track was laid on the west side of Franklin Avenue and has since remained there.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—E. L. Coleman, representing Wolf Teitle & Company, Chicago, who are financing this railway, announces that the line will be built. Residents of Peoria are reported to have subscribed for $350,000 of the stock, residents of Canton for $300,000, and it is expected to sell $300,000 in Quincy. It is intended to begin construction work in the spring. [E. R. J., Dec. 26, '14.]

Illinois Traction System, Peoria, Ill.—Plans are being made by this company to double-track the Prospect Heights line in East Bluff to the city limits of East Bluff.

Springfield & Central Illinois Traction Company, Springfield, Ill.—It is reported that this company, headed by Isaac A. Smith, St. Louis, organized under the laws of Illinois and authorized to issue bonds to the amount of $20,000,000, will during the coming summer begin construction work on an interurban railway which will ultimately extend from St. Louis across Illinois to Terre Haute, Ind. It is announced that the right-of-way has been obtained from Terre Haute to St. Louis, and also for an intersecting line from Springfield to Duquoin, and that the necessary franchises have been granted. The promoters of this line state that the first issue of $2,500,000 of bonds will be taken by a syndicate of English capitalists, and that 60 per cent was already underwritten before the war broke out. The temporary failure to realize on the remaining 40 per cent is given as the reason for delaying the work of construction until next summer. According to the plans announced, the building of the line will begin at St. Louis, and it is now contemplated to construct the line as far as Newton, county seat of Jasper County. It is said that the line will be put in operation as soon as the first 25 miles are completed. Plans provide for a power plant to be erected 46 miles east of St. Louis, near the intersection of the north and south and east and west lines of the proposed system. It is also planned to operate electric lighting plants in the small towns along the lines. Isaac A. Smith, president; George W. White, vice-president, A. C. Skilman, secretary, and N. E. McMillan, treasurer. All are residents of St. Louis.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has placed in operation its new 1-mile line on Minnesota Street from Shelby Street to Churchman Avenue in Indianapolis.

Des Moines (Ia.) Railway.—Plans are being contemplated by this company for an extension from Colfax to Newton. Also for plans to build a line through territory south of Des Moines.

Bangor Railway & Electric Company, Bangor, Maine.—This company has ordered the necessary equipment for the building of a double-track loop on Harlow and Central Streets in Bangor. It is expected that this loop will relieve the congested railway conditions on Main Street. The sum of $40,000 will be expended in this work.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Plans are being contemplated by this company to extend its Harney line south from the Sixth Street terminus to Gibson.

***Haddonfield, N. J.**—Plans are being considered to build an electric railway to connect Haddonfield, Berlin and Gibbsboro. Frank O. Stem, Berlin, and associates are interested.

Morris County Traction Company, Morristown, N. J.—Plans are being made by this company to reduce the running time between Morristown and Dover by fifteen minutes. Work has been begun laying 1000 ft. of double track at Morris Plains for a new turnout. The new track begins at Glen Brook Place and extends past the business section toward the hospital junction.

***Flushing, N. Y.**—The Public Service Commission, First District, has announced that in all probability the so-called Flushing route extending from Corona to Bayside has been legalized by the consent of the property owners at Broadway and Twenty-Second Street, Flushing, where the route of the proposed line would extend.

Monticello & Middletown Railway, Monticello, N. Y.—As soon as surveys are completed work will be begun by this company on its line to connect Middleboro, Bloomingburgh, Wurtsboro, Rock Hill, Bridgeville, Monticello, White Lake and Bethel, a distance of 45 miles. The motive power will be gasoline and the repair shops will be located at Monticello. Capital stock, authorized, $500,000. Blake A. Mapledoram, Monticello, general manager and chief engineer. [E. R. J., Dec. 26, '14.]

Cincinnati (Ohio) Traction Company.—Plans are being made by this company to extend and double-track many of its lines in Cincinnati.

Columbus Railway, Power & Light Company, Columbus, Ohio.—A resolution has been adopted by the City Council of Columbus providing for the appointment of a committee to act with the Chamber of Commerce representatives in conferring with the Columbus Railway, Power & Light Company on the plan to obtain funds with which to make extensive improvements on East Main, East Long and West Broad Streets the coming spring.

East Linden Electric Railway, Linden, Ohio.—It is possible that the new route of this railway proposed to the Council recently will prove unsatisfactory, because of complications that may result from granting franchises to two different corporations in the same street for a portion of the route. Phillip B. Gaynor, of New York, president of the company, was in the city last week looking into the situation. [E. R. J., Oct. 5, '14.]

Niagara Falls, Welland & Lake Erie Railway, Welland, Ont.—The Council of Welland, Ont., has accepted the offer of this company to pay $60,250 in twenty years towards the cost of street paving. The Council also gave its formal permission to allow the company to cross the Canal Bridge at Main Street in Welland to connect up with the west side extension.

Portland, Ore.—W. H. Daly, Commissioner of Public Utilities, will take steps immediately to revoke the franchise granted George F. Heusner, for a system of electric railways operating between Renton and the downtown districts of Portland and the $10,000 bond forfeited. This will be done owing to the failure of Mr. Heusner to comply with the provisions of the franchise which was granted on Nov. 26, 1913, and accepted Jan. 30, 1914. One of the provisions of the grant was that work was to be begun within thirty days after final action by the Council, and cars were to be running within eighteen months. Nothing has been done to indicate that a car line is ever to be built in accordance with the grant. The franchise provided that $350,000 was to be spent in construction. [E. R. J., March 14, '14.]

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—This company has placed in operation its new Ellwood, Koppel & Beaver Falls branch. R. H. Boggs, Pittsburgh, president, of the new line.

***Sharon, Pa.**—With the beginning of operations on the construction of the line between Sharon and Brookfield Center it is learned that a syndicate of Cleveland capitalists has had engineers at work surveying for the construction of an electric line between Warren and Sharon which would make a feeder for the Cleveland-Youngstown Railway.

Montreal & Southern Counties Railway, Montreal, Que.—Plans are being contemplated by this company to extend its tracks to Youville Square in Montreal.

SHOPS AND BUILDINGS

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Preliminary arrangements are being made by this company to build a three-story brick building on Market Street at Logansport. In this new structure will be located the local superintendent's, dispatcher's and division offices, also the freight office and storage rooms. Work on this new structure will be begun as soon as the weather permits.

Bangor Railway & Electric Company, Bangor, Maine.—Plans are being made by this company to establish a new passenger station in the Graham building on Harlow Street in Bangor.

Chambersburg, Greencastle & Waynesboro Railway, Waynesboro, Pa.—This company has begun the construction of a new passenger station at Kauffmans station to replace the old building.

POWER HOUSES AND SUBSTATIONS

Staten Island, Midland Railway, New Brighton, N. Y.—This company will install new substation apparatus consisting of two 500-kw rotary converters, six 165-kva and four 400-kva transformers, switchboard and accessories, all of which have been purchased from the General Electric Company.

Hocking Sunday Creek Traction Company, Nelsonville, Ohio.—This company has ordered for shipment to Nelsonville, Ohio, one 400-kw, 1200-volt rotary converter set consisting of two machines on common bedplate, each of 200-kw capacity, 600-volt, direct current, three-phase, sixty cycles and 1200 r.p.m., and three 135-kva, 11,000-volt high-tension to rotary-voltage oil-insulated, self-cooled transformers, with one switchboard for the control of the above apparatus. The order has been placed with the Westinghouse Electric & Manufacturing Company.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for the following apparatus, to be shipped to Steubenville, Ohio: one outdoor transformer sub-station consisting of two 1500-kva, oil-insulated, water-cooled, three-phase, sixty-cycle, 66,000-volt or 33,000-volt to 16,500-volt outdoor radiator type transformers; one set steel work and towers, and outdoor switching equipment. The company has ordered for its Steubenville sub-station, the following apparatus: three 500-kva, 16,500-volt to 2400-volt, single-phase to two-phase; six 24-kva, single-phase automatic induction regulators with accessories; one 500-kw, sixty-cycle, 600-volt direct-current 900 r.p.m., six-phase rotary converter; one 550-kva, sixty-cycle, 15,000-volt to rotary-voltage, three-phase oil-insulated self-cooled transformer; two 330-kva, three-phase, sixty-cycle, 15,000-volt to rotary-voltage oil-insulated self-cooled transformers, with one switching equipment for the above apparatus.

San Antonio (Tex.) Traction Company.—A new rotary converter is being installed by this company at its power plant on Villita Street in San Antonio. The new converter has a capacity of 1500 hp.

Manufactures and Supplies

ROLLING STOCK

Toronto (Ont.) Civic Railway is reported as expecting to buy six steel and six wood cars.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., is in the market for six interurban cars.

Oklahoma City (Okla.) Railway has ordered eight double-truck T-post city cars from the St. Louis Car Company.

London & Port Stanley Railway, London, Ont., is reported as having ordered three trailers from the Preston Car & Coach Company.

Shore Line Electric Railway, Norwich, Conn., according to an unconfirmed report, has ordered about five cars from the Wason Manufacturing Company.

Interborough Rapid Transit Company, New York, N. Y., has ordered twelve all-steel cars from the Pressed Steel Car Company for operation in the Steinway Tunnel.

Sheboygan (Wis.) Railway & Light Company, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 12 as expecting to order two new steel cars for city service, has purchased this equipment from the St. Louis Car Company. The cars will be equipped with Baldwin trucks.

Boston (Mass.) Elevated Railway, according to later developments in the placing of its 100-trailer order, has ordered seventy-five cars from The J. G. Brill Company, while twenty-five cars will be built by the Laconia Car Company. The trucks for all these equipments will be built by the former company.

Bureau of Foreign and Domestic Commerce, Washington, D. C., is in receipt of a communication from a business man in South America who desires to establish commercial relations with American manufacturers of gasoline and electric motor cars, and who states that he now has an inquiry for two cars and trailers.

Detroit (Mich.) United Railway has placed an order with the Westinghouse Electric & Manufacturing Company for a 50-ton Baldwin-Westinghouse locomotive. This machine is to be used between Royal Oaks, just outside the city limits of Detroit, and Flint, a distance of about 55 miles. The freight between the terminals and intermediate towns is composed chiefly of l. c. l. movements. The railway, after considerable investigation, selected a standard locomotive type instead of the car-type locomotive with which this class of service has been previously and is at present handled. The locomotive will be equipped with No. 301-D-6 field control, slow-speed motors especially designed for locomotive application, and pneumatically operated unit switch control. This company is reported as having authorized the construction of fifty stepless trailers in its own shops.

TRADE NOTES

New York Insulating Wire Company, New York, N. Y., has appointed Lewis O. Brewster as general manager.

Gould Storage Battery Company, New York, N. Y., has located its Detroit office in Room 604, Kerr Building, 100 Beaubien Street.

Nachod Signal Company, Inc., announces the removal of its office and plant to Louisville, Ky. Carl P. Nachod remains the president and chief engineer.

Wallace Supply Company, New York, N. Y., has changed its corporate name to Wallace Supplies Manufacturing Company. This company, besides making its own car fittings and specialties, also manufactures for others.

W. R. Kerschner Company, Inc., New York, N. Y., has been incorporated to take over the business which for the past twelve years has been conducted by W. R. Kerschner personally. The financial interest and personnel which comes into the new company are closely allied with the manufacturing and equipment end of the electric railway industry. The increasing business which Mr. Kerschner has done for the last several years has necessitated the expansion into an incorporated company.

Canadian General Electric Company, Toronto, Ont., has appointed the Hon. J. S. Hendrie, Lieutenant-Governor of Ontario, as a director to fill the vacancy created by the death of the late Senator Jaffray. At the annual meeting of the company an appropriation of $50,000 was set aside to cover the expense of maintaining during the continuance of the war the corps of electrical engineers raised by the company, and subscriptions to the Red Cross Fund and other patriotic and benevolent purposes.

Hodenpyl, Hardy & Company, New York, N. Y., has been incorporated with capitalization of $2,000,000 to manage public utilities corporations and do a stock and bond brokerage business. The new company will take over the business of the firm of Hodenpyl & Hardy. There will be no change in the interests connected. The officers of the new company will be H. G. Hodenpyl, president; George E. Hardy, B. C. Cobb, J. C. Wendock, W. H. Barthold and A. H. Johnson, vice-presidents, and Jacob Hekman, secretary and treasurer.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., reports that the New York Central Railroad's recent order for open-hearth steel rails includes 2000 tons of titanium-treated steel. These rails will be treated with 0.10 per cent of titanium. The order constitutes the first that has been placed by the New York Central Lines for titanium open-hearth steel and is the result of experimental work which has covered a period of at least two years. Titanium has been used in Bessemer steel by these lines in the past, but until now their open-hearth rails have been untreated with the exception of those used for experimental purposes.

Coil Manufacturing & Repair Company, Cleveland, Ohio, has purchased the factory equipment, business and goodwill of the Cleveland Coil & Manufacturing Company. The new company took charge of the business on Dec. 31 and is prepared to supply the trade with armature, field and induction motor coils and do a general rewinding and repairing business. About three years ago the business which this company has assumed was conducted as the electrical department of the Van Dorn & Dutton Company. The principal owner and manager of the new company is H. A. Kuhle, who for a number of years was secretary of the Cleveland Switchboard Company and during the past three years was one of the proprietors of the Electric Wiring Company, Cleveland, Ohio.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has organized a separate department for the production and sale of automobile accessories to be known as the Automobile Equipment Department, of which G. Brewer Griffin is manager and to which he will devote his entire time hereafter. Mr. Griffin was formerly manager of the detail and supply department, having had active charge of automobile equipment sales from the inception of the business by the Westinghouse Company. John J. Gibson, formerly district manager for the company at Philadelphia, has been appointed manager of the detail and supply department to succeed Mr. Griffin. This company also announces the appointment of H. W. Cope, formerly assistant manager of the industrial and power department at East Pittsburgh, as director of its exhibit at the Panama-Pacific International Exposition in San Francisco. This company has recently received orders from the Hershey (Pa.) Transit Company for several four-motor equipments of No. 101-B-2 motors and type K control, and from the Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., for one quadruple equipment of No. 310-C, 75-hp, 600-volt railway motor for installation on a combination baggage, express and freight car, also for a substation and car equipment to be used in connection with the electrification of a portion of the road near Tuscaloosa.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, reports the shipment of headlights and equipment to the following railroads during the month of December: Cambria & Indiana Railroad, Colver, Pa.; Toronto (Ont.) Suburban Railway; Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.; Virginia Railway & Power Company, Norfolk, Va.; Tarentum, Brackenridge & Butler Street Railway, Tarentum, Pa.; Union Electric Company, Dubuque, Ia.; Sioux City (Ia.) Service Company; Hot Springs (Ark.) Street Railway; Princeton (W. Va.) Power Company; Chicago & Joliet Electric Railway, Joliet, Ill.; Los Angeles (Cal.) Railway Corporation; Lawrence (Kan.) Railway & Light Company; San Francisco-Oakland Terminal Railway, Oakland, Cal.; Shreveport (La.) Traction Company; Mahoning & Shenango Railway, Light & Power Company, Youngstown, Ohio; Wilmington, New Castle & Delaware City Railway, New Castle, Del.; Jamestown, Westfield & Northwestern Railway Company, Jamestown, N. Y.; Warren Company, Warren, Ariz.; Altoona & Logan Valley Electric Railway, Altoona, Pa.; Roanoke (Va.) Railway & Electric Company; New York Central & Hudson River Railroad, Croton-on-Hudson, N. Y.; Railway Motor Car Company, Marion, Ind.; Cincinnati, Bluffton & Chicago Railroad, Bluffton, Ind.; Osgood Bradley Car Company, Worcester, Mass. (for Richmond, Staten Island, new cars); Savannah (Ga.) Electric Company; Boston & Maine Railroad, North Adams, Mass.; Lincoln (Neb.) Traction Company; Allentown & Reading Traction Company, Kutztown, Pa.; San Antonio (Tex.) Traction Company; Vicksburg (Miss.) Light & Traction Company; Birmingham (Ala.) Railway, Light & Power Company.

ADVERTISING LITERATURE

Steel City Electric Company, Pittsburgh, Pa., has issued bulletin sheets Nos. 26, 27 and 28 describing respectively its star fixture stems and beam straps, outlet boxes for concrete work and conduit bushing adapters and Hickey fixture hangers.

Sangamo Electric Company, Springfield, Ill., has issued Bulletin No. 40, describing and illustrating its a.c. single-phase and polyphase watthour meters. The catalog discusses the features, constructions, adjustment and performance characteristics of the type "H" watthour meter, and gives directions for testing and for connecting the meters. The catalog also describes current and potential transformers. The bulletin is designed and written by Ray D. Lillibridge, Inc., New York, N. Y.

Prepayment Car Sales Company, New York, N. Y., has issued a folder which contains a novel presentation of the merits of prepayment car platforms. Following the spirit of the suggestion recently made, that electric railways should endeavor to analyze and apply in a practical manner each idea embodied in the ten principles adopted by the American Electric Railway Association at Atlantic City last fall, the folder demonstrates how each principle of the code in turn is fostered and supplemented by prepayment operation.

Pawling & Harnischfeger Company, Milwaukee, Wis., has issued a handsome booklet which outlines the progress of this company during its thirty years of activity. The booklet is well illustrated with interior views of the manufacturing plant and offices of this company. A brief sketch is also included of the organization of the company accompanied by photographs of its personnel. Among the products now manufactured by the company are traveling cranes of various types, grab buckets for foundry service, traveling electric hoists and monorail systems, I-beam trolleys, horizontal drilling and power machines, wheel and boom type excavators and power traction tampers.

Harrison Safety Boiler Works, Philadelphia, Pa., has issued a booklet of seventy-two pages describing its Cochrane multiport valves for back pressure, relief and vacuum service, flow service in connection with mixed flow turbines, and check valve service with bleeder or extraction turbines. The essential idea of the multiport valves is the use of a number of small disks instead of large disks in order to secure greater safety, quietness, lightness of moving parts and tightness. The several disks are each fitted with an independent dashpot held to seat by independent springs, the tension of all the springs being adjusted simultaneously by a pressure plate, the position of which can be changed by means of a handwheel on the outside of the casing. Thus there are no parts directly connected to the disks themselves extending through the casing, hence no possibility of binding, as by over-tightening of glands, or of tying down or overweighting, the movement of the pressure plate being definitely limited. Another advantage claimed is the ability to adjust the back pressure quickly and easily by changing the position of the pressure plate, which may be done from any distance, as by means of chain or rods. In addition to full descriptive and tabular matter the book contains numerous diagrams and layouts, also data on the effects of air in condensers and upon turbine performance.

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IMPORTANCE OF FIRST-AID TRAINING

An excellent feature of the nation-wide "safety first" movement, and in fact in many instances preceding it, has been the establishment of first-aid-to-the-injured stations. Resuscitation from electric shock is an example of their excellent work, and the equipping of all shops and carhouses with first-aid outfits represents a move along the same line. At this time it is particularly to the generally established practice among public utilities of installing the first-aid outfits that we want to direct attention. When a road has provided a first-aid outfit its work is just begun, since only the tools have been supplied without necessary training of employees for their proper use. It is often possible to find among employees someone who is acquainted with the proper method to pursue in first-aid work, yet there is always a chance that that particular person is not available when he is most needed. To make certain that first-aid treatment will be available for all accidents appears to be a fine opportunity for constructive work on the part of the company surgeon. In fact, the surgeon of the Chicago Elevated Railways has carefully trained a first-aid squad, which in turn trains employees at shops and carhouses in the use of the first-aid equipment, as well as how to perform various other kinds of first-aid work. Manifestly, such a schooling is productive of excellent results.

DISCIPLINARY VALUE OF EMPLOYEES' REPORTS

While an excess of red tape, so to speak, in the way of reports is to be avoided, one must not lose sight of their worth for maintaining good discipline as well as for record purposes. A difficulty well known to department heads is the ever-present problem of eliminating interdepartmental friction and petty jealousies among ambitious employees. To a certain extent, there is bound to be some internal stress in any organization or department where each man is striving to make a good showing, but a certain number of report forms help to confine this feeling to a healthy form of rivalry. As an example of this, work-train service furnished to the way department is often unnecessarily delayed, while, on the other hand, through the carelessness of their crews, work trains often hold up the regular traffic. To meet this condition certain managers have required that the causes and lengths of all delays to trains be reported by both the dispatcher and the representative of the way department or other department in charge of the work train. The result of this checking of one report against another, particularly where serious complaint has been made, has been greatly to reduce the number of reports and materially improve relations between employees. Similar good effects have followed the application of the same plan to disputes between the overhead and transportation departments, particularly where power or telephone line interruptions have occurred. Where it is found that there is a discrepancy between the report of one department and another on the same subject it is, by means of an investigation, an easy matter to discover who is in the wrong. The chief effect of this form of disciplining, however, has been that discrepancies seldom occur because one party to a difficulty knows that the other is preparing a report covering the same subject, consequently each endeavors to be honest in the information which he furnishes.

A BRITISH VIEW OF THE CAB SIGNAL

In view of the interest in cab signals that has been suddenly aroused through the radical action of the New York Municipal Railways in adopting them for the new subways in Brooklyn, it is rather a surprising coincidence that a recent discussion of this device by the British Institution of Mechanical Engineers should have indicated, at least by implication, a sudden change of attitude with regard to its merits and possibilities. Conservative practice in Great Britain for some years past has been very generally opposed to the cab signal, which is, inherently, an initial step toward automatic train control, because the energy which illuminates the red lamp in the cab may be utilized, just as easily, to shut off power or to apply brakes. The objections to the use of the cab signal, apparently, have been directed mainly toward the complications involved, automatic stops in connection with fixed signals having received very much more attention than the cab signal as a practical means to provide greater safety of operation. Yet at the December meeting of the British Institution of Civil Engineers, according to *The Engineer*, evidence was brought out to the effect that the automatic stop was "impracticable," by which is probably meant that it was very limited in application. The same charge was not made against the cab signal because this is in presumably successful use on sections of two British railroads to-day. However, our contemporary points out that the cab signal, as an indication only, seems unlikely to effect any improvement over present methods, although it may facilitate train operation in foggy weather, and this statement can hardly be denied. At the same time, if, as is here implied, it is the case that the cab signal may be considered to have reached a parity with the present system in regard to reliability, maintenance cost and expense of installation, it seems difficult to avoid the conclusion that it is an improvement, because it necessarily contains the possibilities of automatic protection against collisions. This is a feature that the roadside-signal systems have failed thus far to achieve in generally practical form, notwithstanding the many years that they have been in extended use. Indeed, it seems probable that the popularity of the cab signal in the near future will depend only upon its ability to equal the operating record of the older systems, and, apparently, this is a task to which it will soon be set in this country on a large scale.

THE MID-WINTER MEETING

The seventh mid-winter meeting of the American Electric Railway Association will be held in Washington on Jan. 29. The proceedings will be confined to a single day. The meeting will be unique in that the President of the United States and other distinguished representatives of the federal government will be in attendance. President Wilson will speak at the conference and, while his subject has not yet been announced, knowing as he does the purpose of the conference and the opportunity which it affords for reaching the heart of the industry, he cannot but touch upon those subjects which vitally concern its leaders. The presence of the President and his colleagues shows that they recognize the important part which electric railway transportation occupies in the prosperity of the country and the daily life of its citizens.

It is high time that the public should come to an equal realization of this and also of the magnitude of the interests involved in the industry. It occupies a different position from that of the steam railroads, partly because of its youth, partly because it is a gradual accretion of large numbers of small detached units without great inherent adhesive force. But now, through the progress made by interurban roads in particular, the electric railway is assuming national proportions, as is evident from the increasing control exercised by the Interstate Commerce Commission and the growing interest of the federal government in its affairs.

The mid-winter meeting is destined to play a more and more important part in the work of the association. This, with its affiliated associations, has two functions—technical and administrative. The annual convention in October largely ministers to the former. Here the committees present their reports, the result of the year's efforts, and the manufacturers show what progress they have made in their respective fields. Papers and discussions largely relate to keeping the cars moving efficiently and with satisfaction to the public. The winter conference is for a different purpose—the deliberate consideration of the broad principles underlying success in transportation, the application of which make operation possible. Those principles are not simple; in fact, compared with the technique of operation, they might be called vague. They are involved with finance, labor, the public temper, the idiosyncrasies of legislation and regulative bodies, and so on. There are, therefore, two compelling reasons why all of the executives concerned with these phases of railway operation should attend the mid-winter conference this year. First, they have an unusual opportunity to demonstrate to the federal legislators the importance of their work, and there are pressing problems of administration which they need to consider.

CHICAGO TRACTION SITUATION

Although Chicago, through contractual relations, is a co-partner in the operation of its surface railway lines, nearly every aldermanic or mayoral election is heralded with scathing criticism of some phase of the railway's operation. To one thoroughly familiar with the 1907 ordinances, known as "the settlement ordinances," since they were supposed to clear up an unsatisfactory situation, it appears ridiculous that the city should raise the "railway issue" whenever its politicians are up for re-election. To the City Council the ordinance gives the power to specify a standard of service and grant extensions. This service standard governs the annual additions made to rolling stock. Yet with this power in its own hands, the city administration is now engaged in a systematic campaign of criticism, seemingly because, out of it, some of the administration's henchmen hope to offer a panacea which will return them to office.

About a year ago a department of public service was added to the city governmental organization, and, judging from the results of its work, for the sole purpose of offering destructive criticism in whatever direction the administration might care to turn its attention. Literally, thousands of petty offences, beyond the control of any street railway organization, have been charged against the surface railways by this department. These add fuel to the campaign of criticism, but it is quite certain that no substantial improvement will result from this flagellation of the railways. It may be that criticism is deserved in some few instances, but the City Council, through its local transportation committee, has power to correct these.

While the various phases of this campaign have received publicity through the newspapers, a few of the editors have grasped the crux of the situation, namely, that the control of Chicago's transportation facilities has no place in local politics. The settlement ordinances created the Board of Supervising Engineers, whose powers do not include supervision over the operation of the surface railways. The record of this organization and the caliber of its members certainly warrant the bestowal of this additional responsibility. The fact that the city has representation equal to the railways on the board should insure unbiased rulings. It is to be hoped that the strategy of the administration will reveal itself to the public to the extent that it in turn will cease to support anything but sound business judgment. On the other hand, the failure of the administration to execute past promises to improve transportation already has caused some important commercial organizations to seek relief by appealing to the Illinois Public Utilities Commission, which has heretofore not taken part in the controversial questions arising between the city of Chicago and its public utilities. It is generally agreed by those who have carefully studied Chicago's transportation problem, that the only solution is to be found in additional downtown terminal capacity. More surface tracks are out of the question, additional elevated lines are not desired, hence there must be resort to subways. For the past six years subways have been discussed, and in fact during the past two years they have received sufficient consideration to warrant definite action. The present city administration promised to begin the subway system if it was elected, yet has always found a plausible excuse for not abiding by its promise when the opportunity was offered.

REACTANCE IN TRANSMISSION SYSTEMS

The necessity in large power systems for greater protection of electrical generating and distributing apparatus than is afforded by automatic circuit breakers, was clearly demonstrated in the discussion at the January meeting of the American Institute of Electrical Engineers in New York. Under short-circuit conditions currents may rise practically instantaneously to many times the normal values, producing overheating and excessive mechanical stresses and jeopardizing equipment other than that directly affected. Switches which will automatically and certainly open circuits carrying enormous currents are available, but in extremely large plants the combined generating capacity may be such as to produce short-circuit currents in excess of the ability of switches to interrupt. In such cases it is essential to limit the magnitude of the currents by introducing reactance into the circuit. For this purpose the inherent reactance in generators and transformers can be augmented and reactance coils can be inserted in feeders, between generators and busbars and between busbar sections. While it is true that the difficulties with short-circuits are most serious in very large plants, the principle of reactance protection is of wide application, which explains the very general interest in the methods proposed for minimizing these difficulties.

Unless electrical mass is deliberately added to it by introducing magnetic leakage in generator armatures or in transformers or by connecting reactors in circuit, as already mentioned, the electric circuit is practically inertialess. Until within a few years this was considered a virtue for several reasons. For example, from the standpoint of switching, small electrical energy storage capacity is desirable, for when a switch opens the stored energy must be dissipated in heat in the switch arc and in the resistance of the line as the stored electric charge surges back and forth. Still more important is the fact that the smaller the reactance the better is the voltage regulation. When reactance is introduced for protection, therefore, it involves the dissipation of more energy in switching and more reactive voltage drop. The former can be taken care of in the design of the circuit breakers. The latter is not now considered as important as it once was, particularly as constant voltage can now be obtained, when necessary, by auxiliary regulating devices. At any rate, in large plants the necessity for protection is so urgent that something must be sacrificed to secure it, and the result is a compromise among conflicting requirements.

In his paper on this subject, abstracted elsewhere in this issue, I. W. Gross gives the results of a mathematical analysis of short-circuit phenomena. We regard the analysis as valuable in the following particulars: First, it gives an idea of the magnitude and the laws of variation of the mechanical forces and the heating effects which may result from short-circuits, although the author has assumed conditions which make the results conservatively large; that is, he has assumed that there are "dead" short-circuits, that the heat is entirely confined to the conductor, etc. Hence the values derived may be considered the limiting ones. Second, it illustrates the scientific method of attacking a problem to secure data which may be relied upon as a guide to practical design. While the mathematics employed may seem more refined than the accuracy of the fundamental assumptions would warrant, the argument is logical, and the accuracy of the results can be discounted sufficiently to allow for possible variations in the premises without invalidating the argument. Third, as the study was made in connection with the design of the extension of a large power plant the results have a practical quality which gives them a higher standing than if they were a merely academic production. Among the very interesting facts brought out by Mr. Gross the most astounding is that forces of a ton or more per running foot may be developed in a cable. The conductor wrapping, which is fortunately amply strong, then performs the important extra function of preventing bursting at short-circuit time, due to the tendency of the conductors to fly apart. Another startling fact is the rapidity of temperature rise, so that one-fifth of a second is none too short a period for the opening of the circuit breaker. One trembles for the fate of a cable if the breaker fails to open promptly.

Mr. Gross also took up the question of the best location for the protective reactance coils in a power plant. These coils are bulky and they cost money. After it has been decided how much protection is desired the problem is to get that with the least cost for the coils and the space to accommodate them. In the discussion it was brought out that reactors in individual feeders radiating from a very large power plant may be so bulky as to be out of the question. It was to determine the most economical arrangement for a given case that Mr. Gross undertook the study which resulted in the preparation of his paper.

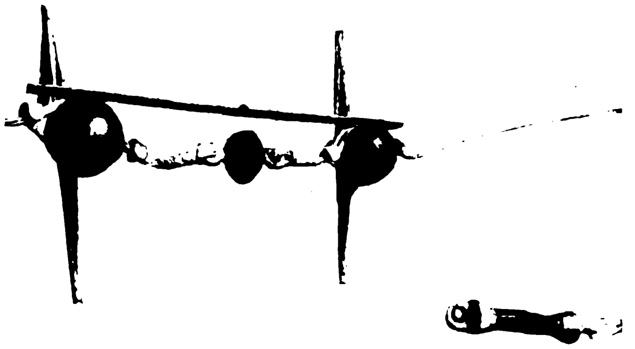
This whole subject of reactance is tied up with the modern tendencies in power generation and transmission. Centralized generation is the order of the day, largely on account of considerations of economy. But centralized generation is risky unless precautions which are not necessary in smaller and detached plants are taken to insure reliability. If "all the eggs are put in one basket" they must be heavily insured.

The Double Trolley System in Seattle

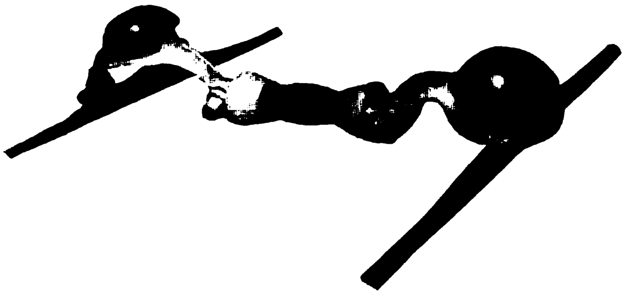
One of the Very Few Installed in This Country—It Contains Many Interesting Features, Some of Which Are Explained in Detail

BY H. J. KENNEDY, ELECTRICAL AND MECHANICAL ENGINEER.

Particular technical interest attaches to Division "A" of the electric railway recently put into operation by the city of Seattle, Wash., due especially to the use of a double-trolley system, which may, perhaps, be called the "heroic remedy" or preventive against electrolysis. With the traffic relations and financial and political conditions surrounding the construction of this railway the present article is not concerned beyond stating that physically it is a continuation of the Seattle, Renton & Southern Railway, from the northerly terminus of the latter, past the westerly shore of Lake Union nearly into Ballard.



SEATTLE MUNICIPAL RAILWAY—COMPONENTS OF DOUBLE-TROLLEY STRAIGHT LINE CONSTRUCTION

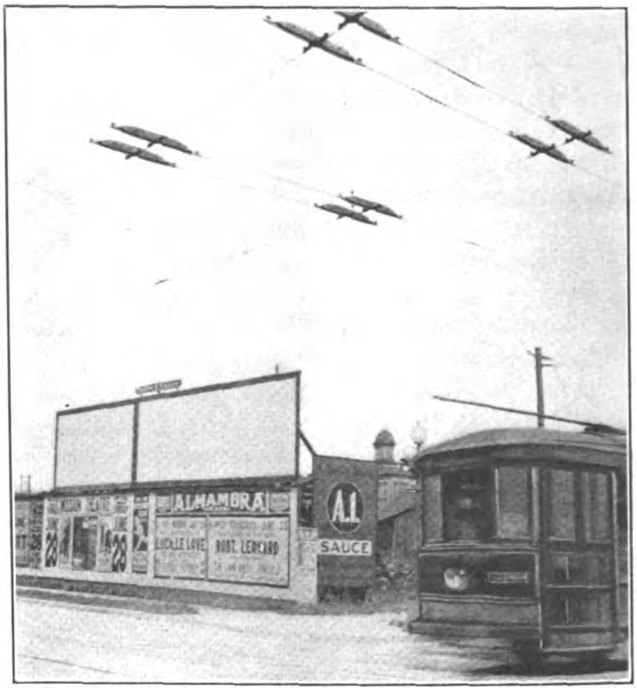


SEATTLE MUNICIPAL RAILWAY—COMPONENTS OF DOUBLE-TROLLEY CURVE CONSTRUCTION

It is proper to state first that the wires are spaced 18 in. center to center, symmetrically with respect to the track center line. An illustration of the principal components of the typical straight-line construction is shown, the hangers being 9 in. on each side of the center, as indicated by the 2-ft. rule. Another illustration shows curve construction. On a double-track line, starting at the wooden pole at one side, the sequence of material is as follows: 5/8-in. eyebolt; 3/8-in. galvanized steel strand; standard, round, wood strain-insulator 10 in. long; 3/8-in. steel strand; standard straight-line hanger of cap-and-cone type with lock washer; standard Giant strain-insulator of 2 5/8-in. diameter, with two eyes into which the ends of the steel strand are close-tied; standard straight-line hanger; 3/8-in. steel strand across to other track, where the order is reversed, back to the other wooden pole.

With the exception of the portion of the railway within the underground conduit district (using iron poles), the poles are of Washington cedar, from 30 ft. to 75 ft. in length. The spacing was complicated by street and alley intersections (often diagonal), entrances, existing poles, cross lines, etc., and varied from 50 ft. to 125 ft. Two cross-arms on one side of street are assigned to carry the railway feeders. Many of the poles have as many as eight cross-arms, due to the necessity of carrying wires for the fire alarm and police telegraph service, the city lighting wires, and the different power, telephone and telegraph company's wires.

The cross-overs most used are being equipped with trolley frogs, insulated crossings and section breaks, so that the trolley wheels run without interruption from the main line to the cross-over, and vice versa, the current supply being subjected to a brief interruption as the wheels pass over an insulated break, or to reversal, due to the oppositive location of positive and negative wires—which reversal, of course, has no effect on the direction of motion of the motors, since armature and field are affected alike.



SEATTLE MUNICIPAL RAILWAY—RIGHT-ANGLE CROSSING OF DOUBLE TROLLEY AND SINGLE TROLLEY

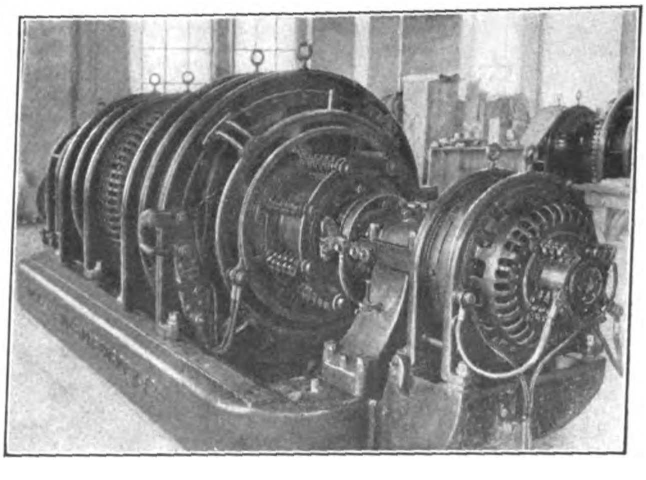
On cross-overs which are not used continually, the expense and complication of trolley frogs, etc., are saved by stopping the cross-over trolley wires 18 in. away from the main track wires, trolley poles being shifted by hand from one pair of wires to the other.

Where the double-trolley railway crosses the single-trolley railway, insulated crossings were installed at the expense of the double-trolley railway, an agreement being drawn up between the two covering the matters of first cost, cost of maintenance and liability for repairs and accidents. In each case the single-trolley wires were allowed the under-run, principally because they were there first, but also because the double-trolley circuit is broken at two places in series in passing the crossing, whereas the single-trolley circuit would have been broken at the single-trolley wheel only, with greater chance of drawing an arc.

These insulated crossings were specially made with extra long wood breaks, for the reason that the negative of the single-trolley system is grounded; whereas if it should at any time become desirable for the neutral of the three-wire generator which was employed on the double-trolley system to be grounded (with equal insulation on both sides, it is virtually at ground potential), the negative of the double-trolley system would then be at 300 volts lower potential than the ground or than the negative of the single-trolley system, and 900 volts lower than the potential of the positive of the single-trolley system.

The feeder system at present installed is considerably less than that designed for ultimate installation when the line is extended and the traffic becomes very much heavier than at the present time. Five feeder-circuit breakers were installed in the substation, with space for some additional ones. Only three have been utilized at the start, one feeding a pair of 1,192,500 circ. mil aluminum cables (each equivalent to 750,000 circ. mil copper), extending northerly and westerly to near the outer end of the line; another tapped on by 638,000 circ. mil aluminum cables (equivalent to 400,000 circ. mil copper) to trolley wire opposite substation, and another pair of 1,192,500 circ. mil aluminum cables extending south. Feeder taps are located from 1000 ft. to 2270 ft. apart, with section breaks between them. With this arrangement of feeders, with ten cars in operation on the division and 600 volts emf at Aloha Street, it is estimated that the maximum drop would be experienced at the outer end of the line, being about 61.5 volts or 10.3 per cent at the furthest feeder tap. Near the southerly end the drop is less. On the initial installation, a saving in first cost of more than $3,000 was made by using aluminum instead of copper, the price per pound of aluminum cable being 22.3 cents delivered at Seattle, while copper cable was 15.6 cents per pound, the total weight of aluminum required being of course very much less for equal conductance.

SEATTLE MUNICIPAL RAILWAY—EXTERIOR VIEW OF SUBSTATION



SEATTLE MUNICIPAL RAILWAY—EXCITER END OF MOTOR-GENERATOR SET

Power for the line is supplied from a single substation, which was designed, in addition to its railway function, also to form part of the municipal electrical distribution system, centering in the Yesler Way substation at the city end of the 60,000-volt transmission lines from the plant at Cedar Falls in the mountains. The distribution from Yesler Way to the various outlying substations is accomplished by a 15,000-volt, two-phase, five-wire system with grounded neutral. The substations are transformer stations, that are used principally for lighting, but also for carrying a certain amount of a.c. motor load. The lighting department is already supplying 250-volt direct current, principally for elevator motors, from its Yesler Way substation, and the addition of similar facilities in the railway substation puts the department in a much stronger position to make contracts. In consequence two 500-kw synchronous motor-generator sets were installed, the generators being of the three-wire type to supply direct current at 300 volts, as well as the 600-volt current required by the railway.

In the accompanying illustration of the machine two slip rings may be seen mounted on the shaft; they are connected to electrically opposite points of the armature winding. From the carbon brushes making contact with these rings, connections are made to a Thompson-Ryan balancing coil, which prevents difficulty from sparking and armature reaction when the 300-volt loads are unbalanced. The balancing coil is intended to be capable of carrying continuously in the neutral 25 per cent of the full load current without exceeding the full-load temperature of generator. The neutral is connected to the middle point of the coil and is led through the generator breaker to the neutral bus. The coil has been located in the basement close beside the machine foundation, to minimize the length of lead to the machine and to improve the regulation. It was specified that under the extreme unbalanced condition, above specified, the variation of emf on either side of the neutral should not be greater than 2 per cent of the mean. The generator is over-compounded 50 volts between no load and full load. The series fields are split, one-half being connected to the positive brush and the other half to the negative brush. A 75-hp induction motor and a 10-kw 125-volt d.c. generator are mounted on the main shaft of the machine, the former being used for bringing the main motor up to synchronous speed in starting the machine and the latter being used for an exciter.

The Pennsylvania Railroad System reports that of the 188,411,876 passengers carried in 1914 not one was killed. The report shows that trains on this system traveled 67,389,381 miles.

Census Report on Electric Railways

Rolling Stock, Traffic, Capitalization, Financial Operations and Employees Are Considered in This Final Abstract of the Forthcoming Census Report on Street and Electric Railways

In the last issue of this paper an abstract was published of the first part of the forthcoming Census Report on Electric Railways. The subjects considered were the development of the industry, power equipment and track. In this issue an abstract is published of the remainder of the statistical portion of the census report.

ROLLING STOCK AND TRAFFIC

Table I shows a classification of the different types of cars in use. Prepayment cars are reported for the first time in this census report. They are in general use in all parts of the country, except in New England and the mountain states. The states leading in express, freight, mail and baggage cars are Illinois with 1917 cars and California with 1507 cars. Of the 73,758 cars with electric motors 45,996 have two motors and 25,806 have "four or more" motors. The other cars have one motor or three motors each. Of the total number of 94,016 cars 43 per cent are equipped with hand brakes exclusively and 57 per cent with power brakes. This shows an increase in cars with power brakes during the past five years, because in 1907 the percentages were, hand brakes 58.8 and power brakes 41.2.

There were 277 electric locomotives in use by the street and electric railways in 1912 as compared with 117 in 1907 and three in 1902. These locomotives are exclusive of the number employed on the electrified divisions of steam railroads, of which, in 1912, there were 341. Of the total number of cars 71.4 per cent were owned by companies having gross incomes of $1,000,000 or more per year, 15.4 per cent by companies with gross incomes between $250,000 and $1,000,000, and 13.2 per cent by companies with gross income of less than $250,000.

The total number of passengers carried in 1912 was 12,135,341,716, or an increase of 27.3 per cent over the number carried in 1907, and 107.9 per cent over the number carried in 1902. The number of transfer and free passengers in 1912 was equal to 27.1 per cent of the number of revenue passengers, as compared with 28.1 per cent in 1907. During the past five years the average number of revenue passengers per mile of track increased 7.4 per cent. The average number of revenue passengers per car-mile was 5.06, as compared with 4.70 in 1907 and 4.26 in 1902. The average number per car-hour was 48.38, as compared with 43.06 in 1907 and 33.28 in 1902 for those companies reporting car-hours. In 1912 92.1 per cent of the companies reported car-hours; in 1907, 77.6 per cent and in 1902, 47.7 per cent.

Table II gives an interesting comparison between the steam and electric railways. It shows that the passenger traffic on the electric railways was nine and one-half times that on the steam railroads, while the receipts from passengers were about 24 per cent less.

CAPITALIZATION

Table III shows the gross and net capitalization of the street and electric railways exclusively. In 1907 common stock formed the largest proportion of the outstanding capitalization, being for the operating and

TABLE I—CARS—NUMBER AND KIND

	Number			Per Cent of Total			Per Cent of Increase[1]		
	1912	1907	1902	1912	1907	1902	1902-1912	1907-1912	1902-1907
Total	94,016	83,641	66,784	100.0	100.0	100.0	40.8	12.4	25.2
Revenue cars	83,956	75,685	61,404	89.3	90.5	92.0	36.7	10.9	23.3
Passenger	76,162	70,016	60,290	81.0	83.7	90.3	26.3	8.8	16.1
Closed	48,123	40,470	32,658	51.2	48.4	48.9	47.3	19.0	23.9
Open	18,993	22,537	24,259	20.2	26.9	36.3	−21.7	−15.7	−7.1
Combination—									
Closed and open	7,985	6,442	3,134	8.5	7.7	4.7	154.8	24.0	105.6
Passenger, with baggage, express, freight, or mail	1,061	567	239	1.1	0.7	0.4	344.0	87.1	137.2
Express, freight, mail and baggage	7,794	5,569	1,114	8.3	6.8	1.7	599.6	40.0	399.9
Service cars—work cars, snow plows, sweepers, etc	10,060	7,956	5,380	10.7	9.5	8.0	87.0	26.4	47.9
Prepayment cars	16,012	.....	.....	17.0	....	....	.....	.....	....
Parlor, sleeping, dining, and private cars	149	118	(2)	0.1	0.1	....	.....	26.3	....
Cars equipped with motors	73,779	63,517	50,699	78.5	75.9	75.9	45.5	16.1	25.3
Electric locomotives	277	117	3	...	...	...	...	136.8	....

[1] A minus sign (—) denotes decrease.

[2] Figures not available.

TABLE II—PASSENGER TRAFFIC—STREET AND ELECTRIC RAILWAYS AND STEAM RAILROADS[1]

	1912	1907	1902	Per Cent of Increase		
				1902-1912	1907-1912	1902-1907
Number of revenue passengers:						
Street and electric railways	9,545,554,667	7,441,114,508	4,774,211,904	100.0	28.3	55.9
Steam railroads	1,004,081,346	873,905,133	649,878,505	54.5	14.9	34.5
Receipts from passengers:						
Street and electric railways	$502,651,637	$382,132,494	$233,821,548	115.0	31.5	63.4
Steam railroads	660,373,176	564,606,343	372,963,248	77.1	17.0	51.4

[1] Steam railroad statistics from reports of the Interstate Commerce Commission.

TABLE III—CAPITALIZATION, INCLUDING FLOATING DEBT AND REAL-ESTATE MORTGAGES

	1912	1907	Per Cent of Increase[1]
Capital stock	$2,379,346,313	$2,097,708,856	13.4
Common	1,970,385,003	1,776,920,076	10.8
Preferred	408,961,310	320,788,780	27.5
Funded debt	2,329,221,828	1,677,063,240	38.8
Floating debt and real-estate mortages	302,259,042	282,986,902	6.7
Total	5,010,827,183	4,057,758,998	23.5
Stocks and bonds of other electric railway companies and treasury securities	360,105,164	237,896,093	51.4
Net capitalization	4,650,722,019	3,819,862,905	21.8
Investments in other securities and nonrailway properties	105,145,250	136,768,104	−23.1
Net capitalization based on street and electric railways:			
Inclusive of floating debt and real-estate mortages	4,545,576,769	3,683,094,891	23.4
Per mile of track	112,405	107,942	4.1
Exclusive of floating debt and real-estate mortgages	4,243,317,727	3,400,107,899	24.8
Per mile of track	104,930	100,495	4.4

[1] A minus sign (—) denotes decrease.

TABLE IV—GROSS INCOME OF OPERATING COMPANIES, BY SOURCE

Account	1912	1907	1902	Per Cent of Increase		
				1902-1912	1907-1912	1902-1907
Gross income	$585,980,517	$429,744,254	$250,504,627	133.9	36.3	71.69
Operating revenues	$567,511,704	$418,187,858	$247,553,999	129.2	35.7	68.9
Passenger	502,651,637	382,132,494	233,821,548	115.0	31.5	63.4
Parlor, chair, and special car	1,036,520	705,261	303,608	241.4	47.0	132.3
Freight	10,165,616	5,231,215	1,038,097	879.3	94.3	403.9
Mail	723,640	646,575	432,080	67.5	11.9	49.6
Baggage, express and milk	3,687,947	1,560,802	401,672	818.1	136.3	288.6
Other transportation revenue	1,919,413	....	....	....	....	....
Sale of electric current	36,500,030	20,093,302	7,703,574	373.8	81.7	160.8
Other nontransportation revenue	10,826,901	7,818,209	3,853,420	181.0	38.5	102.
Income from other sources	18,418,813	11,556,396	2,950,628	524.2	59.4	291.
Per Cent of Gross Income						
Operating revenues	96.9	97.3	98.8	....	....	....
Passenger	85.8	88.9	93.3	....	....	....
Parlor, chair, and special car	0.2	0.2	0.1	....	....	....
Freight, mail, baggage, and express	2.5	1.7	0.8	....	....	....
Sale of electric current	6.2	4.7	3.1	....	....	....
Other operating revenue	2.2	1.8	1.5	....	....	....
Income from other sources	3.1	2.7	1.2	....	....	....

lessor companies 47.1 per cent of the total, while in 1912 it is only 41.8 per cent of the total. On the other hand the five years between 1907 and 1912 have shown a larger proportionate increase of the funded debt, which now constitutes 49.4 per cent of the total, while the common stock is 41.8 per cent and preferred stock 8.8 per cent of the total.

HOLDING COMPANIES

There were sixty-one holding companies or organizations in 1912 identified largely with the industry. The total amount of their reported assets was $1,239,057,329, of which 61.7 per cent was invested in stocks and bonds of electric railway companies. Only seven of these

TABLE V—PER CENT DISTRIBUTION, BY ACCOUNTS, OF GROSS INCOME OF OPERATING COMPANIES

Account	Total—All Companies			Companies Reporting Net Income			Companies Reporting Net Deficit[1]		
	1912	1907	1902	1912	1907	1902	1912	1907	1902
Gross income	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Operating revenues	96.9	97.3	98.8	97.0	97.1	99.4	95.8	98.1	95.2
Miscellaneous income	3.1	2.7	1.2	3.0	2.9	0.6	4.2	1.9	4.8
Operating expenses	56.8	58.5	56.8	55.4	57.0	55.7	68.3	63.5	64.3
Deductions from income	32.6	32.1	31.0	31.0	27.6	28.5	45.4	47.9	47.2
Taxes	6.0	4.6	5.2	6.1	4.8	5.2	4.8	4.0	5.3
Interest	16.7	14.8	15.2	15.2	14.7	14.2	28.7	15.3	21.9
Rent of leased lines and terminals	7.6	11.2	10.2	7.5	6.4	8.8	9.1	28.0	19.4
Miscellaneous deductions	2.3	1.5	0.4	2.2	1.8	0.3	2.8	0.6	0.6
Net income or net deficit[1]	10.6	9.4	12.2	13.6	15.3	15.8	[1]13.7	[1]11.4	[1]11.5
Dividends	8.8	6.2	6.3	9.9	7.9	7.2	0.1	(2)	0.3
Surplus or deficit[1]	1.8	3.2	5.9	3.7	7.4	8.5	[1]13.8	[1]11.4	[1]11.8

[1] Indicates deficit.

[2] Less than one-tenth of 1 per cent.

TABLE VI—PER CENT DISTRIBUTION OF OPERATING EXPENSES, BY ACCOUNTS

Account	Operating Expenses			General Accounts		
	1912	1907	1902	1912	1907	1902
Operating expenses	100.0	100.0	100.0	....	....	....
Way and structures	13.9	11.4	9.6	100.0	100.0	100.0
Superintendence of way and structures	0.8	....	....	5.6	....	....
Maintenance of way	9.1	8.7	6.8	65.0	76.5	70.9
Maintenance of electric lines	1.7	1.9	2.1	11.9	16.8	21.8
Buildings and structures	0.8	0.8	0.7	5.8	6.7	7.3
Depreciation of way and structures	1.1	....	....	8.0	....	....
Other operations	0.5	....	....	3.7	....	....
Equipment	12.0	12.5	11.7	100.0	100.0	100.0
Superintendence of equipment	0.5	....	....	4.2	....	....
Maintenance of power equipment	1.1	1.5	1.5	9.4	12.2	13.1
Maintenance of cars and locomotives	5.1	5.5	5.4	42.3	43.9	45.9
Maintenance of electric equipment of cars and locomotives	3.0	4.3	3.7	24.7	34.1	31.9
Miscellaneous equipment expenses	0.9	1.2	1.1	7.6	9.8	9.1
Depreciation of equipment	1.1	....	....	9.2	....	....
Other operations	0.3	....	....	2.7	....	....
Traffic expenses	0.8	0.7	0.8	....	....	....
Conducting transportation	57.0	56.1	59.1	100.0	100.0	100.0
Superintendence of transportation	2.1	1.4	1.8	3.8	2.5	3.1
Power	18.2	17.5	16.2	41.9	31.2	27.4
Power-plant employees	1.9	3.1	3.2	3.3	5.6	5.5
Substation employees	0.6			1.0		
Fuel for power	6.1	8.4	9.0	10.6	14.9	15.3
Other power supplies and expenses	0.6	1.1	1.2	1.1	1.9	2.1
Power purchased	7.4	4.9	2.7	13.0	8.7	4.6
Other operations	1.6	....	....	2.9	....	....
Operation of cars	36.7	37.2	41.0	64.4	66.3	69.5
Conductors, motormen, and trainmen	29.5	29.8	34.2	51.8	53.0	58.0
Miscellaneous transportation expenses	7.2	7.5	6.8	12.6	13.3	11.5
General and miscellaneous	16.3	16.8	17.3	100.0	100.0	100.0
General expenses	5.7	6.0	6.7	35.3	35.9	38.8
Injuries and damages	6.2	7.2	6.6	38.2	43.0	38.1
Insurance	0.9	1.2	1.5	5.8	7.4	8.4
Stationery and printing	0.3	0.3	0.3	2.0	2.0	2.0
Store and stable expenses	0.6	0.7	1.2	3.8	3.9	6.7
Rent of tracks and terminals	1.1	1.1	1.0	6.8	6.5	6.0
Rent of equipment	0.4	0.2	....	2.2	1.4	....
Other operations	1.0	....	....	5.8	....	....
Wages, supplies, and expenses incident to electric service, not elsewhere included	....	2.4	1.5	....	....	....

TABLE VII—PER CENT DISTRIBUTION OF OPERATING EXPENSES BY ACCOUNTS—COMPANIES CLASSIFIED ACCORDING TO INCOME FROM RAILWAY OPERATIONS: 1912

Account	Per Cent of Total			Per Cent of Operating Expenses			
	Class A	Class B	Class C	Total	Class A	Class B	Class C
Number of companies	9.3	15.9	74.8	....	....	....	....
Operating expenses	72.0	16.0	12.0	100.0	100.0	100.0	100.0
Way and structures	72.5	16.0	11.5	13.9	14.0	13.9	13.4
Equipment	74.7	14.5	10.8	12.0	12.5	10.9	10.8
Traffic	51.6	29.0	19.5	0.8	0.6	1.4	1.3
Conducting transportation	72.7	15.7	11.7	57.0	57.5	55.8	55.4
Superintendence of transportation	77.2	13.8	9.0	2.1	2.3	1.8	1.6
Power	64.4	18.8	16.8	18.2	16.3	21.4	25.5
Operation of cars	76.5	14.3	9.2	36.7	39.0	32.7	28.3
General and miscellaneous	68.3	17.6	14.1	16.3	15.4	17.9	19.2

TABLE VIII—OPERATING COMPANIES—DEDUCTIONS FROM INCOME, BY ACCOUNTS

Account	1912	1907	Per Cent Distribution	
			1912	1907
Number of companies	975	939	....	....
Deductions from income	$191,123,408	$138,094,716	....	....
Taxes	35,027,965	19,755,602	18.3	14.3
On real and personal property	15,658,239	9,464,616	8.2	6.9
On capital stock	3,899,146	2,348,439	2.0	1.7
On earnings	9,486,792	5,437,028	5.0	3.9
Federal corporation tax	1,016,901	....	0.6	....
Miscellaneous	4,966,887	2,505,519	2.6	1.8
Interest on funded and floating debt and mortgages	98,025,338	63,740,744	51.3	46.2
Rent of leased lines and terminals	44,784,521	48,022,596	23.4	34.8
Charges for sinking fund	6,229,136	(1)	3.3	....
Miscellaneous deductions	7,056,448	6,575,774	3.7	4.8

[1] Included under "Miscellaneous deductions."

TABLE IX—RATIO OF TAXES TO GROSS INCOME LESS OPERATING EXPENSES (PER CENT)

Division	1912	1907	1902
United States	13.8	11.1	12.2
New England	21.1	17.2	19.4
Middle Atlantic	12.6	9.4	11.9
East North Central	15.2	11.2	10.7
West North Central	14.0	11.4	10.6
South Atlantic	11.9	11.6	11.6
East South Central	14.4	15.0	11.7
West South Central	10.4	9.3	13.1
Mountain	10.7	6.6	8.5
Pacific	12.2	11.5	10.0

TABLE X—GENERAL RESULTS OF OPERATIONS OF ALL COMPANIES AND OF COMPANIES CLASSIFIED ACCORDING TO INCOME FROM RAILWAY OPERATIONS, 1912

Unit	All Companies	Class A	Class B	Class C
Number of companies	975	91	155	729
Ratio of operating expenses to operating revenues (per cent)	58.7	56.7	61.7	68.3
Per mile of track:				
Operating revenues	$13,820	$19,844	$8,937	$5,784
Operating revenues exclusive of income from sale of current	12,931	19,011	7,929	4,890
Operating expenses	8,107	11,252	5,517	3,949
Net operating revenue	5,713	8,592	3,420	1,835
Per car-mile:	*Cents*	*Cents*	*Cents*	*Cents*
Operating revenues	29.53	29.49	30.63	28.32
Operating revenues exclusive of income from sale of current	27.63	28.25	27.18	23.94
Operating expenses	17.32	16.72	18.91	19.33
Conducting transportation	9.87	9.62	10.56	10.71
All other	7.45	7.10	8.35	8.62
Net operating revenue	12.21	12.77	11.72	8.99
Per revenue passenger:				
Operating revenues	5.95	5.54	7.51	7.68
Passenger revenue	5.27	5.08	6.10	5.87
All other	0.68	0.46	1.41	1.80
Operating expenses	3.49	3.14	4.64	5.24
Net operating revenue	2.46	2.40	2.87	2.44

TABLE XI—OPERATING RATIOS FOR 1912 AND 1907

	Total Number of Companies		Number of Companies Reporting Operating Ratio—											
			Under 50 Per Cent		50 Per Cent but Under 60 Per Cent		60 Per Cent but Under 70 Per Cent		70 Per Cent but Under 80 Per Cent		80 Per Cent but Under 90 Per Cent		90 Per Cent and Over	
	1912	1907	1912	1907	1912	1907	1912	1907	1912	1907	1912	1907	1912	1907
Total number	[1]973	[2]938	69	77	224	195	233	263	177	160	109	109	161	134
Revenue passengers per mile of track:														
Under 25,000	184	169	4	11	31	27	50	45	25	26	26	21	48	39
25,000 but under 50,000	143	134	6	9	24	21	27	22	30	22	16	26	40	34
50,000 but under 100,000	242	232	13	19	40	39	61	73	46	37	37	25	45	39
100,000 but under 200,000	220	263	19	17	60	61	55	83	47	52	22	30	17	20
200,000 but under 300,000	95	67	11	7	33	20	23	23	16	12	6	3	6	2
300,000 but under 400,000	41	32	9	8	14	11	10	8	5	5	1	..	2	..
400,000 and over	48	41	7	6	22	16	7	9	8	6	1	4	3	..
Revenue passengers per car-mile:														
Under 2	157	144	4	6	28	26	34	35	27	23	17	19	47	35
2 but under 3	168	164	7	11	27	34	36	27	32	30	27	27	39	35
3 but under 4	194	217	10	15	38	30	40	68	43	36	25	36	38	32
4 but under 5	200	202	15	15	52	56	64	67	37	37	17	11	15	16
5 but under 6	137	122	16	17	43	26	37	41	18	23	15	7	8	8
6 but under 7	57	37	9	4	20	10	14	10	5	6	3	4	6	3
7 and over	60	52	8	9	16	13	8	15	15	5	5	5	8	5

[1] Not including two companies doing freight business only. [2] Exclusive of six companies which failed to furnish this information, and one freight road.

holding companies were in New York, but they controlled 35.9 per cent of the total investment.

FINANCIAL OPERATIONS

The first eight states, in the order of the magnitude of their gross receipts, were the same in 1912 as in 1907, viz: New York, Pennsylvania, Illinois, Ohio, Massachusetts, California, Missouri and New Jersey. The ninth state in 1912 was Michigan, which in 1907 was twelfth in the list.

The gross income of all companies in 1912 was $621,535,884, of which $35,144,521 was reported by the lessor companies as income from rental paid by the operating companies. The gross income of the operating companies is shown in Table IV. Table V shows the per cent distribution by accounts of gross income of operating companies, showing net income and also net deficit. The bulk of the deficit comes from companies in the New England and Middle Atlantic divisions. In 1912 these divisions furnished 61.5 per cent of the total deficit, as compared with 58.3 per cent in 1907 and 52.6 per cent in 1902.

Table VI shows the per cent distribution of operating expenses of the 975 operating companies. Table VII shows the corresponding figures for 1912 but divided into three classes of companies, viz: Class A, or those having gross income from railway operations of $1,000,000 or more; Class B, with income of $250,000 or more but less than $1,000,000; and Class C, with income less than $250,000. Table VIII gives the deductions from income for the operating companies, and Table IX shows the ratio of taxes to gross income less operating expenses in per cent for the different groups of states. The report says that in all the divisions, with the exception of the South Central, taxes consumed a larger proportion of the income left after paying operating expenses in 1912 than in either 1907 or 1902.

TABLE XII—EMPLOYEES, BY CLASSES OF OCCUPATION

Class	1912	1907	Per Cent of Increase
Number of companies	975	[1]939	3.8
Persons employed:			
Number	282,461	221,429	27.6
Salaries and wages	$200,890,939	$150,991,099	33.0
Salaried employees—			
Number	23,271	11,700	98.9
Salaries	$26,128,786	$12,909,466	102.4
Salaried officers of corporation—			
Number	1,027	1,518	26.9
Salaries	$5,708,553	$3,852,252	48.2
Managers and superintendents—			
Number	2,882	2,094	37.6
Salaries	$5,376,526	$3,580,367	50.2
Clerks, stenographers, and other salaried employees—			
Number	18,462	8,088	128.3
Salaries	$15,043,707	$5,476,847	174.7
Wage earners—			
Average number	[2]259,190	209,729	23.6
Wages	$174,762,153	$138,081,633	26.6
Conductors and motormen—			
Average number	131,321	115,518	13.7
Wages	$95,451,625	$75,705,054	26.1
Conductors—			
Average number	65,726	60,032	9.5
Wages	$47,101,768	$38,231,158	23.2
Motormen—			
Average number	65,595	55,486	18.2
Wages	$48,349,857	$37,470,896	29.0
All other employees—			
Average number	127,869	94,211	35.7
Wages	$79,310,528	$62,376,579	27.1

[1] Exclusive of six companies which failed to furnish this information.
[2] Number employed Sept. 16, 1912.

Table X shows the general results of operations of all companies and of companies classified according to income from railway operations. Table XI shows the operating ratios reported for 1907 and 1912, the companies being grouped according to the revenue passengers per mile of track and per car-mile.

EMPLOYEES

Table XII gives the number of employees and salaries or wages paid for all of the companies. In connection with this table, the report points out that in the 1907 and 1902 reports wage earners were grouped by occupations into a number of classes, but except for conductors and motormen the grouping was unsatisfactory, as among the small and medium-sized companies one employee acts in several capacities. Hence the schedule was altered for the 1912 census. The bureau believes that the change in the form of the inquiry may have had some effect on the numbers reported for the different classes in the various censuses, and it may be that in some cases foremen, inspectors, starters and engineers, that were specified as wage earners in the prior censuses, were considered salaried employees in 1912 and reported as such.

Transmission Line Short-Circuit Conditions Discussed at A. I. E. E. Meeting

Electrical Engineers Consider Mechanical and Heating Effects of Short-Circuits and the Application of Reactance to Limit Them

A paper on this subject was presented at the New York meeting of the American Institute of Electrical Engineers on January 8 by I. W. Gross of the motive power department Interborough Rapid Transit Company. The paper and the following discussion brought out, first, the magnitudes of the effects of short-circuits in large power plants and in transmission lines, particularly cable lines; second, the necessity for furnishing protection to equipment, and, third, the function of reactance in furnishing such protection and the methods used in applying it.

Mr. Gross pointed out that, in a high-tension system, protection must be furnished for the following: (1) Oil switches against absolute failure; (2) generators, transformers, busbars and underground cables against mechanical forces; (3) all apparatus against overheating, and (4) the system as a whole against complete shut-down. No system is completely protected without attention to these elements. The paper was the result of a study made in connection with the plans for the enlargement of the Seventy-fourth street power plant of the company.

Following the outline given in the above paragraph the author proceeded to discuss the theoretical and some of the practical phases of the subject. He cleared the ground by stating that oil switches can be obtained with a guarantee that they will interrupt short-circuit currents up to 36,800 amp. He demonstrated mathematically that, with short-circuit current values likely to occur in large plants, rupturing forces of the magnitude of a ton per foot of cable may result. The cables, however, are amply strong to resist these. Curves showing these forces for different current values and different center-to-center distances of conductors were given. A similar analysis of mechanical reaction between busbars was described.

In showing how temperature rise is related to short-circuit conditions, Mr. Gross gave the results of calculations based on the assumption that for the short period involved, less than a second at the outside, the heat generated can be assumed to be confined to the conductor. Then, from the calculated volume of the conductor, the assumed specific heat of the material and the heating effect of the calculated train of current waves, the temperature rises for a large number of conditions were calculated and results plotted. Owing to the oscillating character of the current, which falls quickly from a maximum transient value to a steady alternating value, the mathematical demonstration is involved, but the underlying physical principles are not so, and the results are easily adapted to other conditions. The curves show that the temperature may rise to prohibitive values within the 0.18 second stated by Mr. Gross to be the minimum period during which the circuit can be opened, unless precautions are taken to limit it.

The remainder of the paper is taken up with the application of the theory to various arrangements of current-limiting reactors, particularly to the one adopted for the Seventy-fourth street plant and described in the issue of the ELECTRIC RAILWAY JOURNAL, Vol. 43, page 872. Short-circuits at various points were assumed and the results were calculated and plotted. This method, which was selected by H. G. Stott as the best adapted to conditions at Seventy-fourth street, has the merits of limiting the current to safe values without excessive reactance; of protecting the generators against mechanical injury due to poor synchronizing, and of transmitting power between busbar sections with reasonable voltage drop.

Inspecting Equipment in Greater New York

Pull-Ins, Equipment Complaints, Ventilation, Accidents, Etc., Discussed by Commission's Senior Electrical Engineer

William C. Whiston, senior assistant electrical engineer of the Public Service Commission for the First District of New York, contributed to the *Public Service Record,* for November, 1914, published in the interest of that commission, a very interesting article dealing with the equipment inspection bureau of the commission. Mr. Whiston said that in 1907, when the commission first began its work, more than 30 per cent of the cars on some lines in Manhattan and the Bronx had to be run into the carhouses during the day because of defective equipment. After the engineers of the equipment inspection bureau had made a minute inspection of this equipment it was thoroughly overhauled under orders of the commission and put in good condition. The city is now divided into districts, to each of which is assigned an engineer to visit each surface carhouse in his district at irregular intervals, according to the conditions found. One engineer is assigned to the subway and elevated car equipment, which is similarly inspected.

In addition to the inspections of car equipment, general inspections of the tracks of the various street railways are made at least once each year to determine what track should be rebuilt or repaired during the following season. The matter is then taken up with the company and an agreement is reached by which as much as possible of poor track is scheduled for rebuilding or overhauling during the next season.

Complaints by the public regarding equipment are investigated promptly, and if they are found to be justified the company involved is communicated with. In almost every instance repairs are made without formal action by the commission.

Another branch of the work is the investigation and study of accidents. The accident reports received from the engineers are classified and studied to prevent repetitions of those of most frequent occurrence. A study of the commission's records brought out the fact that the near-side stop reduced the number of collisions with vehicles, and the number of persons struck by cars, but that the number of boarding accidents increased seemingly, because people not familiar with the new ordinance still wait on the far side of the street and then try to jump on a moving car.

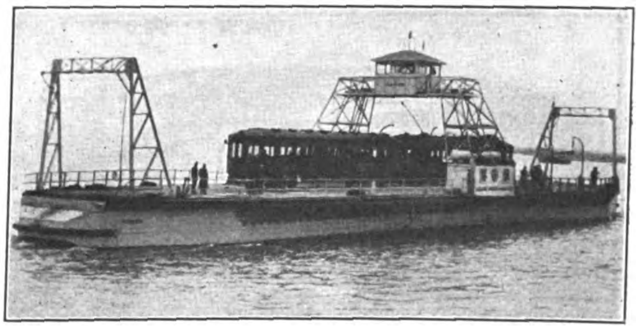
Mr. Whiston referred to the subject of brakes on surface cars and to the rehabilitation of the power plant of the Richmond Light & Railroad Company at Livingston, Staten Island, the rebuilding of which has been referred to previously in this paper.

In regard to the tests which are being carried on to determine the efficiency of different systems of ventilation in use on cars, Mr. Whiston said that samples of the air in cars of different types are taken to determine the number of parts of carbon dioxide in 10,000 parts of air, but he expressed doubt as to whether this will convince the traveling public, who generally cannot be convinced that a car is well ventilated unless they can see some direct opening to the outer air. To substantiate his point about the idiosyncrasies of the public, Mr. Whiston says that many complaints have been received in regard to the center-entrance cars, which are the most scientifically ventilated in the city.

In connection with the matter of the screeching caused by the application of brakes Mr. Whiston says that most of the companies affected have already submitted for approval a brakeshoe containing an asphaltum insert which it is found gives just enough lubrication on the flanges of the wheels to prevent screeching and not interfere with braking efficiency.

Steel Ferryboat in Service on the Oakland, Antioch & Eastern

The steel ferryboat *Ramon* was put in service on the line of the Oakland, Antioch & Eastern Railway between Mallard and Chipps Island in Suisun Bay on Jan. 3. The new boat, which was built at San Francisco, is 235 ft. long, has a beam of 58 ft. and is equipped with a 600-hp oil-engine. The two slips into which the ferry operates are 2600 ft. apart and the trip takes from eight minutes to nine minutes, the normal speed of the boat being 7½ m.p.h. The boat has a capacity of eleven freight cars and one locomotive and ordinarily handles eighteen trains a day. A special feature of its design is that, instead of the usual means of mooring in the slip, there is provided a mechanical locking device that can be released instantly when the last truck is on board. The engine is always started a few minutes before the train arrives, and thus there is a minimum delay in getting away from the slip. The ferry is equipped with pneumatic steering gear and operates in either direction. For the convenience of passengers a grill room is provided on the lower deck.



STEEL FERRYBOAT OF THE OAKLAND, ANTIOCH & EASTERN RAILWAY

The Stevens Institute of Technology, of which Dr. A. C. Humphreys is president, is conducting a whirlwind ten-day campaign to raise $860,000 for an endowment fund, to clear off present debts and to add somewhat to the building equipment. If this amount is raised Andrew Carnegie and John D. Rockefeller will each add $250,000. The campaign is under the direction of the "Stevens Tech. Fund Committee," with executive offices at 50 Church Street, New York.

Travel on New York Transit Lines and Steam Railroads

Statistics of Passengers Carried—Statement Showing the Extent of Travel and Accidents in Five Years and Six Months

In the editorial last week in this paper on the number of passengers carried and accidents to passengers on the steam railroads and on the subway and elevated roads in New York, an error was made in the comparison of the passengers carried. The number of passengers carried on the steam roads reporting to the Interstate Commerce Commission for the year ended June 30, 1912, was 1,004,081,346, while the number on the combined subway and elevated railway system in New York for the same year was 607,244,697, or a little more than 60 per cent of the number on the steam roads for the same period. The statistics for accidents on the steam railroads quoted were from the Interstate Commerce Commission reports for the years ended June 30, 1913, and 1914, and for the Interborough for the year ended June 30, 1914. These figures were correctly stated. Although the difference in accidents per passenger carried is not so great as stated last week the comparison is sufficiently striking.

On Jan. 14 the Interborough Rapid Transit Company published a statement in all of the New York daily papers, showing the safety of subway and elevated travel. The statistics of the accidents on the subway and elevated lines were brought up to include the recent accidents, and figures were given for five-year periods. The statement follows:

"To the Public:

"In view of recent published statements calculated to unsettle confidence in the safety of travel upon the rapid transit lines in this city and to create a false impression that the management, intent on profit, is unmindful of public welfare, the board of directors invites attention to the following facts:

"Passengers carried during the five years, six months, and twelve days ended Jan. 12, 1915,

Elevated Division	Subway Division	Total
1,678,115,936	1,692,362,193	3,370,478,129

"Fatal accidents due to train operation, excluding suicides and trespassers,

Elevated Division	Subway Division	Total
3	1*	4

---

*Including recent fatality not due to train operation.

"Some measure of the comparative safety of travel upon the rapid transit lines in this city, notwithstanding the onerous conditions of congestion, and frequent and rapid service under which they are operated, may be derived from the following comparisons:

"Passengers carried for the five years ended June 30, 1913, upon the steam railroads of the United States, over 4,800,000,000.

"Fatal accidents to passengers from steam railroad operation, excluding trespassers, 1862.

"Fatal accident rate upon the steam railroads, to passengers carried, one passenger in 2,610,000.

"Fatal accident rate upon the London underground lines to passengers carried, one passenger in 25,000,000.

"Fatal accident rate upon the elevated and subway lines of the Interborough Rapid Transit Company, to passengers carried, *one passenger in* 842,620,000.

"This company employs the best operating talent.

"This company buys the best materials.

"This company leads the world in the development of electrical transportation.

"This company encourages and carefully considers every thoughtful suggestion relating to the safety and comfort of its passengers.

"This company has never refused a request of its operating department for any device or improvement tending to promote efficiency and safety in operation. For this purpose this company has expended during the last five years (apart from its ordinary operating and maintenance charges), more than *Thirteen Millions of Dollars*.

"This company operates the safest passenger railroad in the world."

The statement is signed by T. P. Shonts, president Interborough Rapid Transit Company.

Discussion on Paving

Merits of Wood and Stone Blocks Considered at Philadelphia A. A. A. S. Meeting

At a meeting of the engineering section of the American Association for the Advancement of Science held in Philadelphia on Dec. 30 and 31, several interesting papers on paving were presented. The program was in charge of Fred W. Taylor, consulting engineer, Philadelphia, and A. H. Blanchard, professor of highway engineering Columbia University, New York.

Wood Block Paving

T. S. Oxholm, engineer in charge, bureau of engineering borough of Richmond, New York, explained his practice in laying wood blocks on dry mortar in preference to sand. He considers paving thus constructed more durable and, as the mortar sets gradually, there is ample time to roll the blocks into place. At the same time new pavement can be used as soon as completed.

George W. Tillson, consulting engineer to the president of the borough of Brooklyn, New York, outlined the practice in New York City in regard to wood paving block specifications and tests. A test for the absorption of creosote oil to the extent of 20 lb. per cubic foot by blocks of yellow pine weighing 42 lb. per cubic foot was that they should sink in water. After blocks were kiln-dried at 100 deg. Fahr. for twenty-four hours they were immersed for an additional twenty-four hours and were rejected if they gained more than 3 per cent in weight. Pavements constructed of such blocks without expansion joints have been in use ten or eleven years with practically no attention on account of instability of the blocks. The specifications have been changed to admit the use of oil of 1.10 to 1.12 specific gravity without resin, and to permit 3½ per cent absorption. No trouble from bulging has resulted even when expansion joints were not used. The borough of Manhattan, in its 1914 specifications, has decreased the treatment from 20 lb. to 18 lb. per cubic foot and has increased the permissible absorption to 5 per cent. These blocks are used with bituminous joint filler but without expansion joints. No maintenance data are, of course, available as yet.

Stone Block Paving

This subject was discussed by H. H. Schmidt, chief engineer of the bureau of highways, borough of Brooklyn, New York. He stated that modern granite block paving dates back but five years and many of the objectionable features have been removed. An extensive study of this type of paving has been conducted in Brooklyn, and it has been found that the value of granite for paving purposes depends very largely upon its composition. Standard specifications were prepared and have been embodied in the specification adopted by the American Society of Municipal Improvements in October, 1914. There are in Brooklyn 160 miles of stone pavement, of which 25 miles are of the improved type. There were no expenditures for maintenance of these 25 miles in 1914.

The bureau employs certain traffic standards in studying paving and street congestion as follows:

Traffic density units per minute per foot of roadway = (number of vehicles passing a given point × traffic value) ÷ (8 × 60 × width of roadway in feet).

Traffic value is given by the following table:

Character of Vehicle	Weight in Tons	Traffic Value
Rubber-tired vehicles:		
Large auto trucks, loaded	9	5
Large auto trucks, empty	4	4
Small auto trucks, loaded	3	3
Small auto trucks, empty	1½	2
Pleasure automobiles	1¾	1
Carriages	2	2
Steel-tired vehicles:		
Loaded trucks	7½	10
Empty trucks	3½	7
Loaded wagons	2½	7
Empty wagons	1½	4
Carriages	1	2
Trolley cars	—	10

The density of traffic may be divided roughly thus: Maximum, 1.16 to 1.74; medium, 0.58 to 1.15, and minimum, 0.00 to 0.57.

Reduced to tonnage per foot width of roadway, per eight-hour day, the following show what is meant by heavy, medium and light traffic in Brooklyn: Maximum, 200 to 235 or more; medium, 100 to 199, and minimum 0 to 99.

Buffalo's Railway Facilities

Sketch of Past and Present Conditions in That City and Vicinity Is Given by E. J. Dickson

At the first "Electrical Railway Night" of the Central Railway Club, Buffalo, N. Y., held at the Hotel Statler on Friday, Jan. 8, E. J. Dickson, vice-president International Railway, presented a historical survey of street and electric railway development in and about Buffalo. The following abstracts from Mr. Dickson's paper are of more than local interest because of their comparisons of old and new service equipment and costs.

TRACK

In the track construction used during the sixties and seventies a side-bearing stringer rail weighing 42 lb. per yard was used. This was spiked to 5-in. x 7-in. pine stringers. The joint plates were of cast iron, 18 in. long and countersunk into the stringers. The tie rods to hold the stringers in place were spaced 5 ft. centers, and no crossties were used. Where paving was employed it consisted of stone block bedded in sand only. The following is a bill of material covering 1 mile of track built between 1860 and 1880:

65 tons rails at $28 per ton	$1,820.00
31,800 ft. lumber at $22 per thousand	677.60
1056 tie rods and 4224 washers averaging 16 cents per rod	171.06
5280 spikes at 8 cents per pound	79.20
211 joint plates at 8 cents per pound	16.88
200 yd. sand at $1.25 per yard	250.00
Labor at 35 cents per running foot, including laying track, paving and clearing rubbish	1,848.00
Total	$4.862.74

During the following decades the standards of track construction constantly advanced because of heavier cars and shorter headways, until in 1910 the company found it necessary to install a 124-lb. 9-in. girder rail with shoulder tie plates, tie rods at 6-ft. centers, ties at 2-ft. centers and eight-bolt continuous joints with bonds. The substructure used with this construction was of crushed stone ballast which had been rolled with a 10-ton roller. While this substructure gave general satisfaction where the sub-grade was of dependable character, it called for constant repairs in those locations where lack of drainage converted it to a soggy, unstable mass. This portion of the track standards adopted in 1910 had been replaced, therefore, by an 8-in. concrete base under the whole structure, the rail being afterward tamped up with 2 in. of crushed stone. The following is a bill of material covering 1 mile of single track as laid on the system to-day:

195 tons of rail at $38.50 per ton	$7,501.00
2640 white oak and long-leaf yellow pine ties at 93 cents each	2,455.00
880 tie rods at 32 cents each	281.00
4928 tie plates at 13.6 cents each	670.00
176 Continuous joints at $4.75 each	836.00
10,560 drive screws for plates at 0.136 cent each	40.00
10,560 screw spikes at 2.5 cents each	264.00
528 No. 0000 bonds at 39.8 cents each	209.00
1228 yd. concrete sub-base at $2.43 per yard	2,984.00
695 yd. concrete paving base at $2.43 per yard	1,684.00
444 yd. tamping stone at 75 cents per yard	333.00
Drainage material, tile, lumber, drains, etc	138.00
Labor excavating, concreting, laying, bonding, etc., at $1.61 per track foot	8,516.00
Paving at $3.14 per track foot	16,580.00
Total	$42,491.00

ROLLING STOCK

About 90 per cent of the cars used between 1860 and 1890, the beginning of the electrification period, were of two-horse type, 26 ft. over all, with 20-ft. body, single-truck type with cast-iron wheels, seated thirty passengers in longitudinal seats, weighed more than 1800 lb. and cost from $800 to $1,000 each. Most of the earlier electric double-truck cars weighed from 14 tons to 20 tons each. In 1906 came 200 pay-as-you-enter cars for the heavier traffic lines. These prepayment cars weighed 26½ tons each. One hundred and fifty were equipped with four 40-hp motors and fifty with four 50-hp motors each. Each had seats for forty-four people, and the unit cost per car was approximately $7,000. In 1910-1911 the company bought sixty-two double-truck near-side cars, now increased in number to 362, which carry only two 60-hp motors each, seat fifty-four people, weigh but 19 tons and cost, complete with all additions to date, $6,000 per car.

WORKING HOURS

All horse cars except the 10 per cent of bobtail type were manned by a driver and conductor. In 1870 these men were paid a flat rate of $1.65 a day. They began their morning run at, say, 6 o'clock and, except for fifteen minute reliefs for dinner and supper, worked through the day until they pulled into the carhouse at night between 8 o'clock and midnight. In this way cars averaged 84 miles a day, while the crews averaged 80 miles a day with fourteen to seventeen hours. To-day the older men in the service average only nine and one-half hours a day, and if they were to work sixteen hours a day as in 1870 they would, according to the present wage schedule, earn $5.45 a day, or three times the wage of 1870.

PRESENT SYSTEM FREIGHT AND MARKET SERVICE, DISPATCHING, ETC.

The International Railway of to-day is a unification of thirty-two separate street railway, bridge and construction companies formed in Buffalo, Niagara Falls, the Tonawandas, Lockport and on the Canadian side of the frontier. It may be conveniently divided as follows: The city lines in Buffalo, Niagara Falls and Lockport; the interurban or suburban lines to Lancaster-Depew, Kenmore-Tonawanda, Lockport-Olcott and to Niagara Falls; also the Park and River (Canadian side) line.

The Buffalo-Lockport-Olcott division extends from

Buffalo over the leased Erie Railroad right-of-way to and through the Tonawandas to the former Erie station in Lockport. From Lockport to Olcott the track is on the International Railway's right-of-way through the thickly-populated fruit and produce district between the Lock City and Lake Ontario. Between the Tonawandas and Olcott standard steam railroad equipment is handled for freight service by electric locomotives, three of the latter being owned by the company. In addition to the carload freight and l.c.l. shipments, the company operates during each fruit season a "fruit express" by which fruit and produce is transported from stations north of Lockport direct to the Elk Street market in Buffalo. Ten special motor cars are used for this service during the height of the season.

The interurban portion of this division consists of 32.5 miles of road 12 1/3 miles of which, between Tonawanda and Lockport, has recently been double-tracked. Operation had always been on standard rules, namely, time-tables and train orders with dispatchers on duty while cars are in operation. In 1913 it was determined that, owing to the increase in number of trains and the continued growth of traffic, the system of train dispatching by use of the telegraph with operators at the principal stations along the line, was becoming obsolete and would not long fulfil requirements for safe operation. In December, 1913, the telephone system with all-metallic circuit was installed for messages of this character. At the same time the services of operators were discontinued, the dispatchers delivering orders direct to the train crews. At this time there were but 2 1 3 miles of double track on the division, and notwithstanding the fact that the six months period immediately following the change was one of construction with large numbers of work extras on the line daily, the results from the standpoints of safety and continuity of operation, especially, have been most gratifying.

Mr. Dickson also described the operations of the Niagara Falls and Scenic Belt Line which are, perhaps, the most widely-known scenic electric railways in the world. On heavy days both of these lines are operated on a three-minute headway.

Speaking of city fares Mr. Dickson said that up to the year 1892 no universal transfer privileges had been allowed to Buffalo local riders. A few transfers were granted, but as a rule it was necessary to pay an extra fare, usually an exchange ticket costing 3 cents. On the first horse railway, a 3-mile ride cost 12 cents; to-day a 12½-mile ride could be obtained for 5 cents under the broad transfer system in vogue.

GENERAL STATISTICS

The cost of the first power station in Buffalo in 1892 was $285,000, compared with an appraised value of $2,180,712 for the power stations and substations of 1913, despite which increase the company secures most of its electrical energy from Niagara Falls. In fact, during 1913 the average energy purchased a day was 260,625 kw-hr., while that taken from the steam standby plant was only 15,530 kw-hr. a day. In addition, the company's own hydroelectric plant generated 10,075 kw-hr. a day in 1913.

The total mileage of the system, single-track, is 396. For this trackage the company provides on a regular week-day schedule 10,628 single trips each twenty-four hours. A steam railroad, Mr. Dickson said, would be proud to have 98 per cent of its trains on time although all operation was over right-of-way. Yet if the International Railway, which must operate very largely over public streets open to other traffic, made an equivalent showing by being late 200 out of 10,628 trips the citizens would soon be carrying complaints to the Public Service Commission. During 1913 his company carried 231,509,275 passengers, of whom 52,080,550 were transfer passengers. The number of passenger car-miles was 21,222,760.

In conclusion, speaking as a former steam railroad man, Mr. Dickson said that when he entered electric railway service its intricacies were as surprising to him as some of the data submitted might be to his audience; but it was a great and interesting business with tremendous possibilities, notwithstanding the many unpleasant features connected with it.

The paper was followed by an informal discussion and the election of officers for the new year. Secretary Vought urged the members to enlist the electric railway men of the Buffalo district, following the example of the New York Railroad Club.

Experiences with 2400-Volt Locomotives *

Maintenance Costs and Methods on Butte, Anaconda & Pacific Electrification—Roller Pantographs—Arcing at Contactors

In the discussion on J. B. Cox's paper on the Butte, Anaconda & Pacific Railroad electrification, which was published in the ELECTRIC RAILWAY JOURNAL for Nov. 7, 1914, the author stated that the steel rollers on the pantographs of the electric locomotives collected 600 amp at speeds ranging from 16 m.p.h. to 20 m.p.h. quite satisfactorily, a mileage of from 10,000 to 12,000 being obtained. The sliding type is simpler than the roller collector and is preferable to it, even with half the life in mileage and with equal wear on the trolley. Currents up to 3000 amp have been collected without sparking by a single pantograph with a double sliding collector.

The cost of maintenance of the distributing system, as given in the paper, covered all items chargeable to this account, which were principally for material, labor and work-train service and were at the rate of approximately $125 per mile per year. The cost given for electric locomotive maintenance, including depreciation, should be less in the future. This is because the published figure, 7.47 cents, included 2.46 cents for depreciation, leaving 5.01 cents per mile for actual repairs, and this latter figure included the cost of considerable experimenting with pantograph rollers and minor improvements. Again, it is natural to expect the workmen will become more familiar with the new equipments. Mr. Cox added that it was easier to break in old steam organizations to operate and take care of electric locomotives than to train electrical men who had not had previous steam railroad experience.

To familiarize the workmen with the electric locomotives a general shop inspection and overhaul was made after the first year's service. The locomotives were each in the shop one week, whereas four weeks were required on an average for the steam locomotives for a similar overhaul, and the costs in each case were about proportional to the time in the shops. The tires on the drivers of the electric locomotives averaged somewhat more than double the mileage between turnings obtained from those under the steam locomotive, although the numerous sharp curves on the system result in rapid wear of the flanges. The author believed that on the first installation of a new type locomotive on any road, whether electric or steam, the adaptation and development charges during the first year were likely to make up for the smaller amount of general repair work required during the first year.

Referring to the matter of the burning out of contactors on the locomotives due to dust or to irregularity in following the proper sequence of operations, Mr. Cox

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*Abstracted from Proceedings of American Institute of Electrical Engineers for January, 1915.

said that there had been no instances of serious trouble. There had been instances of flashing-over of insulators at the back of the contactors which was thought to have been due to the accumulation of dust from the ore, as this contains some copper. But these arc-overs were discovered only at inspections and apparently had occurred when the contactors were opening the circuit, thus breaking the current before the arc did anything more than burn off the dust. They gave no trouble. No difficulty with contactors has been experienced when the motors were changed from the series to the parallel position, nor had any contact tips been changed. On the whole the contactors on the locomotives show less signs of arcing or burning than on an ordinary 600-volt locomotive in a similar service. The commutators of the main motors also are in splendid condition and look as if they had recently been turned.

Meeting of Massachusetts Association

At the monthly meeting of the Massachusetts Street Railway Association at Young's Hotel, Boston, on Jan. 13, Arthur A. Ballantine, counsel for the Middlesex & Boston Street Railway, discussed the recent decision of the Massachusetts Public Service Commission authorizing the increasing of fares on the system. This case was abstracted in the ELECTRIC RAILWAY JOURNAL of Nov. 7, 1914, page 1055. Mr. Ballantine brought out that under the public service act a company cannot put a change in fares into effect until the commission has had at least thirty days' notification. The Middlesex & Boston proceedings extended from July 1, 1914, to Oct. 28, 1914, and the company had lost the benefit of an increased revenue during its heavy summer riding period. He thought the time element required to conduct such cases should be taken into account by other companies contemplating proceedings of this character.

Mr. Ballantine paid a high tribute to the manner in which the board set forth the fundamental principles at stake in the case and outlined the bearing of the findings upon the future of electric railways in Massachusetts. The full petition of the company was not granted, but pending the working out of the fares adopted the company is endeavoring to give a fair trial to the rates, hoping that in due course the additional revenue needed will be authorized, when it is seen that the realization of all that the commission expressed itself in favor of on principle cannot be obtained under the present schedules. The company desired to increase its gross receipts by about $110,000 per year. The decision of the board yields about $80,000 additional income per annum, corresponding to a rate of return of about 3.5 per cent on the stock. The recognition by the commission of the fundamental needs of capital, however, gives the company every reason to believe that its legitimate requirements will be taken care of in due course. The decision marks a turning point for electric railways in Massachusetts toward a more equitable return upon their efforts to serve the public.

Exhibit at A. R. M. M. and M. C. B. Convention

The Railway Supply Manufacturers' Association has issued its annual circular in regard to the exhibit at the American Railway Master Mechanics' Association and the Master Car Builders' Association at Atlantic City this June. The Master Mechanics' meeting will be held from June 9 to 11 inclusive and the Master Car Builders' from June 14 to 16 inclusive. The exhibit, as usual, will be held on Young's Million Dollar Pier. The charge for space, in addition to the membership dues of $15, is 40 cents per square foot. Space will be assigned on Feb. 19, and those who desire to exhibit are requested to send in their applications before that date to the secretary, J. D. Conway, Oliver Building, Pittsburgh, Pa.

COMMUNICATION

Interest Rates on Public Utility Bonds

WELSH BROTHERS: INVESTMENT BONDS
PHILADELPHIA, PA., Jan. 12, 1915.

To the Editors:

I note with interest the discussion in your columns upon the rates of interest which will obtain throughout the remainder of the war and the reconstruction period which must follow the re-establishment of peace. An estimate may be offered as to the general trend, certain guesses (more or less intelligent) as to the details. My personal opinion is as follows:

Rates for liquid capital, which is largely used to complete commercial transactions, will remain low for some months to come. Production and trade should increase materially in 1915 and cause the rates for liquid capital to harden. The rise in these rates should be regulated and checked by at least three main factors in the general situation: (1) While certain lines of manufacture and trade will doubtless be abnormally stimulated by war conditions, the average for all industries the country over should not cross (if it reaches) the line of normal; (2) speculation in securities should continue much restricted by steady, though governed, liquidation for European account, if not by arbitrary regulations imposed by the exchanges; (3) the possibility of gold imports due to large commercial export balances and favored by low rates in London.

Rates for capital to be permanently invested in plant account should remain high throughout the war, partly on account of uncertainty, largely because the great financial countries of the world are destroying capital and to that end will be seeking to borrow here instead of lending as in the past. The reconstruction to follow the war will be difficult. Many concerns carried along by others till then will be thrown on their own resources, to stand or fall as the case may be. Hundreds of millions of fiat money will have to be retired or repudiated before the issuing countries will attain financial soundness. Though at that time prostration of business may result in the maintenance of low rates for the liquid capital needed to complete a comparatively small volume of commercial transactions, the accumulated destruction of fixed capital and the doubt as to the solvency of individuals, corporations and nations abroad should make capital for permanent investment dear both abroad and here. Most economists, I think, believe that the destruction of capital in the Russo-Japanese and Balkan wars and in such catastrophes as the San Francisco fire had a perceptible effect on interest rates. The destruction resulting from this war will, of course, be many times that occasioned by all of the above disasters combined. The effects of the present unparalleled destruction will be mitigated, but not, I hold, nullified by business depression, enforced economies and the return into circulation of hoarded gold.

Assuming high rates for fixed capital, what will the effects be upon the corporations of this country, more particularly those engaged in so-called "public service"?

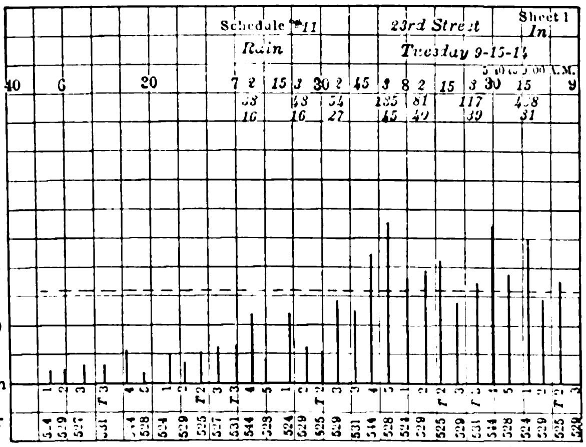
The results thus far have been peculiarly confusing. In this local market accumulated funds for investment have been to a considerable extent released and (excepting equipments and other short term securities) have gone chiefly into old, well-known railroad bonds and bonds of municipalities. The prices of such long term issues have advanced till they now sell nearly as high as they did before the war and return only about 4 per cent. Simultaneously, one of the greatest and strongest railroad companies paid a full 5 per cent for a long-time loan, based on the same security behind bonds which sold on a 3½ per cent basis just ten years ago. Fresh issues of this nature will doubtless affect the whole long-term investment market. It is my opinion that they will affect more fully bonds now selling to return only 4 per cent, than sound issues of public utilities now selling to return 5½ to 6 per cent.

As was to be expected, earnings of public service companies are standing up remarkably well in the face of the business depression. It is beginning to dawn on the minds of investors that a good rate of interest and high security are to be found in the bond of a public service company, which, in return for good service at reasonable rates, is protected from competition by commission authority. The American public is fast becoming convinced that though trade is dull finances here are sound beyond doubt. It will not be long before public service companies, which have justified or can justify their capitalization and charges and on those charges are reporting fair margin of earnings, will be able to borrow all the money they really need by paying rates of interest, which, though perhaps high, will not be prohibitive. The weaker companies may suffer. Nor will this condition be altogether deplorable. For a number of years there has been need of just such a curb to the pyramiding operations of more than one large public utility operator. **Herbert S. Welsh.**

Plotting Peak Traffic as an Aid to Schedule Adjustment

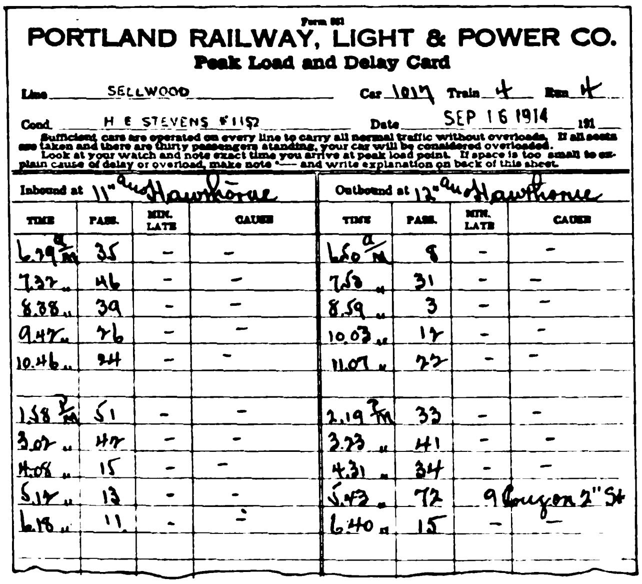
This System Gives the Company Valuable Data to Adjust Schedules and Disprove Claims of Poor Service

Records of the rush-hour traffic on lines of the Portland Railway, Light & Power Company have long been used in deciding where and when to increase the service, and the method of plotting the data shown in the accompanying illustrations has been developed recently after a great deal of experiment. The primary object was to facilitate schedule adjustment, but, in addition to showing just where extra rush-hour service is needed, it has been found that this system enables the company to disprove unjust claims as to poor service. At the same time it convinces the public, wherever it becomes known, that the company is making an honest effort to meet the traffic requirements.



PORTLAND TRAFFIC—TYPICAL CHART

The data are compiled from the daily "Peak Load and Delay Card," which each conductor is required to keep. The peak load is taken as the number of passengers on the car at the point on each route where experience shows the car to be regularly crowded the most, and beyond which the load commences to decrease. When passing this point the conductor records on each trip the number of passengers in the car and the amount of delay, if any has occurred.



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PORTLAND RAILWAY, LIGHT & POWER CO.

Peak Load and Delay Card

Line SELLWOOD Car 1017 Train 4 Run 4

Cond. H E STEVENS #1152 Date SEP 16 1914 191

Sufficient cars are operated on every line to carry all normal traffic without overloads. If all seats are taken and there are thirty passengers standing, your car will be considered overloaded.

Look at your watch and note exact time you arrive at peak load point. If space is too small to explain cause of delay or overload, make note "—" and write explanation on back of this sheet.

Inbound at 11th and Hawthorne / Outbound at 12th and Hawthorne

TIME	PASS.	MIN. LATE	CAUSE	TIME	PASS.	MIN. LATE	CAUSE
6.29 a.m.	35	-	-	6.50 a.m.	8	-	-
7.37 "	46	-	-	7.58 "	31	-	-
8.38 "	39	-	-	8.59 "	3	-	-
9.47 "	76	-	-	10.03 "	17	-	-
10.46 "	24	-	-	11.07 "	22	-	-
1.58 p.m.	51	-	-	2.19 p.m.	33	-	-
3.07 "	47	-	-	3.23 "	41	-	-
4.08 "	15	-	-	4.31 "	34	-	-
5.17 "	13	-	-	5.43 "	72	9	Congn on 2nd St
6.18 "	11	-	-	6.40 "	15	-	-

PORTLAND TRAFFIC—CONDUCTOR'S REPORT

For the rush-hour periods these data are recorded on charts, as shown in the illustrations. The length of the lines in the chart indicates the number of passengers, and the position of each line marks the time at which the car passed the corner established as the point on its route where the peak load may be expected. Vertical dotted lines are used to show extra cars or "trippers" that run only during rush hours, the full vertical lines representing cars on regular runs.

In addition to the number of each car, its train or route number is given. Whenever the loading exceeds the seating capacity three additional figures are entered for each fifteen-minute period, of which the upper one represents the number of cars passing during the period, the second the total number of passengers, and the lower one the average number of passengers on each car. The dotted horizontal line marks the seating capacity, so that a glance shows on what trips cars carried standing passengers. This plan was introduced by F. W. Hild, general manager of the Portland Railway, Light & Power Company, and Fred Cooper, superintendent of transportation.

Use of Signals on Steam Railroads

According to the last report of the Interstate Commerce Commission 53 per cent of the country's steam railroad mileage on which passenger traffic is carried is protected by block signals, 20.8 per cent having automatic signals and 32.2 per cent having manually operated signals of some form. Of the automatic signals 91.6 per cent were of the semaphore type and 8.1 per cent used discs either exposed or enclosed, only 0.3 per cent being unclassified. Of the non-automatic signals 0.2 per cent made use of the electric train staff, while the controlled manual system comprised 1.3 per cent. It was stated also that 36 per cent of the steam railroads were still using a yellow or white light for a clear indication.

American Association News

Additional Committee Appointments Are Announced—President Wilson and Other Men of Note Will Address the Washington Meeting—Activities of Various Committees—Coming Committee Meetings

ADDITIONAL COMMITTEE APPOINTMENTS

In addition to the appointments announced in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 2, page 59, the following committee lists have just been given out by Secretary Burritt:

Joint committee on life of physical property: (Accountants) R. N. Wallis, Fitchburg, Mass., co-chairman; A. R. Patterson, Boston, Mass.; W. H. Forse, Jr., Anderson, Ind.; (engineers) Martin Schreiber, Newark, N. J., co-chairman; R. B. Rifenberick, Detroit, Mich.; J. H. Hanna, Washington, D. C.

Accountants' Association committee on accounting definitions: Frederic Nicholas, New York, N. Y., chairman; R. N. Wallis, Fitchburg, Mass.; George A. Harries, Gloversville, N. Y.; S. C. Stivers, New York, N. Y.; F. H. Sillick, New York, N. Y.

PROGRESS ON THE WASHINGTON PROGRAM

Supplementing reports previously printed it may be stated that President Woodrow Wilson will address a second session of the conference which will convene specially at 3 o'clock for the purpose, immediately following the 2 o'clock reception at the White House.

The morning conference will be held at 10:30 o'clock at the New Willard Hotel. The speakers for the morning conference so far secured are as follows: Hon. Andrew J. Montague, member of the House of Representatives; D. W. Morrow, of J. P. Morgan & Company; N. C. Kingsbury, vice-president American Telephone & Telegraph Company; Timothy S. Williams, president Brooklyn Rapid Transit Company; Charles L. Henry, president Cincinnati & Indianapolis Traction Company; Arthur Williams, president American Museum of Safety; C. C. Peirce, vice-president American Electric Railway Manufacturers' Association. C. Loomis Allen, president American Electric Railway Association, will preside.

CHICAGO MEETING OF BLOCK SIGNAL SUB-COMMITTEES

Several sub-committees of the joint committee on block signals of the Engineering and Transportation & Traffic Associations met in Chicago on Jan. 11. The committee members in attendance were J. W. Brown, Newark, N. J.; C. D. Emmons, South Bend, Ind.; John Leisenring, Peoria, Ill., and H. A. Nicholl, Anderson, Ind. L. E. Gould, M. H. Hovey and W. W. Talbert were present also.

The sub-committee assigned to this duty discussed the use of the terms "registering" and "non-registering signals" and "car counting" and "non-car counting signals." This discussion indicated that the members favored the use of the former expression.

On the subject of highway crossing protection, Mr. Leisenring reported that he had sent out data sheets and that at the March meeting of the committee he will present a synopsis of the replies. He will also consider this subject in a memorandum to be presented after the report on highway crossing protection has been read at the next meeting of the Illinois Electric Railway Association.

The sub-committee appointed to suggest revision of the block signal rules for contactor signals decided to consider the matter after a transcript of the Atlantic City discussion is obtained.

In connection with the topic "Operating by Signal Indication Only" Mr. Nicholl read letters from twenty-four steam and electric railroads and one consulting engineer, giving opinions on the suggested plan. It was decided that he should secure more data and outline a recommendation upon which the committee can take action at the March meeting.

COMMITTEE ON SECTIONAL ASSOCIATIONS

The American Association Committee to consider relations with sectional associations met in New York on Jan. 11. Those present were R. P. Stevens, Youngstown, Ohio, chairman; H. C. Donecker, Newark, N. J.; James F. Hamilton, Schenectady, N. Y., and C. L. S. Tingley, Philadelphia, Pa. After discussing the work of previous committees, T. C. Martin, secretary of the National Electric Light Association, who had been requested to attend for the purpose of explaining the membership plan of that organization, outlined the relation of the section movement to the success of the N. E. L. A. Mr. Donecker agreed to compile, for reference by the committee, certain statistics of existing associations, relating particularly to plan and scope of activities, membership and dues. This compilation will be presented at the next meeting, which will probably take place in March.

COMMITTEE ON PASSENGER TRAFFIC

A meeting of this committee of the Transportation & Traffic Association was held at the Congress Hotel, Chicago, on Jan. 11, with morning and afternoon sessions. Those present were P. P. Crafts, Mobile, Ala., chairman; J. A. Greenland, Fort Wayne, Ind.; E. E. Soules, Peoria, Ill., and E. M. Walker, Dubuque, Iowa.

The committee prepared a form letter and data sheets to be sent to all member companies preliminary to taking up the following: (1) study of the results of one-man car operation, (2) study of the effect of the use of the automobile on passenger traffic, with particular reference to interurban and suburban conditions; (3) continuation of the study of the motor bus and trackless trolley, supplementing the report of the 1914 committee. The meeting adjourned to a date to be set by the chairman.

MILWAUKEE COMPANY SECTION

In place of the usual December meeting of Company Section No. 1, the section accepted the hospitality of the local N. E. L. A. company section at a joint Christmas celebration.

COMING COMMITTEE MEETINGS

Jan. 26, 27, New York, 10 a. m., meetings of the sub-committees of the block signal committee, postponed from Jan. 4 and 5, as outlined on page 1393 of the issue of this paper for Dec. 26, 1914, will be held at association headquarters.

Jan. 27, New York, 10 a. m., Engineering Association committee on equipment, W. G. Gove, Brooklyn Rapid Transit Company, chairman. (See outline of work, ELECTRIC RAILWAY JOURNAL, issue of Dec. 26, 1914, page 1393.)

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

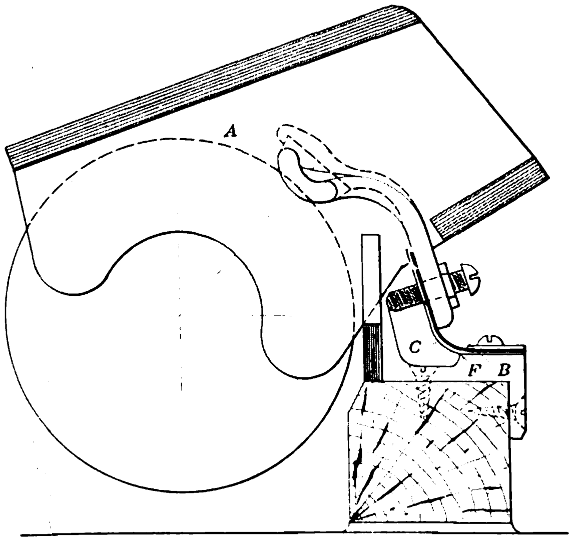
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Equipment Defects—Hand-Operated Controllers—Contacts, Fingers, Springs and Bases—II

BY C. W. SQUIER, E.E.

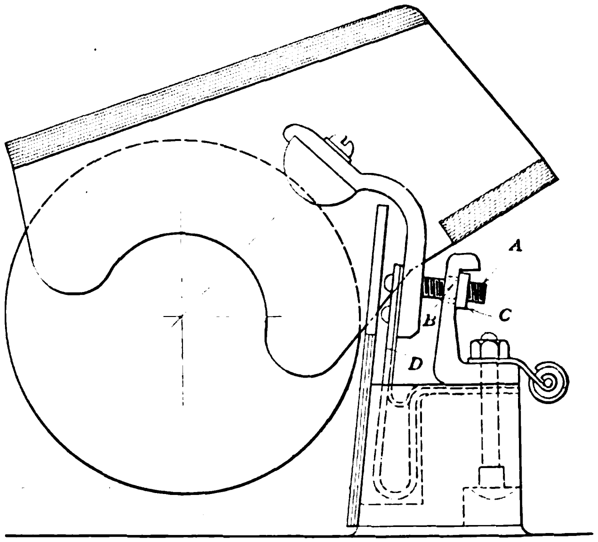
Renewable Contact Tips.—The ball of the contact finger receives all the wear and burning due to making and breaking the circuit and is the only part of the finger that makes renewal necessary. In order to avoid scrapping the entire finger and contact spring when the contact portion of the finger becomes too worn, several types of renewable contact tips have been designed. The principal argument against the use of such tips is their high first cost and the troubles that some of them have given due to the loosening of the tip.

One of the best and simplest renewable contact tips is illustrated in the right-hand drawing. This consists of a standard section of half-round copper so tapped out that it can be screwed to the shank of the finger. The tip is kept in place and is prevented from turning by a small lip on the end of the finger shank. A positive lock washer is also used under the head of the screw to prevent it from loosening. The advantage of using a standard section of half-round copper is that it can be obtained readily from most supply houses, thus making it unnecessary to send to the controller manufacturers for the supply parts. This half-round copper is obtained in a long bar and can be cut off to correspond to the different widths of the fingers. It requires no machining of the contact tip other than the drilling and tapping for the screw. This kind of tip also provides a large section of metal to take the arcing, and the tips can be replaced in less time than is required to replace an entire contact finger.



Electric Ry. Journal

STANDARD CONTACT DETAILS FOR K-10 AND K-11 CONTROLLERS



Electric Ry. Journal

SPECIAL CONTACT DETAILS FOR K-10 AND K-11 CONTROLLERS

Renewable Contact Tips on Standard Controllers

The left-hand drawing shows a section of the standard K-10 and K-11 controller contact details. A finger with a renewable contact tip is also shown dotted in this figure. This finger can be used in the standard controllers without changing any of the other contact details. In the right-hand drawing the same type of renewable contact tip is shown, but the other contact details have been changed to overcome troubles experienced with the standard adjusting screws, finger springs and contact bases.

Adjusting Screws

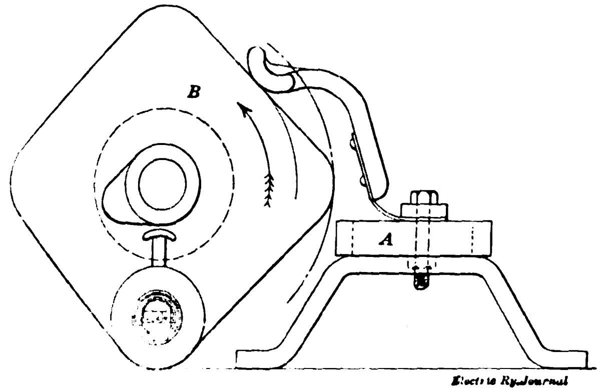
The style of adjusting screw used with the standard fingers of the K-10 and K-11 controllers is shown in the section of the contact details (left-hand cut). This is screwed through the finger and causes the finger to be raised or lowered by pressing against the upright portion of the finger base. When the proper adjustment has been made unscrewing is prevented by the tightening of a check nut.

The chief criticism of this form is the trouble required to make an adjustment, as it is necessary to use both a screwdriver and a wrench. If the check nuts are not screwed down firmly the adjusting screws loosen and the fingers are pressed in too far toward the center of the drum. Care should be taken to use only screws that are the proper length and that are threaded to the head. When screws are too long they sometimes strike the arc shield as the latter is closed and thus prevent free movement of the fingers. Again, if not threaded to the head, the screw may be screwed the full length of the thread without obtaining the proper degree of adjustment.

The right-hand drawing named shows a finger adjustment which was designed to overcome the objections and troubles just mentioned. It includes a threaded rod *A* riveted into the shank of the contact finger. The end of this rod passes through a hole in the finger base *B* and the adjustment is obtained by screwing or unscrewing a square nut *C* on the threaded rod. The adjustment can ordinarily be made with the hand and without the use of tools by pulling the finger back so that the adjusting nut clears the lip on the finger base, and then by screwing or unscrewing this nut. After the adjustment has been made the nut is kept from turning by the lip on the finger base, and it cannot change its position due to vibration because the nut is locked positively by the lip. This adjustment also preserves the exact alignment of the fingers with respect to the contact segments on the drum. Where this type is used care must be taken to make certain that the holes in the contact bases through which the adjusting screws pass are so large that they do not bind or rub on the screws as the fingers raise and lower. The square nuts on the adjusting screws must also fit close enough to the lugs on the finger bases so that they cannot turn when in position; but the nuts must not be so close that they will interfere with the slight movement which the fingers have as they make and break contact with the contact segments.

FINGER SPRINGS

While investigating controller troubles, I inspected several thousand worn-out controller fingers at various maintenance shops, and found that an average of one finger in every ten was removed for a broken or cracked finger spring. Most of these breakages occurred just at the edge of the finger where the spring and shunt rest against it. This point is shown in the standard contact drawing at *C*.



DEVICE FOR TESTING CONTROLLER FINGER SPRINGS

The fingers inspected were of several different types and a further classification of the spring breakages showed that 90 per cent of the broken springs were on fingers which had no shunts. I first thought that the current carried by the spring might have something to do with their breakage, but later tests showed that this was not the case. The reason that the breakages were not as frequent on finger springs with shunts was due to the fact that the soft copper shunt formed a cushion for the spring at the edge of the finger so that the bending strain was distributed over a greater area of the spring. By rounding the contact edge of the finger, the breakages were decreased somewhat, but the insertion of a few thin strips of soft copper to act as a cushion proved the best remedy. It is thus seen that shunts are an advantage in another way than that of helping to carry the current from the finger to the contact base. Another cause for the breakage was in the material used and the manner in which the springs were manufactured. A vibration and bending test on springs showed that a phosphor bronze spring punched out of sheet metal had a much shorter life than springs which were drawn to the exact width required. In comparing results of tests on punched springs, I also found that those which were bent across the grain of the spring had a longer life than those in which the bending occurred with the grain.

TESTING FINGER SPRINGS

In the third drawing I have illustrated a simple method for testing finger springs. A number of fingers with springs are clamped side by side to the base *A*. The contact portion of the fingers rests on the drum *B*, which has alternate high and low spots so located that the contact portion of the fingers is moved through a distance of ½ in. in passing from the low to the high position. The drum may be mounted in an old controller frame and the clamping base located in a similar relative position to the regular contact block. The pressure with which the fingers bear against the drum should be measured with a spring balance before the test is started and afterward at regular intervals. This pressure can be increased or decreased as desired by moving the clamping bar together with the fingers toward or away from the drum. Rotation of the drum may be obtained by belting it to any conveniently located shaft, and the number of revolutions may be recorded by a counter.

"SWAN NECK" FINGER SPRINGS

When fingers become burned or blistered from excessive arcing there is a tendency for them to stub as the ends of the contact segments are rotated against the finger, that is to say, when the drum is being rotated from the ball of the finger toward the spring. With the fingers located as in the first two drawings this stubbing would occur with clockwise rotation of drum.

The closer the fulcrum about which the fingers move is to the drum, the less tendency there is to stub, as any pressure against the end of a finger will then tend to lift it away from the drum instead of pressing it in toward the center. In the first drawing the line *A B* is drawn tangent to the drum at the point of contact with the finger. The fulcrum about which the finger moves is at *F* and this is slightly inside the line of tangency *A B*.

In order to bring this fulcrum point still farther inside the line of tangency, a type of finger spring known as the "swan neck" has been developed. This was brought out by the General Electric Company several years ago and has come into very extended use on several of the later types of controllers. This spring is shown in the second drawing. In addition to bringing the fulcrum close to the drum, this spring also provides a long finger spring, thus increasing durability. The drawing shows how this type of spring may be applied to K-10 and K-11 controllers. Its use with these controllers would necessitate a new design of contact base and block.

In using the "swan-neck" spring it is necessary to place a carefully designed insulating shield between the spring and the drum because when an arc is broken on the heel of the finger, that is to say, on the side next to the finger spring, the arc has a tendency to hang on and follow down the finger spring to a point *D* where the arc is broken. Hence instead of breaking the arc on the contact tip of the finger it is broken on the spring, and but a few operations will be required to destroy the spring. For this reason the clearance between the insulating shield for the spring and the arc deflectors must be very small because the arc will follow through a very small crack. The magnetic blow-out should also be arranged so that the arc will be blown away from the spring.

With all types of finger springs care must be taken to see that they are properly riveted to the fingers and a good contact obtained. An inspection of a large quantity of fingers just manufactured showed that many had lacquer and varnish between the springs and fingers.

FINGER BASES

The principal troubles experienced with finger bases consist of breaking of adjusting lugs and loosening of the bases from the finger boards where these are of wood and fastened with wood screws. The breakage of the adjusting lugs is generally due to the fact that the fingers are stubbed or become caught in the drum. In the second drawing a type of finger base which uses a through bolt to hold it in place is shown. This bolt has proved much more satisfactory than wood screws.

Location of Trolley Wire on Curves—III

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Effect of Change in Trolley Pole Length or Trolley Base Location—The wheelbase of each truck, the distance between the centers of trucks and the height of the car roof are not conveniently susceptible of change.

The height of the trolley wire and the track conditions are assumed to be uniform for all cars, leaving as the only two convenient variables in the formula the length of the trolley pole and the distance of the trolley base from the center of the car roof. The effect of changes in these variables on the car just considered is shown in the following tables, assuming all other dimensions left unchanged:

Length of Trolley Pole	Location of Trolley Wire Inside Track Center—No Elevation of Outer Rail	Increase or Decrease for Change of One Foot in Pole Length
13.6 ft.	9¾ in.	
14.6 ft.	10⅞ in.	1⅛ in. increase
12.6 ft.	8¾ in.	1 in. decrease
Distance of Trolley Base from Roof Center		
5.6 ft.	9¾ in.	
6.6 ft.	9¼ in.	½ in decrease
4.6 ft.	10¼ in.	½ in. increase

The above figures also indicate the bad results of not maintaining a uniform length of trolley pole and the effect of indifference to the uniform location of the trolley base.

ADAPTATION OF CARS TO STRANGE CURVES

Variation of the length of pole or location of base, preferably the latter because requiring no further thought, can be used to compensate for differences in car dimensions not susceptible of alteration. By this variation the trolley wheel of a new type of car can be made to run with least friction on a curved trolley wire already located for an old type of car.

Example: Two cars have the following dimensions:

Car	b	B	C	L	h	l	K
I	4.5	20.8	10.6	14.4	19	11.5	155
II	4.4	21.6	8.6	14.4	19	12.3	212

Move Trolley Base—It is desired to run car I on trolley curves already installed for car II and to do all the adapting of car I by altering the location of the trolley base.

From formula (11) it is seen that the location of the trolley base—C—was used squared and as a minus quantity. By adding the C^2 of car I—112—to the K of car I—155—we get, then, a quantity—267—from which a new C^2 must be subtracted to get the same K—212—as that of car II.

This new C^2 is 55, and the square root of this 55 or 7 ft. 5 in. is the new distance to which the trolley base on car I should be moved from the center of the car roof to secure least friction between the trolley wheel of car I and the curved trolley wire which was installed for car II.

Vary Length of Trolley Pole—If it had been desired to leave the trolley base where it was originally and to secure the adaptation of the trolley wheel of car I to the curve already installed to suit car II, it would have been only necessary to substitute l^2—266—in the K of car I in place of the original l^2—209—to secure the same K as the K of car II. By extracting the square root of this 266 we get 16 ft. 4 in. as the new pole length.

This is unlikely to be the course followed as it is desirable to have a uniform length of trolley pole throughout a railway system. It is also unlikely because this longer pole would probably project abnormally beyond the end of the car and cause trouble in car storage work.

Effect of Change in Height of Trolley Wire—The effect of variation in the height of the trolley is shown in the accompanying table using the same data as before:

Height of Trolley Wire	Location of Trolley Wire Inside Track Curve—No Elevation Outer Rail	Increase or Decrease for Change of 1 Ft.
16 ft.	11 in.	⅜ in. increase
17 ft.	10⅝ in.	⅜ in. increase
18 ft.	10¼ in.	½ in. increase
19 ft.	9¾ in.	
20 ft.	9¼ in.	½ in. decrease
21 ft.	8½ in.	¾ in. decrease
22 ft.	7⅝ in.	⅞ in. decrease
23 ft.	6⅞ in.	¾ in. decrease

These figures show that slightly raising or lowering the trolley wire at curves has a very slight effect on the relation between the trolley wheel and trolley wire.

Transition Curves—In the case of transition, spiral or easement curves, the results of the foregoing formula are applied in the central part of the curve, where the radius is uniform, the ends, where the transitions or larger radii are, will take care of themselves as the trolley wire will be gradually brought back to the center of the straight track by the lineman's eye.

Proportionality as Table Basis—In the case of suburban lines where the curvature is expressed in degrees, it is necessary only to calculate the versed sine for a 1-deg. curve, or one having a radius of 5730 ft. The versed sines of other curves are proportional to the degree of curvature. For example, if the versed sine on a 1-deg. curve is ⅜ in. exclusive of the versed sine due to elevation of the outer rail, then a 2-deg. curve, the versed sine, exclusive of elevation of outer rail, will be ¾ in.

Likewise it is necessary only to calculate the versed sine for one radius of curvature, as the versed sine varies proportionally with the radius though inversely, whereas it varies directly with the degrees of curvature. For example, if the versed sine for a 50-ft. radius curve and a long suburban car is 3 ft. 9¼ in., for a 100-ft. radius curve and the same car, it will be one-half or 1 ft. 10⅝ in., for a 200-ft. curve it will be one-quarter, etc.

Radius from Versed Sine—It is often desirable to determine the radius of curvature roughly on the ground from the versed sine. This is readily done by the formula

$$R = \frac{4V^2 + C^2}{8V} \qquad (14)$$

Where R = Radius of curvature
V = Versed sine at center of the chord length used
C = Chord length used
all dimensions are in feet.

Using 30 ft. as length of chord, this formula becomes

$$R = \frac{V^2 + 225}{2V} \text{ or transposing } V = R - \sqrt{R^2 - 225} \qquad (15)$$

The accompanying table of versed sines has been calculated for the various radii given, using 30 ft. as chord length. Beyond 1000-ft. radius 30-ft. rails will probably not be bent accurately and this chord method will not be safe unless a longer length than 30 ft. is used.

TABLE OF RADII AND CORRESPONDING VERSED SINES OR MIDDLE ORDINATES FOR 30 FT. CHORD LENGTH

Radius	Versed Sine	Radius	Versed Sine
35 ft.	40½ in.	160 ft.	8½ in.
40 Ft.	35 in.	180 ft.	7½ in.
45 ft.	31 in.	200 ft.	6¾ in.
50 ft.	27½ in.	250 ft.	5½ in.
55 ft.	25 in.	300 ft.	4½ in.
60 ft.	23 in.	350 ft.	4 in.
70 ft.	19½ in.	400 ft.	3⅜ in.
80 ft.	17 in.	500 ft.	2¾ in.
90 ft.	15 in.	600 ft.	2¼ in.
100 ft.	13½ in.	700 ft.	2 in.
120 ft.	11 in.	800 ft.	1¾ in.
140 ft.	9½ in.	900 ft.	1½ in.
150 ft.	9 in.	1000 ft.	1⅜ in.

Railway Sand Experience

BY W. F. CARR, ENGINEER MAINTENANCE OF WAY CHICAGO, OTTAWA & PEORIA RAILWAY, OTTAWA, ILL.

Whether it is more economical to purchase a high-grade, thoroughly clean sand which does not require the use of a sand drier, or to purchase a cheaper grade of sand and attempt to clean and dry it, is a question which has received careful consideration. The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., operates along a portion of the Illinois River valley, in the region of large silica sand deposits. In fact, Ottawa sand is well known all over the country for its excellent quality and high proportion of silica, and is used by the government in its neat cement tests. At first this sand appeared to be too expensive for use on our interurban cars, hence we opened a sand pit of our own where a reasonably clean, uniform grade of sand was available. I believe this sand from our pit will compare favorably in quality with most of the sand used by railway companies.

More or less trouble has been experienced in using our own sand, however, and after investigation it was concluded that the sand contained a natural cement in some form. Shortly after it had been placed in the sand drier and thoroughly heated, a slight crust formed over the top. It was also found that apparently clean sand had a great affinity for moisture. This made it difficult to keep the sand dry and non-clogging during periods of extremely damp weather. To avoid this trouble, it would have been necessary to wash the sand thoroughly and then dry it, which would have been very costly. In seeking another remedy for this difficulty, it was decided to purchase the silica sand, which had been mined, thoroughly washed and dried.

Experience with this high-grade sand has shown that it is free from vegetable matter and, being thoroughly clean, is practically moistureproof. This sand costs about $1.35 per ton, and by storing it in a practically airtight house a sand drier is unnecessary. A microscopic examination of the sand shows that, while the grains are round, when it is deposited on the rail from the sand pipes and crushed under the wheels it acts like a high-grade powdered glass. A slight spinning of the wheel is sure to burn a blue spot in the rail, indicating its extreme hardness and high abrasive value, a thing desired in all sand used in either braking or to stop slipping wheels. In other words, by the purchase of sand at $1.35 a ton it has been found that the sand drier is not only an unnecessary piece of equipment, if the sand house is made comparatively weatherproof, but that less sand is necessary. In addition, probably the most important advantage in using high-grade sand is that the pipes are never clogged, a condition which is just as likely to occur in an emergency as at any other time.

The *Review of Reviews* for January contains a page article entitled "Electric Railway Progress" and based on the articles in the convention number of this paper.

Dead-Ending Feeders to Metal Poles

BY G. H. M'KELWAY, LINE ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

There are two ways to dead-end feeders to metal poles, either directly on to the pole through insulators, or on an arm attached to the pole. The former method can be considered as standard when only one feeder is to be dead-ended, but when there are several, the best practice calls for a wooden dead-end arm. As wood has good insulating qualities, it practically adds a third insulator to the two which sound practice always requires between a live wire and the ground. It is on account of the omission of this dead-end arm that Fig. 1 is representative of poor practice, or rather does not represent the best practice. Fig. 2 is a photograph of the same point as Fig. 1 but was taken a month or two later after an arm had been installed. The only excuse for not putting in an arm sooner at this location was that the feeders had been run at different times, so that the best practice was overlooked when the second and third wires were run.

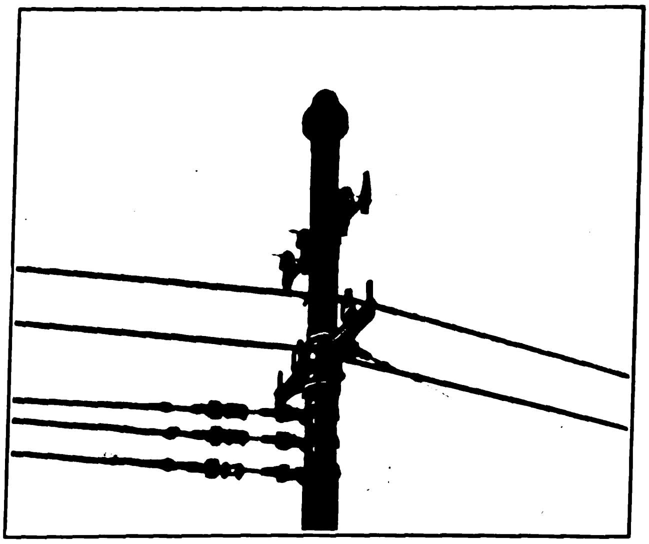


FIG. 1—THREE FEEDERS DEAD-ENDED ON POLE

When there is only one feeder to stop there is no objection to dead-ending on the pole, as the first cost is less and the appearance better than if an arm were installed. When two or more wires are to be dead-ended an arm should be placed on the pole, as the

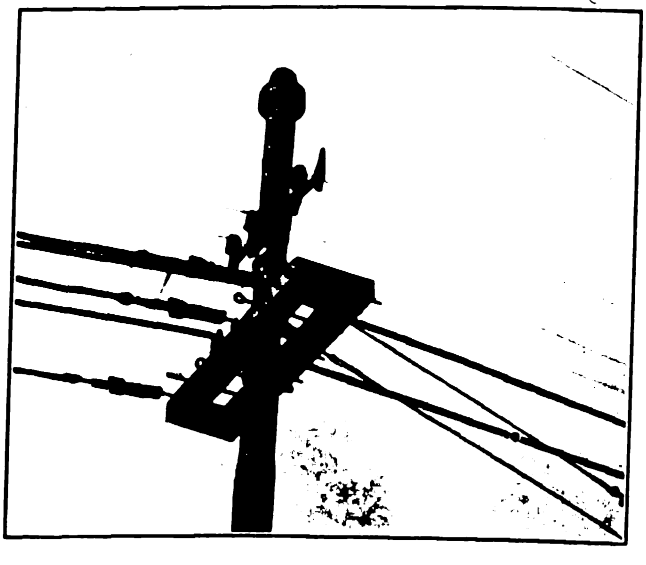


FIG. 2—FEEDERS OF FIG. 1 DEAD-ENDED LATER ON ARM

appearance of the installation will be better while the difference in cost decreases with each wire installed.

The dead-end insulator generally used with feeder wires is the heavier type of Brooklyn strain as shown in Figs. 1 and 2, but sometimes the heavy wood strain, shown in Fig. 3, is used. This insulator can be made very strong, equalling the Brooklyn in its resistance to tensile stress, and has the advantage that it gives positive evidence when it fails, while the composition insulator may burn out or break down mechanically without its weakness being noted until the insulator in series with it, which may have had to bear all of the potential stress for an extended period, also breaks down.

The disadvantages of the heavy wooden strain are, first, its appearance, for it is big and clumsy; and second, the fact that unlike the Brooklyn, it has no take-up feature. A take-up could undoubtedly be incorporated into the wood insulator of the size attached to feeders in the same way that it has been added to the smaller type of wood strains used as span insulators. However, that form of construction would be uneconomical.

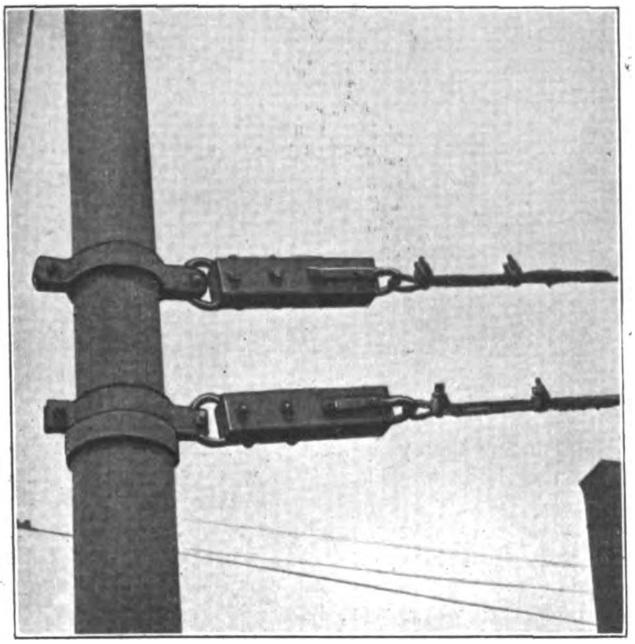


FIG. 3—USE OF HEAVY WOODEN STRAIN TO DEAD-END FEEDERS

The fact that a broken wood strain insulator will drop the feeder to the ground might be held as a point against its use, but if a Brooklyn insulator breaks down enough to put a hard ground on the feeder it will burn down. Hence the ultimate result will be the same and there will be no chance that the pole will be made alive while the insulator still appears to be in good condition.

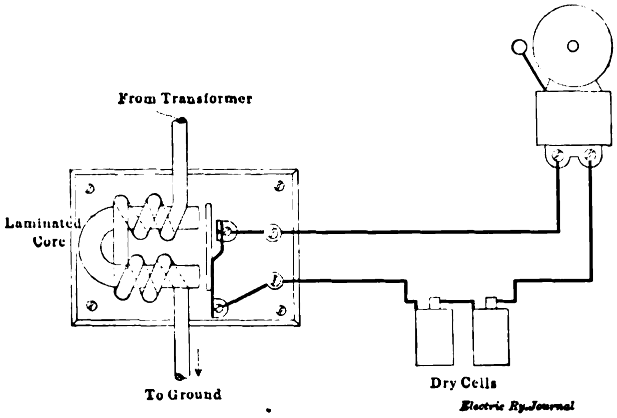
In most cases the use of the Brooklyn strain would seem to be preferable with the wooden arm installed whenever more than one feeder is dead-ended, despite the fact that the wooden insulator is a very serviceable although unattractive piece of equipment.

A cat was chased up a high line pole of the Fox & Illinois Union Railway by a dog recently and became crossed with an a.c. wire carrying 33,000 volts. The automatics tripped and when the power was again put on the line they tripped again and the cat fell to the ground. On inspection the cat showed a singed streak for its full length. The cat was sent to the office of the Public Service Company at Joliet, by which the high-tension line is operated.

A Ground Wire Alarm

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES, SAULT STE. MARIE, MICH.

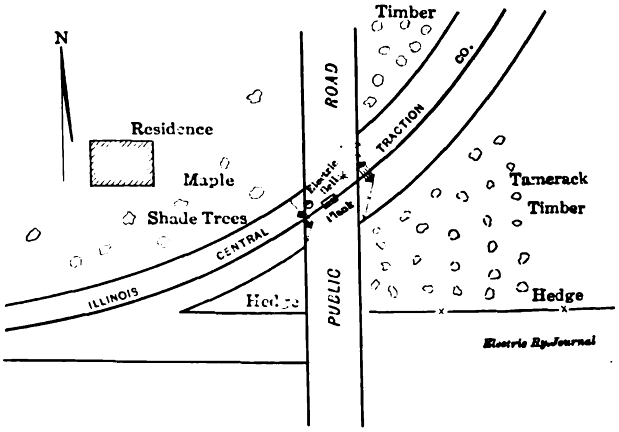
The accompanying drawing shows a home-made ground alarm which was devised and constructed by the writer some time ago and which has been in successful operation since. The device is connected in series with any ground wire used to protect electrical apparatus in a power house or substation. The core is laminated, insulated and wound with No. 6 B. & S. bare copper wire, the combination being so sensitive that very little current is needed to attract the iron armature by which the circuit of the alarm bell is closed to warn that there is a ground on the system.



WIRE-WOUND LAMINATED CORE AND DRY BATTERY BELL OUTFIT USED AS GROUND WIRE ALARM

Sketch of Illinois Standard Highway Crossing

In response to a request from the Governor and the Illinois Public Utilities Commission, all steam and electric railways are required to furnish detailed information regarding the condition of all road and street crossings along their lines. This information is prepared on a two-page form which is accompanied by a standard road-crossing sketch. A line drawing typical of one of these sketches is reproduced. It will be noted that all the information regarding the condition of the crossing, its arrangement and physical characteristics are shown. The call for this information was made in pursuance of an investigation to determine the most effective street and road crossing protection, now under way by the Illinois Public Utilities Commission. In the form used, the condition of any crossing is available in ready reference form in case an accident occurs or a complaint arises.



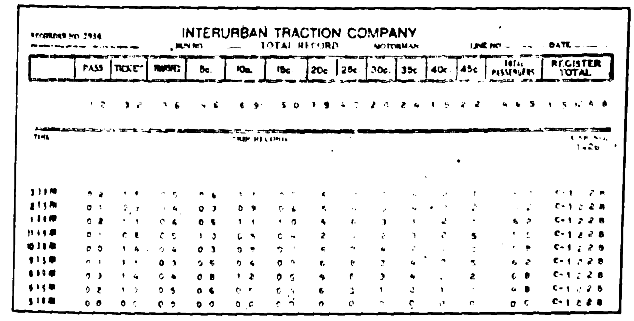
SKETCH OF ILLINOIS STANDARD HIGHWAY CROSSING

New Computing Fare Recorder

In the new computing fare recorders for suburban and interurban railway systems recently put on the market by the Dayton Fare Recorder Company, of Dayton, Ohio, several marked improvements have been introduced. The recorders are made in eight standard sizes, and intermediate sizes are also made to provide for classified registration of any number of fares from two to twenty-four. All are constructed with standard interchangeable parts, special attention having been given in the design and construction of the mechanisms to insure durability and dependability in service.

The operating mechanism for the recorders is very simple and durable in construction, two rods, 5/16 in. and 7/16 in. in diameter, with straight, positive connections and operating handles conveniently located, being used in the standard equipment. On some cars, where it is not practicable to use rods for both the setting and registering operations, only one rod and a cord are used. An improved form of fare indicator is located in various parts of the car, thus providing for the most effective public and private inspection of the classification and registration of the fares.

A very important feature of the Dayton system is the computed form of the printed record of the fare collections produced on the recorders. The records are a complete computation of the fare receipts, showing in detail the number of each kind and denomination of fare collected on each trip, as well as the number of passengers carried, and the starting and leaving time; also the total registrations of each kind of fare during the entire run regardless of the number of trips made. The records are in the form of a balance sheet. The items of registration can be verified by both cross and column addition. In the accompanying illustrations two forms of records are shown, each covering the work of the conductors for the same number of trips and hours of operation.


INTERURBAN TRACTION COMPANY

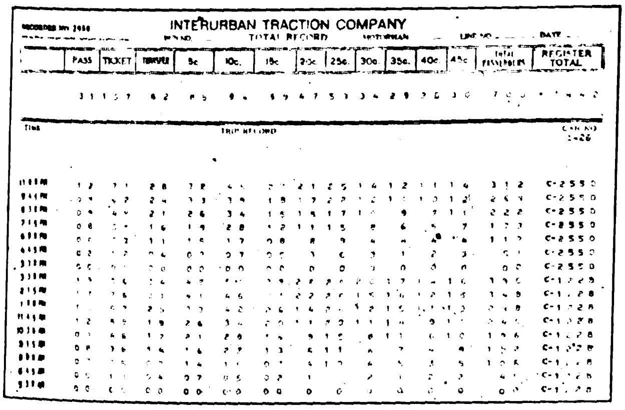
TOTAL RECORD

PASS | TICKET | 5c. | 10c. | 15c | 20c | 25c | 30c. | 35c | 40c | 45c | TOTAL PASSENGERS | REGISTER TOTAL

TIME

TRIP RECORD

COMPUTING FARE RECORDER—FIG. 1—RECORD OBTAINED BY SINGLE CONDUCTOR


INTERURBAN TRACTION COMPANY

TOTAL RECORD

PASS | TICKET | 5c | 10c. | 15c | 20c | 25c | 30c | 35c. | 40c | 45c | TOTAL PASSENGERS | REGISTER TOTAL

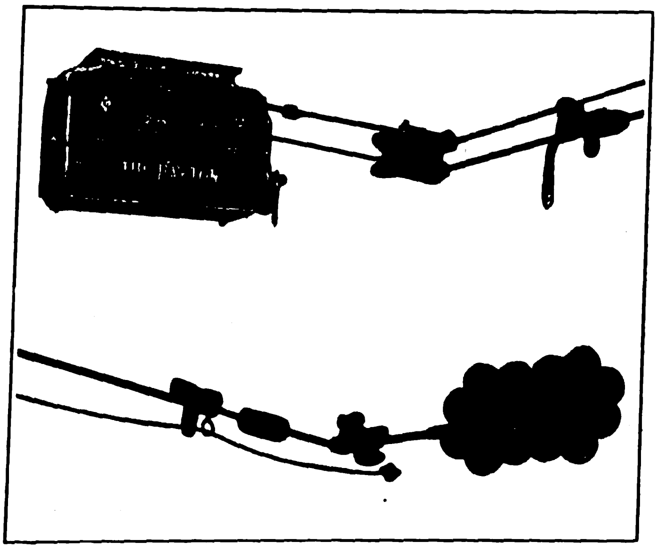
TIME

TRIP RECORD

COMPUTING FARE RECORDER—FIG. 2—SAMPLE RECORD OBTAINED WHEN CONDUCTORS CHANGE

To produce the record shown in Fig. 1 the conductor sets the counters at zero at the end of each trip, the record showing the number of fares of each denomination collected on the trip, and the total number of fares for all the trips.

To produce the record shown in Fig. 2 the conductor does not set the counters at zero until the end of his last trip. The last reading from the register which he takes shows the total number of all fares registered. The relief conductor who takes charge of the car then takes a zero reading to show the condition of the register at the beginning of his run as indicated at 3:30 p. m. on the sample record. This conductor then operates the recorder the same as the preceding conductor, the last register reading showing the total result of registrations for his period of work.


COMPUTING FARE RECORDER—FIG. 3—OPERATING MECHANISM AND FARE INDICATOR

When operation of the car is discontinued for the day, as shown at 11 p. m. on the sample record, an inspector or other authorized employee takes a final reading from the recorder, obtaining a record of the total fare registrations made by both conductors. The work of any number of conductors operating on the same car, can, of course, be covered in this way.

With either of the above forms of record, it is optional with the company whether the conductors are permitted to remove the records from the recorders and use them in making settlement, or else will have the records removed by an inspector or register clerk and later check them against the returns made by the conductor. In all cases the printed records produced on the recorders are an indisputable statement of the fare collections and are accepted without question as to their correctness by both the conductors and the receiving office, thus creating a condition of mutual confidence. All employees engaged in the work of collecting and handling and accounting for the fares are equally protected, and this helps greatly in building up the personal efficiency of the men and counts for immediate and lasting improvement of the service.

According to advices sent to the railroads of the country, the Panama-Pacific Exposition in San Francisco will open on time. The exposition is now 97 per cent completed, which assures a fully-completed exposition on the opening date, Feb. 20. Forty-two foreign nations will exhibit, among whom will be nearly all the European nations now at war. The exposition will continue from Feb. 20 to Dec. 4, 1915.

Messages of the Governors

Significant Statements Are Reproduced from the Messages of the Governors of Ten States to the Incoming Legislatures, Now in Session

Legislative sessions are held in nearly all states this year. In many of them the preliminary work of organization has been completed and the consideration of regulatory measures has been begun. The subjects of interest to the electric railroads discussed by the governors include taxation, workmen's compensation, public service corporation regulation, etc. Governor Whitman of New York is expected to deal with matters in special separate messages. Extracts from the messages of the governors of Massachusetts, Nebraska, Kansas, Indiana, New Jersey, Rhode Island, Missouri and Illinois follow:

GOVERNOR DAVID I. WALSH OF MASSACHUSETTS

"I must repeat my last year's protest against the law which relieved the transportation and telephone and telegraph companies from defraying the cost of the Public Service Commission, thereby adding nearly $200,000 annually to the State tax. The sole question is whether these companies, rather than other public service corporations, are entitled to this exemption from taxation at the expense of all the other taxpayers of the commonwealth; and this question I am sure should be answered in the negative.

"We all fervently hope that the five trustees who really represent the public will be able to work out the salvation of the Boston & Maine Railroad. As the situation develops I shall make further recommendations to you in a special message.

"With a network of trolley service connecting all our cities, I can see an immense advantage by creating simple and inexpensive receiving stations at points a few miles apart along these lines, where farmers might leave their farm products at stated intervals during the day to shipped into a central station in the city, the latter station to be owned and controlled by private co-operative associations, as is now the case among the orange growers in California. With a zone system of receiving and distribution inaugurated throughout the commonwealth, this method of transportation should be more economical than by steam railway, automobile or wagon.

"I must protest against obliging the commonwealth to begin the experiment of public ownership of transportation facilities by building and operating lines which private capital will not undertake because of the certainty that they cannot pay. Let us begin with a paying proposition if we are to venture at all in this untried field."

GOVERNOR JOHN H. MOREHEAD OF NEBRASKA

"The increase in population of the State and the rapid development of our towns and cities make the subject of public service corporations important. The method of dealing with this class of property should receive your earnest and careful consideration. Other States have passed legislation that is said to completely and satisfactorily deal with the subject, and I recommend that you consider the legislation of these States, as it is unwise to pass experimental legislation or to adopt new and untried methods when we may profit by the experience of others. I urge a careful study of the laws of these States, and that these corporations be placed under the jurisdiction of our State Railway Commission, and that we adopt a system which will deal with this far-reaching question adequately and successfully."

GOVERNOR ARTHUR CAPPER OF KANSAS

"I recommend the enactment of laws to strengthen the workmen's compensation act for the better protection of the workers. I recommend the adopting of an amendment to the utility commission law prohibiting the use of free railroad passes by members and employees of the commission, and the strengthening of the 'blue-sky' law."

GOVERNOR SAMUEL M. RALSTON OF INDIANA

"I hesitated long before I espoused legislation creating a Public Service Commission. Certainly there can be no complaint with the present commission because of the amount and character of work it has done since May 1, 1913. It inherited all the unfinished work of the Railroad Commission, and, by the terms of the statute of its creation, it had imposed upon it all the current duties of that body. Some idea of the work of the commission can be had from the fact that, during the first year, 693 formal cases were filed and 425 of these have been disposed of. During the same period there were 335 cases, denominated as informal, filed and by far the greater portion of these have been adjusted. And the docket of the commissions now shows that from May 30, 1914, to Dec. 30, 1914, the number of formal cases filed approximates in number all the cases filed the first year. These facts show the stupendous amount of work that must be done by the commission in the discharge of its duties.

"The commission was given the appropriation of $40,000 set aside for the Railroad Commission and an appropriation of $75,000 made directly to it, a total of $115,000. The commission turned over to the State in fees collected $22,785, showing the cost for the first year to be $92,215, which is much less than the amount appropriated by some of the other states for like work. I have expected great things of this commission and I have not been disappointed, no matter what the disappointments of others may have been. If there be anyone in this body who is hostile to the public service law, I want to remind those representing the majority of this Legislature that their party in its platform of 1914 went on record in favor of the public service law and commission. The commission will be glad to lay before your honorable body any information at its command you may desire bearing upon its work.

"The Indianapolis street railway strike of 1913, as well as various others of less magnitude, has shown the waste and cost in time and property and life itself, chargeable to the irrational, crude and cruel strike and lockout, as means of settlement of differences between capital and labor. The day when the individual citizen played any great part on the side of either capital or labor has departed. It is my earnest desire that the Sixty-Ninth General Assembly enact a law creating a board of conciliation and arbitration, and thus place Indiana in the line of progress alongside of her sister states."

GOVERNOR R. LIVINGSTON BEECKMAN OF RHODE ISLAND

"A careful study of the result of the workmen's compensation law since it has been in full operation has convinced me that some amendments ought to be made. It is important that all accidents should be immediately reported by the employers to the Commissioner of Industrial Statistics. From a complete report of all accidents, much could be learned which would be of value in preventing a recurrence of many avoidable accidents. Approximately 11,000 accidents, slight or severe, occur yearly in the State of Rhode Island, where more than 165,000 wage earners are employed. I am of the opinion that if a careful investigation were made concerning the causes of these accidents many of them would be found to have been avoidable and that it would result in the adoption of rules and regulations which would be of practical benefit and a material factor in the elimination of many unnecessary accidents. I therefore recommend an amendment to this law which will require all employers of labor, except those coming under the head of agricultural, domestic and personal service, to report all accidents upon uniform cards, to be furnished by the State, to the Commissioner of Industrial Statistics, within five days of their occurrence."

GOVERNOR WOODBRIDGE N. FERRIS OF MICHIGAN

"Provide for the assessment of interurban railroads, light and power companies and all corporations whose property extends through more than one assessing district, and the equitable apportionment of the same among the several assessing districts in which located. Repeal the law exempting from taxation credits that can be offset by debits.

"At the meeting of attorneys-general held in Washington in October a committee was appointed to prepare and submit to the legislatures of the various states of the nation a new 'blue-sky' bill, to meet the objections to the validity of the present act. This bill will be submitted to you, and I earnestly recommend its enactment into law.

"Under the present corporation laws only 10 per cent of the authorized capital of the corporation is required to be paid in. Parties turning in property to a corporation fix their own values in their articles of association. I recommend that no corporation be permitted to organize unless at least 50 per cent of its authorized capital be paid in, and that when property makes up any part of such payment that an appraisal of such property be had by some officer of the State.

"The powers of the Railroad Commission should be extended to cover all public utility corporations of the State. Furthermore, as there can be no intelligent fixing of charges without a knowledge of the real value of the properties, I would recommend that the commission be authorized to make physical valuation of all such properties that they may deem advisable, that the rates fixed may return reasonable dividends on actual cash investment.

"I respectfully suggest that the incoming Legislature create a court of inquiry composed of the Circuit Judge of the circuit where the industrial dispute arises, the Governor and Attorney-General of the State, and one or more members appointed on the nomination of the parties involved; or a board composed in some other manner, which shall investigate the matter in dispute and make a public finding thereof, with such recommendations as they believe are warranted to secure justice for both parties. It is generally admitted that compulsory arbitration is impractical. In the light of legislative experience little more can be accomplished than to focus public opinion upon industrial disputes.

"A provision should be added to the workmen's compensation law covering under proper restrictions portions of work which are let or sublet on contract by manufacturers and builders, so as to reasonably insure the protection of the compensation law to all of the men engaged in such work, whether they are working directly for the principal or doing his work through some contract or sub-contract. Our Supreme Court has recently decided that the Michigan compensation law is limited strictly to injuries received by accident. There can be no reasonable ground for denying the same measure of compensation to the workman or his dependents in case of the loss of life or limb suffered through an occupational disease, as is given in case where such loss is sustained by accident. The provision of the compensation law requiring the employer to furnish the injured employee with medical and hospital service and medicine for a period of three weeks following the injury is wholly inadequate. The amount of medical attention and care furnished should in all cases be proportionate to the injury, the same as the money compensation provided for. The provision fixing the rate of compensation in seasonable occupations should be so amended that the earnings of the injured workman in other like employments may be taken into consideration in computing the rate of compensation."

GOVERNOR JAMES F. FIELDER OF NEW JERSEY

"The annual report of the State Board of Equalization of Taxes, recently filed with me, shows an increase of more than $75,000,000 in the total valuation of property for taxation, exclusive of the stocks of banks and trust companies and railroad property, and that, notwithstanding this increase in valuation, the average tax rate of our municipalities is twenty-seven points higher than last year. I renew my recommendations that assessors be no longer elected, but be appointed under civil service rules for assessment districts; that they be paid proper salaries; that their assessments be made under uniform rules to be prepared by some higher tax authority; that their tax lists be open to inspection before confirmation, and that some appellate board be given power to hear appeals from the valuation proposed, after which the tax lists may be finally made up and filed. I commend this highly important matter to your most careful thought, with the earnest hope that a satisfactory solution of the problem will be reached before you adjourn."

GOVERNOR ELLIOTT W. MAJOR OF MISSOURI

"By establishing an industrial commission, which should be fashioned after and along the same lines of the public service act, you can place in operation a commission which will meet the industrial needs and demands of the day, and render an enlarged service to the people, one far in excess of that heretofore rendered, although each department has been effective and efficient in its labors. A committee was appointed by the last General Assembly to investigate this subject and make its report to the present Legislature. The men upon this committee were drawn from both political parties. The committee's work has been thorough and complete, and it has prepared a measure creating an industrial commission, to which I call your earnest and careful consideration.

"I recommend to the Legislature the passage of a workmen's compensation act. I have not had time carefully to examine the law prepared by the committee appointed by the last Legislature, to study the subject and prepare a measure, but have examined it in a general way, and find it has much merit and perhaps is as good a measure upon the subject as can be found in the other states.

"The public service commission act abolished the Railroad & Warehouse Commission, and the Public Service Commission has been no more expense to the State than it cost to maintain the Railroad & Warehouse Commission. The commission has now been at work for twenty months, and in that time has handled approximately 600 formal complaints and applications and approximately 1000 informal complaints. The fees collected by the commission and turned into the general revenue fund of the State have reached the sum of $100,000. In addition to these fees, the commission, through its counsel, Judge Bean, ascertained the cost paid by the State in the Missouri rate cases upon motion in the federal court, same was collected and turned into the treasury, approximately $30,000. The service of the commission to both the public and the public utilities coming under its jurisdiction has been entirely satisfactory."

GOVERNOR EDWARD F. DUNNE OF ILLINOIS

"The State Public Utilities Commission closed the first eleven months of its administration on Nov. 30, 1914. During that time the commission was organized, its work systematized, and the administrative, engineering, accounting, rate and service departments were built up to such a state of efficiency as the limited time and the means at the disposal of the commission would allow. The present working force of the commission, attorneys, engineers, accountants, statisticians, experts, inspectors, clerks, stenographers, etc., numbers seventy-three persons. The Illinois public utilities law is probably the most comprehensive measure of its kind ever enacted. While the operations of the commission have been satisfactory throughout the entire State, including Chicago, and while there seems to be no sentiment, at the present time, in favor of local commissions to regulate intraurban utilities down the State outside of Chicago, there is considerable sentiment in that city in favor of a local ancillary commission, to take charge of and control the intraurban municipal utilities of that city, and I therefore favor the creation of such an ancillary commission for Chicago to take charge of and control the intraurban utilities of that city.

"In the interest of the protection of human life and limb rather than protection to railroad interests, I believe that a law should be enacted making trespassing on railroad property a misdemeanor. It is now merely an infraction of civil rights. Such a law would tend to discourage trespassing and result in the saving of life and limb."

News of Electric Railways

NEW JERSEY COMMISSION REPORT

Recommendations Regarding Legislation—Enterprise Should Not Be Penalized—Going Concern Value—The Year's Work.

In its annual report the Board of Public Utility Commissioners of New Jersey makes the following recommendation in regard to legislation which it deems desirable:

"In accordance with the provisions of the public utility act which directs the board in reporting to the Governor to make 'such recommendations as it may deem proper,' the board, in view of the foregoing, respectively recommends that consideration be given to the advisability of amending the public utility act so that it shall clearly appear, as the legislative intent and as an authoritative declaration of State policy, that the board, in fixing just and reasonable rates to be charged by a public utility, shall not value the franchise of such utility in excess of the amount the board finds to have been legitimately spent in procuring it. Such is the policy of the State as specifically declared in the public utility act with respect to the capitalization of franchises.

"The board can exercise such powers only as the Legislature delegates to it. The law designating these powers must be in the first instance construed by the board. The Legislature has provided for appeals to be taken from orders of the board to the court. If an order of the board is issued, based on what the court regards as an erroneous construction of the law, the board's order will be set aside.

"In the Passaic gas rate case, the Legislature not having specifically referred to the value to be placed on the franchise in fixing a rate, the board did not apply the rule apparently laid down by the Court of Errors and Appeals.

"The valuations specifically referred to have been undertaken with a view of determining the reasonableness of the rates charged and of fixing new rates to be charged if the existing rates should be found unjust and unreasonable. Such determination and fixation by a board exercising powers of the nature conferred on this board, necessarily involves valuations of the utilities' properties. The value fairly determined must be the base on which the utility shall be allowed a reasonable return, and this governs the rate to the public. It is the opinion of the board that this base should be not merely the value of the company's physical property used in supplying service to the public. To hold this would require elimination from consideration of expenditures legitimately incurred in developing the business of the utility to a state of efficiency commensurate with the requirements of the community in which it operates.

"The management of a utility which develops the utility's business in a thorough and efficient way, which seeks to obtain and is successful in getting and holding as its customers those who, except for the effort of the utility to make its service attractive, would not take it, should not be penalized. Expenses reasonably incurred in this way, sometimes called 'going concern value,' sometimes 'development cost,' in the opinion of the board, should be considered in determining the base on which a return should be allowed. This is a rule uniformally applied by other commissions and the courts in rate proceedings. The utility furthermore should be allowed a return on expenses legitimately incurred in obtaining the franchise under which it operates. On the theory outlined above, the board determined the base on which, in its opinion, the Public Service Gas Company was reasonably entitled to a return in its Passaic district. Allowing on the base so determined a return of 8 per cent, the board found the rate charged by the company to be excessive and ordered it reduced to 90 cents per thousand cubic feet."

Outlining the work of the past year, the report shows that the board has investigated 606 complaints. Many of these were treated informally and settled without hearing, this being particularly the case with reference to complaints of inequalities in freight rates. In these cases a number of rates were lowered by railroads without objection. Proceedings to the number of 456 were subjects of hearings by the board. These included complaints formally treated, applications for approval of issues of securities, leases and mergers, privileges granted by municipalities to utilities and sales of properties.

The board approved fifty-nine applications for the issuing of securities, the par value of the securities involved being $88,106,750. There have been forty-nine sales of properties of public utilities approved. Eighty-two petitions for approval of ordinances and resolutions of municipalities granting privileges to utilities have been sanctioned.

SUBWAY FIRE INQUIRY AND ORDERS

New York Commission Orders Retirement of Wooden Cars—Chief Engineer Asked to Report on Making Subway Safer

On Jan. 8 the Public Service Commission of the First District of New York notified the Interborough Rapid Transit Company that wooden cars must be eliminated from the subway. May 1 was mentioned in the commission's letter to the company as the date on which it has been decided tentatively that the elimination of the cars should begin. On the same day the commission adopted a resolution calling on Alfred Craven, its chief engineer, to report at once on the practicability of a number of suggestions that have been made for rendering the subway safer. The suggestions referred to the chief engineer include several of those made by Fire Commissioner Adamson in his report to Mayor Mitchel on Jan. 7. Mr. Adamson's principal recommendations were as follows: Complete isolation of all splicing chambers from the subway proper; fire escapes between stations; emergency fire-fighting equipment, including standpipes; fire alarm system connecting with fire headquarters; abolition of wooden cars. The suggestions on which Mr. Craven has been asked to report follow:

1. Whether splicing chambers in the subway operated by the Interborough Rapid Transit Company could be so reconstructed as to cut off all connection with the subway.
2. Recommendations for enlargement, rearrangement or increase of emergency exits.
3. Separation of high-tension and low-tension cables, particularly in splicing chambers.
4. The complete separation of lighting and signal circuits from power cables, with auxiliary independent connections for emergency purposes.
5. Independent supply of power for ventilating fans and for the lighting of signs at emergency exits.
6. Auxiliary independent connections to power substations.
7. Recommendations as to increase in the lighting system throughout the subway.

The letter from Chairman McCall of the commission to President Shonts of the Interborough Rapid Transit Company regarding the elimination of the wooden cars in the subway follows:

"Following conferences between the engineers of the commission and of your company, and the testimony of Frank Hedley, vice-president and general manager of the company, before the commission on Jan. 7, 1915, the commission is of the opinion that the Interborough Rapid Transit Company should replace composite cars now operating in the subway, at the earliest possible moment, and, accordingly request the forwarding immediately to the commission the earliest practicable dates, and not later than May 1, 1915, upon which you can secure delivery of car bodies for the purpose of effecting such substitution."

On the same day that the foregoing letter was addressed to Mr. Shonts, Commissioner Maltbie proposed and the commission adopted a resolution instructing Clifton W. Wilder, the electrical expert of the commission, to inquire and report the earliest possible date when the manufacturers would be ready to supply 478 steel car bodies necessary to convert all of the composite cars into steel ones.

Upon receipt of the letter from Chairman McCall the answer from Mr. Shonts was made public. He said in substance:

"The company is prepared to carry out the plan for such substitution substantially as explained by Mr. Hedley in his testimony on Jan. 5 last, to which you refer. We have this day asked the manufacturers to advise us as to the earliest dates of delivery. We shall transmit that information as soon as received by us. I will leave the discussion of the details of the exchange between the subway and elevated systems to be taken up with the commission at the adjourned hearing."

The substitution plan to which Mr. Shonts referred was that wooden bodies of composite cars be removed from the trucks and placed on lighter trucks, which would make it possible for them to be used on the elevated lines, especially on sections reinforced for the third-tracking.

As if to make its position clear beyond doubt the commission on Jan. 12 unanimously adopted a formal order directing the company to eliminate the 478 wooden cars it now has in use in the subway not later than Dec. 1, 1915. This action was taken after the commission's engineers had advised it that the new steel cars to replace the old wooden cars could be built and delivered within ten months. James L. Quackenbush, counsel for the company, wanted to stipulate that the company should have the privilege of transferring the wooden cars ordered out of the subway to the elevated line, but the commission announced that the question of whether or not the wooden cars may be used on the elevated line will be taken up at the hearings now being conducted into the elevated service and equipment. The formal order of the commission to the company was in part as follows:

"It is ordered that the Interborough Rapid Transit Company be and the same hereby is required and directed to retire from operation on its subway lines hereinafter described the cars of wooden construction known as copper sheathed composite cars, now operated by it in trains on the subway lines known as the Manhattan-Bronx Rapid Transit Railroad and the Brooklyn-Manhattan Rapid Transit Railroad, and to replace the said cars with cars of all-steel construction of a type similar to the cars of all-steel construction now operated by it on its said subway lines. . . . and shall not operate any cars on the said subway lines for the transportation of passengers except cars of steel construction of the type above mentioned; and that the Interborough Rapid Transit Company shall not after the retirement and replacement of any of said wooden cars again put any of said wooden cars into service on its said subway lines."

The jury which has been investigating the two deaths in the Ninth Avenue Elevated Railway accident of Dec. 9 on Jan. 12 rendered a verdict charging T. P. Shonts, president; Frank Hedley, vice-president and general manager, and all of the other directors of the company with culpable negligence. No mention was made by the jury of the motorman or conductor of the wrecked train. James L. Quackenbush, counsel for the company, accused the coroner of giving the jury a wrong statement of law and with misstating the evidence. The coroner said he would fix the bail at $5,000 each and declared the hearing closed. Subsequently he reduced the amount of the bond to $1,000 each. All signed bonds except a director who lives in Philadelphia.

LABOR LEGISLATION IN OHIO

Twenty-five representatives of the electric railway employees in Ohio met in Columbus during the week ended Jan. 16 to map out plans for securing legislation in their interest at the present session of the Legislature. Delegates were present from Cleveland, Cincinnati, Mansfield, Steubenville, East Liverpool, Akron, Youngstown and Elyria. Thomas Moore, Youngstown, was made chairman of the meeting. George R. Davies, president of the local organization at Cleveland, acted as secretary. The delegates returned to their homes on Jan. 14, but did not care to discuss the steps taken until information could be given in complete form. It is practically certain, however, that a bill will be prepared for the purpose of enabling the men to secure a revision of their contract at Cleveland. This, it seems, they cannot do under existing arrangements. The subjects about which the men are concerned—the number of hours of work, the number that men must be on duty to secure a full day's work, speed of cars, time for layovers and other things—it is claimed cannot be arranged satisfactorily under the schedules prepared by the city and executed as nearly as possible by the company.

TOLEDO MUNICIPAL OWNERSHIP ORDINANCE

The ordinance which City Solicitor Thurstin of Toledo, Ohio, asked the City Council to pass at its meeting on Jan. 4 not only provides for a bond issue of $4,000,000 for the purchase of the local street railway, but fixes the rate of fare and makes provision for turning the property over to a private company if it is found that the city cannot operate the lines to advantage.

The bonds are to be dated March 1, 1915, and run twenty years and are made a lien on the street railway built or purchased with the proceeds from their sale. The bonds are to be considered in default ninety days after the failure to pay interest when due. If the property is sold under foreclosure the purchasing company will receive a franchise provided for in the ordinance to run not more than twenty years from the date of purchase or until the city pays off the bonds or the amount due. Any company into whose possession the road may come as a result of foreclosure and sale is to collect fares as follows:

Children under four years of age accompanied by adults, nothing. Children between the ages of four and eight years, 1 cent. Persons more than eight years of age, between the hours of 5 and 8 a. m. and between 4 and 7 p. m., 3 cents, with five tickets for 15 cents; at all other hours, 5 cents or six tickets for 25 cents, good at any hour, with free transfers.

The city is to have the right to take over the property from the purchaser at any time up to Jan. 1, 1935, by the payment of the amount due on unpaid bonds with 7 per cent interest since the date of the foreclosure. The city is to have the right to take over the property without restriction in 1935. Any controversy that may arise in regard to these matters is to be submitted to arbitration. The ordinance provides for street paving by the operating company and for the joint use of the operating company's tracks by interurban railways.

LIMITING PROFITS

Comments of a Virginia Newspaper on the Subject of Profits

The Roanoke (Va.) *Times* printed in its issue of Jan. 6 an editorial "Limiting Profits," as follows:

"Can we limit profits of public utilities without restraining enterprise? Mr. Trafford, of Richmond, head of the municipal electric plant there, thinks the street railway and electric system should be limited to 'a reasonable profit,' which he fixes at 6 per cent to 7 per cent. That is a fair profit. Most people with money to invest would be satisfied with it. But is it right to limit a profit while we cannot guarantee it? And can people with money be induced to invest it in any undertaking involving risk, or waiting, with 6 per cent or 7 per cent as the very top notch to be hoped for?

"Suppose a man is asked to put $10,000 in a street railway to develop a new section. He knows he must expect to wait four or five years before he possibly can touch a cent of dividend. He will lose interest on his money through that time. What is the business reasoning that will carry him into such an investment, with the possibility of never realizing anything and the certainty that at best he never can get more than 7 per cent? In this country millions and millions of dollars are invested in enterprises which have developed new territory, created vast new wealth, established communities and given employment to thousands of people, which have been years in operation and never have paid the original investors a cent. How are we to compute what will be fair and reasonable profit when these enterprises do begin to earn? Are we to allow nothing for the interest lost while the money was earning nothing for its owners but doing much for the public? And who is to provide for the lean years? If 6 per cent or 7 per cent is fair profit in good years, will the public, or the government, take care that the same rate shall be maintained in lean years when by dull times, strikes, fire or other calamity the profits disappear?

"Mr. Trafford is a deeply philosophical citizen with the habit of splashing around in water several feet over his head."

BAY STATE ARBITRATION

Hearings in the wages arbitration case of the Bay State Street Railway were resumed at Boston, Mass., on Jan. 7. Philip Mansfield was entered as counsel for the Amalgamated Association, succeeding Joseph B. Eastman, resigned. Robert S. Goff, vice-president of the company, estimated the average wage of all the men on the system at about $14 per week. About 25 per cent of the system is double track. The witness said that if the cars were all run well loaded the requirements of travel would not reasonably be met, on account of the need of maintaining a minimum service. Taking the system as a whole, the running time has not been materially reduced within recent years. A record obtained from the time-table department showed that in the fiscal year 1914 the average number of motormen and conductors employed was 3422, and the total platform wages paid was $2,054,148, an average of $609 per man. Free transportation outside an employee's division is usually granted upon request. The company's business increases about 65 per cent in a summer month as compared with a winter month, the range in total employees being from 5000 to 6600, including a track force of from 1200 to 1500 in spring and summer. George H. Gray, general superintendent, Division 1, North, and Thomas Lees, general superintendent, Division 2, Lowell, Mass., testified at length relative to the duties of transportation employees.

At the continued hearing this week John T. Conway, general superintendent of Division 1, Lines South, with headquarters at Brockton, described in detail his multifarious duties.

TRACKLESS TROLLEY REQUEST REFUSED

The Public Service Commission of Pennsylvania has refused to approve the application of the Perkiomen Electric Transit Company for a certificate of public convenience which would have authorized the company to establish a trackless trolley system in Pennsylvania. The applicant is a Delaware corporation and is registered to transact business in Pennsylvania. The commission says that the application involves the question not merely whether the transportation of the kind offered by such a trackless trolley system is necessary or proper for the accommodation or convenience of the public, but whether such service rendered in the course of business proposed to be carried on by the particular applicant would, in view of the entire absence of legislative regulation of the rights and powers of such a corporation, be proper for the service, accommodation, convenience or safety of the public.

The commission points out that the State has adopted a broad policy in relation to the improvement of the public roads and highways in country districts and that large sums are constantly being expended on their construction and maintenance. While the commonwealth has been vigilant in regulating by law the right of street railways to use streets and roads, the Legislature has not clearly indicated the policy of the State in regard to the use of such highways by companies using a means of transportation such as the trackless trolley system. The commision declares that the exercise in Pennsylvania by a corporation of another State, of rights in which the public is so vitally interested, should be undertaken only when these rights have been considered and defined by the law-making body of the commonwealth.

INTERSTATE COMMERCE DEFINED

Remarks of Justice Day of Supreme Court in South Covington & Cincinnati Street Railway Case

The Supreme Court of the United States on Jan. 5 rendered a decision in the suit of the South Covington & Cincinnati Street Railway against the city of Covington, Ky., to enjoin the enforcement of an ordinance providing for the regulation of the operation of the road. The court distinguished between the legal and illegal phases of the ordinance and remanded it to the State court for further consideration not inconsistent with the opinion just rendered. The court found the provisions of the ordinance prohibiting the use of unguarded platforms by passengers, separating the motorman from the passengers and requiring cleanliness, ventilation and fumigation of cars to be within the State jurisdiction. The court considered to be invalid, however, the provisions affecting frequency with which cars shall be run, the number of passengers to be carried on each car and the requirement that a temperature of 50 deg. Fahr. shall be maintained in the cars. In rendering the decision, Justice Day said in part:

"This court repeatedly has held that whether given commerce is of an interstate character or not is to be determined by what is actually done, and if the transportation is really and in fact between states, the mere arrangements of billing or plurality of carriers does not enter into the conclusion.

"Here is an uninterrupted transportation of passengers between states, on the same cars and under practically the same management, and for a single fare. We have no doubt that this course of business constitutes interstate commerce.

"Reaching the conclusion that the traffic here regulated is of an interstate character we think the necessary effect of these regulations is not only to determine the manner of carrying passengers in Covington and the number of cars that are to be run in connection with the business there, but necessarily directs the number of cars to be run in Cincinnati and the manner of loading them when there, where the traffic is much impeded and other lines of street railway and many hindrances have to be taken into consideration in regulating the traffic.

"If Covington can regulate these matters certainly Cincinnati can, and interstate commerce might be impeded by conflicting and varying regulations in this respect, with which it might be impossible to comply. On one side of the river one set of regulations might be enforced, and on the other side quite a different set, and both seeking to control a practically continuous movement of cars.

"There are other parts of the ordinance which we are of opinion are within the authority of State, and proper subject matter for its regulation at least until the federal authority is exerted. As to the regulation affecting the temperature of the cars and providing that it shall never be permanently below 50 deg. Fahr., the undisputed testimony shows that it is impossible, owing to the opening and closing of doors and other interferences that make it impracticable. We therefore think, upon this showing, this feature of the ordinance is unreasonable and cannot be sustained. Our conclusion is that the Court of Appeals of Kentucky erred in refusing to grant the injunction as against the provision of the ordinance regulating the number of passengers to be carried in a car and the number of cars to be provided and the regulation as to heating, in view of the testimony as heretofore stated.

"In these respects its decisions should be reversed. We think the other provisions of the ordinance are separate, and concerning them the plaintiff in error was not entitled to an injunction in the State court. Judgment is reversed in part and the case remanded to the State court for further proceedings not inconsistent with this opinion."

PUBLIC RELATIONS IN SAN FRANCISCO

Good-Will of Public the Company's Best Asset, Says President Lilienthal

In a signed editorial in the November issue of the *United Railroads Magazine*, Jesse W. Lilienthal, president of the company, says in part:

"I believe that I have made it plain to you all that the good-will of the people is the best asset that the company could have. So that if we are influenced only by the most selfish motives, it would still be good policy to do everything in our power to earn that good-will. Now, how is the good-will of the public to be obtained? One purpose of this magazine is to have you tell us from time to time how you think this should be done. We must, of course, in the first instance use every dollar that we can spare to put our roadbed and equipment in the best possible condition and keep them so. Cars must be kept clean and properly ventilated. We must use every possible effort to stop killing and maiming people. That does not simply mean that we must avoid all carelessness on our own part —it also means that we must guard against the carelessness or helplessness or incompetence of passengers and pedestrians and drivers of other vehicles. It is our legal duty, just as it is our moral duty, to prevent injury to third persons where possible, even though they foolishly expose themselves to it. And we must, by all means in our power, educate the public to the dangers that attend transportation in a crowded thoroughfare. We have already begun to advertise 'safety first' principles, and we are considering having lectures delivered and motion pictures shown in the public schools to teach the children what they must do to protect themselves against accidents.

"We must, where injury has been done, give patient attention to claims for damages, examine all the circumstances impartially, and when we are at fault we must make reasonable reparation.

"Finally, we must be courteous to the public. I have said this often before, but I cannot say it too often. A pleasant word changes the whole picture. We are made happier when we come in contact with an obliging person, and the best of it all is that our own task is made easier when we perform it cheerfully and with kindness toward those with whom it brings us in contact. Nothing pleases me more than to receive a letter from some passenger calling attention to the courtesy of any of our platform men. That is the surest way to get the good-will of the public, and I am glad to say that of late such letters of commendation are beginning to come in quite frequently."

OHIO COMMISSION REPORT

According to the report of the Public Utilities Commission of Ohio filed with Governor Cox on Dec. 31, the mileage of the electric railways in that State is 2745.03. The capital stock of the companies is $123,429,920, a decrease of $2,265,080 over 1913. The net income was $2,381,174, a decrease of $88,823. Dividends amounted to $1,901,695, an increase of $210,894. The bonded debt of the companies increased by $3,500,000 over 1913 and the cost of equipment showed an increase of $5,428,000. The operating revenues increased $948,000 over the previous year and the operating expenses $1,086,000. The roads employed 11,601 persons, an increase of 579. The salaries paid aggregated $7,858,959, an increase of $881,271 for the year. The number of persons killed or injured on the electric railways was 1744, or 166 more than in 1913. Of 178,637,260 fare passengers carried on the electric railways thirteen were killed, or one to every 13,741,327. Injured passengers numbered 869, or one to every 205,566.

The commission suggests that the law should be so amended that rates may be suspended pending an investigation. The commission now has no authority to suspend a rate or schedule until it becomes effective. The report suggests that railroads be required to give notice of thirty days of a change in rates, unless otherwise ordered by the commision. It is also recommended that railway and railroad companies be required to secure the approval of the commission for the abandonment of stops, stations and agencies. This, however, would not apply to city lines, where such regulation should be exercised by the local authority. Block signal systems should be installed on all roads where gross earnings justify the expenditure. Other suggestions are: That the commission be notified immediately of any change in the personnel of the responsible officers of railroad and utility corporations; that the commission be authorized to order the refunding of unreasonable charges by railroads and utilities; that members of the commission be exempted from testifying in civil actions when the matter out of which the action grew has been officially investigated, and that the commission be authorized to investigate upon its own motion matters affecting the rules, regulations and practices of common carriers.

PROPOSED NEW TRAMWAYS IN LONDON

Among the Parliamentary notices for the proposed construction of new tramways are those of the London County Council to extend its present tramways to new terminals within the city of London at Tower Hill in lieu of Aldgate, and Smithfield in lieu of Farringdon Street. Various short extensions in the Hackney district are also proposed. Many of these schemes are revivals of proposals to which Parliamentary sanction has been refused in former sessions. It is also sought by the Council to obtain authority to run trail cars on lines north of the Thames similar to those in use on the southern portion of the system. It has been decided by the Council that the proposal regarding the suggested tramways from Waterloo Road to Blackfriars Road, through the New Cut and Great Charlotte Street, will not be proceeded with in the next session of Parliament. The scheme has met with strong local opposition on behalf of the traders of the New Cut market and their customers. The Council has also decided not to proceed with the contemplated legislation with regard to the proposed tramway from Victoria Station to Westminister Bridge, via Victoria Street.

PERSONNEL OF NEW CALIFORNIA RAILROAD COMMISSION

The personnel of the new Railroad Commission of California, which took office on Jan. 4 under appointments from Governor Johnson, is the same as heretofore with the exception that Frank R. Devlin was named to fill the vacancy caused by the election of John M. Eshleman, former president of the commission, as Lieutenant-Governor. As now organized the members of the commission and their terms of office are as follows: Max Thelen, president, six years; Edwin O. Edgerton, six years; H. A. Loveland, four years; Frank R. Devlin, four years, and Alex Gordon, two years. Douglas Brookman has been named as attorney for the new commission, which announces that all present employees will be retained. Mr. Devlin was a member of the State senate in 1903-1905 and was elected judge of the Superior Court of Solono County in 1906, which position he later resigned to resume private practice as an attorney at law.

Rayburn Interstate Commerce Bill Reintroduced.—Senator Pomerene of Ohio has reintroduced in the Senate the Rayburn railroad securities bill with an amendment increasing the number of Interstate Commerce Commissioners from seven to nine. The Rayburn bill was abandoned by Democratic leaders at the last session of Congress.

Three New Haven Officials Denied Immunity.—The Federal District Court at New York has overruled the pleas of immunity interposed by John L. Billard, James S. Elton and William Skinner to indictments charging them with criminal violations of the Sherman law in connection with their acts as directors of the New York, New Haven & Hartford Railroad.

St. Louis Mill-Tax Case.—The United Railways, St. Louis, Mo., has carried the mill-tax case direct to the Supreme Court at Jefferson City. On Jan. 2 the court instructed its chief clerk not to file the motion of the company for a rehearing. The plea made to the court on Jan. 7 asks that body to reverse its decision in the mill-tax cases handed down on Dec. 19, to reverse its construction on its rule not to permit readjudication of decisions, and to take another view of its decision that holidays and Sundays shall be included in the ten days allowed after a decision, in which to file motions for rehearings.

Suggestion Advanced for a National Electric Week.—Acting on a suggestion advanced by the Society for Electrical Development, representatives of leading electrical manufacturers, central stations, jobbers, contractors, dealers and trade journals, at a special meeting held on Jan. 8 in the society's office, voted in favor of planning a national electric week to be held in the United States and Canada some time this fall. It was the opinion of those present that such a week would call the attention of the public in the most forcible manner possible to the many uses of electricity, stimulate the men in the industry itself and impart a boom to general business throughout the entire country.

Strike Averted.—Mediation appears to have been finally successful in averting the strike called by the conductors and motormen of the Wilkes-Barre (Pa.) Railway to enforce demands for increased wages and for relief from other alleged grievances. Congressman Casey, Wilkes-Barre, representing Secretary of Labor Wilson, effected a meeting between Thomas A. Wright, general manager of the company; ex-Judge F. W. Wheaton, counsel of the company; Roland B. Mahany and John A. Moffitt, national mediators, and John A. Steese, State mediator. As a result, an offer of 1 cent an hour increase has been made. The question of the right of the company to discharge employees without giving reasons remains to be adjusted.

Cincinnati Rapid Transit Belt.—C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, was in Cincinnati on Jan. 5. In regard to the rapid transit belt line projected by the city, he advised that adequate freight facilities as well as passenger terminals be provided in the plans. Indianapolis made the mistake of looking upon the interurban railways primarily as passenger lines, with the result that freight facilities there are inadequate. Freight is an important factor in modern interurban business, and special care should be taken to build large and well-equipped freight terminals. Mr. Henry said that the company of which he is president will build into Cincinnati as soon as plans for the interurban entrance are settled.

Repaving in Columbus.—At a conference with representatives of the Columbus Chamber of Commerce and a special committee of the City Council recently, S. G. McMeen, president of the Columbus Railway, Power & Light Company, stated that if the city insists upon repaving West Broad, East Main and East Long Streets this year $400,000 will be added to the company's improvement expenses. The company's program for improvements called for the expenditure of $380,000, which is $180,000 in excess of the normal improvement bill. The city desires to do this work in order to give employment to as many people as possible and because to delay it another year will place a greater amount of work in the next year's period than can be done.

Philadelphia Transit Loan Ordinance.—Two ordinances providing for a vote of the people of Philadelphia on an increase in the indebtedness of the city by $30,000,000 for new transit facilities have been introduced in the Councils by John T. Connelly, chairman of the finance committee. A special election is provided for in one of the ordinances. The other signifies the desire of the city authorities to increase the debt of the municipality "for the purpose of establishing, purchasing, leasing, locating, constructing, equipping and improving transit facilities, wholly or in part, or for any one or more of them, and the use and operation of the same within the corporate limits of Philadelphia and within the limits of adjacent cities, boroughs or townships."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

NEW YORK

Governor Whitman of New York announced recently that it was proposed to conduct an investigation of both the Public Service Commission of the First District and the Commission for the Second District. The Legislature reconvened on the evening of Jan. 13. Senator William H. Bennett of Manhattan had presented a resolution providing $25,000 for expenses and a committee of three Senators and five Assemblymen to investigate not only the recent accidents in New York, but the commission as well, but the Senate has not acted on the matter. The preamble of the resolution called attention to the presence of wooden cars in the subway and referred to the present disorganized condition of and chaotic control exercised by the commission for the first district. The Governor is reported to have said that the only plan for doing away with the commissions which has received serious consideration is the one to consolidate the two commissions into one with five members, each receiving the present salary of $15,000 a year.

PROGRAM OF ASSOCIATION MEETING

Wisconsin Electrical Association

A paper entitled "How to Overcome Some Operating Difficulties of Small Electric Utilities" and a paper on the effects of high taxation of public service companies in Wisconsin have been added to the program of the meeting of the Wisconsin Electrical Association to be held in Milwaukee, Wis., on Jan. 20, 21 and 22. The program of papers of special interest to central station and electric railways intended to be presented at this meeting was published in the ELECTRIC RAILWAY JOURNAL of Jan. 9, page 113.

Financial and Corporate

PREDICTION OF PROSPERITY

Recent interviews of this paper with manufacturers of railway apparatus indicate that a much larger number of inquiries have been received from possible purchasers than for many months. Some companies, especially among those handling the smaller supplies, report larger sales during December than at any time since the outbreak of the European war. A similar investigation among railway managers indicates rather a waiting condition, pending a more definite settlement of the general industrial conditions and the money market. They feel more encouraged and believe a revival of general business would soon be reflected in their gross receipts, but with the poor records for 1914, and the uncertainties which are bound to exist during the continuance of the war, are cautious about branching out. This attitude is most apparent in the districts of the country which have most felt the business depression, like the cotton and manufacturing districts. In financial circles the sentiment is more optimistic than for some time. The financial situation at present, with gold actually being imported and a large credit balance in most of the European capitals, could hardly be improved, and moderate sales of American securities for foreign holders could easily be financed, although there is no evidence yet of such sales as were feared before the opening of the New York Stock Exchange.

According to a recent interview with L. C. Haynes, vice-president East St. Louis & Suburban Railway, East St. Louis, Ill., the swinging back of the pendulum of public sentiment toward the fair treatment of railroads by legislative bodies is tending to inspire confidence in railroad managements. Consequently the feeling of the financial interests, to which the railroads must look for aid in carrying out betterment plans, is improved. Continuing along this line, Mr. Haynes said:

"There seems to be a growing disposition to cease trying to fix upon the railway managements of to-day guilt for the actions of their predecessors of one to three decades ago. There seems also to be an increasing appreciation of the fact that railway securities are generally held to-day by private investors who purchased in good faith and who are fairly entitled to the protection of their investments, provided only and always that rates charged for transportation of freight and passengers be not excessive."

Mr. Haynes declared that public utilities are being retarded by federal and state laws which tend to take the profit out of promotion. In his opinion, last December was the worst month in recent history for railway earnings, but 1915 will be the best year ever from a safe business standpoint. A large number of orders for railway supplies will be placed and East St. Louis in particular will be benefited by these.

OUTLOOK IN NORTHWEST

At the recent annual meeting of the British Columbia Electric Railway, Ltd., Vancouver, B. C., Can., held in London, the chairman, R. M. Horne-Payne, stated that the last year had been a bad one and that the immediate prospects are unfavorable on account of the war. The monthly traffic returns up to October, as compared with the previous year's results, showed a falling off in net earnings at the rate of between $450,000 and $500,000 a year. As for the outlook, the chairman said:

"I do not think that we can hope for any marked improvement in conditions during the current financial year, but it is reasonable to look for an improvement in the latter half of 1915. This improvement may arise from two sources—namely, from the final extermination of the enemy's cruisers in the Pacific and South Atlantic Oceans, and from good prices for wheat and a large crop in the prairie provinces of Canada. Either of these factors would immediately resuscitate business in British Columbia.

"Whenever the revival comes it will be found that this period of depression has been for the permanent good of the province, and that in several important ways new conditions have been established enabling its sounder and more rapid development. The cost of living, especially in the matter of rentals, will have considerably decreased, and with this a lower basis of wages will be in force."

ANNUAL REPORT

Wisconsin Railway, Light & Power Company

In submitting its first report of operations from Feb. 10, 1913, the date of beginning business, to Sept. 30, 1914, the Wisconsin Railway, Light & Power Company, Milwaukee, Wis., presents a statement of earnings compiled from the company's annual report to the Railroad Commission of Wisconsin for the twelve months ended June 30, 1914. This company owns the electric railway and power companies in Winona and the electric railway in La Crosse. A comparative statement for the year ended June 30, 1913, compiled by consolidating the accounts of these constituent companies so as to reflect as accurately as possible the operating conditions of the year, is also shown. These statements are as follows:

	1914	1913
Gross earnings	$385,947	$357,259
Operating expenses	$221,829	$224,729
Taxes	26,287	23,611
Net earnings	$137,831	$108,919
Annual interest on $1,200,000 of first security bonds and $220,000 of underlying bonds	71,000	
Balance available for interest on junior liens, depreciation, etc.	$66,831	
Annual interest on $1,025,000 of temporarily second security bonds	$51,250	
Less credit being one year's interest on $225,000 of temporarily second security bonds held by trustee to pay for future improvements	11,250	
Total	$40,000	
Balance	$26,831	

The following comparative statement shows the earnings and operating expenses of the company for the six months ending Sept. 30, 1913 and 1914. As the Winona Railway & Light Company was not added to the new company until early in March, 1913, this six months' statement comprises the longest period in which it is possible to give an actual comparison of earnings and operating expenses of the new company.

	1914	1913
Operating revenues	$182,958	$179,503
Operating expenses (excluding taxes)	$104,677	$106,302
Taxes	14,365	12,060
Net operating revenues	$63,915	$61,140
Non-operating revenues	1,583	1,493
Net earnings	$65,499	$62,633

Until Aug. 1, 1914, the company's earnings from electric light, power and street railway showed a constant increase. Since that date, while the electric light and power earnings have suffered but a small loss, the street railway earnings in both La Crosse and Winona have fallen off materially as compared with 1913 and are still showing a decrease. This condition is directly attributable to the general depression caused by the European war. The company has used every endeavor to reduce expenses to meet the loss in earnings, and the completion of numerous improvements has assisted in reducing the operating cost so that the net earnings still show a slight gain over 1913.

Upon the completion of the new substation now under construction at La Crosse, it is expected to operate the electric railway entirely by water power reinforced when necessary by steam from Winona. This will considerably reduce the operating expenses of the La Crosse street railway system.

During the period ending Sept. 30, 1914, the company accumulated a surplus in its reserves of $5,224, of which $5,034 is in the injuries and damages reserve. New construction and improvements to the street railway property in La Crosse have cost $20,665. The total cost of four new cars in Winona and the change of seven old cars for one-man operator was $11,893. The total cost of all the lands, new construction, equipment, improvements, betterments and rehabilitation was $168,194.33. A portion of this amount was charged directly to operating expenses, a portion to depreciation and rehabilitation and a portion to new construction.

On March 10, 1914, the company began furnishing from Winona power to the Chicago, Milwaukee & St. Paul Railway for operating its automatic block signal system between La Crosse, Wis., and Wabash, Minn., a distance of 60 miles. The cost of putting up the necessary electric feeders to supply the system was $1,695 and the earnings at present on the contract are at the rate of $2,940 per annum.

ELIMINATION OF EXCESS CAPITALIZATION

The Public Service Commission for the Second District of New York has issued an order by which it expects to straighten out the tangled finances of the Buffalo, N. Y., street railway lines which were consolidated into the International Railway. This action was taken just before the final consideration by the commisson of the International Railway's large extension, the high speed line to Niagara Falls. The order lays down the method by which the company is to charge off the remainder of the excess capitalization of $12,000,000 which the commission found in its constituent companies at the time of the consolidation. For some time these companies had been competing in Buffalo and vicinity, and much of the property which had been duplicated for the purposes of this competition was rendered useless by the consolidation, though theretofore it was a legitimate charge for capital in the operating companies. In many cases there were parallel tracks, duplicate carhouses and other equipment.

In the order approving the consolidation the commission provided that this excess amount should be charged off from year to year until at the end of forty years the company would be capitalized at its actual value. The present order, which simply covers the completion of this process, provides that in charging off certain remaining items the company shall follow in determining their value the appraisal of the property made by B. J. Arnold, Chicago, at the time of the consolidation.

MEETING OF HUDSON COMPANIES

At the annual meeting of the Hudson Companies, New York, N. Y., on Jan. 12, John R. Waterbury and Oscar L. Gubelman were elected directors to succeed A. S. Wing and E. W. Taintor. Mr. Taintor, who was displaced by about a vote of 11 to 2, represented the complaining preferred stockholders referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 2.

In his remarks to the stockholders, W. G. Oakman, president, said:

"There have not been any transactions of importance during the year, except the renewal of the mortgage of $6,500,000, due April 23, 1914, upon the property of the Greeley Square Realty Company. In connection with the extension of this mortgage, and in furtherance thereof, the company purchased at par $427,000 of Greeley Square Realty Company first refunding mortgage bonds. The purchase was authorized by the vote of the directors. No director or officer had or has any interest, direct or indirect, in these bonds or the purchase—or any stockholder, so far as known."

After the meeting Mr. Taintor issued a statement criticizing the management of the company. According to a previous circular issued by Mr. Oakman, covering points such as brought up by Mr. Taintor, the company purchased from bankers in January, 1908, following the panic of the previous year, $1,000,000 of Hudson & Manhattan Railroad first mortgage 4½ per cent bonds and $250,000 of its common stock, at par and interest for the bonds, as a part of the consideration for the purchase of the company's $3,000,000 of notes. The need of funds was then urgent and this action was taken in the belief that the securities purchased were worth and would ultimately realize the price paid for them. Furthermore, the cancellation of the agreement by which the railroad company agreed to pay the Hudson Companies certain sums, if earned, by way of interest was necessary as a part of the readjustment of 1913. As the readjustment managers insisted upon the cancellation, a refusal to permit this would have endangered the whole readjustment, the cessation of which would have meant a loss to the preferred stockholders. The questions arising out of the purchase of the bonds and the cancellation of the deferred interest agreement have been submitted to independent counsel with a view to ascertaining whether the

Hudson Companies have any legal grievance. Action on a proposed appropriation of $5,000 for further examination in the company's affairs was postponed until the receipt of information on these two transactions. Thereafter the examination will be completed.

LEGAL STREET RAILWAY BONDS

The Massachusetts Public Service Commission has transmitted to the bank commissioner the list of street railways incorporated in Massachusetts which appear from the returns made by them to have annually earned and properly paid, without impairment of assets or capital stock, an amount in dividends equal to at least 5 per cent on their outstanding capital stock in each of the five preceding years. The companies included in the list follow: Bay State Street Railway, Boston & Revere Electric Railway, East Middlesex Street Railway, Fitchburg & Leominster Street Railway, Holyoke Street Railway, Milford & Uxbridge Street Railway, Nahant & Lynn Street Railway, Springfield Street Railway, Union Street Railway, West End Street Railway, Worcester Consolidated Street Railway. The Milford & Uxbridge Street Railway was added to the list this year.

Ardmore (Okla.) Electric Railway.—John F. Easley, secretary of the Ardmore Electric Railway and editor of the *Ardmorite*, has been appointed receiver of the company.

Brooklyn (N. Y.) Rapid Transit Company.—At the annual meeting of the stockholders of the Brooklyn City Railroad, held on Jan. 12, the retiring directors were elected, with the exception of Edward D. White, who resigned. Mr. White is succeeded by Henry F. Noyes.

California Railway & Power Company, San Francisco, Cal.—The Bankers' Trust Company, New York, as agents for the California Railway & Power Company, on Dec. 31 drew by lot for redemption 1000 shares of this company's prior preference stock.

Central Park, North & East River Railroad, New York, N. Y.—The minority stockholders of the Central Park, North & East River Railroad have won a point in their fight to sue former directors of the old Metropolitan Street Railway system for personal liabilities on account of a decline in the value of property. The United States District Court of Eastern Pennsylvania has overruled the demurrers of the three Philadelphia directors, Thomas Dolan, P. A. B. Widener and George W. Elkins, establishing the plaintiff's claim of the right to sue. The previous course of the court actions on this subject, in both New York and Pennsylvania, may be followed by referring to the ELECTRIC RAILWAY JOURNAL of April 4, 1914, May 16, 1914, and June 27, 1914.

Chicago (Ill.) Railways.—Henry A. Blair, chairman Chicago Railways, has issued a statement to the following effect: "Considering the number of inquiries relative to dividends of series 1 and 2, the directors and finance committee held a meeting and decided that owing to the present financial situation as well as the antagonistic attitude of the city towards the company at the present time, it is advisable to defer declaring any dividends."

Dayton (Ohio) Street Railway.—At the annual meeting of the Dayton Street Railway on Jan. 4 John Schantz was elected a director to succeed E. W. Hanley, resigned. Mr. Hanley relinquished the position of treasurer several months before on account of illness, and P. H. Worman has now been chosen as his successor.

Electrical Securities Corporation, New York, N. Y.—The Guaranty Trust Company, New York, successor as trustee to the Standard Trust Company, is inviting proposals for the sale of as many bonds of the third series of the Electrical Securities Corporation as can be purchased for $74,152.50 and as many bonds of the eighth series as can be purchased for $54,000, at not exceeding 103 and accrued interest in each instance. Sealed proposals will be received at the trustee's office until Jan. 18. All bonds accepted will be paid for on Jan. 20, 1915, upon delivery, interest ceasing after that date.

Fairmount Park Transportation Company, Philadelphia, Pa.—A recent circular issued to the stockholders of the Fairmount Park Transportation Company stated that according to the last annual report the company had a floating debt of $26,403, including $10,000 in loans from stockholders. On April 1 $18,750 of interest will be due on the company's first mortgage bonds, and changes to reduce operating costs will require $10,000, making a total of about $55,000 to be provided by April 1 or possibly $50,000 with increased earnings. On account of this showing it was proposed to the stockholders (a) to raise $50,000 by the issuance of 6 per cent five-year debentures, convertible after two years into 6 per cent preferred stock, par for par, with a 50 per cent preferred stock bonus; (b) to reduce the par value of all capital stock, including the $250,000 of full paid treasury stock, from $50 to $10 per share; (c) to convert the treasury stock thus reduced into 6 per cent cumulative preferred stock and to increase the amount of the latter to $100,000, $75,000 to be reserved for retiring the debentures and $25,000 for future financing; and (d) to allow stockholders to subscribe for the $50,000 of debentures on the basis of one $100 debenture for every seventy shares of reduced stock. In order to make this reorganization effective, 85 per cent of the debentures must be subscribed for. Up to Jan. 5 the holders of $1,153,650 of the $2,000,000 of capital stock had deposited their holdings with the Fidelity Trust Company, Philadelphia, and subscribed to their pro rata share of the debentures.

Federal Light & Traction Company, New York, N. Y.—Guy P. Gannett, vice-president of the Augusta Trust Company, has been elected a director of the Federal Light & Traction Company.

Hanover & McSherrystown Street Railway, Hanover, Pa.—At the annual meeting of the Hanover & McSherrystown Street Railway on Jan. 11 B. W. Frazier, H. F. Hansell and John E. Zimmerman were elected directors to succeed J. W. Steacy, F. G. Metzger and G. W. Bell.

Interborough-Metropolitan Company, New York, N. Y.—The Interborough-Metropolitan Company has made a new deed of trust to the Bankers Trust Company, New York, as trustee, to secure an issue of $3,000,000 of ten-year 6 per cent collateral trust gold notes, the authorization of which was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2. The proceeds of this issue are to be used for the retirement and payment of the remainder of the company's $4,000,000 of 6 per cent notes due on July 1, 1915. An amount of $1,000,000 was taken up on Jan. 1, 1915, and the remaining notes have already been exchanged for the new notes. The new notes are dated Jan. 1, 1915, and due on Jan. 1, 1925, but subject to call for redemption or purchase for the sinking fund at par on any interest date on thirty days' notice. They are supported by a sinking fund of $300,000 yearly, beginning on Nov. 1, 1915, and are secured by pledge of $15,270,100 of the $17,495,060 of capital stock of the New York Railways.

Lehigh Valley Transit Company, Allentown, Pa.—At the recent annual meeting of the Lehigh Valley Transit Company, H. J. Steele of Easton was added to the directorate to represent Easton interests, in view of the removal of President Fehr from that city to Allentown.

Ogden, Logan & Idaho Railroad, Ogden, Utah.—It is reported that the Ogden, Logan & Idaho Railroad, which was formed last October by the consolidation of the Ogden Rapid Transit Company and the Logan Transit Company with a capitalization of $5,000,000, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 31, 1914, will soon hold a meeting to authorize a $10,000,000 mortgage. The company at the time of consolidation announced that it planned the construction of 71 miles of extensions, including lines to Preston, Idaho, and Huntsville, Utah, and an extension of the Brigham City line to Logan. The new bond issue will be for financing these extensions and other improvements.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has filed an application with the California Railroad Commission for authority to issue $4,000,000 of 5 per cent one-year gold notes to be dated Dec. 15, 1914, and to be used in refunding $4,000,000 of its 5 per cent one-year gold notes dated March 25, 1914. The company proposes to issue these notes at not less than 98 and to pledge as security for their payment $5,000,000 of its convertible general lien bonds and $5,000,000 of its general and refunding mortgage gold bonds. The company has also filed a supplemental application with the commission for authority to sell its general and refunding mortgage gold bonds at not less than 85. The commission last July authorized the company to issue $5,000,000 of these bonds on the condition that it should later secure from the commission a supplemental order specifying the minimum price at which they were to be sold.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—John Nickerson, Jr., New York and St. Louis, and Baker, Ayling & Company, Boston, are offering the remainder of the $500,000 first mortgage 6 per cent bond issue of the Portsmouth Street Railway & Light Company at 101 and interest to yield about 6 per cent. More than $400,000 of these bonds has already been sold. The bonds are dated July 1, 1914, and are due in annual serial instalments of $25,000 at 100 and interest from 1918 to 1920, inclusive, and at 101 and interest from 1921 to 1935, inclusive. In 1935 the amount to be retired is $75,000. The bonds are callable at 102½ and interest on any interest date. This company furnishes electric light and power to Portsmouth and New Boston and electric railway service to these two towns and to Sciotoville. It has 14 miles of track and equipment of twenty-six cars, mostly of the "pay-as-you-enter" type.

San Diego Consolidated Gas & Electric Company, San Diego, Cal.—On Jan. 6 the California Railroad Commission rendered a decision authorizing the San Diego Consolidated Gas & Electric Company to renew three promissory notes totaling $55,000, held by H. M. Byllesby & Company and bearing interest at the rate of 7 per cent per annum.

United Railroads, San Francisco, Cal.—Jesse W. Lilienthal, president United Railroads of San Francisco, and the creditors of the Solano Irrigated Farms project have under consideration a plan of rehabilitation for the latter which it is believed will result in saving the investment of the railway and other stockholders therein. It is understood that the United Railways Investment Company, which controls the United Railroads of San Francisco, will not be financially interested as a company in any rehabilitation proceedings that materialize.

Southern Traction Company of Illinois, East St. Louis, Ill.—A hearing for creditors' claims against the Southern Traction Company of Illinois will be heard in Chicago on Feb. 8, 1915. This was announced by Walter Lindley, special referee in bankruptcy, at the conclusion of a similar session at East St. Louis, Ill., on Jan. 5, 1915.

United Traction Company, Pittsburgh, Pa.—A conference was held on Jan. 7 between James B. Callery, president United Traction Company of Pittsburgh, and the committee representing holders of the company's preferred stock. This committee, composed of Henry G. Bringle, Philadelphia Trust Company; Arthur V. Morton, Pennsylvania Company; J. C. Neff, Fidelity Trust Company, and C. M. Wood, Wood Estate, was appointed, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9, to take action regarding the anticipated passing or payment in scrip of the semi-annual 2½ per cent cumulative preferred dividend usually paid on Jan. 1. After the conference it was announced that a proposition of half of the preferred stockholders would be submitted by Mr. Callery to the board of directors when it meets in New York.

Virginia Railway & Power Company, Richmond, Va.—The Philadelphia Stock Exchange has listed an additional $240,000 of the first and refunding mortgage 5 per cent bonds of Virginia Railway & Power Company, thus making a total of $12,253,000.

Winnipeg (Man.) Electric Railway.—William A. Reid & Company, New York, and the Dominion Securities Corporation have sold all of an authorized issue of $1,500,000 of 6 per cent one and two-year gold notes of the Winnipeg Electric Railway, recently offered at 100¼ for the first class and at par for the second. These notes are dated Jan. 15, 1915, and are due half on Jan. 15, 1916, and half on Jan. 15, 1917. They are redeemable at 102½ per cent and interest at any interest date on notice. The company owns 100 miles of electric railway in Winnipeg and controls 165 miles in all, besides doing a local gas, electric light and power business.

DIVIDENDS DECLARED

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred.

Greene & Coates Streets Railroad, Philadelphia, Pa., quarterly, $1.50.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1¾ per cent, common, payable in scrip.

Public Service Investment Company, Boston, Mass., $1.50, preferred; $2, common.

Tampa (Fla.) Electric Company, quarterly, $2.50.

Toronto (Ont.) Railway, quarterly, 2 per cent.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
1m., Nov.,	'14	$160,928	*$105,053	$55,875	$42,576	$13,299
1 " "	'13	171,074	*112,725	58,349	37,495	20,854
5 " "	'14	944,718	*583,628	361,080	215,883	145,197
5 " "	'13	968,233	*581,350	386,883	186,844	200,039
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.						
1m., Nov.,	'14	$72,156	*$64,896	$7,260	$17,315	†$10,055
1 " "	'13	76,365	*73,271	3,094	15,344	†12,250
5 " "	'14	448,206	*399,892	48,315	85,922	†37,607
5 " "	'13	465,957	*379,701	86,255	75,358	10,897
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.						
1m., Nov.,	'14	$30,998	*$17,689	$13,389	$10,880	$2,509
1 " "	'13	30,188	*18,017	12,171	10,483	1,689
11 " "	'14	395,802	*213,327	182,574	120,887	61,683
11 " "	'13	392,398	*212,250	180,148	114,683	65,465
CONNECTICUT COMPANY, NEW HAVEN, CONN.						
1m., Nov.,	'14	$623,592	*$474,675	$148,916	$98,386	$50,530
1 " "	'13	645,252	*550,349	94,903	88,371	6,532
5 " "	'14	3,670,039	*2,650,636	1,019,404	492,245	527,159
5 " "	'13	3,760,009	*2,640,578	1,119,430	448,779	670,651
MEXICO (MEX.) TRAMWAYS						
1m., Nov.,	'14	$320,693	$213,495	$107,198	......	......
1 " "	'13	301,523	140,208	161,311	......	......
11 " "	'14	3,156,226	1,467,841	1,685,386	......	......
11 " "	'13	3,344,925	1,754,757	1,590,167	......	......
NEW YORK (N. Y.) RAILWAYS						
1m., Nov.,	'14	$1,095,043	*$681,081	$413,962	$366,614	$47,348
1 " "	'13	1,175,107	*715,879	859,228	371,683	87,545
5 " "	'14	5,864,073	*3,553,255	2,310,818	1,838,735	472,083
5 " "	'13	6,136,310	*3,687,939	2,448,371	2,176,722	271,599
NEW YORK & STAMFORD RAILWAY, NEW YORK, N. Y.						
1m., Nov.,	'14	$24,005	*$22,692	$1,312	$7,876	†$6,564
1 " "	'13	24,344	*16,926	7,419	7,626	†207
5 " "	'14	190,596	*138,334	52,261	39,379	†12,882
5 " "	'13	185,514	*131,835	53,679	38,367	†15,312
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.						
1m., Nov.,	'14	$37,939	*$44,602	$6,683	$6,313	†$12,996
1 " "	'13	34,226	*54,336	20,110	5,576	25,686
5 " "	'14	187,739	*215,734	27,995	30,008	†58,003
5 " "	'13	173,186	*248,301	75,116	26,574	101,690
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.						
1m., Nov.,	'14	$286,732	*$186,009	$100,724	$50,261	$50,453
1 " "	'13	265,099	*184,001	81,095	49,373	31,722
11 " "	'14	3,319,704	*2,040,014	1,279,691	556,365	723,326
11 " "	'13	2,989,155	*1,829,359	1,159,797	511,533	648,264
RHODE ISLAND COMPANY, PROVIDENCE, R. I.						
1m., Nov.,	'14	$398,705	*$343,126	$55,579	$117,300	$61,721
1 " "	'13	413,312	*319,898	93,415	109,223	15,808
5 " "	'14	2,412,872	*1,724,294	688,577	591,800	96,777
5 " "	'13	2,470,001	*1,693,502	776,499	530,879	245,620
WESTCHESTER STREET RAILWAY WHITE PLAINS, N. Y.						
1m., Nov.,	'14	$19,769	*$21,686	$1,917	$1,315	†$3,232
1 " "	'13	19,673	*21,209	1,536	1,118	†2,658
5 " "	'14	123,452	*116,640	6,812	6,225	587
5 " "	'13	117,809	*108,312	9,497	5,280	4,217

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*Includes taxes. †Deficit.

Traffic and Transportation

THE "JITNEY" BUS

Hearing on Bus Regulations in Los Angeles—San Diego Company Outlines Its Position

Scenes of disorder were narrowly averted at the hearing held at the City Hall in Los Angeles, Cal., on Jan. 4 by the public utilities committee of the City Council to consider the proposed legislation to govern the operation of the "jitney" bus traffic in that city. The crowd in attendance overflowed into the corridors and the anterooms. So wide was the divergence of opinion that measures had to be taken to preserve order. The demand for regulation was presented in petitions from the Merchants' & Manufacturers' Association, the Realty Board, the Chamber of Commerce and from prominent merchants, bankers and citizens. Herbert J. Goudge spoke for the Chamber of Commerce. The views which he expressed were upheld by Percy H. Clark for the Realty Board. Two street railway trainmen pleaded for such regulations as would protect the 4500 employees of the railway companies and prevent them from being thrown out of employment.

The gist of the appeals of the representatives of the bus owners was that the Council should provide for loading zones in the downtown districts and traffic rules that would prevent undue congestion on the street. They favored only a moderate indemnity bond being exacted from each bus owner to guarantee compensation to persons injured by the buses. Councilman Roberts, chairman of the committee, announced at the conclusion of the hearing that the committee would take all of the suggestions offered and consult with the city attorney relative to drafting an ordinance covering the situation.

W. Clayton, vice-president and managing director of the San Diego (Cal.) Electric Railway, has addressed to the Council of that city a communication in which he outlined the position of the company with regard to the "jitney" bus in part as follows:

"The San Diego Electric Railway has made no complaint to the Council in relation to the 'jitney' bus. All that we desire to do is to state the effect the continued operation of the 'jitney' bus, if not regulated, will have upon the affairs of the company, and incidentally upon the growth and prosperity of the city.

"The company stands in a peculiarly unsatisfactory position in regard to this 'jitney' bus competition. As far as we can learn there are probably 125 buses operating in the city daily—some all the time, and some for only short periods during the time of heavy travel. All kinds of people are running buses.

"The money we are losing to the 'jitney' bus amounts to interest on more than $2,000,000, and the company is crippled to that extent at least in its policies for extensions and car service. The company pays into the city treasury 2 per cent of its gross receipts, and into the State 4¾ per cent of its gross receipts. What we and other corporations pay into the State relieves the citizens of San Diego of paying State taxes. All the taxes for running the State are for the most part collected from railroads, street railways, power and light companies, etc.

"In addition, the total amount of money expended on street paving during the last three years and ten months was $361,985, or practically 11 per cent of our gross receipts. Now the bus does not pay anything beyond a tax on the automobile and a small license tax to the city, so the city loses 2 per cent on gross receipts otherwise collected by the railway company. The State is also losing 4¾ per cent of the gross receipts because the 'jitney' bus pays no proportion of its gross receipts either to the city or to the State. The bus has no paving to maintain.

"Our greatest objection to the 'jitney' bus is that it operates over streets on which we already have franchises, running a little ahead of the street car and sniping the passengers. With very few exceptions, you do not find buses operating on streets where there is no street car line.

"We are unable to make any further improvements or to complete the improvements we have already commenced, solely for the reason that the competition of the bus has so reduced our receipts that we must conserve every dollar to enable us to pay interest on the investment we already have. We cannot make any further investment until such time as we know exactly how far the bus can reduce our income.

"The San Diego Electric Railway never has paid more than a reasonable rate of interest on the investment. In all its history, it has been conducted along the same lines upon which the Railroad Commission now demands all public utilities shall be conducted. When we went before the Railroad Commission quite recently for the purpose of obtaining an issue of bonds, Max Thelen, who tried the case, remarked from the bench that we were the cleanest corporation financially the commission had yet had before it.

"We have been asked a number of times to make some suggestions to your honorable body as to what should be done about the 'jitney' bus, but that is the one thing we wish to avoid. We have stated the company's case against the bus, and now leave the whole matter without prejudice in the hands of the Council and the citizens of San Diego and prefer that whatever action the Council may take shall be based on suggestions from parties not directly interested in the street railway business."

For the ten days ended Jan. 7 not less than fifty automobile owners applied to the city clerk of Seattle, Wash., for permits to operate "jitney" buses within the city limits. A fee of $4 per year for license to operate is charged by the city. Councilman Hesketh has had a bill passed to regulate those who drive automobiles for hire, which includes drivers of "jitney" buses. This bill requires that drivers shall be twenty-one years of age or more; that they shall submit to a physical examination to prove their ability to handle a car, and that sworn testimonials of at least two citizens shall be filed with the city before obtaining a license. Every applicant must submit two photographs of himself. One is filed in the comptroller's office and the second is attached to the license, which must be shown on request of the public authorities.

ALBANY SERVICE ORDER CONTEST

Long Statement by President Sims Indicating Appeal from Commission Service Order

The United Traction Company, Albany, N. Y., filed with the Public Service Commission of the Second District of New York on Jan. 8 a letter indicating that formal application will be made for a rehearing on the order of the commission regarding service, referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 19. The letter from Clifford S. Sims, vice-president, discusses in much detail the orders of the commission and, submitting a lengthy financial history and analysis of the affairs of the United Traction Company, says the performance of some of the commission's orders would threaten the company with bankruptcy. In connection with the schedule requirements of the commission's order, Mr. Sims says that in view of the steadily declining revenue and increasing operating expenses of the company, the officers are firmly convinced that a readjustment of the schedules on all of the lines of the company is essential to its successful life. Mr. Sims asks that the electrical expert and statistician of the commission make a thorough inspection and analysis of the car schedules of the entire system, to the end that "all our lines may return to us a rate of income above operating expenses more nearly in accord with such averages as are shown by car lines in cities whose population and general surrounding conditions approximately conform to those of the communities which we serve." He enclosed a copy of a letter to the commission, containing an elaborate analysis of the company's operating returns and comparing it with that in other cities.

Reviewing the financial history of the United Traction Company Mr. Sims submits figures to show that a total of $1,994,287 has been expended or must be expended for additions and betterments from Jan. 1, 1907, to Nov. 30, 1915. This includes new lines and extensions, improvements to roadway and track paving, bridges, signal apparatus, distribution system and power plant equipment and cars and equipment. Mr. Sims' comment is that much of this new capital investment not only creates no new revenue, but actually involves further operating expense "to provide additional comfort for existing traffic." The figures indicate that though the passenger revenue per car-mile has increased from 23 cents to 26 cents, operating expenses per car-mile, including taxes, have increased from 14.99 cents to 20.47 cents. Mr. Sims says that this reduction of the difference between passenger car-mile revenue and expense from 8.01 cents to 5.53 cents is due to the fact that the company cannot collect any more than 5 cents for fare, and that the westward movement of the city's population added greatly to the length of haul per passenger. He sees no way for relief from this condition except by the addition of a reasonable charge for transfers or by more efficient use of equipment only to be attained by an increase in the speed of cars beyond the present limit fixed by municipal ordinance. He also refers to the fact that the reduction of the fare to Rensselaer by the commission has cost the company $21,000 a year and that the sale of school tickets has meant an approximate loss in revenue of $4,300.

The increased pay of the men, Mr. Sims says, has increased the cost of service $243,700, with no corresponding increase in revenue, pointing to the fact that the last increase is counted as effective during only a part of 1914. Taxes have increased from $88,500 in 1906 to $222,600 in 1914. His figures show that the cost of road and equipment was $10,202,082 on Jan. 1, 1907, and $11,990,059 on Nov. 30, 1914, or an increase of $1,787,977. The changes in the other figures of revenue and expenses during this period Mr. Sims shows to be as follows: Increase in gross revenue, $600,000, 10 per cent; increase in operating expenses, $700,000, 18 per cent; decrease in net earnings from operation, $77,000, 10 per cent; increase in taxes, $134,000, 151 per cent.

Mr. Sims says that these figures show that with an actual increase of cash expended for road and equipment of $1,787,977, there was a decrease of about $211,000 in the operating income available for interest and dividend. This represents a return of only 3.87 per cent on the cost of road and equipment, or even less than that on the total capital sum devoted to the service of the public. Mr. Sims estimates that the total cost of carrying out the provisions of the commission's last order will be $900,270. There is to be added to this $206,310, the cost of work now under way, mostly pursuant to orders of the commission, making a total of $1,106,580, which the company must borrow.

Mr. Sims does not know how this additional sum can be secured, in view of the fact that all the bonds under the present mortgages of the company authorized have been sold. It would be impossible for the company to borrow this money without security. In view of the fact that the consolidated mortgage bonds are now quoted at but 89½ bid, 90 asked, and in view of the present condition of the security market, due to the European war, there is no demand for the best railroad securities. Hence the company could not hope to finance an issue of bonds with a lien junior to that of its present issues, the reduction of the company's dividend rate from 4 per cent to 2 per cent having placed its bonds out of the class legally available for savings banks and trust estate investment.

CHICAGO SERVICE QUESTIONS

The Better Public Service Association has been formed by some of the members of the Cook County real estate board. This organization plans to take up service questions in Chicago before the State Public Utilities Commission. In order to harmonize the differences regarding questions of service between the city administration, the railway companies and the Board of Supervising Engineers, Bion J. Arnold, chairman of the board, arranged for a meeting of the chairman of the local transportation committee, the commissioner of public service, the city traction supervisor and L. A. Busby, president of the Chicago Surface Lines. At this conference various service standards were discussed but no definite action was taken. In connection with a service standard the local transportation committee of the Council now has in its hands a draft of an ordinance providing for a seat per passenger during any fifteen-minute period outside of the rush hours, which include the time between 6:30 and 9 a.m. and between 4:30 and 7 p.m. on each week day. Exceptions to the terms of this ordinance, however, state that they do not apply where natural or physical causes prohibit, or where the full track capacity is being utilized. Track is considered as used to full capacity when the headway is twenty-five seconds or less.

WASHINGTON PROFIT-SHARING CHECKS

Full Text of Letter of President King Transmitting 1914 Profit-Sharing Checks—Provision for Faithful Hereafter

The maximum profit-sharing checks of the Washington Railway & Electric Company, Washington, D. C., for 1914, were for $21.17 each. The letter transmitting the checks, addressed on Jan. 2 to conductors, motormen, depot clerks and starters by C. P. King, president of the company, was as follows:

"Herewith you will find check representing your portion of the 1914 profit-sharing fund.

"A year ago, when I had the pleasure of sending profit-sharing checks for 1913, each man one year or more in the service received $42.53; the previous year the sum was $28.72. In my letter accompanying the checks I spoke a word in regard to 1914, as follows: 'Now as to 1914. You want your profit-sharing fund to be larger. So do I. Let me suggest a watchword for the year, "Safety First," "Eternal vigilance is the price of safety" and its reward shows directly in the profit-sharing fund.'

"As I wrote those words I little thought they were to prove a bad omen for the new year. Instead of expenditures for accidents and damages being less, they are largely increased. From the list of settlements I select three, for example: On March 6, 1914, one for $7,500; May 9 another for $5,000 and Nov. 28 one for $10,063. These three accidents alone have diminished your profit-sharing check $30.76. There are many others—more, in fact, than ever before.

"In the same letter I said, 'Watch your fares,' and pointed out that an extra nickel collected each round trip would increase your profit-sharing check by $21. Did this thought strike home and develop activity advantageous to both of us? On the contrary, abundant evidence is before me of carelessness in the handling of fares.

"In some degree a smaller profit-sharing fund is accounted for by diminished passenger receipts. This is not surprising when it is remembered that the Inauguration largely increased the earnings, and contributed to the fund of 1913. But this is not the point, and its bearing upon the situation is slight. Again, it may be said that we have had an 'off year,' 'hard times,' 'business depression,' etc. Making full allowance for this, my point is that the traffic increase in Washington during the year 1914 (giving due consideration to Inauguration) is not reflected in our passenger earnings. Irresistibly the conclusion is forced upon me that general co-operation has been lacking. Some men have given it with complete fidelity, and we honor them for it, but others have been careless and indifferent. Both classes suffer, for under our profit-sharing plan as operated during 1912-1913-1914 no satisfactory way was found to discriminate between the man who was efficient and the one who was not. However, a plan has been adopted for 1915 which will give recognition to the faithful ones, both by marking them for preferment and increasing their share in the profits.

The figures for 1914 are as follows:

Gross passenger receipts, less District of Columbia tax of 4 per cent		$2,645,139
26 per cent appropriated for trainmen's wages and accidents		687,736
Accidents and damages	$114,495	
Disbursed for wages	557,714	
		672,209
Profit-Sharing Fund		$15,527

"This amount is now being distributed among 817 men, as follows:

667	men in service one year or more, each	$21.17	$14,120.39
17	men in service 11 months, each	19.39	329.63
9	men in service 10 months, each	17.64	158.76
12	men in service 9 months, each	15.88	190.56
12	men in service 8 months, each	14.12	169.44
3	men in service 7 months, each	12.33	36.99
22	men in service 6 months, each	10.57	232.54
5	men in service 5 months, each	8.81	44.05
14	men in service 4 months, each	7.05	98.70
10	men in service 3 months, each	5.28	52.80
7	men in service 2 months, each	3.52	24.64
39	men in service 1 month, each	1.76	68.64
817			$15,527.14

"I send you greetings for 1915. I am not satisfied with 1914. I know that with hearty co-operation far better results can be achieved during the new year. This is my hope, and I do not hesitate to say that if you transportation men will measure up to a standard easy of accomplishment, your profit-sharing check for 1915 will surprise you."

PASSES DISCONTINUED IN ATLANTA

The issuance of pass books to officers, employees and others was discontinued by the Georgia Railway & Power Company, Atlanta, Ga., on Jan. 1. The new order does not, however, affect persons whose uniforms have hitherto entitled them to ride, this exemption embracing city policemen, firemen, sanitary inspectors, other public employees in uniform and uniformed employees of the company. It does, however, affect "plain clothes" policemen. Their fare must be paid hereafter by themselves or the city. Except officers and employees of the company not in uniform they are the only ones included in the withdrawal. No other persons received pass books. The company will refund the fares of all employees traveling in the interest of the company. The fares of United States mail carriers are paid in a lump sum under annual contract by the federal government; and when the carriers are not in uniform they will pay cash. City policemen and firemen, and other uniformed public employees, are carried without charge. There is no contract requiring this, but the courtesy was validated several months ago by the Legislature.

For more than twenty years the officers and the employees of the company have ridden free almost as a matter of course. Then came the days of the anti-pass laws, and city officials, newspaper men and all others who had ridden without charge until that time were set upon their own resources as to fare. Some time ago the company drew a distinction among its own non-uniformed employees. Ticket books of a certain color, not renewable before a certain date after issue, were distributed among the office workers, the theory being that they would ride to and from home a certain number of times per month but would not travel for the company upon business. Ticket books of another color were issued to others connected with the company whose duties might require them to ride often on the company's affairs. These latter books were renewable at any time. Investigation in behalf of the board of directors at the end of 1914 developed that the pass books issued during the year had attained an astonishing value figure. Thereupon the practice was ended, the directors surrendering their own passes by their own action.

POLICE RESPONSIBLE

Mr. Whitridge, Hinting at Police Ingratitude, Offers Cash for Blockade Photos

F. W. Whitridge, president of the Third Avenue Railway, New York, N. Y., on Jan. 13 prepared a notice to the public to be posted in all cars of lines under his control. The notice reads:

"It is well known that whenever there is a snowstorm in this town the service of the surface street railroads deteriorates, and it is apparently impossible to run the cars on any schedule at all. This is because the tracks are used by every sort of vehicle to the exclusion of the cars, and in most cases quite unnecessarily. The city authorities, through the police, are mainly responsible for this condition and for the inconvenience to which the public is subjected. The Police Department demands from the companies hundreds of free passes, and from mere gratitude it should give more protection to our tracks than we now receive.

"In the hope of attracting their attention to the annoyances which their inattention causes the public, the Third Avenue Railway desires to collect photographs of the way in which vehicles are allowed to impede the traffic, and to this end it will pay $10 for each of the best photographs and $5 for each of the next best photographs after the next considerable snowstorm showing how its cars are blocked by trucks, omnibuses, motors and other vehicles. These photographs are to be sent to the office of the company, Third Avenue and 130th Street, each bearing the name and address of the photographer and the place and exact time when the photograph was taken."

NEW COMPANY PUBLICATION

The Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has begun the publication of *Em-an-Ess Electric News* monthly "to promote the safety of employees and patrons, to encourage courtesy toward the public and to increase efficiency in serving the people through a spirit of common helpfulness." The paper is 6 in. wide by 9 in. long and the first issue, dated December, 1914, contained twenty-four pages and cover. The paper is to be compiled by employees under the editorial direction of the department of public relations, which is in charge of Frank Wirt, and it is to be distributed free to all persons employed by the company. In its editorial introduction the company said in part:

"The *Em-an-Ess Electric News* herewith makes its bow. Of course a foreword, a bit of explanation, therefore, is in order. The *Em-an-Ess Electric News* is intended solely to be a little magazine and newspaper for employees of the Mahoning & Shenango Railway & Light Company and its affiliated companies, a publication that will occasionally edify and always entertain every man and woman connected with the company in any capacity.

"It will appear monthly, coming from the press about the first of the month. It will be a common meeting ground for all departments, railway, electric and gas. In its columns we hope for a free exchange of views, so that the trainman may become better acquainted with the lineman, the trackman with the power-house man, the active outside worker with the man in the office, and so on all along the line of diversified employment that goes to make up the Em-an-Ess System.

"We all are, as it were, members of one large commercial family, and it is well for members of a family to be acquainted. Then in introducing itself with this issue the *News* cannot better express the purpose of its being than to say it hopes, as time passes, to make all of us better acquainted with one another so that we may share the joys and problems of living."

HEARINGS ON BROOKLYN SERVICE

Hearings are being held by the Public Service Commission of the First District of New York to determine the advisability of operating more cars over the Brooklyn Rapid Transit surface and elevated lines, as recommended by Joseph Johnson, chief of the commission's transit bureau, based upon the results of his recent investigation into the company's service. The company is represented at the hearings by D. A. Marsh and C. L. Woody, attorneys, and S. W. Huff, vice-president.

At the hearing on Jan. 7 Mr. Johnson was questioned by the company's attorneys as to his technical qualifications for conducting an accurate expert investigation. Mr. Johnson said that he based his recommendation for a 10 per cent increased operation in the number of cars upon the results of reports submitted by competent inspectors who had completed civil service examinations. He contended that the company was operating fewer cars over the Brooklyn bridge than a month ago before the question was brought up. The railway contended that Mr. Johnson had neglected to consider the serious effects of the much lowered scheduled speed which would be occasioned by the operation of more cars.

On Jan. 9 Mr. Johnson suggested that moving pictures be taken to supplement his report on the overcrowded conditions of the surface cars. At this and at a subsequent hearing on Jan. 13 John Weigel, chief of the time-table bureau of the company, was the principal witness. Mr. Weigel said that just as the early operation of the present Atlantic Avenue subway had very materially reduced the traffic over parallel surface lines, express train operation following third tracking of the elevated system and the new Fourth Avenue subway trains would reduce the number of cars necessary for adequate surface transit. The railway company complained that the delay of the commission in approving the new subway contracts had retarded the relief of the surface cars congestion. For this reason no provision had been made for the purchase of new cars. Commissioner Williams ascribed the delay in this work to failure promptly to receive the approval of the abutting property owners. The rehearing was to continue on Jan. 15.

INCREASE IN WAGES IN LITTLE ROCK

The Little Rock Railway & Electric Company, Little Rock, Ark., has announced an increase in the wages of its trainmen. C. J. Griffith, general manager of the company, issued a statement in part as follows in regard to the increase:

"The action taken by the directors is the result of plans which we have had in mind for some time. The bonus system is a feature which we long have contemplated and which has been made possible by the co-operation of our men in the matter of reducing accidents.

"During the early part of 1914, in a conference with our employees, I told them that I believed the Little Rock Railway & Electric Company would inaugurate a system of bonuses from the money saved to the company through the lessening of damage claims. The directors have approved that plan and have gone even further, in agreeing to distribute virtually every cent saved to the company, the distribution to be shared in by the employees.

"The safety campaign which we have been rigidly pursuing has proved its value in the highest degree. We reduced the number of accidents in 1914 more than 12 per cent over the number in 1913, and with the continual improvement of our safety system we believe the number will be lowered further in 1915. The company saved approximately $7500 last year as a result of decreased number of casualties. This is the sum we are willing to turn back to our employees in 1915.

"The increase in wages granted to our motormen and conductors was recommended because an increase has not been given them since Jan. 1, 1911. The increase is 1 cent an hour. This will give us a maximum wage of 26 cents, which is the highest paid by any company operating in a city of this size in the United States."

The new scale went into effect on Jan. 1.

Increase in Fare Contemplated.—The St. Louis (Mo.) Electric Terminal Railway, one of the properties of the Illinois Traction System, is preparing to apply to the Missouri Utilities Commission for permission to increase its fare from 5 cents to 10 cents between St. Louis and Granite City, a distance of approximately 6 miles. A valuation of the property is now being made.

Montreal "Safety First" League.—A "safety first" league, composed of the public utility corporations, is being formed in Montreal, Que. The Bell Telephone Company, Montreal Tramways, Canadian Pacific Railway, Telegraph Department, Great North Western Telegraph Company, Westmount Corporation Light & Heat Department, Montreal Public Service Corporation and Montreal Light, Heat & Power Company will probably enter the league.

Lady Conductors in Jacksonville.—Cars of the Jacksonville Railway & Light Company, Jacksonville, Ill., which is included in the Illinois Traction System, recently carried lady conductors in addition to the regular conductors and the money collected by them in excess of the regular fare was turned over by the company to the Associated Charities of the city. This courtesy to the ladies was arranged through W. B. Miser, general superintendent of the Illinois Traction System at Jacksonville.

Appeal Taken from Fare Decision.—The receivers of the Interurban Railway & Terminal Company, Cincinnati, Ohio, have appealed to the Ohio Supreme Court from a decision of the Circuit Court of Hamilton County. This decision held that the railway must charge only a 5-cent fare between Pleasant Ridge, a suburb of Cincinnati, and the business section of the city. The importance of this fare reduction in the matter of the receivership of the company was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 10, 1914.

Fixed Stops in Winnipeg.—Judge H. A. Robson, the public utilities commissioner of Winnipeg, Man., is considering the advisability of requiring the Winnipeg Electric Railway to make certain changes in its operating schedule. Among the suggestions are the location of stopping places at standard distances of 500 ft. apart, irrespective of whether these points are at street corners or not; loop tracks at vantage points all over the city or stations to hold emergency cars for use in maintaining the schedule where the regular cars are delayed. It is also suggested that a signal system be installed so that the police who are regulating the traffic may be in constant communication with one another and so minimize delays.

New Augusta-Aiken Fares in Future.—R. W. Spofford, general superintendent of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., made the following announcement recently in regard to putting into effect the new fares allowed by the Railroad Commission of South Carolina: "Recognizing the general financial conditions of this section it has been decided that the new rate of fares shall not go into effect until some future time. I wish to correct the impression that this increase in rate will amount to 100 per cent. In the first place, the through rate to Aiken will not be more than 40 cents and some of the rates for some of the present zones will not be increased at all. Our regular patrons will be taken care of by some form of commutation ticket which will be sold at a very small increase over the present rate, and I can assure the people of Belvedere and vicinity that there will be no increase for school children coming to North Augusta. It is my intention to publish in the newspapers and post in the various stations along our lines a map showing the new system of zones and fares with a full explanation of same, so that our patrons may become familiar with them when the new system is put into effect."

Change in Fares on New York State Line.—The Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has filed a new tariff with the Public Service Commission of the Second District of New York effective on Feb. 1, 1915. Local round-trip fares are to be advanced 5 cents between Gloversville and Fort Johnson, 10 cents between Gloversville and Amsterdam, Cranesville, Hoffmans and Schenectady, and 5 cents between Johnstown and Fort Johnson, Amsterdam, Cranesville, Hoffmans and Schenectady. The fare for fifty-four-trip commutation ticket between Amsterdam and Schenectady will be advanced from $8 to $8.50. Ticket books containing sixteen coupons, each good for passage in either direction between Johnstown and Gloversville (except on limited cars) between the hours of 6 and 7:45 a. m. and 5 and 6:20 p. m. (except on Sundays), and between 12 noon and 1 p. m. Saturdays, will be sold at $1 per book. The sale of twenty-coupon workmen's tickets between Gloversville and Johnstown at $1 will be discontinued. The fare of $1 for ticket book containing twenty-four coupons each good for a 5-cent ride in Gloversville and Johnstown, or between these stations, will be canceled and the sale of such tickets discontinued. The fare of $1 for ticket book containing twenty-four coupons, each good for a 5-cent ride within the corporate limits of Amsterdam, is to be canceled by the company and the sale of such tickets discontinued.

Change in Fare on Maine Road.—The new passenger tariff of the Atlantic Shore Electric Railway, Sanford, Maine, to go into effect on Feb. 1, has been made public. Among the most radical changes made from the old tariff are the cancellation of all reduced rates now in force, including commutation tickets, strings of five coupons, workmen's tickets and juvenile tickets, the extension of 6-cent cash fare zones and the limitation of tickets to not less than nine coupons to the strip, to be sold for 50 cents per strip. The new ticket rate of nine coupons for 50 cents will be an advance of five-ninths of 1 cent on each fare over the present rate of five coupons for a quarter, and an advance of 1 1/5 cents for each fare over the present workman's limited ticket rate. The cash fare will be 6 cents, the same as at present, with the exception of extension of certain fare zones all along the line, where transfers will be issued. The following paragraphs relating to baggage are from the new tariff: "No piece of baggage will be accepted for transportation which is too large to be put upon the front platform of car, or is too heavy to be handled by car crew. Large baby carriages and bicycles will not be accepted for transportation. No baggage in bad order, or too fragile to withstand ordinary handling, will be accepted for transportation, except at risk of owner. No baggage will be transported unless identified by the owner, and the Atlantic Shore Electric Railway does not guarantee to forward baggage on same car with the owner, but will do as the exigencies of each case may require."

Personal Mention

Mr. H. T. Jones, heretofore acting general superintendent of the United Railroads, San Francisco, Cal., has been appointed general superintendent of the company.

Mr. Thomas H. Mather, formerly chief engineer of the Empire United Railways, Syracuse, N. Y., has been appointed commissioner of public works of Syracuse.

Mr. W. A. Steckel, formerly roadmaster of the Empire United Railways, Syracuse, N. Y., has been appointed first deputy commissioner of public works of Syracuse.

Mr. Nathan Anthony, Boston, Mass., has been elected president of the Hartford & Springfield Street Railway, Warehouse Point, Conn., to succeed Mr. W. A. Tucker.

Mr. George S. West, Boston, Mass., has been elected secretary of the Hartford & Springfield Street Railway, Warehouse Point, Conn., to succeed Mr. Arthur Perkins.

Mr. O. G. Talmadge, heretofore connected with the Chicago (Ill.) Surface Lines, has been elected president and a director of the Chicago & Interurban Traction Company, succeeding Mr. John L. Matson, deceased.

Mr. H. M. Hagerman, Bangor, Pa., has been appointed general counsel of the State Belt Electric Street Railway to fill the vacancy created by the resignation of Mr. J. Davis Brodhead, who has been appointed judge of the Northampton County Court.

Mr. Charles Harris, who has been superintendent of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, has been elected president of the company to succeed Mr. C. H. Kroger, who has disposed of his interest in the company.

Mr. S. H. Russ, who has been assistant secretary and assistant treasurer of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., has been appointed to a similar position with the Hot Springs (Ark.) Street Railway. Both companies are controlled by the Federal Light & Traction Company, New York, N. Y.

Mr. A. G. Rogers, for the last four years chief clerk of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., has been appointed assistant secretary and assistant treasurer of the company, to succeed Mr. S. H. Russ, whose appointment to the Hot Springs (Ark.) Street Railway is referred to elsewhere in this column.

Mr. D. D. Curran, elected president of the New Orleans Railway & Light Company, New Orleans, La., will resign as president of the New Orleans & Northeastern Railroad, the Alabama & Vicksburg Railroad and the Vicksburg, Shreveport & Pacific Railway, but will continue with the properties as chairman of the board of directors.

Mr. Walter A. Draper, former president of the Chamber of Commerce of Cincinnati, Ohio, was made an honorary member of that organization on Jan. 5, in recognition of his excellent service in increasing the membership of the chamber from 800 to 2000 during his administration. Mr. Draper is vice-president of the Cincinnati Traction Company.

Mr. J. M. Pneuman, formerly master mechanic of the Annapolis Short Line, has been appointed electrical engineer of the Buffalo, Lockport & Rochester Railway. Previous to his connection at Annapolis Mr. Pneuman spent four years at Stamford, Conn., as foreman of electric locomotive and car maintenance of the New York, New Haven & Hartford Railroad.

Mr. Lee H. Landis, formerly general manager of the Ocean Shore Railroad, San Francisco, Cal., has been named as general manager of the Fresno & Interurban Railway, now building from Fresno to Clovis, Sanger and other points. Mr. Landis has been assistant to the president of the Tidewater Southern Railroad for three years. He was made president of the San Jose Terminal Railway several months ago.

Mr. John E. MacLean, Cohoes, N. Y., has been appointed counsel for the United Traction Company, Albany, N. Y., to succeed Mr. Patrick C. Dugan, resigned. Mr. MacLean acted as attorney for the United Traction Company during 1907 and 1908, while Mr. Dugan was deputy state comptroller under Governor Martin H. Glynn. Mr. MacLean is assistant to Mr. Lewis E. Carr, attorney for the Delaware & Hudson Company, which controls the United Traction Company through stock ownership.

Mr. Walter H. Gaither, who has been appointed a member of the Public Service Commission of Pennsylvania by Governor Tener, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, will serve for a term of two and one-half years, beginning on Jan. 19, 1915. Mr. Gaither was born in Foxburg, Clarion County, Pa., forty-five years ago, and was engaged in newspaper work in Pittsburgh for several years. He was secretary to Governor Tener during his term as Congressman and served in the same capacity during Mr. Tener's term as Governor.

Mr. J. W. Simons, whose appointment to the position of superintendent of transportation of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9, entered the employ of the Chicago & Milwaukee Electric Railroad as a motorman on May 21, 1905, and was made dispatcher on April 28, 1913. On June 1, 1913, Mr. Simons was promoted to chief dispatcher, and on July 1, 1914, he was again promoted, being made trainmaster, which position he retained until he was promoted to superintendent of transportation, to succeed Mr. G. S. Henry, advanced to general superintendent.

Mr. John E. Greeley, president and general manager of the Indianapolis & Louisville Traction Railway, Scottsburg, Ind., received a New Year's greeting in the form of a telegram, signed by every employee of the road, which reads as follows: "The employees of the Indianapolis & Louisville Traction Railway take this means of assuring you of their appreciation of the cordial relationship that exists between the management and themselves, and of pledging you their heartiest support and co-operation with a view of making the year 1915 a most prosperous one for the road." Mr. Greeley has been identified with the operation of the road since its construction in 1907, and has served as general manager since 1911.

Mr. G. S. Henry, whose appointment as general superintendent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., was announced in the ELECTRIC RAILWAY JOURNAL of Jan. 9, is the eldest son of Mr. Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. He began his electric railway career in the shops of the Indiana Union Traction Company, but in 1906 accepted a position with the Indianapolis & Cincinnati Traction Company, under his father. Several promotions advanced him to the position of traffic manager, from which he resigned in September, 1913, to become superintendent of transportation of the Chicago & Milwaukee Electric Railroad.

Mr. G. F. Soule, who has been identified with steam road electrification for several years, has recently accepted the position of inspector for the electrification of the Chicago, Milwaukee & St. Paul Railroad with headquarters at Butte, Mont. Mr. Soule started in the electric railway business with the Boston (Mass.) Elevated Railway and remained with that company for six years. He then spent five years with the New York, New Haven & Hartford Railroad in the construction of trolley and transmission lines and the electrification of steam lines. From New Haven he went to Butte, Mont., as general foreman in charge of the Butte, Anaconda & Pacific Railway electrification. Returning East, Mr. Soule has been general line foreman for the Bay State Street Railway at Lynn, Mass., during the past year.

Mr. Harry G. D. Nutting has been appointed manager of the engineering department of the John E. DeWolf Company, investment bankers, Milwaukee, Wis. Mr. Nutting will assist the buying department in the investigation of public utility issues and will also have general charge of the public utility properties controlled by the company. His office will be with that of the John E. DeWolf Company, in the Railway Exchange Building, Milwaukee. He will also continue to devote his attention to his private practice as consulting engineer on public utility problems. Mr. Nutting was formerly an engineer for the Wisconsin Railroad Commission, has managed a number of municipally and privately owned properties, and was recently assistant to the president of the Wisconsin Public Service Company, Wisconsin Railway, Light & Power Company and the Evanston (Ill.) Railway Company.

R. B. STICHTER

Mr. R. B. Stichter, who has been elected vice-president of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., was born at Louisiana, Mo., on April 18, 1876, was educated in private schools there and at Drexel Institute, Philadelphia, Pa., from the mechanical engineering department of which institution he was graduated with the class of 1897. Mr. Stichter engaged in consulting engineering work until 1900, when he became general manager of the Cleburne Electric & Gas Company, Cleburne, Tex. In 1904 the property of the Sherman Gas & Electric Company, Sherman, Tex., was rebuilt under his direction and a new Diesel engine plant was installed which attracted attention on account of its economy in operation and maintenance. Upon the completion of this work Mr. Stichter became general manager of the company and served in that capacity until the spring of 1907, when he accepted the position of general manager of the public utility properties of the J. F. Strickland Company, consisting of electric light and gas plants at Cleburne, Sherman, Bonham, Dublin, Hillsboro and Waxahachie, Tex. In the spring of 1909 the Texas Traction Company, operating an interurban railway from Dallas to Sherman, 66 miles, was added to the group and in 1910 the Denison & Sherman Railway, consisting of an interurban railway from Denison to Sherman, 10½ miles, and local lines in both cities, were added. In 1911 the electric light, gas and street railway properties in Waco, Tex., were added. About this time the construction of the Southern Traction Company's interurban system was begun. This comprises a line 64½ miles long between Dallas and Corsicana and a line 98 miles long from Dallas to Waco. With the completion of the Southern Traction System, the traction properties of the Texas Traction Company, including the interurban from Dallas to Denison and local city lines in McKinney, Sherman and Denison, and the Southern Traction Company, including the interurban from Dallas to Corsicana and Waco and local city lines in Corsicana, Waxahachie and Waco, were put under the management of the Strickland-Goodwin Management Association with Mr. Stichter as general manager. The lighting properties passed to the Texas Power & Light Company. On Jan. 1, 1915, the management association was dissolved and Mr. Stichter was elected vice-president of the Texas Traction Company and the Southern Traction Company with active duties. From 1907 to 1910 Mr. Stichter served as secretary of the Southwestern Electrical & Gas Association and was elected president of the association in 1910. Mr. Stichter is also vice-president and a director of the Security National Bank, Dallas, the second in size in north Texas.

OBITUARY

W. S. West, president of the Valdosta (Ga.) Street Railway, is dead.

Charles S. Price, for eighteen years general manager of the Cambria Steel Company, and later its president, died on Jan. 10 at his home in Westmont, Pa., of heart disease. Mr. Price was born in West Chester, Pa., in 1852, went to Johnstown in 1876 as a draughtsman, and rose to the highest office within the gift of the company.

Ernst Cronbach, manager of the railway department of the Allgemeine Company, Berlin, Germany, has been killed in battle in Galicia. Mr. Cronbach was born in 1878 and was graduated from the Vienna Technical High School. He then entered the employ of the Austrian Union Electrical Company. Following the consolidation of the Union and the Allgemeine Companies he became connected with the consolidated company at Berlin, finally becoming head of the railway department. His interest in American traction development was shown by an extended tour which he took through the United States a couple of years ago.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Norwich, Colchester & Hartford Traction Company, Hartford, Conn.**—Chartered in Connecticut to build an electric railway to connect Norwich, Bozrah, Lebanon, Colchester, Marlborough, Glastonbury and East Hartford. Incorporators: Frank Cronin, Arthur Manning and Wells Strickland.

***Portland, Vancouver & Northern Interurban Railway, Vancouver, Wash.**—Application for a charter has been made by this company in Washington to build an electric railway between Vancouver and Portland. Franchises over the Columbia River, Interstate Bridge and in Portland have been applied for. Capital stock, $300,000. Incorporators: Henry Crass and George W. Forks, both of Vancouver, are interested.

***Marietta-Parkersburg Interurban Company, Parkersburg, W. Va.**—Chartered in West Virginia to build a 10-mile electric railway from Parkersburg to Marietta, Ohio, on the western bank of the Ohio River. Capital stock, $10,000. Incorporators: John Kaiser, E. Clark, Jr.; C. C. Middleswart and M. M. Rose, Marietta, and H. H. Archer and Kenner B. Stephenson, Parkersburg.

FRANCHISES

Birmingham, Ala.—Birmingham Railway, Light & Power Company has asked the Council for a franchise for a line from the intersection of Fifteenth Avenue South and Twentieth Street South to Key Circle in the Milner Land Company's new division in Birmingham.

Tuscaloosa, Ala.—The Birmingham-Tuscaloosa Railway & Utilities Company has received an extension of time until Feb. 1 in which to complete the electric railway in Tuscaloosa.

Los Angeles, Cal.—The Pacific Electric Company has asked the Board of Public Works for an extension of ninety days to improve its portion of Lake View Avenue between Temple Street and Glendale Avenue in Los Angeles.

Indianapolis, Ind.—The Board of Public Works has received an extension of time on its franchise until June 1, 1915, to complete the proposed new line in West Tenth Street, from Bismarck Avenue to Tibbs Avenue in Indianapolis.

Newbury, Mass.—The Massachusetts Northwestern Street Railway has asked the Council for a franchise for its line in Newbury to Parker River pavilion. No franchise was ever granted this company for this section of the line, so that the petition is one to merely legalize the location of tracks which the company now holds.

***Lincoln, Neb.**—An electric interurban railroad from Nowata to Vinita by way of Centralia in Craig County is being projected by the Farmers' Street Car Association of Lincoln, Neb.

Buffalo, N. Y.—The International Railway has asked the Public Service Commission, Second District, for permission to build a line between Niagara Falls and Lockport.

Columbus, Ohio.—The East Linden Electric Railway has received a franchise from the County Commissioners for a line from the end of the Leonard Avenue line to East Linden. About ½ mile will be in Columbus and 3 miles in the county. [E. R. J., Jan. 9, '15.]

Cincinnati, Ohio.—The Cincinnati, Newport & Covington Railway has received a twenty-five-year franchise to use certain streets to bring its cars from the bridge across the Ohio River to the business district of Cincinnati. In return the company has agreed to pay a franchise fee of $12,000 the first year, and an addition of 3½ per cent each succeeding year of the period. It also agreed to pay $65,000 in settlement of the claim for car licenses held against it by the city. Several objections were brought against the proposition by various members of Council, but the majority felt that additional burdens would make it impossible for the company to accept the franchise.

East Linden, Ohio.—The East Linden Railway has received a twenty-five-year franchise from the Council in East Linden. The proposal to extend the line to include Leonard Avenue was abandoned because it was found that a franchise had already been granted another company over a portion of the route.

Ottawa, Ont.—The Ottawa & St. Lawrence Electric Railway has asked the Ontario Legislature to extend the time for the construction of the proposed railway from Ottawa to Morrisburg and along the St. Lawrence River to Brockville and Braeside, on the Ottawa River, and along the Ottawa River to Ottawa; and for permission to build a branch line, or deviate the main line so as to serve Smiths Falls; and to extend the line from Russell to Embrum, and northerly to South Indian. The company is also asking for a change of name, and for authority to use steam or other motive power instead of electricity as in the original charter. [E. R. J., Nov. 21, '14.]

Portland, Ore.—The County Commissioners have granted an extension of the franchise of the United Railways on the Linnton Road, in accordance with a request of the Council and Public Dock Commission. Some time ago the franchise was revoked to take effect on Feb. 1. The company is seeking to readjust its franchises in Portland so that it can retain the privilege of operating freight and switching lines on a number of streets. Several important questions have arisen in regard to these franchises which could not be settled as soon as anticipated and for this reason the extension was asked.

Easton, Pa.—The Easton Transit Company has received a franchise from the Council to reconstruct its lines in South Easton. The company has also requested that it be allowed to lengthen the switch at the top of Chestnut Street, College Hill. H. R. Fehr, president.

Montreal, Que.—The Montreal Tramways Company has asked the Council for a franchise in Mount Royal.

Ogden, Utah.—On Dec. 22 the City Commission granted a franchise to the Salt Lake & Ogden Railway and the Ogden, Logan & Idaho Railway to construct standard gage tracks in Lincoln Avenue between Twenty-third and Twenty-fourth Streets in Ogden. The new track will lead into the joint terminal of the lines at Ogden. The Salt Lake & Ogden Railway operates south of Ogden and the Ogden, Logan & Idaho Railway north of the same point. The franchise is for fifty years.

Newport News, Va.—The Newport News & Hampton Railway, Gas & Electric Company has received a franchise from the Council for an extension down Jefferson Avenue to the municipal small boat harbor in Newport News.

Clarkston, Wash.—The City Council has granted a franchise to A. G. Nortz and associates to operate an electric railway from the Lewiston-Clarkston bridge through and over certain streets of Clarkston. Work on the bridge will be begun in a few days. Franchises have been granted in Lewiston and over the interstate bridge. Electrical concerns will submit bids at once for the equipment, which will cost approximately $15,000. [E. R. J., Jan. 2, '15.]

Delafield, Wis.—A certificate of convenience and necessity has been granted The Milwaukee Light, Heat & Traction Company to operate a second power transmission utility in Delafield.

TRACK AND ROADWAY

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala.—During 1915 this company plans to build its 30-mile line between Gadsden and Center.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The 12-mile line between Dixon and Dixon Junction, which connects the Sacramento Valley Electric Railway with the Oakland, Antioch & Eastern Railway, has been completed and is now being operated under contract by the latter company.

Pacific Electric Railway, Los Angeles, Cal.—This company is expending $105,000 for betterments on its line from San Bernardino to Highland and Patton.

Fresno (Cal.) Interurban Railway.—During 1915 this company plans to build its 21½-mile line between Fresno, Clovis and Centerville.

San Francisco (Cal.) Municipal Railway.—A resolution that has been unanimously recommended by the Public Utilities Committee of San Francisco provides for extending the Stockton Street line of the Municipal Railway across Market Street and southward for a distance of three-fifths of a mile to the Southern Pacific station at Third and Townsend Streets in San Francisco. The resolution requests the Board of Public Works immediately to prepare an estimate of the cost of such track or appurtenances belonging to the United Railroads as the municipal line would use jointly with that company, and further declared the intention of the city to pay to the United Railroads one-half the estimated cost of the construction of such tracks and appurtenances, as provided by law.

New York, New Haven & Hartford Railroad, Stamford, Conn.—During 1915 this company expects to build 2 miles of sidings along its main line.

Hartford & Springfield Street Railway, Warehouse Point, Conn.—Notice has been given by this company of its intention to have introduced into the incoming legislature a bill to so amend its charter as to secure the privilege of building a branch line to connect Thompsonville and Suffield. The plan is to build a line from the local waiting station through Main Street, Thompsonville, and across the Connecticut River to unite with the present Suffield road at a point on Mapleton Avenue, a distance of approximately 3 miles.

Washington Railway & Electric Company, Washington, D. C.—About 1.75 miles of new track will be built by this company during 1915. The company plans to expend $200,000 on extensions of its lines in Washington.

Chicago (Ill.) Surface Lines.—This company is under contract with the city of Chicago to build 20 miles of track this year.

Joliet & Eastern Traction Company, Chicago, Ill.—Two new directors were added at the annual election of the stockholders of this company, making the total seven directors. Daniel Peterkin, Chicago, receiver for the Joliet & Southern Traction Company under the bankruptcy proceedings, and F. C. Eckman, Joliet, are the two new directors. [E. R. J., Sept. 19, '14.]

Kankakee-Urbana Traction Company, Urbana, Ill.—An extension to Paxton is being planned by this company.

Public Utilities Company, Evansville, Ind.—During 1915 this company expects to build its 2-mile Bell Street extension in Evansville.

Union Traction Company, Coffeyville, Kan.—Plans are being considered by this company to extend its lines.

Hutchinson (Kan.) Interurban Railway.—This company plans to build 1 mile of new track in Hutchinson during 1915.

Salina (Kan.) Street Railway.—Plans are being considered by this company to build a double track line to the new union station in Salina.

Topeka (Kan.) Railway.—During 1915 this company plans to build ½ mile of new track in Topeka.

Louisville (Ky.) Railway.—This company plans to begin work on the reconstruction of its West Chestnut Street line, crossing over to Madison Street and extending thence west to Shawnee Park, a distance of 1 mile or more.

Winnipeg (Man.) Electric Railway.—It is announced that the line from Stony Mountain to Stonewall, Man., 7½ miles, built by the subsidiary Winnipeg, Selkirk & Lake Winnipeg Railway, has been placed in operation. [E. R. J., Sept. 19, '14.]

Worcester (Mass.) Consolidated Street Railway.—Plans are being made by this company to double track its line on Pleasant Street from Richmond Heights to Moore Avenue, with the probability of extending the double tracks to Tatnuck Square later in Worcester.

Detroit, Almont & Northern Railroad, Detroit, Mich.—During 1915 this company plans to build its 9½-mile line between Almont and Imlay.

Twin City Rapid Transit Company, Minneapolis, Minn.—Plans are being considered by this company to extend its lines in the part of Ramsey County between Hamline Avenue on the east, the city limit on the west, Langford Avenue on the south, and Larpenteur Avenue on the north in St. Paul.

Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo.—A line to connect Zora, De Soto, Endora and Lawrence, 25 miles, will be built by this company during 1915.

Big Horn Canyon Irrigation & Power Company, Billings, Mont.—Surveys have been completed for the line to be built from a point near Custer, Mont., to Big Horn Canyon, 68 miles. John J. Harris, Hardin, president. [E. R. J., Aug. 8, '14.]

St. John (N. B.) Railway.—This company plans to construct 1½ miles of new track in St. John during 1915.

***Franklin, N. H.**—Citizens of Penacook and Boscawen are reported to be interested in efforts to have the electric railway at Penacook extended to Boscawen Plains.

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y.—During 1915 this company expects to build ½ mile of new track.

Newbern-Ghent Street Railway, Newbern, N. C.—Plans are being made by this company to extend its tracks about 1 mile to the Union Station in Newbern.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio.—About 2 miles of double track will be relaid with 100-lb. rails in Findlay during 1915.

Lancaster Traction & Power Company, Lancaster, Ohio.—During 1915 this company plans to build 1 mile of new track in Lancaster.

Toronto (Ont.) Civic Railway.—The City Council has begun work on a double track line from Dundas Street to Quebec Avenue on Bloor Street West in Toronto. A temporary track has been laid, but the permanent work will not be begun until next spring.

Guelph (Ont.) Radial Railway.—This company has been authorized to construct a line on Suffolk Street in Guelph. A. H. Foster, general manager.

Toronto, Ont.—On. Jan. 1 the ratepayers voted in favor of an expenditure of $343,000 on a civic car line from the Canadian Pacific Railway tracks at Yonge Street to Broadway and Mount Pleasant Avenues. The ratepayers sanctioned by by-law the expenditure of $425,000 for the extension of the civic car line. This will likely include a line on Lansdowne Avenue south from St. Clair to the Canadian Pacific Railway tracks and a line for North Toronto, extending from Yonge Street easterly to the intersection of Broadway Avenue and Mount Pleasant Road.

Pacific Power & Light Company, Astoria, Ore.—This company plans to build 1 mile of new track in Astoria during 1915.

Roseburg, Ore.—It is reported that work will be started in the spring on the railroad line which is to be constructed between this place and Coos Bay on the coast. This city voted $500,000 in bonds toward this project and it is estimated that this sum will build about 15 miles of the line. It is presumed the road will be an electric railway.

Southern Oregon Traction Company, Medford, Ore.—This company will build another mile of new track within the next few months. This extension will begin at the west end of its completed track on Main Street, near Central Avenue, and will extend west on Main Street to the city limits. It is imperative that the company build 1 mile of track within the city limits during the year in order that it does not forfeit its franchise with the city, but it is probable that considerable more track will be constructed and operated than required by the franchise. Overtures have been made to the company having for their purpose the extension of the line east to the Hillcrest orchards and the coal mine and it is not improbable that this will be done.

Milwaukie, Ore.—The Portland & Oregon City Railway Company has accepted the franchise granted by the City Council of Milwaukie and has started to build its line in that city. Grading on the streets granted in the franchise has been begun and the work will be pushed forward to the northern city limits of Milwaukie from Portland. Construction of this interurban railway, it is announced, will be continued actively. The southeast branch of the line will be built to Baker's Bridge this year, and later will be extended to Viola and the smaller towns in that section, which have been asking for railway connections with Portland for ten years.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—Plans are being considered by this company to extend its line from the United States Navy Yard to North Charleston.

***Houston & Beaumont Interurban Railway, Beaumont, Tex.**—Plans are being considered by this company to build a line to connect Beaumont, Houston and Anahuac. Anson Miller, G. L. Tufts and L. W. Schwartz, Anahuac, are interested.

Dallas (Tex.) Consolidated Electric Company.—This company has completed its 1½-mile extension to the Southern Methodist University in Dallas and will place it in operation at once.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—The 18-mile line between Provo, Springville and Payson will be built by this company during 1915.

Utah Light & Traction Company, Salt Lake City, Utah.—About 1 mile of new track will be built by this company during the year.

Seattle, Wash.—The extension of Division "A," of the Seattle Street Railway into Fremont and Ballard to Market Street and Leary Avenue, at a cost of approximately $100,000, to be paid from the electric railway bond issue authorized two years ago, is contemplated in a resolution introduced by Councilman Erickson at a recent meeting of the Council. The resolution provides for the submission of the extension proposition to the voters at the general election on March 2. The proposed extension will tap Division "A" a short distance south of its carhouses, on the south side of the Lake Washington Canal, across the Canal at Fremont and enter Ballard by the way of Leary Avenue. Division "A" runs from Third Avenue and Pine Street to Thirteenth Avenue West and Nockerson Street, on the south shore of Salmon Bay, a distance of 4.1 miles.

Casper (Wyo.) Street Railway.—Work will be begun by this company in May on its 3½-mile line in Casper. The repair shop will be located in Casper. Capital stock authorized, $100,000. Officers: J. B. Fleming, 40 Wall Street, New York City, president; Harley B. Beagle, Casper, secretary. [E. R. J., June 20, '14.]

SHOPS AND BUILDINGS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company has completed its new building at First Avenue and Twenty-first Street, in Birmingham, and will soon move its offices to this new structure.

Boston (Mass.) Elevated Railway.—The Massachusetts Public Service Commission gave a public hearing on Jan. 5 upon the petition of residents of Cambridge for an additional station in the Cambridge subway between Harvard and Central Squares. The petitioners contended that rapid transit would be furthered for the Dana Hill residential district of the city by the proposed station.

POWER HOUSES AND SUBSTATIONS

Birmingham-Tuscaloosa Railway & Utilities Company, Birmingham, Ala.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 500-kw, 600-volt, six-phase, sixty-cycle rotary converter; three 185-kva, 2300-volts to rotary-voltage transformers, and a switchboard for its substation.

Ithaca (N. Y.) Traction Corporation.—This company will place in operation in its power plant a 937-kva a.c. Curtis steam turbo-generator and switchboard equipment. The General Electric Company will build and install the unit.

Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio.—A new substation is being built by this company on Wilson Avenue in Steubenville. The structure will be 48 ft. x 130 ft. and of structural steel and concrete construction. It will have a capacity of 3000 kw. The cost of the buildings and equipment is estimated to be about $60,000.

Ogden, Logan & Idaho Railway, Ogden, Utah.—About $200,000 will be expended upon improvements to this company's line. They include an extension from Lewiston to Preston and a new brick depot. Grading has been begun 2 miles north of Lewiston. All of the trackage and overhead material necessary for the construction of the entire extension has been ordered.

Manufactures and Supplies

ROLLING STOCK

Slate Belt Electric Street Railway, Pen Argyl, Pa., will purchase during 1915 one interurban car complete, with motors.

San Angelo (Tex.) Street Car Company will purchase during 1915 three or four medium sized second-hand single-truck closed cars.

Winona Interurban Railway, Warsaw, Ind., expects to purchase during 1915 one 60-ft. freight and express car body.

Cushing Traction Company, Muskogee, Okla., has ordered two all-steel, double-end interurban passenger cars, with seating capacity of forty-eight and about 45 ft. over all, from the Cincinnati Car Company for its new 1500-volt d.c. line.

Interborough Rapid Transit Company, New York, N. Y., has issued inquiries to about twelve car-builders on prices on 478 all-steel car bodies to replace the composite car bodies now in operation in the New York subway.

London & Port Stanley Railway, London, Ont., has ordered five all-steel motor passenger cars from the Jewett Car Company, which will be equipped with Baldwin trucks and O. B. couplers. Four trailers, which were ordered from the Preston Car & Coach Company, will be equipped with trucks built by the National Steel Car Company, Hamilton, Ont.

Pacific Electric Railway, Los Angeles, Cal., noted in the ELECTRIC RAILWAY JOURNAL of Nov. 14, 1914, as having ordered twenty-four all-steel interurban cars from the Pressed Steel Car Company, has specified the following details of this equipment:

Seating capacity	60
Weight of car body (approx.)	50,000 lb.
Bolster centers, length	34 ft.
Length of body over end sills,	47 ft. 2 in.
Length over buffers,	58 ft. 1 in.
Width over sills	9 ft. 2 in.
Width over all, at eaves,	9 ft. 4¼ in.
Height, rail to sills,	3 ft. 7¾ in.
Height, sill to trolley base,	9 ft. 9⅜ in.
Interior trim,	wood, steel finish
Headlining	Agasote
Roof	oval
Airbrakes	West. automatic
Axles	Vanadium steel
Bumpers	Hedley
Cables	G.E.
Control	G.E., type M
Couplers	West.
Curtain material	Pantasote
Curtain fixtures,	Cur. Sup. Co.
Fenders	Eclipse
Gears and pinions	G.E.
Hand brakes,	St. Louis high power
Heaters	Consol.
Headlights	Crouse-Hinds
Journal boxes	Symington
Motors,	4 G.E., 354A, inside hung
Registers	Ohmer
Sash fixtures	O. M. Edwards
Seats	H. & K. No. 300
Seating material	plush
Step treads,	Mason safety carborundum
Trolley catchers	Ideal
Trolley base,	Ry. std. pneumatic
Trucks,	Swinging bolster built-up type.
Ventilators	automatic
Wheels	36-in. rolled steel

TRADE NOTES

Williams, Dunbar & Coleman, New York, N. Y., specialists in public utility securities, have issued a small calendar for 1915.

Newman Clock Company, New York, N. Y., has issued a sheet relative to its watchman's clock for safeguarding life and property.

Barron G. Collier, Inc., New York, N. Y., has moved its New York offices to the Candler Building, 220 West Forty-second Street.

Reynolds Electric Company, Chicago, Ill., which now manufactures small motors, has issued Bulletin No. 201, describing its type A induction single-phase a.c. motors in fractional horsepower sizes of 1/20, 1/12, ⅛ and ⅙ hp.

C. L. Benjamin, for the past eight years advertising manager of the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., and one of the best-known advertising men in the Middle West, has announced that he has acquired an interest in the Klau-Van Pieterson-Dunlap, Inc., advertising agency and will have an active part in its work.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed H. H. Seabrook, formerly district manager of the company in Baltimore, to the position of district manager in Philadelphia. Owing to the consolidation of territories the Philadelphia offices will hereafter embrace that previously covered by the Philadelphia and Baltimore offices. Mr. Seabrook succeeds J. J. Gibson, who became manager of the tool and supply department at East Pittsburgh.

Union Electric Company, Pittsburgh, Pa., has issued price lists and sheets describing and illustrating its pole anchors, tamping bars, cement tampers, cement or dirt rammers, and Loxon lamp guards. The anchor has unusually great expansion when placed in the soil, which tends to increase the resistance, with little digging necessitated. The anchor requires but one man to install it and no extra tools. All that is necessary is to place the anchor in the bored hole, tamp the rail down and apply the strain.

Lee P. Hynes has resigned as vice-president of the Railway Utility Company to become secretary and general manager of the Thermo Electric Regulator Company, Chicago, Ill. Mr. Hynes has been in the railway supply business for over twelve years. After leaving the University of Michigan in 1902 he was for a time in the drafting room of the Illinois Steel Company, South Chicago, Ill., leaving there to go with the Safety Car Heating and Lighting Company in 1903. In 1911 he was elected vice-president of the Railway Utility Company in charge of the engineering and manufacturing department.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, has issued a folder describing and illustrating its air-sander equipment for slippery rails. The diaphragm or center valve can be mounted behind or at either side of the engineer's valve and the handle rotated so as to be in reach of the motorman's lamp when his hand is on the air handle. The flexible bronze diaphragm between the valve stem and plunger absolutely prevents escape of air and eliminates all packing. The folder also describes the O. B. chime whistle and whistle valve.

NEW PUBLICATION

American Handbook for Electrical Engineers, edited by Harold Pender, Ph.D., professor of electrical engineering, University of Pennsylvania. Published by John Wiley & Sons, Inc., New York, 1914. 7 x 4½ in., pp. xviii + 2023, $5 net.

Wiley & Sons, Inc., have issued an electrical handbook upon which a large and competent staff of editors has been at work for three years. The result is a comprehensive series of articles which have been arranged according to the plan explained below. The test of use is required in order to determine the success of the editor of a handbook so that no attempt will be made by the reviewer to refer critically to the merits of the text which must be temporarily evaluated in terms of the reputations of the respective authors. This can be done because the author's name is signed to each article. The following brief outline can therefore give only the general editorial plan. The book is put together in encyclopedic form, articles being arranged alphabetically by topics. Theory and practice are largely covered in separate articles, so that the reader can have one or the other separately as he requires. Where practicable a standard outline forms the basis of the articles as follows: general description and definitions; brief statement of application; principles of operation; design; testing; performance; specifications; installation; operation; dimensions, weights and costs, and bibliography. In addition to articles on electrical engineering topics, there are many on related mechanical and civil engineering subjects. A profusion of tables, of course, forms a prominent feature of the book. The topical arrangement necessarily scatters the articles relating to a given general subject. The titles are, however, gathered together under general headings in a "topical list of articles" at the front of the books. There is a general index of more than fifty double-column pages at the back.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLV NEW YORK, SATURDAY, JANUARY 23, 1915 No. 4

HIGHWAY CROSSING SIGNALS

In an editorial printed in this journal last July an outline of the requirements and an analysis of the status of crossing signals were published. Since then an increasing amount of attention has been directed toward this subject. This was instanced by the exhibit at Atlantic City last autumn of several signals of this character and now by a valuable review of the entire subject, read at the last meeting of the Illinois Electric Railways Association by John Leisenring, Illinois Traction System, and republished in this issue. One reason for the growing interest in highway crossing signals is undoubtedly the recent advances made in block signals, the two kinds of equipment having many points of resemblance, both in construction and purpose. Another reason which has focused attention upon highway signals recently has been the increasing number of automobiles and motorcycles which use the highways. At the last meeting of the Railway Commissioners in Washington the committee on grade crossings called special attention to this point and pointed out that many of the drivers of these vehicles have little regard for law or custom as well as for their own safety, and incur dangers at crossings where it would seem to be a challenge to one's sanity to suggest that warning signals of any kind were necessary. If more people would follow the legal obligation to "stop, look and listen" before crossing a railroad track there would be fewer accidents, but it seems to be a modern maxim that the heedless must be protected so far as possible against their own carelessness. There would seem to be an opportunity here for an extension of the "safety first" movement to educate users of the highways as to the dangers at crossings, as well as for the inventive genius of the signal manufacturer to provide visible and audible warnings of an approaching train.

"SAFETY FIRST" SAVINGS AT MONTREAL

The "safety first" movement on electric railways is so recent that figures on its value are still difficult to obtain. Exceptional interest, therefore, pertains to two articles on this subject in recent issues of the Montreal *Gazette*. The first says that the reduction in the number of suits for damages against the Montreal Tramways since it began its campaign in the early part of 1914 has been about 50 per cent and that the amounts sued for average much less than was formerly the case. Furthermore, the company's "safety first" warnings to passengers have become so familiar to the public that there is far less inclination for plaintiffs to demand a trial by jury, because the jurors know that the company is earnestly trying to promote better conditions. Consequently a larger proportion of cases is being settled out of court and at more reasonable figures than in the old days. This condition, our Montreal contemporary sagely remarks, may or may not be a bad thing for lawyers and court officials, but it is undoubtedly a good thing for the company and the public. The second article contains an abstract of the local coroner's report for the year 1914, according to which the number of deaths due to tramway accidents was reduced from thirty-four in 1913 to twenty in 1914. Furthermore, it is noted that all of these accidents were due to the imprudence of the victims and that verdicts of excusable homicide were returned. These splendid results were accomplished by the Montreal Tramways almost single-handed, but now the chief city engineer, the chief of police and the heads of several civic departments are co-operating with Superintendent Gaboury of the railway as a general safety committee. The Montreal Tramways is certainly to be felicitated on a showing which we hope will be repeated in hundreds of other cities.

"WITHOUT ADDITIONAL COMPENSATION"

Congressman Moon would make an earnest advocate of 3-cent fares or even of no fares at all for electric railway transportation. He has demonstrated his qualifications for leadership in such a cause in a very striking way. Those who are devoted to the national sport of getting something for nothing from railroads ought to make Mr. Moon their patron saint forthwith. For it is Mr. Moon who is the author of the amendment to the post-office appropriation bill providing a fine of $5,000 for each and every refusal to carry the mails for whatever pay the Postmaster-General may fix. According to its author the measure (which has passed the House) provides a means whereby railroad transportation for the whole of the parcel post could be obtained "probably without any additional compensation." The railroads say that they are already underpaid $8,000,000 for carrying the mail. An ordinary reformer would be satisfied with making the railroads carry half the parcel post free of charge, just as the ordinary reformer would be satisfied to cut fares in half. But not Mr. Moon. He would fine a railroad $5,000 every time it refused any compensation for the whole of its transportation service that an official might fix for a part of that service. Perhaps Mr. Moon claims Biblical sanction for taking away even the half portion of mail pay which the railroads have. Thirst for the blood of the railroads has never gone farther than this. It is certainly a bad example for Congress to set for big business and for trusts and railroads, which, we are told, are now already inclined to turn from their evil practices. But our highest financiers never conceived anything so badly unconvincing as the post-office department report showing a "surplus" of $3,600,000 by the expedient of exacting a forced rebate of $8,000,000 (as the railroads claim) on a transportation bill.

THE MID-YEAR MEETING

It is interesting to recall that Jan. 29, the date of the mid-year meeting at Washington this year, is practically the tenth anniversary of the important meeting held in New York on Feb. 3 and 4, 1905, at which the American Electric Railway Association decided upon its present plan of organization. It is true that the constitution was not formally adopted until the annual meeting at Philadelphia in October, 1905, but at the meeting in February, called for this purpose by W. Caryl Ely, then president of the American Street Railway Association, the general principles were determined upon. Prior to that time the present parent association and each of its affiliated associations were entirely distinct organizations with separate membership lists. Each was doing a good work, but there was some overlapping, no general headquarters and no systematic plan of organization. The inefficiency of the existing methods was apparent, and at the annual meeting in 1904 the president and executive committee were authorized to take steps to effect a more coherent and efficient body.

At the meeting in February, held at the Holland House, New York, Richard McCulloch, now vice-president United Railways of St. Louis, presented a tentative plan of organization, based somewhat upon the plan of organization of the American Association for the Advancement of Science, and contemplating a general organization and various affiliated organizations to embrace the fields of accounts, engineering and claims, the only affiliated organizations which then had been organized. The plan as a whole commended itself to those in attendance, and under the supervision of a committee which was appointed for the purpose, a constitution was drafted imbodying the present plan of organization. Too much credit cannot be given to the far-seeing men who were able to foresee the advantages to the industry of an efficient national organization and who laid the foundation upon which the present structure rests.

No one who can remember the period before 1905 but must realize the great benefit to the industry accomplished by that reorganization. Much has been accomplished, but much remains to be done. Indeed, after considering the field with its ever-widening vistas of possibilities and problems, one might almost say that a beginning only had been made. There is a greater need for an association than ever before, and also a greater need for efficient work in association interests. This in the last analysis depends upon the members themselves. It is to be hoped that they will show by their attendance at the Washington meeting that they heartily support the association.

THE HEART OF THE INDUSTRY

An analysis of the 1913 and 1914 rolling stock statistics, published in our first issues of 1914 and 1915, reveals a striking proximity between the center of the purchases of this new electric railway rolling stock and the center of population in the United States, as recorded by the last census in 1910. The center of population that year was in Bloomington, Ind. An approximate calculation places the center of electric rolling stock purchases in 1913 near Dayton, Ohio, in 1914 near Lima, Ohio, only about 175 and 200 miles, respectively, from the population center. The rolling stock calculation was made by a gradual sifting-down method, similar to that used, for example, in determining the resultant of a number of forces acting in different directions. In this case, however, the product of number of cars ordered, multiplied by the distance between any two cities where the cars were put in use, was substituted for the product of the force times the distance.

Geographically speaking, this point would be the ideal position for an electric railway manufacturer to locate his plant, assuming that he enjoyed a monopoly in the line of his specialty and disregarding such place-determining factors as nearness to raw materials, labor, supplies, inequality of shipping conveniences and rates and other special facilities.

Owing to the vast agricultural areas in the West which invite interurban rather than congested city operation and thus require fewer cars, it seems unlikely that the two centers will advance much beyond the Mississippi River for some time to come, notwithstanding the fact that this dividing line is only one-third the distance across the continent.

The continuous growth of the Western section of the country has drawn the population center steadily westward for the last half century at the rate of about 40 miles every ten years. The lagging behind of the buying center is probably explained by the fact that street and interurban railways appear only in communities which have first developed a population of sufficient density to justify their existence. Conversely, in the future, a certain Eastern economic force will tend to check the western drift of both central points, this time, however, acting first on the purchasing center. The construction and extension of large subway and rapid transit systems now contemplated by the Eastern cities of Cleveland, Cincinnati, Detroit, Philadelphia and New York will require the ordering of a large amount of rolling stock in anticipation of a future increased traffic to ultimately more populated suburbs. This condition, at the time when these cars are purchased, will temporarily retard the westward movement of the purchasing center.

Somewhat later the sudden development of the new Eastern suburbs would also retard the movement of the population center. When Western cities become of sufficient size to warrant similar transit undertakings a reciprocal pull on the two points in the opposite direction may be expected.

PUBLIC CO-OPERATION AT COMMISSION HEARINGS

In presenting the side of the company at a commission hearing on service matters the representative of the railway is often at a psychological disadvantage. Ordinarily the hearing room is massed with residents of the neighborhoods most concerned looking for additional facilities of some sort or other and outnumbering the company's representation anywhere from twenty-fold to a hundredfold. The odds are against the company, whose official while on his feet must be able to meet a great variety of demands and objections, cross-questioning and assertions upon details of service with many of which no one man can be as familiar personally as the people asking the questions and presenting their views to the board. It is at once apparent that, to succeed in this difficult work, the company's representative must have the local system at his fingers' ends, must treat every inquiry with absolute frankness, admitting any lack of personal knowledge regarding events on the cars disclosed by evidence. He must also express earnest desire to investigate and remedy any conditions which indicate that the rules are being disregarded or broken by the operating department's employees, while standing firmly by the company's general position relative to the taking on of additional burdens which it feels that it cannot assume in justice to itself or to the larger community outside the immediate petitioners.

An experienced commission will make allowances for the difference in numbers, but if it is possible to supplement the company's views with evidence of a popular character against the attitude of the petitioners, a case usually may be greatly strengthened. Where the petition involves an important principle, as in the maintenance of a limited stop service in a certain district for the benefit of patrons living farther away from the business center, the bringing out of both sides by popular evidence as well as by the company's representatives is bound to be useful to the commission. There is no reason why a company should be obliged to fight its battles virtually alone before a commission when its own views on a given petition accord with the interests of perhaps thousands of its patrons who may not wish to see changes inaugurated in the service to please a relatively small number of people situated elsewhere on the system. The natural avenue of approach to this co-operation is through local business and improvement associations whose officials are men alert to grasp the facts in each case and with whom the company can work to advantage in striving to accomplish the greatest good for the greatest number. That is the policy which the modern electric railway must endeavor to realize, and, without attempting to create neighborhood dissensions or antagonism between adjacent communitiees, there is no reason why a company should not seek the co-operation at commission hearings of groups of patrons whose interests are identical with its own, taking care always to treat every issue frankly and to bring forward facts and figures with which to support the rebuttal to the petition.

EXPERIMENTAL SERVICE

One of the benefits of commission regulation which deserves emphasis is the facility with which experimental service may be applied in territory where traffic conditions are changing considerably from time to time. In the old days an extensive change in routes or schedules was apt to be followed by a good deal of opposition from patrons who preferred the existing order, and while others might be equally pleased with the change the modification of service was looked upon as establishing a well-fixed precedent. The result was that many rearrangements of car trips and running cards were passed by. There was a decided feeling on the part of operating men that if the company did a thing once the effect of a change would be so far-reaching that only upon the strongest reasons should a change be permitted.

To-day this attitude is much less common among transportation officials. Important changes in service are very generally submitted to the supervisory public service commission before they are inaugurated, and the probable effect of such changes upon the public convenience is often largely predetermined through the co-operation of the inspection forces of the commission and the knowledge the members of the board usually have of local situations. If there is any doubt about the expediency of a given change it is the simplest matter in the world for the commission to order it to be tried out experimentally for a short period, say from one to three months, or less in cases where the results of the change can be gaged in a lasting way sooner. The public generally appreciates that the commission is looking out for its interests. Also, the public is far less likely to assault the company through the press, via the "improvement association" route or individually, if it knows that a given alteration in schedule is made with the consent of the public authorities and that a time limit has been set upon it.

If the riders can be brought to feel that the experiment is one which the company is making on their behalf and if their interest in the result can be aroused and maintained by means of well-planned publicity, the result will be a more congenial public sentiment.

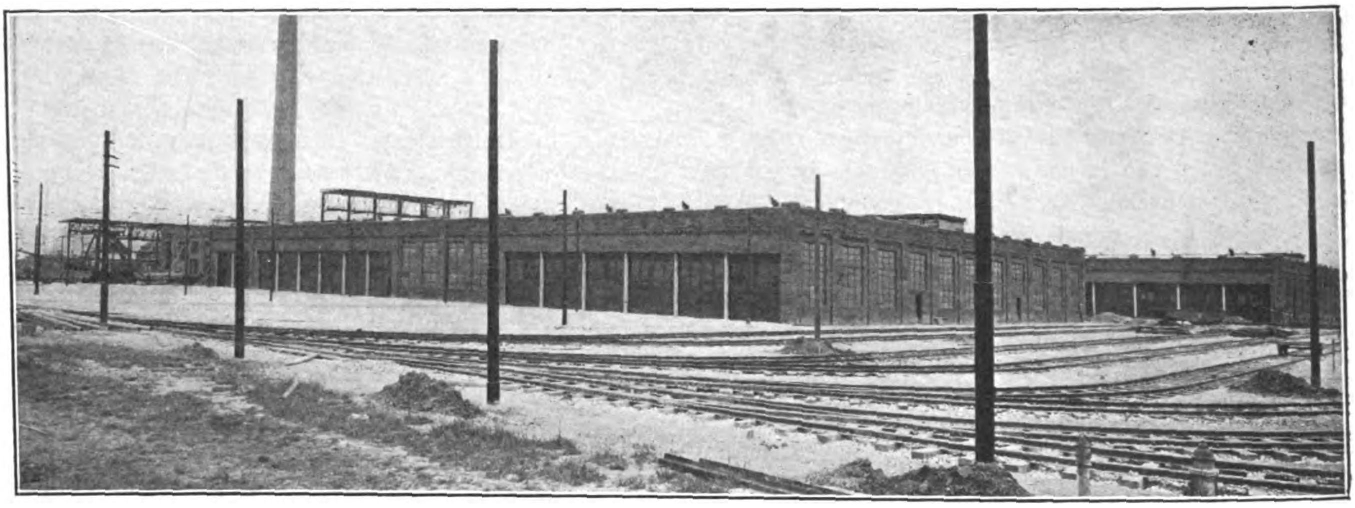
The results of the experiment reflected in a permanent change, when announced officially in the findings of the board, are also likely to be received favorably by the public at large, since it views the matter as settled by a disinterested tribunal and is precluded from entertaining the feeling that the popular side of the case has not received suitable consideration. With the increasing complexity of traffic distribution in networks resulting in no small degree from the extension of free transfer privileges, the building up of new suburban districts and the changing of the character of the old-established sections of the city, the need of changing the service even quite materially at rather short intervals is a problem of continuous importance, and the practice of having recourse to the sanction of a commission to try out such schedules as appear best adapted to the conditions is one of increasing interest.

Cleveland Railway's New Repair Shops

A Description of the New Wood-Working Shop, Erecting Shop and Paint Shop That Have Been Constructed as the First Step in a General Repair Shop Layout Which, When Completed, Will Be One of the Most Comprehensive in the Country

As a part of the general plan of rehabilitating the physical property of the Cleveland Railway Company to bring it up to a modern standard of physical excellence and thereby improve operating efficiency, a complete new general repair shop is being constructed. Approximately forty acres of land were purchased for the new shops and for a new operating station and track-department material yard, and it is estimated that the entire improvement when completed will have cost about $1,500,000, the shop building being designed to furnish capacity for overhauling between 1500 cars and 1600 cars annually.

In general, the shop buildings cover an area 775 ft. x 980 ft. in dimensions, containing approximately 18 acres, or about one-half the entire property. As shown in one of the accompanying illustrations, the shop site is accessible to the street railway by way of several of the company's lines, the distance to the business district of the city being 4 miles. One end of the property adjoins the right-of-way of the Newburgh & South Shore Railroad, a direct steam-road connection to the Cleveland belt, which in turn handles the transfer freight business between all the steam trunk lines entering Cleveland. A track connection has been made with this line, thereby permitting the delivery of materials and equipment direct to the shops.



CLEVELAND SHOPS—GENERAL VIEW OF SHOP BUILDINGS AND TRACK FACILITIES

Excepting for a single track at the extreme south end of the property, and two at the north end, all shop tracks, of which there are thirty-five on one side and thirty-six on the other, are intersected by the main transfer table pit. This pit will be occupied by two transfer tables, one of 25-ton capacity for handling street railway equipment, and another of 75-ton capacity for shifting cars of coal and other heavy material either to the heating plant or to the various shop buildings and tracks. All tracks, both in the adjoining streets and on the property, are built of 80-lb. A. S. C. E. rail with hard-center special work at the turnouts. The tracks are laid on wooden ties with crushed-stone ballast.

In order to permit the free movement of men and equipment across the tracks outside of the buildings, the entire area is filled with limestone screenings up to the tops of the rails.

SHOP BUILDING LAYOUT

In general, the shop buildings are arranged in two rows, the long transfer table pit being in the aisle between them. The transfer tables serve all the departments except the wood-working shop, which is separated from the group and is served by a transfer table and pit occupying the aisle between it and the erecting shop. A 228-ft. pit with a 25-ton transfer table is also provided at one end of the truck shop for convenience in routing work.

The shop buildings are separated transversely by the store house and boiler house into two groups. The truck, motor and blacksmith shops compose the group of buildings in which all iron work will be handled and running repairs made. The second group embraces the paint shop, erecting shop and wood shop, or those departments which are largely used when a general overhauling or repainting of car bodies forms a part of the repair program. The office of the master mechanic, which is in a separate building, centrally placed in the shop building group, also serves as quarters for the company's surgical department, an important part of the Cleveland Railway's welfare work.

The floor areas of the different departments and their percentages of the total area are shown in Table I.

TABLE I—AREAS OF DIFFERENT DEPARTMENTS IN CLEVELAND SHOPS

Department	Area	Per Cent of Total Area
Truck shop	29,072 sq. ft.	10.7
Motor shop	38,456 sq. ft.	14.3
Blacksmith shop	10,221 sq. ft.	3.7
Paint shop	54,096 sq. ft.	20.1
Machine and erection shop	62,928 sq. ft.	23.5
Wood-working shop	22,294 sq. ft.	8.3
Storehouse	51,078 sq. ft.	19.4
	268,145 sq. ft.	100.0

Reference to general data in repair shop layouts as furnished on page 540 of the April 6, 1912, ELECTRIC RAILWAY JOURNAL reveals the fact that the areas devoted to the several departments of the Cleveland shop closely approximate the average of ten existing shop layouts. As a matter of interest the table shown in that article is reproduced in Table II and the Cleveland Railway Company's shop figures are shown below the average figures.

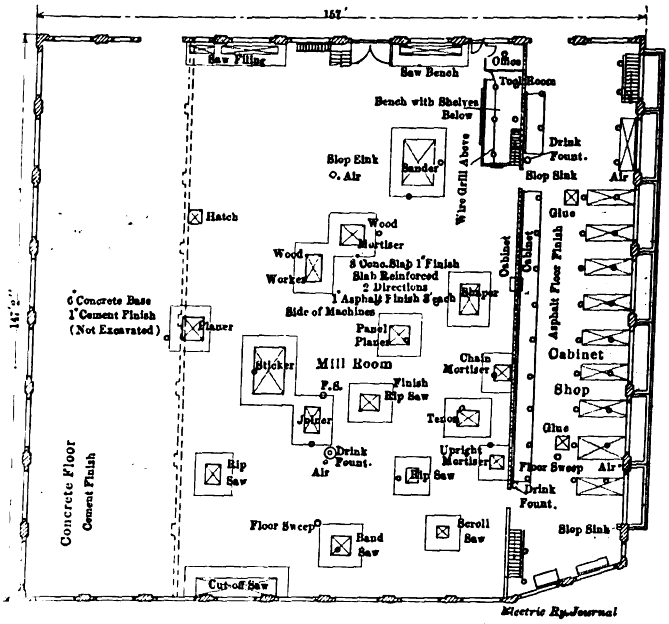
TABLE II—AREA OF DIFFERENT DEPARTMENTS EXPRESSED IN PERCENTAGE OF TOTAL SHOP AREA

	Repair Shop	Machine Shop	Blacksmith Shop	Carpenter Shop	Storeroom	Armature Room	Wood Mill	Paint Shop and Washroom
Milwaukee	19.6	12.9	5.9	18.3	13.8	5.2	6.9	17.4
Baltimore	17.9	7.4	3.7	17.9	12.4	4.8	12.8	23.1
Seattle	17.4	10.8	3.1	13.9	18.1	6.5	7.0	23.2
Rochester	21.0	13.6	2.3	10.5	30.4	3.2	5.6	13.4
Anderson	22.0	8.3	3.3	17.5	16.4	5.6	9.7	17.2
Minneapolis	9.5	8.3	7.1	17.7	17.8	8.3	8.9	22.4
Portland	19.5	8.4	6.2	10.7	11.5	8.3	7.8	27.6
Syracuse	30.2	5.5	1.5	18.7	18.5	1.5	2.4	21.7
Chicago	21.1	12.6	1.4	22.5	4.8	4.1	15.2	18.3
Montreal	23.3	8.6	4.9	19.0	10.6	5.5	7.6	20.5
Averages	20.3	9.4	4.0	16.8	14.9	5.3	8.2	21.1
Cleveland	10.7	6.0	3.7	17.5	19.4	14.3	8.3	20.1

While a discrepancy appears in the Cleveland repair-shop and armature-room percentages, the total of these two departments in the average of ten shops is 25.6 per cent, while the Cleveland total of the truck and motor shops is 25 per cent. Percentages for other departments except the storeroom, which naturally varies with conditions and the nature of the materials to be stocked, indicates that the results are quite close to the averages for the ten shops shown in the table.

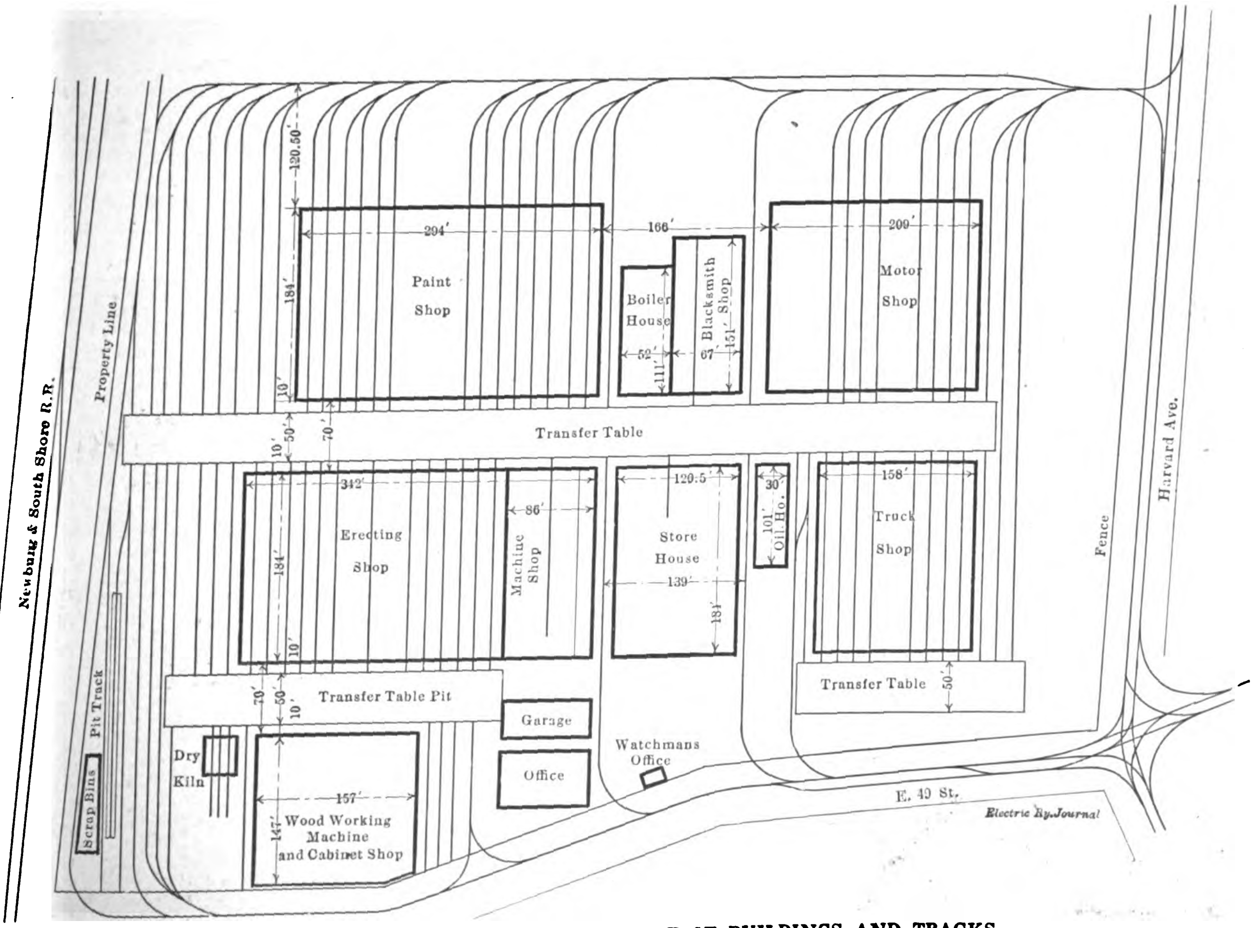
CHARACTER OF BUILDINGS

The same general architectural scheme is being followed in the new repair shop buildings as that which was adopted for the company's operating stations. The repair shop buildings, however, are of a much plainer type, conforming in appearance to the modern practice. They are constructed of brick, steel and concrete and are entirely fireproof. As shown in the accompanying illustrations, a liberal spacing of Fenestra steel sash in the walls and Drouvé skylights in the roof provides a practically uniform natural illumination throughout the shop-floor areas. In addition to the pivoted sash in the skylights operated by continuous mechanisms, which may be used during the warmer months of the year, Swartout rotary ball-bearing ventilators have been installed on the ridges of the skylights.

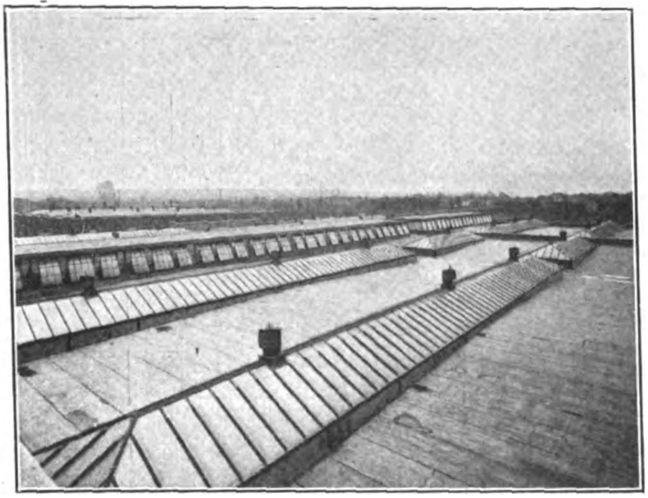

157'
147' 2"
Saw Filing
Saw Bench
Office
Tool Room
Bench with Shelves Below
Wire Grill Above
Drink Fount.
Slop Sink
Air
Slop Sink
O. Air
Sander
Hatch
Glue
Wood Mortiser
Wood Worker
8 Conc. Slab 1" Finish Slab Reinforced 2 Directions
1" Asphalt Finish 3' each Side of Machines
Shaper
Cabinet
Cabinet
Asphalt Floor Finish
6 Concrete Base 1" Cement Finish (Not Excavated)
Planer
Panel Planer
Sticker
Mill Room
Chain Mortiser
Cabinet Shop
F.S.
Finish Rip Saw
Tenon
Jointer
Glue
Drink Fount.
Air
Upright Mortiser
Floor Sweep
Air
Rip Saw
Rip Saw
Drink Fount.
Concrete Floor Cement Finish
Floor Sweep
Band Saw
Scroll Saw
Slop Sink
Cut-off Saw
Electric Ry. Journal

CLEVELAND SHOPS—PLAN OF WOOD-WORKING SHOP

All buildings in the group are heated from the central plant by direct radiation, in the form of coils mounted on racks on the building walls or by standard cast-iron radiators. An exception, however, is made of the wood mill, which is farthest from the heating plant.


Newburg & South Shore R.R.
Property Line
Pit Track
Scrap Bins
120.50'
204'
Paint Shop
184'
10'
166'
Boiler House
52'
111'
Blacksmith Shop
67'
151'
200'
Motor Shop
Transfer Table
10'
50'
70'
342'
Erecting Shop
184'
10'
86'
Machine Shop
120.5'
Store House
139'
181'
30'
101'
Oil Ho.
158'
Truck Shop
Fence
Harvard Ave.
70'
50'
10'
Transfer Table Pit
Transfer Table
50'
Garage
Office
Watchmans Office
Dry Kiln
157'
147'
Wood Working Machine and Cabinet Shop
E. 49 St.
Electric Ry. Journal

CLEVELAND SHOPS—GENERAL ARRANGEMENT OF BUILDINGS AND TRACKS



CLEVELAND SHOPS—VIEW SHOWING SKYLIGHT ARRANGEMENT

Here the direct radiation method of heating is supplemented by an auxiliary indirect system comprising a large blower and pipe coils installed on a balcony at one side of the building. As shown in one of the accompanying illustrations, in the paint shop standard cast-iron radiators are used, these being installed in the aisles between the tracks and securely anchored to the floor. This distribution of heat in the paint shop was employed to hasten the drying process of cars undergoing repainting. In connection with the heating system feed and return pipes, it is interesting to note that all pipe systems throughout the shops are painted certain colors to indicate their use. The sprinkler system is painted red, the compressed-air system blue, and the steam piping system white.

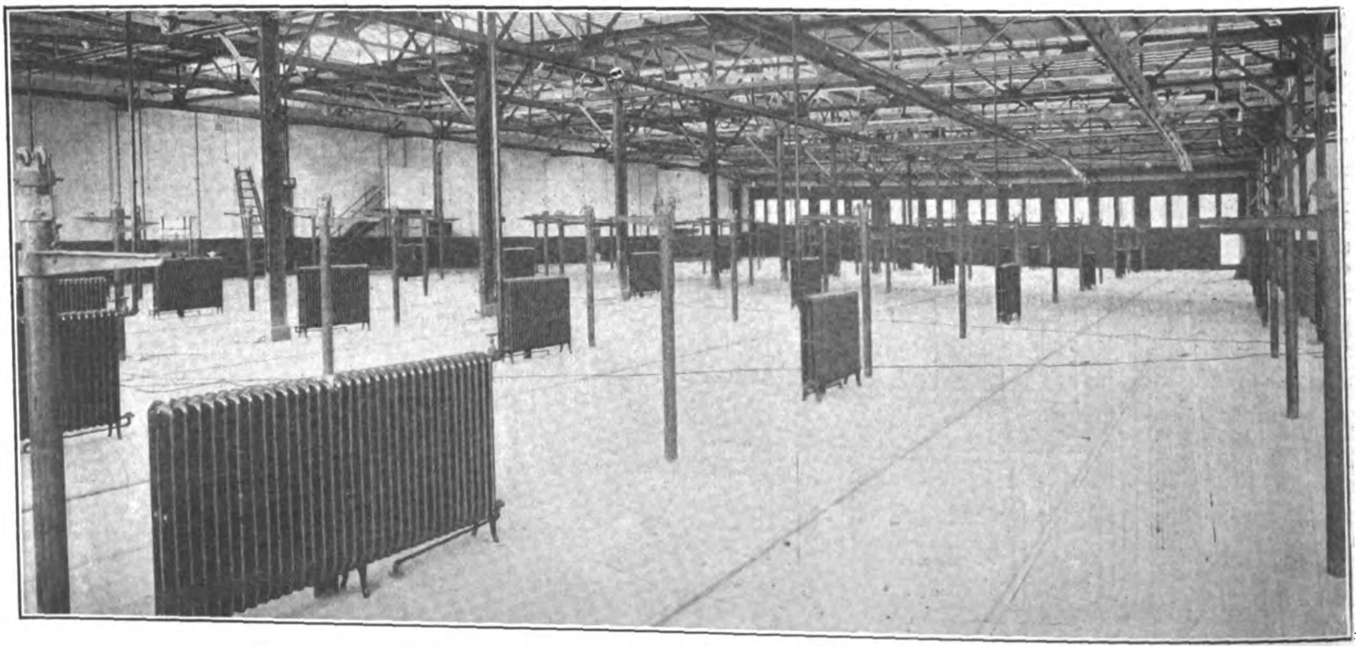
The first three buildings to be completed and occupied include the wood-working shop, the erecting shop and the paint shop, all of which are separated from each other by transfer-table pits. The wood-working shop is 147 ft. x 167 ft. in size, this area being divided into a mill room approximately 125 ft. x 147 ft. in plan, and the cabinet shop 31 ft. x 147 ft. in plan. A small tool-room and office inclosed in a sheet-steel and wire-mesh partition occupies one corner of the millroom. A gallery extending approximately the full width of the millroom serves for the employees' locker room and lunchroom, and toilet facilities. One end of this gallery is also occupied by the templet room, and adjoining it is the space provided for the indirect radiation auxiliary heating system. The equipment in the cabinet shop consists principally of benches and facilities for gluing and finishing cabinet work. By separating the cabinet shop from the millroom, it is kept free from the dust and dirt incident to the use of wood-working machinery.

The floor construction in the wood-working shop, as well as in the other shop buildings, is somewhat unusual, being a combination of concrete, wooden block and asphaltum. In the millroom each wood-working machine is surrounded with an asphalt-finished floor extending 3 ft. out from all sides. The remainder of the floor is of reinforced concrete with a sidewalk finish, the idea in employing this construction being that the concrete aisles would furnish a smoother surface for trucking and handling materials to the various wood-working machine tools, while the asphalt slabs surrounding each machine would make them more comfortable for the operators. In the cabinet shop and on the balcony the entire floor is surfaced with a 1-in. asphalt finish, since the trucking and handling of heavy materials over these floors will occur only on rare occasions.

All wood-working machine tools are driven from motors in the basement below the millroom, where also are installed the conduit carrying the power circuits to the various tools, the main and return pipes in the heating system and the shaving and refuse exhaust system. A single track enters the wood-working shop from the transfer table beside it. The center of this track is parallel to the millroom wall opposite the cabinet-shop partition, and it is planned to use the 32-ft. aisle between this track and the building wall for the storage of lumber.

ERECTING SHOP ARRANGEMENT

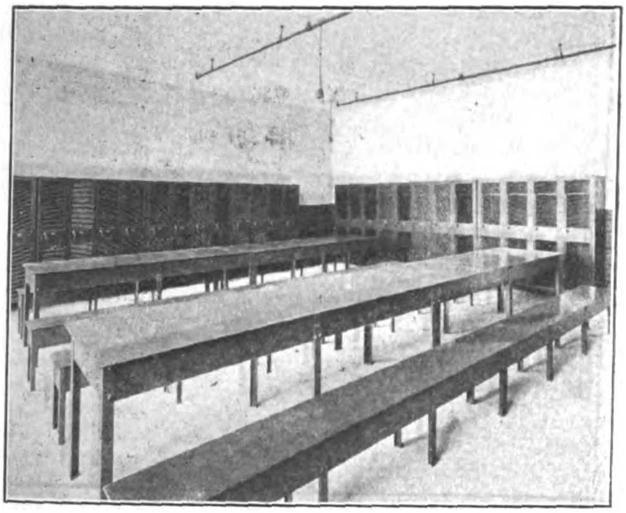
Across the transfer-table pit from the wood-working shop is the combination erecting and machine-shop building. This is the largest building in the shop group, as it is 184 ft. x 342 ft. in dimensions. The area is divided into three rooms, of which two compose the erecting shop, one being for taking care of light body repairs which cannot be done at the operating stations, and the other being for general overhauling purposes. The third room is set aside for the machine shop. The



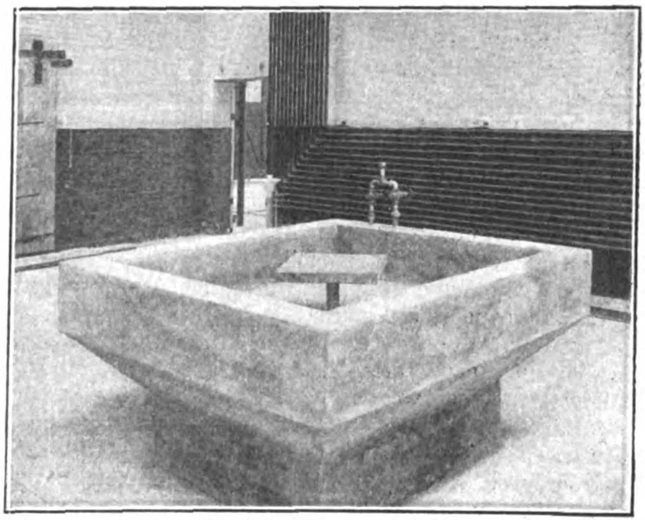
CLEVELAND SHOPS—INTERIOR VIEW OF PAINT SHOP light-repair section is 102 ft. wide by 184 ft. long and contains six tracks. Two of these tracks are constructed with inspection and repair pits extending the full length of the building, except for 6-ft. aisles at each end. The tracks in this section are spaced at 16-ft. centers, and the floor area is clear except for a single row of columns down the center aisle.

The erecting shop proper is 152 ft. 6 in. wide by 184 ft. long and is served by seven tracks extending entirely through the building. Six of these tracks are on 16-ft. centers and the seventh passes through the center of a 51-ft. aisle which is set aside for the storage, cleaning and repairing of sashes, doors and seats. The space allotted for storage and the various light-repair operations has been carefully laid out. Equipment in this portion of the general erecting shop largely includes wood benches in sizes which will best accommodate the work to be handled on them. Inclosed in brick partition walls at one end of this space is the varnish-remover room. Beside it, in sheet-steel and wire-mesh partitions, are a small storeroom and office. On a balcony above the storeroom and office, and also extending over a portion of the sash, door and seat-repair floor, is the lunch and locker room, and employees' toilet facilities.

The floors in the intermediate or general overhauling sections of the erection shop are of concrete with a sidewalk finish of cement, while those in the storage and repair department are creosoted wood block, except in the aisle occupied by the track entering this department and in the transverse passageways between the two erecting shop sections. Wood block was employed because a resilient floor was desired, and it was believed that asphaltum would not stand up under the rough usage common to the work to which this space was devoted.



CLEVELAND SHOPS—INTERIOR VIEW OF LUNCH AND LOCKER ROOM



CLEVELAND SHOPS—VIEW OF CONCRETE SINK FOR WASHING SASH

A machine shop 86 ft. 9 in. wide by 184 ft. long forms the third section in the erection-shop building. A single track passes down the center of this shop from the transfer table between the erection shop and the paint shop. The heavy machine tools, embracing the wheel lathes, presses and boring mills occupy the space on each side of this track. The machine tools for handling the lighter work are installed on a balcony 15½ ft. wide and occupying one side and one end of the machine shop. A portion of this balcony at one end is utilized for the employees' quarters.

In order to facilitate the work of handling heavy repair parts, the machine shop is served by an overhead traveling Toledo crane of 5-ton capacity, and in addition each machine tool handling heavy parts is served by a jib crane. A rather unique feature in connection with the crane installation is the special traveling jib crane, which serves the wheel press and a lathe. This is mounted on the partition wall between the machine and erecting shop and has a traveling range sufficient to permit it to serve both tools. By the use of the traveling jib crane it was possible to avoid columns in the space between the wheel press and lathe and the track. and at the same time one crane serves both tools.

The overhead traveling crane in the machine-shop section spans the entire width of the building, and. therefore, serves both the first floor and the gallery. Ample vertical clearance in the machine shop has been provided by increasing the height of this section of the building, so that the distance between the underside of the roof and the floor is approximately 45 ft. This provides a clearance between the crane rail and the floor line of 21 ft. 8½ in. As in the wood-working shop there is also a basement in the machine shop, so that all machine tools can be equipped with underdrive motors.

PAINT-SHOP LAYOUT

The third building in the general shop layout that is at present completed and ready for occupancy is the paint shop, which is just across the transfer-table pit from the erecting shop. In plan the paint shop is 184 ft. x 294 ft., and this area is divided into three sections—two for use in painting cars and a third for car washing. Fourteen tracks on 16-ft. centers pass through this building, six through each of the two paint-shop sections and two through the washroom. The paint shop proper is arranged somewhat like the erecting shop, having an area embracing six tracks on either side of a 50-ft. aisle where miscellaneous parts such as signs, fenders and sashes are cleaned and painted. One end of this aisle is occupied by a paint-mixing room, which is inclosed in brick firewalls, and there is also a storeroom and a small office. Above these is a balcony occupied by the employees' quarters.

Concrete floors have been provided throughout the paint shop, and these, like the firewall and metal-clad doors between the two paint-shop sections, effect a reduction in the insurance rate. Although the buildings are built almost exclusively of concrete, steel and brick, sprinkler systems are provided in all the shop buildings and these also effect a substantial reduction in the insurance rate. All lunchrooms and locker rooms are fitted with steel furniture. Sanitary drinking fountains have been installed throughout all of the buildings.

A rather unique feature in the paint-shop building is the concrete sash-scrubbing basins, of which there are two. One of these basins is shown in one of the accompanying illustrations, and it will be seen that it is of a rectangular section and provided with a small pivoted wooden platform in the center. Sashes are laid on this small platform and a goose-neck shower fixture, extending above from the pipe connection, serves to spray hot water over them.

The importance of these shops and their many interesting and ingenious details make them worthy of extended description, and a later article will include an account of the remainder of the buildings and of the many unique labor-saving devices which have been installed in the various departments. The design and general layout were in the hands of Morrow & Cross, civil and architectural engineers of Cleveland, under the supervision of Terrance Scullin, master mechanic Cleveland Railway. All of the buildings but not the tracks were constructed by W. I. Thompson & Son Company, general building contractors, of Cleveland.

One Year of Baltimore's Pension System

President House Sends Personal New Year's Letter to the Pensioners, Accompanied by a Framed Service Certificate and a Pass Book

In January, 1914, the United Railways & Electric Company of Baltimore inaugurated a pension system, under which employees who have rendered long and faithful service are retired after having reached an age necessitating relief from duty, or when through physical disability they are unable to perform the duties of their position. The plan is as follows:

All employees, other than those on salary, are subject to the following pension provisions:

Those who have attained the age of seventy years, whether incapacitated or not.

Any employee sixty-five to sixty-nine years of age who has become incapacitated.

Any employee who has not reached the age of sixty-five, but who has been in continuous service for at least thirty years, and who has become incapacitated, may be retired with the amount of pension as fixed in paragraphs (*c*) or (*d*) below.

Any employee after twenty years of continuous service if physically or mentally disabled in the company's service.

The pension allowances are as follows:

(*a*) If in continuous service twenty years and less than twenty-five years, 30 per cent of the average monthly wage received during the ten years immediately preceding retirement.

(*b*) If in continuous service twenty-five years and less than thirty years, 35 per cent of the average monthly wage received during the ten years immediately preceding retirement.

(*c*) If in continuous service thirty years and less than thirty-five years, 40 per cent of the average monthly wage received during the ten years immediately preceding retirement.

(*d*) If in continuous service thirty-five years or more, 50 per cent of the average monthly wage received during the ten years immediately preceding retirement.

The entire expense is borne by the company, and the announcement of the system evoked most favorable comment from the press, as well as from the company's employees. As is well known, a pension system obviously tends to encourage employees to remain in the service long enough to develop capacity and acquire experience. The resulting efficiency is reflected in the service afforded and is, therefore, of direct interest to the riding public.

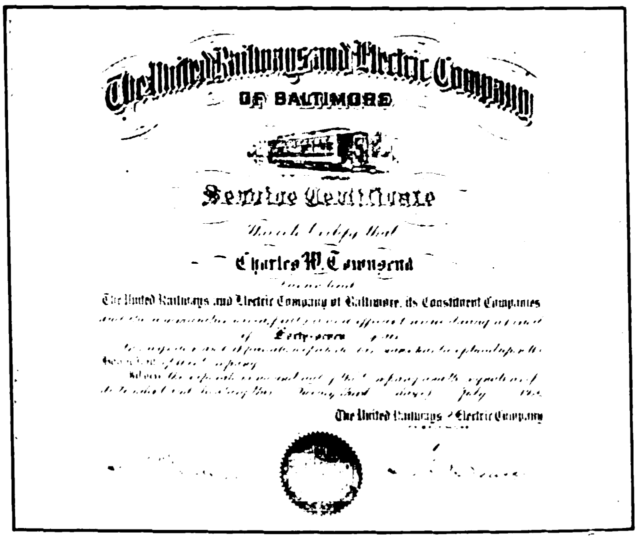
It was determined after inaugurating the pension plan to spare no pains or expense in providing a certificate of service to be presented to each retired employee placed upon the company's honor roll. The company has succeeded in devising what it believes to be one of the most attractive that has come under its observation. The accompanying cut shows one of these service certificates, but unfortunately a reproduction cannot bring out the full beauties of the original.

The courtesy of free travel over the lines of the company's system has also been extended to these honor men, with an invitation to make liberal use of the privilege and to bear in mind that they were still considered "one of the family."

After a successful operation of the pension system for one year, a suitably framed pension certificate of the character named, together with pass book and the following individual letter, was delivered at the home of each retired employee:

"At the close of the first year of the company's pension system, it would seem but proper to hand to each man who is enrolled upon the list of honor a testimonial in recognition of the long, faithful and valuable services rendered.

"In all my official connection with the company, no action taken by the board of directors has given me greater pleasure than the inauguration on Jan. 1, 1914, of this pension system.



The United Railways and Electric Company
OF BALTIMORE

Service Certificate

Charles W. Townsend

The United Railways and Electric Company of Baltimore, its Constituent Companies

Forty-seven

The United Railways & Electric Company

FORM OF SERVICE TICKET PRESENTED TO ALL PENSIONERS OF THE COMPANY

"While unable to engage actively in the work to which you have heretofore been assigned, we still feel that you are one of us and interested in the success and prosperity of the company. It is with much gratification, therefore, that I am handing you a pension certificate in your name, suitably framed, evidencing to yourself, family and friends your efficiency and loyalty to the interests of the company you have served, as well as a book of travel for your use at such times as you may find it necessary to use the lines of the company's system, renewable when coupons are exhausted.

"Hoping the New Year may have in store for you and those dear to you many good things, and expressing the fullest appreciation of your services, believe me,

"Very sincerely,
"WM. A. HOUSE, President."

One of the men, Charles W. Townsend, whose certificate is the one reproduced, was in active service forty-seven years, having been retired in July, 1914.

It has been a source of much gratification to President House to learn of the appreciative and cordial manner in which the men received their certificates, transportation and New Year greetings from the management. In most part they were deeply affected and were unable, because of emotion, to express their appreciation of the honor bestowed upon them. One old section foreman referred with pride to his record of always looking after the company's interests in seeing that all replaced material, such as bolts, nuts, plates, etc., was carefully gathered up and forwarded to the scrap pile. The management feels rightly that such loyalty cannot be purchased, and that in honoring men of that caliber the company is honoring itself.

Winter Meeting of the Illinois Electric Railways Association

The Meeting Was Devoted to the Presentation and Discussion of Committee Reports—F. E. Fisher, Joliet, Was Elected President

The Illinois Electric Railways Association met in Chicago on Jan. 15. Nearly 100 members and guests discussed the committee reports and were entertained at luncheon. The chief features of the meeting were discussions of the reports of the traffic committee on a state interurban map, and of the block signal committee on highway crossing protection, which was illustrated.

After President B. I. Budd had outlined briefly the work which the executive committee had carried on during the past year, Frank E. Johnson, Ohio Brass Company, chairman of the membership committee, reported that all the roads in the State except four were now members of the association. Ten had joined during the year. The report of the traffic committee, prepared by Richard Breckinridge, Aurora, Elgin & Chicago Railroad, was next read. This had to do with interchangeable coupon mileage books. In the discussion T. W. Gregory, East St. Louis & Suburban Railway, asked for a committee discussion on how the 2-cent fare law would affect the method of collection for local stops. The law just states that 2 cents per mile may be collected, but does not provide for cross-country "convenience" stops.

COMPANY SECTIONS

President Budd, in acknowledging the report of the program committee presented by Chester Willoughby, Illinois Traction System, spoke of the value of company sections of the American Electric Railway Association. He said that following a paper on company sections presented at an earlier meeting of the Illinois association, the Chicago Elevated Railways had formed a company section which since had held two successful meetings. He was now certain that this section would be valuable to the individuals participating in its programs and to the railway companies.

STATE INTERURBAN MAP

Eugene E. Soules, Illinois Traction System, reported for the publicity committee and displayed several maps that had been made ready for final correction and approval by the association. The committee had considered plans for three maps: (1) A small map showing the State outline and the properties therein, including member and non-member companies. This map was designed for printing on the backs of letterheads of all companies. (2) A map 30 in. x 18 in., to include the steam railroads and packet lines offering connections with the interurban lines. (3) A map approximately 36 in. x 50 in. for advertising purposes, to be printed in three colors and to show all steam and electric railways. The association instructed the committee to proceed with the execution of the work and to have the master plates ready at the earliest possible moment.

The publicity committee also reported that the Chicago Elevated Railways, acting as a central information bureau for the interurban lines of the State, had, during the summer, distributed on the elevated railway platforms the folders and other publicity literature of nine separate railways. The committee suggested a joint publicity booklet for all association roads and mentioned the desirability of a central information bureau in Chicago at a location such as the Fifth Avenue terminal of the Aurora, Elgin & Chicago Railroad.

ELECTIONS AND COMMITTEE APPOINTMENTS

The following were unanimously elected to the positions named: President, F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway; first vice-president, J. R. Blackhall, general manager Chicago & Joliet Electric Railway; second vice-president, A. J. Purrinton, general superintendent East St. Louis & Suburban Railway; executive committee, B. I. Budd, president Chicago Elevated Railways, chairman; E. C. Faber, second vice-president and general manager Aurora, Elgin & Chicago Railroad; H. E. Chubbuck, vice-president executive Illinois Traction System; W. C. Sparks, general manager Rockford & Interurban Railway; Frank J. Baker, vice-president Middle West Utilities Company, and C. F. Handshy, assistant general manager Illinois Traction System.

President-elect Fisher appointed the following committees to act during 1915: Membership—Frank E. Johnson, Ohio Brass Company, chairman; W. M. Brown, Central Illinois Traction Company; Ralph G. Arnold, Elgin & Belvidere Electric Company. Traffic—Richard Breckinridge, general freight and passenger agent Aurora, Elgin & Chicago Railroad, chairman; C. C. Shockley, general freight and passenger agent Rockford & Interurban Railway; W. P. Patten, Illinois Traction System; A. M. Farrell, chief clerk traffic department Chicago, Ottawa & Peoria Railway; T. W. Gregory, general passenger agent East St. Louis & Suburban Railway. Signals—John Leisenring, signal engineer Illinois Traction System, chairman; E. F. Gould, electrical and mechanical engineer Aurora, Elgin & Chicago Railroad; W. F. Carr, engineer maintenance of way and overhead construction Chicago, Ottawa & Peoria Railway; B. J. Fallon, engineer maintenance of way Metropolitan West Side Elevated Railway; G. T. Seely, assistant general manager Chicago Elevated Railways; L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL. Program—W. V. Griffin, secretary and treasurer Chicago Elevated Railways, chairman; Dr. H. E. Fisher, Chicago Elevated Railways; Miles B. Lambert, Westinghouse Electric & Manufacturing Company; H. J. Kenfield, president *Electric Traction;* L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL. Publicity—E. E. Soules, manager publicity and advertising Illinois Traction System, chairman; W. H. Heun, superintendent of transportation and claim agent Chicago & Joliet Electric Railway; C. E. Patten, general agent Chicago Elevated Railways; J. M. Strasser, vice-president Illinois Light & Traction Company; Thomas J. Dawson, attorney.

HIGHWAY CROSSING PROTECTION

John Leisenring, Illinois Traction System, chairman of the block signal committee, presented the report of the committee on highway-crossing protection. An abstract of the report will be found elsewhere in this issue. He stated that Carl P. Nachod had prepared for the committee a treatise on the fundamentals of highway-crossing alarms and their control, which was available for the use of the member companies on requisition to Mr. Leisenring. In the discussion after the report some of the features brought out were the need for more uniformity in aspects, and the desirability of more study of the need for a tell-tale indication to inform the motorman of an approaching car whether or not the highway-crossing signal was operating properly.

Highway-Crossing Protection

Abstract of the Report of the Block Signal Committee of the Illinois Electric Railways Association Presented at the Meeting in Chicago on Jan. 15

At the winter meeting of the Illinois Electric Railways Association John Leisenring, chairman of the block signal committee, presented an exhaustive report on highway-crossing protection. After outlining briefly the general situation the report gave the results of observations, made by a number of steam railroads, of the extent to which pedestrians and drivers take precautions for their own safety when about to cross tracks. The report then described and illustrated the available crossing signals and protecting gates and gave data on their installation, operating and maintenance costs. Data as to the present practice of the member companies in highway crossing protection were given in conclusion. The following paragraphs contain abstracts and paraphrases of much of the report.

In 1874 the Illinois Legislature first ordered the erection of highway-crossing warning signs. On Oct. 4, 1913, the Governor held an executive conference with officers of steam and electric railways of the State to plan for co-operation of railway, State, county and township authorities in minimizing grade-crossing hazards. Laws have been passed in several states requiring protection of railway crossings over state-aided highways. In Canada the railway commissioners have for five years had authority to draw upon a fund of $200,000 per year for the abolition of grade-crossing hazards and have issued 161 orders for bells, sixty-eight for gates, sixty for subways and bridges, fourteen for highway diversion and two for highway closing.

STEAM RAILWAY METHODS AND EXPERIENCES

The Chicago & Northwestern Railway is erecting at all dangerous and obscure highway crossings additional crossing signs 400 ft. from the track, for the purpose of giving advance warning. The company's safety bulletin requests suggestions from employees as to crossings at which such signs should be erected. In 1913 and 1914 the Southern Pacific Company made observation tests at crossings in widely-separated localities in Nevada, California and Oregon with the results shown in the accompanying table. After the first tests had been made a campaign of publicity was started in every town traversed by the line, and in this campaign the figures obtained by the test were employed to excellent advantage. Literature of the warning sort was distributed very thoroughly, and the railroad employees were requested to report instances of carelessness on the part of automobile and motorcycle drivers, together with license numbers, to their superintendents. Superintendents had been provided with copies of the State automobile registration lists and took up the individual cases of carelessness with telling effect. The campaign was carried into the schools by division officials. To determine the effect of this campaign, observation checks were made at the same crossings eight months after the original tests were made, with the result indicated in the table.

Tests made by the Illinois Central Railway show that more than 75 per cent of the people passing over crossings at congested points pay little or no attention to the approach of trains. In this connection the chairman of the general safety committee of this road states that he believes a great many people depend on their hearing rather than on their eyesight to detect the approach of trains.

Investigation made by the Pennsylvania Railroad and by the New York Central lines show that about 5 per cent of the persons using the crossings stop, look and listen, while the results obtained by the Baltimore & Ohio Railroad in a total of nearly 30,000 observations were as follows: Nine-tenths of 1 per cent stopped and looked in both directions, 14.9 per cent kept moving and looked in both directions, 26.9 per cent kept moving and looked one way only, and 57.3 per cent kept moving and looked straight ahead. The observations of the Southern Pacific, before that road's campaign of publicity, showed that almost exactly the same percentages hold for those who stopped and looked in both directions and those who kept moving and looked straight ahead. After the Southern Pacific educational campaign this latter percentage was reduced from 58 to 27, that is, half of the people who previously paid no attention to the condition of the track later stopped, looked or listened.

PROTECTIVE METHODS

The protective methods that may be followed in making a crossing more safe for the passage of trains and highway traffic involve the following fundamentals:

Kinds of Protection

Improvement of physical conditions surrounding crossings: Grade separation; realignment of highway to give better vision; reduction of time vehicles are on crossings and decrease of installation and maintenance costs; removal of obstructions to view of approaching trains, such as hedges, brush, trees, buildings, fences, billboards and embankments; improvement of highway profile.

Installation of protective apparatus: Barriers, i.e., gates and watchmen; signals, i.e., signs and alarms.

As the methods for improving the physical conditions surrounding crossings are so well known the subjects of crossing alarms and barriers are taken up directly.

HIGHWAY CROSSING SIGNALS

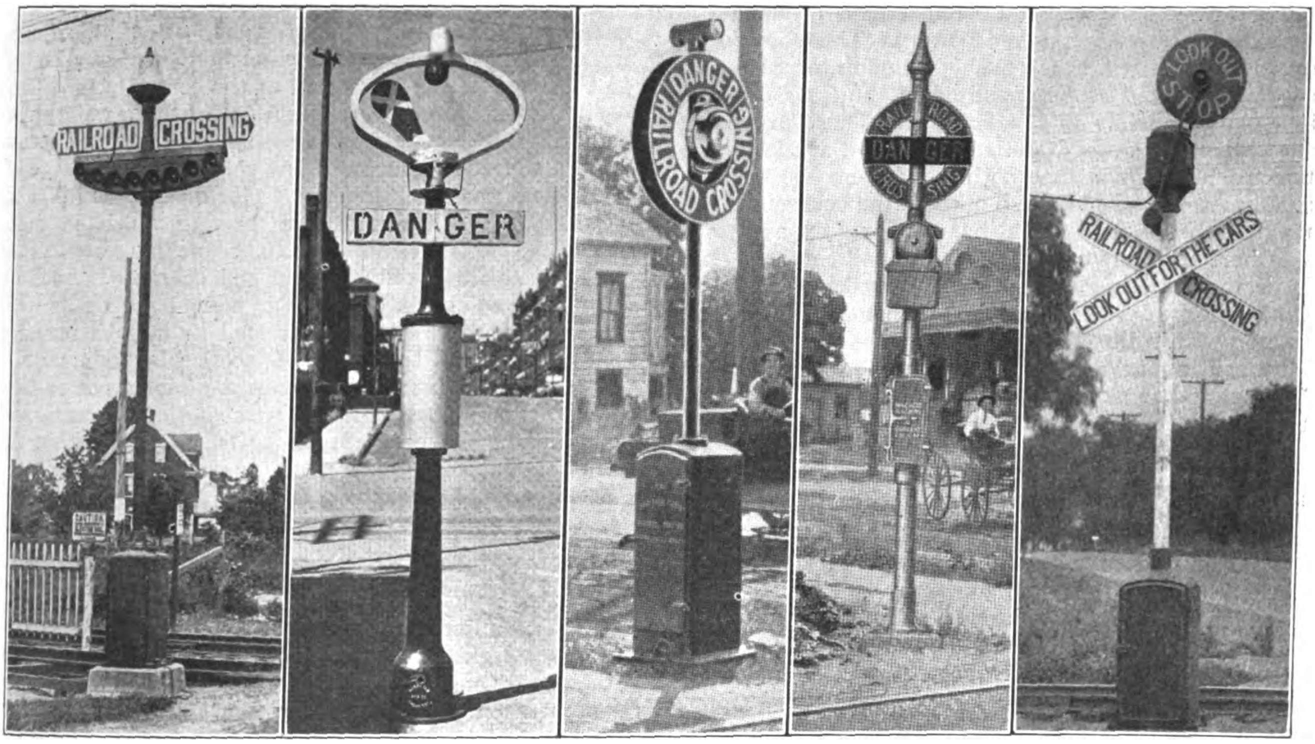
An editorial in the ELECTRIC RAILWAY JOURNAL of July 11, 1914, presented some of the fundamentals controlling the choice and installation of highway crossing protection systems. Highway crossing signals perform two functions; they designate the location of crossings and announce the approach of trains to the crossings. A simple form of signal for informing the traveler on the highway that he is approaching a railroad intersection is the old-fashioned "stop, look, listen" signboard.

REPORTS OF SOUTHERN PACIFIC COMPANY'S OBSERVATIONS AT HIGHWAY CROSSINGS

Actions of Pedestrians or Drivers Previous to Crossing Tracks	Automobiles				Teams				Pedestrians				Total			
	1913		1914		1913		1914		1913		1914		1913		1914	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent.	No.	Per cent
Stopped and looked in both directions	35	1	139	1	....	..	....	..	....	..	.....	..	35	1	139	1
Kept moving and looked in both directions	4,734	28	8,401	51	2,546	52	9,171	52	2,268	36	35,569	65	9,548	34	53,141	60
Kept moving and looked one way only	416	2	2,255	14	417	8	2,595	14	951	15	5,680	10	1,784	6	10,530	12
Kept moving and looked neither way	11,836	70	5,686	35	1,926	40	5,989	34	3,082	49	13,586	25	16,844	59	25,261	28
Ran over crossing at reckless rate of speed	3,301	19	446	3	....	..	....	..	....	..	.....	..	3,301	..	446	..
Total	17,021		16,481		4,889		17,755		6,301		54,835		28,211		89,072	

Somewhat similar boards are now being used as distance signals for crossing bells. The announcing of an oncoming train is more difficult of performance. Among the more common types now available for installation on electric railways are the simple illuminated crossing sign, the intermittently illuminated sign which gives repeated flashes of light, the signal with moving parts imitating the waving or swinging of a red blade or flag, and various combinations of these aspects, all designed to be arrestive. Combined with these visible indications are audible indications such as bells, gongs and sirens.

The prime requisite in a highway-crossing signal is reliability. The signal should be so controlled that the train, passing certain limits by virtue of being within a certain section, will cause itself to be announced at the crossing. There are two forms of such control, intermittent and continuous.


RAILROAD CROSSING
DANGER
DANGER RAILROAD CROSSING
RAIL ROAD DANGER CROSSING
LOOK OUT STOP
RAILROAD LOOK OUT FOR THE CARS CROSSING

HIGHWAY CROSSING PROTECTION—TYPICAL CROSSING SIGNALS

From Left to Right—Brach Automatic Flagman, Hoeschen Magneto-Mechanical Signal, Protective Oscillator Signal, Nachod Flashlight and Bell Signal, and Railway Specialties Company's Wigwag Signal

With the intermittent control the electrical signal release is actuated either by the passage of the car wheels or the trolley wheel past some setting device. One car-wheel type of control is the old-style steam-railroad-track instrument, a short insulated-track section or a contact bar placed adjacent to the rail and so located that the flange or tread of the wheel will touch it. Another successful type is that in which the control is obtained by the movement of the rail, which in one make of signal is mechanically multiplied and drives a small generator, which in turn supplies an electrical impulse to release the bell. In another type the movement of the rails opens or closes balanced contacts attached to the base or side of the rail. By each of these intermittent-control devices the highway-crossing signal is started and stopped by the passage of any car, whether it is a motor or not.

The second and very common form of intermittent control, i.e., the trolley-contactor type, is obtained by the trolley wheel passing along the wire, the wheel either mechanically throwing a switch or electrically making a contact.

Contrasted with these intermittent forms of control is the continuous control obtained with track circuits, in which are connected interlocking relays that in turn energize the crossing bells and lamps whenever a car is passing through or standing within the block.

A second feature of importance in highway-crossing protective apparatus is continuity of signaling. For example, if more than one train should enter the ringing limits at one time and, later, one should pass out or both stop for some time and then proceed across the highway, the signal must warn against the last as well as the first crossing. Thus car-counting devices are an important feature in the intermittent scheme of control. It is important to so arrange the device that if several cars are near the crossing simultaneously, the bell will continue ringing as long as there is one car inside the control zone. The continuous track circuit performs this function in the ideal way, but is little used on an electric railway because of its high first cost. With trolley-contact and mechanical-rail controls continuity may be approached by placing extra contactors or restarters between the first starter and the crossing. When trains entering the protected zone do not proceed directly over the crossing, devices have been installed so that the bell will stop ringing after a predetermined time. An additional instrument or contact insures that, in a case of this kind, warning will be given when the train again proceeds. This feature makes possible the use of bells near residences where they might otherwise be objectionable.

TYPES AND COSTS OF CROSSING ALARMS

As there is such a wide variety of crossing alarms, all available for use on electric railways, brief descriptions of the various types will be presented. Space and time limit the descriptions to the chief characteristics of each type mentioned, the principal features being the method of control, the kind of indication given and the method of giving the indication.

The following manufacturers supplied the committee with information about their crossing signals designed for and now in use on electric railways: L. S. Brach Supply Company; Hoeschen Manufacturing Company;

Protective Signal Manufacturing Company; United States Electric Signal Company; Nachod Signal Company, Inc.; Railway Specialties Company, and Automatic Signal & Appliance Company. Other companies which have electric railway crossing signals in process of development but not yet installed in actual service are: Union Switch & Signal Company; Chicago Railway Signal & Supply Company; Bryant Zinc Company; Railroad Supply Company, and Handlon-Buck Manufacturing Company.

BRACH AUTOMATIC FLAGMAN

This signal combines audible and visible indication. For the former a locomotive bell is used, the loudness being adjustable. The visible indication employs a moving red light to convey the impression of danger by representing a swinging red lantern. The effect is produced by moving a brush over a commutator furnishing current to eight lamps, mounted in the form of an arc and plainly visible in the daytime. These are lighted successively backward and forward, and are located between lenses which face both ways from the track. A small motor is employed to operate the commutator and ring the bell. This signal has no parts exposed to the weather. For the control a type of rail contact is used. If desired, a time-element cut-out may be used also as a car-counting device. The time-element permits a train to stop within the control limits without having the bell ring continuously, and the counter allows one train to follow another closely over the crossing, both operating the signal.

HOESCHEN MAGNETO-MECHANICAL SIGNAL

This signal is actuated by a powerful spring motor wound by the natural movement of the track rail, which is transmitted to the winding mechanism by means of a connecting rod and plunger lever resting against the base of the rail. The starting control apparatus is not in any way connected with the trolley or transmission circuit, this particular feature being considered as one of the chief advantages. The small electric impulse necessary to unlatch the bell when a car passes the control point is generated in a piece of apparatus also connected with the track rail and actuated by the depression of the rail as the car passes the control point. The generator consists of a laminated permanent magnet, through the poles of which two generating coils are bolted. A keeper placed across the faces of these two poles is operated by a lever clamped to the base of the running rails in such a way that the rail is twisted and its gage line raised about ⅛ in. above normal surface. When a car passes the rail is depressed to its normal level, and the lever connected with the base of the rail kicks the keeper away from the pole faces of the coils which are attached to the permanent magnet. This breaking of the magnetic circuit generates an electrical impulse which is sufficient to unlatch the bell-ringing, spring-actuated motor. The passage of the car by the crossing bell and the automatic winding due to the depression of the rail at the bell cut out the ringing mechanism.

Some of the features emphasized as of particular value to electric roads are that no battery or trolley or high-tension connection is necessary, and that neither the rail bonding nor the block signal track circuits are interfered with. As the car itself actuates the control, the bell will operate equally well whether or not the train is motor or engine-driven or whether or not the trolley is on the wire.

The indications available include the swinging bell, an illuminated sign reading "Danger," and a set of red and white semaphore blades which wave through an arc.

The Illinois Traction System has recently installed at Champaign, Ill., a so-called silent crossing signal equipped with two oscillating blades and a flashing red danger sign 4 ft. long. This signal is placed within the city limits where the noise from a loud bell might be objectionable. Diagonally across the tracks is an illuminated sign reading "Railroad Crossing," the word "Danger" being shown also in red when a train is crossing. Others of the same type will be similarly installed.

PROTECTIVE SIGNAL MANUFACTURING COMPANY'S SIGNAL

The feature of this company's crossing signal is the simplified form of oscillator control. The oscillator acts on the push-button principle in opening or closing the control circuit, which, in turn, actuates a relay that energizes the bell, lamps and display features. The oscillator is a horizontal, weighted vibrating member with a contact point at its free end. It and its adjusting devices are inclosed in a waterproof iron box clamped to the base of the track rail at the control point. The oscillator is connected to the line through a waterproof conduit in which the leads are encased. It is in a series with a source of energy of low voltage. The passage of a car over the track imparts a vibration to the rail, and starts the vibrating member moving which, in turn, opens the control circuit within the oscillator case. This causes the line relay to drop and energize the bell or signal. The oscillator is not connected electrically with the return propulsion circuit and so may be installed and operated in the midst of interlocking or other circuits. It requires no adjustment of the track or ties. Bells are supplied with and without time-elements, and any number of oscillators may be installed within the control zone to obtain restarting control. An oscillator at the signal location serves to cut out the bell when the train passes the highway. The signal is made with both audible and visible indication, as desired.

UNITED STATES ELECTRIC CROSSING SIGNAL

This equipment consists of a crossing bell, with or without lights and semaphores, and three trolley contactors. One contactor is located at the crossing and one at each distant starting point. The contactors are directional in operation and the control is designed to provide for two cars passing through the control section at the same time. This crossing signal is operated by trolley current and its parts are standard with those of the United States trolley contactor block signal system. Also, provision is made for indicating to the motorman of an approaching car that the signal is operating.

NACHOD CROSSING SIGNAL

This signal has trolley contactor control and is fed from the trolley circuit. Three contactors, which are without moving parts, are used, the starting contactors being directional. The apparatus is standardized with that of the Nachod automatic block signal system. The control is such that cars may pass through the control zone in any manner, and so long as one remains between the starting contactor and the highway, the bell continues to ring. The bell is mounted at the top of the case which contains the oil-immersed relay and other moving parts. The danger sign, electrically illuminated, is flashed by a make-and-break contact on the bell clapper. If desired a motorman's indicator is provided.

RAILWAY SPECIALTIES COMPANY'S "WIGWAG"

This signal is used in large numbers by the Pacific Coast electric railways, one road having installed 112 of them. The signal may be mounted either on a post or on a cantilever bracket projecting from a post. The signal itself consists of a disc 26 in. in diameter and painted red. Upon it is the legend "Stop, Lookout."

At the center is an electrically illuminated red bull's-eye lens, and attached to the mechanism case is a 12-in. gong.

When in operation the red disc is waved back and forth through an angle approximately 60 deg. and at the rate of seventy-two strokes a minute, thirty-six each way. At the same time the bull's-eye lens is illuminated, at night presenting a waving red light in place of the disc. While the flag and the light are in motion the gong is sounded at the same rate as the oscillation of the disk. The gong, however, can be cut out if desired.

For electric operation the open circuit is employed, a contactor being placed at any desired distance on the trolley wire or on the third-rail. This diverts current to a high-voltage relay at the signal, thereby cutting in the power from the main conductor to the mechanism. A similar contactor, placed at the crossing and connected to the opposite side of the relay, opens the circuit as the train passes the crossing.

THE "AUTOMATIC" CROSSING BELL

This crossing bell is operated by trolley current and controlled by an insulated track circuit, one rail only being insulated, leaving the other for the return trolley current. The length of the insulated rail is determined by the speed of the cars at the crossing to be signaled, but usually extends from 900 ft. to 1500 ft. in the direction of approaching traffic. The rail section terminates at the crossing.

On single track an interlocking relay is used so that the bell rings only when cars approach the crossing. A dry battery is used to operate the track circuit in connection with a small track relay, thus assuring the continual ringing of the bell while one or more cars occupy the insulated rail. When a visual signal is desired a lighthouse type of illumination is provided by mounting lamps in front of reflectors and revolving a pair of such lamps on a vertical shaft driven by a small motor.

TYPES AND COST OF GATES AND WATCHMEN—MECHANICAL CROSSING GATES

While gates and watchmen have been used for a longer period than any of the devices described, the development and recent large use of the crossing signals indicate that the older practice was not entirely satisfactory. Watchmen were almost without exception men old in a company's employ, and the service given by them was incomplete and undependable. At the same time the cost was excessive, varying from $25 per month for a single shift crossing protected only during the daytime to from $50 to $80 per month for crossings requiring protection during the entire twenty-four hours.

Crossing gates have a place which cannot be filled by any form of warning signal alone, but their use is confined mostly to busy street crossings in or adjacent to towns or villages or to main thoroughfares in thickly-settled suburban districts. They are expensive to install and maintain, and until very recently required, without exception, attendants to operate them if satisfactory service was to be derived. Automatic gates have been little used on account of the danger of their dropping on vehicles or trapping vehicles on the crossings between them.

The chief disadvantage of the gate is its cost, which has absolutely precluded its use for such crossings as the average interurban railway desires to protect.

Manually-controlled gates are divided into four classes: mechanical, pneumatic, electric and wire connected, the last-named being in a general way included with the first named.

There are two classes of such gates, known as lever and crank gates, respectively. The use of the lever type allows the operator to be placed in a tower or on the street level, while the crank type requires him to stand at one of the gate posts. Connections between gates in both types are similar, motion being transmitted from the main sheave of the gate post, through a chain to a horizontal steel rod running through a pipe. This pipe is carried under ground to either the opposite gate or the operating lever stand.

The main, or street arm, casting is provided with counterweights in the form of flat round disks, which vary in weight from 10 lb. to 40 lb., each post averaging about 60 lb. The street arms are provided with hooks for suspending lanterns by night, which are replaced by small weights by day.

PNEUMATIC CROSSING GATES

Pneumatic gates are of two types—diaphragm and cylinder—and air is supplied for them by means of hand pumps or motor compressors.

In the diaphragm type one pair of gates is operated by the application of air pressure to rubber diaphragms mounted on steel bowls. To the diaphragms are connected cranks which, through chains, operate the gate arms. The air-operated gates are mechanically connected to those across the tracks.

The cylinder gates act upon the same general principle as the diaphragm gates, except that the mechanical connection between opposite arms is replaced by air pipe connection. Two cylinders replace a single diaphragm, one for down movements in turn connected with the opposite gate cylinder through an equalizing cock, and one for upward movements similarly connected. The reason for using this connection is that less air will escape over piston heads of opposite cylinders than will escape through stuffing boxes. In the installation of this type the loads on cylinders must be balanced carefully and the air-pressure load distributed equally. Drainage must also be carefully considered to avoid freeze up from condensation.

ELECTRIC CROSSING GATES

The electric gate is of recent design and few are in actual operation. In one type of motor-operated gate a ¼-hp series motor is placed in each post. A heavy roller chain runs from a socket on the motor shaft to one on a worm shaft, the worm meshing with a worm gear. A forked connecting rod is fastened on a pin projecting through the worm gear giving a central pull on it. The other end of the connecting rod is connected to the main-arm shaft. A magnetic brake is used to stop the motor instantly when the current is cut off.

The motor is operated from a small switchboard in the tower by means of a double-throw switch. In one position of the switch current flows through the motors in a direction to drive the gates upward, and when the street arms have risen to an angle of 70 degrees an automatic cut-off in the gate post shuts off power and the magnetic brake, being de-energized, locks the gate in position.

WIRE-CONNECTED CROSSING GATES

Wire-connected gates are specially adapted to high and dry locations where the gates are a short distance apart. Timber posts treated well with wood preservative are used and the cast parts are few in number and easily assembled. The main shaft is held in place by a cast-iron shaft box bolted to the post. Motion is transmitted in much the same manner as in the mechanical gate except that two iron wires replace the horizontal rod. These wires are run through pipe, filled with oil or graphite and with stuffing boxes at the ends. Chain is used on turns. Counterweights are provided on the street-arm casting, and a center stop with a coil spring minimizes the strain when the gate is lowered.

Crossing Gate Arrangement for Special Cases

On the Chicago & Oak Park Elevated Railroad, west of Laramie Avenue, trains are operated on the surface. The tracks parallel the elevation of the Northwestern Railway. On the north side is a retaining wall and on the south is the street line which compels the gateman to operate between tracks. To give him protection an enclosure 4 ft. high has been built between tracks in a parkway. Four posts are set in the ground and enclosed on three sides with dressed and matched lumber, making an enclosure 4 ft. x 6 ft.

On the Northwestern Elevated Railroad, Evanston division, people continually went under the gate arm. Simple attachments or aprons were added to the street and sidewalk arms, consisting of pine strips suspended parallel to the arms by means of strap iron. This type of apron has been adopted as standard on all lines of the Chicago Elevated Railways. "Safety first" signs, enameled red and white on No. 16 sheet steel, are placed on the outside spaces of all gate arms.

Cost Figures for Crossing Gates

The table gives the cost for installing, operating and maintaining gates of the four types described.

Type of Gate	Number of Typical Sets Taken as Criterion	Average Cost of Installation, Four-Post Set	Operation per Set Year per (average)	Maintenance per Set Year per (average)	Remarks
Mechanical ..	55	$475.00	$900.00	$30.00	(Exclusive of tower)
Pneumatic ..	319	700.00	820.00	50.00	(Exclusive of tower)
Electric	1	950.00	984.00	60.00	Estimated
Wire-operated	1	160.00	500.00	20.00	Estimated

Recent Developments in Crossing Gate Design

A recent development is an automatic gate, illustrated herewith, which does not obstruct passage over the crossing while the gate is down. It consists of an arm supported on a post located at the side of the highway, and a number of light chains depending from the arm which, in the lowest position, reach to within a few feet of the ground. The arm is operated by an electrical mechanism housed in a case at the bottom of the post. The arm itself never descends below a height sufficient for a vehicle to drive underneath it, in this way affording an easy exit from the crossing in case the arm is lowered while a passing vehicle is upon the crossing.

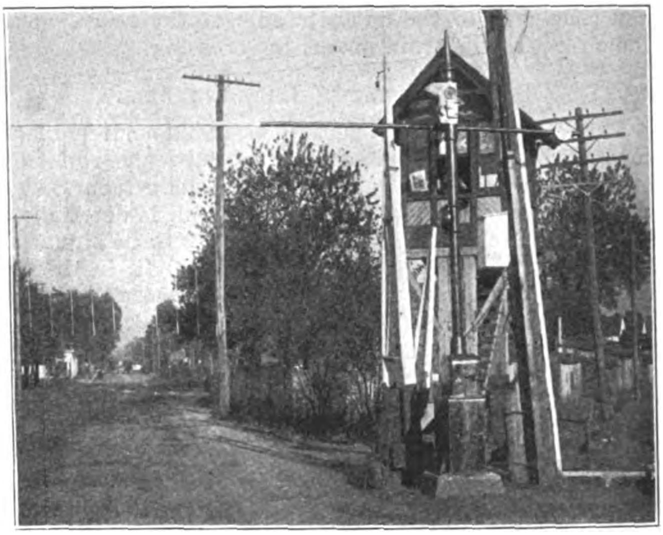
The position of the arm is an indication as to whether or not it is safe to proceed over the crossing, the chains forming a tell-tale in case the warning is overlooked. The arm is illuminated at night by means of a light placed near the top of the signal post and, in addition, a bell is rung and a red light is displayed toward the highway when a train is approaching. The control of this device can be through the medium of a track circuit, track instrument or trolley contactor.

Census of Crossing Alarms in use by Member Companies

From the data sheets sent to electric railways in the State, the committee learns that seven had crossing alarms of some nature in use, seventeen did not use them and five did not reply to the questions.

Of the roads using protective apparatus, the largest number in use on any one property was sixty-four. The total number of signals in use by the seven member companies was 166, of which number 104 were audible only, two were visual only and sixty were both audible and visual. By way of explanation it may be stated that the joint use of audible and visual indication is of much more recent development than the use of audible signals alone.

As to the method of controlling these signals, 105 were operated by track instruments and sixty-one by either trolley or third-rail contactors. Seventy-eight bells had time-limit devices to cut off the signals when a certain fixed time had passed after the giving of the impulse which originally started the signal, but those roads having the majority of installations without this feature stated that it was a desirable one. In fact, only one road stated that the time-limit device was not of considerable benefit.



HIGHWAY CROSSING PROTECTION—HIGH-ARM CROSSING SIGNAL WITH LIGHT HANGING CHAINS

Outside the State the largest crossing signal installation is one of 112 signals, of which eleven are purely visual, the balance being both audible and visual. All are controlled by trolley contactors.

Installation, Maintenance and Operation Costs of Signals

The costs obtained by the committee differed widely, due undoubtedly to varying local conditions. The average cost of installing a single-track warning signal, exclusive of the cost of the signal itself, was $110, the range being from $90 to $150.

The number of signals which could be maintained by one man varied from fifteen to fifty, the average being about forty-four. This wide difference can be partly accounted for by the fact that some roads combine the cost of signal maintenance with other signal and telephone costs, while others state the costs for bells alone.

One road, having a total of twenty-nine signals, maintained them at a monthly cost of 65 cents per bell, the data being collected over a year's operation. Another road with sixty-four signals reported the cost as $2.86 per signal per month, while some roads reported as high as $7 per signal per month. Sufficient data were not at hand to reduce this maintenance cost to a basis of a single operation. Of the two roads instanced above, the one with the smaller up-keep cost had somewhat fewer than one-third the number of operations of the road having the maintenance cost of $2.86, showing that the maintenance cost per operation does not differ greatly. The average maintenance cost from all replies received was $3.25 per bell per month, which appears to be higher than it should be.

The large differences in the figures will be better understood in the light of replies to questions as to the frequency of required inspection. Two roads inspected daily, four weekly and one every two weeks. This undoubtedly is governed very largely by the number of train movements past the crossings, as well as by other local conditions, thereby making a direct comparison of replies somewhat misleading.

Suggestions were asked as to the desirable improvements in signals, and in the replies the need for an indicating light for the motorman frequently appeared. The bettering of the indication was suggested, as was also the need for a signal which would show a green light or other proceed indication to a vehicle when no train was approaching, and a stop or danger indication when the signal was out of order.

It was found from the canvass, also, that usually, in addition to the signal itself, crossings were announced by some form of the customary crossing sign.

Finally the committee pointed out that methods of protection of highway crossings are still in the developmental stage and that no recommendations can be made at this time. It was suggested, however, that closer attention be given during future development to obtain more uniform aspects. This matter lies with the manufacturers but, in order to solve it successfully, an intimate knowledge of the railroad company's requirements is necessary and a close co-operation with the various companies is desirable.

Municipal Operation in England

Mr. Connett Points Out a Number of Its Disadvantages —Few Municipally-Operated Lines Are Successful

A. N. Connett, chief engineer and joint managing director of J. G. White & Company, Ltd., of London, has been in New York on a short visit. During his residence of eighteen years abroad, Mr. Connett has had many opportunities to observe municipal operation of public utilities. At the request of the ELECTRIC RAILWAY JOURNAL he described some of his experiences and impressions from a study of municipal ownership and operations in Great Britain.

"Unfortunate as some of the experiences of municipalities in their public utilities have been in England," Mr. Connett said, "political conditions are much better there than in this country. They do not constitute the same handicap to successful operation that political conditions impose on municipally-owned plants here. Municipal politics have always presented the worst element in politics in this country, and the extension of the activities of cities to the operation of the various public utilities here would seriously enlarge the opportunities for mismanagement, poor service and waste in expenditure.

"When a man is employed by a city in England it appears to have a very bad effect on his power of initiative and ability to develop. These are qualities that are greatly needed by managers of utilities. As a rule the men who are employed in municipal undertakings would prefer to work for corporations. As managers of municipal properties they are required to do many petty things that would not be thought necessary in corporate properties, such as to make voluminous reports at the request of an alderman or other city official who has authority to ask for information but who has not the ability and training to use it wisely when he receives it. Much of the time of managers of municipal undertakings is taken by political superiors who issue commands and requests regardless of the money and energy involved. Municipal service is deadly to energetic men. It takes the ginger out of them, and they lose their best powers of usefulness."

Mr. Connett gave several illustrations of difficulties in municipal operation. For example, in one city where his company built the tramways the manager thought he could economize a little to help overcome the deficit in earnings. He decided to replace a grown man by a boy. "Objection was raised," added Mr. Connett, "and finally a special meeting of the tramway committee and then of the City Council was called and the plan was formally rejected.

"In another English city where the municipal tramways were built by J. G. White & Company, Ltd., the rails were ordered from Belgium at a saving of £1,000 below the bid of English manufacturers. The specifications had not provided that English rails must be used. An unjust inspection was imposed by the city with the result that the Belgian rails were rejected. At a meeting called to consider the protest of the company, the technical composition of the rails was discussed. One alderman asked: 'What is this silicon that they are talking about?' Some one explained that it was something like pure sand. The alderman then commented, 'Oh, I see, them Belgians are putting dirt in the rails.' This was typical of the kind of knowledge on matters of tramway construction and operation that is sometimes found in City Councils." Continuing, Mr. Connett said:

"The fact that so many of the municipal tramways are unsuccessful creates nervous tension between the public and the management that in itself tends to prevent the introduction of measures that would produce profitable operation. Where municipally-owned plants are profitable the British public is in favor of them. Where they do not pay the public is very much disgruntled. In the entire list of municipal tramways there are very few that are successful financially.

"One unfortunate result of municipal ownership and operation in England is that towns are bound too closely by the restricted development of their tramway systems. Cities and towns often do not take in their suburbs, and the operation of their tramways stops at the corporate limits. Municipally-owned properties may have no rights to extend beyond their borders. At the border lines in many instances they meet the systems of private companies, but passengers who want to ride in the territory of the connecting line must change cars. They cannot go comfortably from one municipality or town to another or to the suburbs. The absence of facilities for convenient travel from one community to another restricts the development of the riding habit. It makes the properties self-contained to a degree that is rather fatal to the successful enlargement of tramway earnings. Much has been said about the ha'penny fare in Glasgow. The fact is that Glasgow has an area about one-half mile square in its central district in which an immense traffic exists. The ha'penny fare is good for transportation only in this limited district. A passenger who travels beyond this short zone has to pay a larger fare. The tramways in Dublin, which are privately owned and operated, are doing very well and present an excellent example of corporation efficiency and development.

"Interurban railway men in this country are likely to conclude that interurban roads in England would be very profitable. The exact reverse has been shown to be the fact. Since the riding habit has not been developed as fully in England as in this country the people appear to be contented to remain in their home towns. From a traffic standpoint the large system between Liverpool and Manchester has not worked out satisfactorily. One undoubted reason for this is that it does not reach the central districts of those cities. Owing to the unwillingness of the municipal tramway systems to permit entrance and terminals to lines of this character, the company is forced to operate from the outskirts of one city to the outskirts of the other. This is a traffic handicap that it is almost impossible to overcome.

"One difficulty about the operation of utilities in England is that government regulation adds such very heavy costs to every step. Parliament deals with almost all matters. It is necessary to have plans for Parliament and a parliamentary lawyer. It would facilitate governmental action and reduce the expenses chargeable to capital costs of new undertakings if parliamentary practices should be reconstructed and some of the powers were delegated to other smaller bodies with authority to act in restricted districts. The regulations of the Board of Trade are intelligent and cannot be considered onerous. In fact, the railway and other public service commissions might study to advantage the workings of the local government board and the Board of Trade."

The unprofitableness of municipal tramways, which Mr. Connett mentioned, is based on accurate accounting regulated by law, leaving no opportunity for misrepresentation. Overconstruction of municipal lines at the urgent representation of aldermen who have the interests of their individual constituents and not the entire community in mind is one cause of the difficulty. "The extension of municipal ownership to public utilities," Mr. Connett said, "has restricted the legitimate field of investment for private capital. It is one of the causes that has led the British to search the face of the earth for foreign company investments instead of holding their money at home. It is a handicap upon the British investor as well as upon development."

Notwithstanding the existence of municipal ownership in many communities Mr. Connett mentioned the curious fact that the water supply of London is still owned by a private company. In the plan to centralize the supply of electrical energy in London the capital will be contributed by a new company, and operation will be in its hands, although ultimate public ownership will be possible after the contract period of fifty years is ended.

"Competition from motor buses affects some of the tramways in England to a serious extent," continued Mr. Connett. "Some of the English municipal systems would be opened to tenders for operation by private companies if companies could be found that were willing to take over the deficits and risks that characterize these systems. Private capital, however, hesitates to undertake the operation of systems which have shown regular deficits year after year. There is intense jealousy on the part of managers of municipal tramways and officials towards those of private companies. They rarely join in meetings or business negotiations of any kind. This is unfortunate and it does not benefit anybody.

"The managers of municipal central stations are much farther advanced in their ideas and practices than the managers of the tramway systems. They are trying to get a satisfactory day load, and have formed the Point Five Association which is doing advanced work to develop the market."

Mr. Connett sailed for London on Dec. 30, and expected to be there only a short time before leaving for Brussels to take charge of the distribution of relief supplies to the Belgians as a vice-chairman of the Commission for Relief in Belgium.

The Utica *Press* says: "As a rule railroad employees are proverbially polite. They are asked more fool questions in a day than any other class of people, and answer them more courteously. Their patience is tried frequently and sorely, but they usually put up with it good-naturedly and let it go at that."

Convention of Western Red Cedar Association

The ninth annual meeting of the Western Red Cedar Association was held on Monday, Jan. 11, 1915, at the offices of the Lindsley Brothers Company in Spokane, Wash., President M. P. Flannery presiding. Representatives of eleven member companies were present. In his address to the association President Flannery stated that, after the last annual meeting, the piling committee had adopted specifications covering cedar piling which had been approved by the board of directors and had been universally adopted since that time. The National Electric Light Association also had included specifications on western red cedar poles in its new handbook. During the entire year, he said, posts had moved quite freely at fair prices, but at no time had there been a brisk demand for poles or piling. The stocks on hand had been very large in proportion to the amount of consumption. He believed that the putting into operation of the regional banking system would place funds at the disposal of constructive corporations and thereby stimulate the red cedar business by reason of its power to concentrate the required credit at the point where most needed.

At the election of officers which followed W. M. Leavitt of the National Pole Company, who was vice-president during the year 1914, was unanimously elected president, and E. T. Chapin, of Spokane, was elected vice-president without opposition. The association then voted for three directors, G. C. McDonald, N. C. Culver and W. M. Burns being elected. R. L. Bayne was reappointed as secretary-treasurer.

At the luncheon which followed the business session C. P. Lindsley spoke on the future of the cedar pole industry and expressed the belief that the electrification of the Butte, Anaconda & Pacific Railway and the mountain divisions of the Chicago, Milwaukee & St. Paul Railway were simply precursors of a general installation of electric power by the steam railroads. This could not but be beneficial to the red cedar industry as no pole had been discovered which could take the place of cedar. To secure the benefits of this it would be necessary for all the dealers to co-operate in urging the use of the Western red cedar pole and to work for the industry as a whole rather than for individual advantage.

During the afternoon session the directors were instructed to take means to advertise the advantage of the Western red cedar poles to the trade, particularly in the Atlantic states, where other species of poles are being used.

Bombardment of the Hartlepool Tramways

During the bombardment of Hartlepool on Dec. 16 by German armored cruisers, states the *Tramway and Railway World*, the municipal tramways suffered considerable damage. The roof of the offices was struck by a shell and a part of it was carried away. The flagstaff on top of the carhouse was splintered and a shell fell a few yards to the rear of the carhouse and buried itself in the railway embankment. Trolley wires were brought down for a distance of about 300 yd., but no poles were damaged. The windows of several of the cars in service were shattered, and a controller on one car standing in the carhouse was struck by a piece of shell which came through the window of the carhouse. One member of the office staff sustained a slight scalp wound, but fortunately no other members were injured by the bombardment.

American Wood Preservers' Association

At the Convention in Chicago Recommendations for Plant Operation, the Bleeding and Swelling of Paving Blocks, the Annual Maintenance Cost of Ties and Other Subjects of Electric Railway Interest Were Discussed

The eleventh annual convention of the American Wood Preservers' Association was held in Chicago on Jan. 19-21. During the three-day meeting a number of important committee reports were presented, including that of the committee on specifications for the purchase and preservation of treatable timber which suggested modifications of the American Railway Association's standard specifications in regard to the heartwood and sapwood requirements, the present limits for sapwood being considered unduly severe. The reports and papers are given in brief abstract form in the following paragraphs, as lack of space prohibits extended republication of the data contained in them.

RECOMMENDATIONS FOR TREATING WOOD

The committee on specifications for the purchase and preservation of treatable timber discussed the purchase of various kinds of woods with regard to the use after treatment, stating that the fundamental requirements of structural timbers intended for treatment were strength and capacity for treatment to an extent which would insure protection against decay on all exposed surfaces. A penetration of ½-in. on the heart faces was recommended as a safe minimum on structures above ground. The specifications of the American Railway Engineering Association as to general requirements for treatable timber were accepted for the present, but several modifications were suggested including in general more liberal allowances for sapwood.

The report contained an outline for the best procedure to follow in preparing timber for treatment, and gave specifications for preservatives and general methods for their application. In a summary of fundamental principles the report stated that preservative treatment should be limited to those kinds of wood which are not in themselves resistant to decay, thus making timber available which otherwise would be useless, and which is obtainable at low cost as compared with durable species. Only sound timber should be treated, as treatment will not cure decay nor defects of any kind. The moisture content of the wood before treatment should be reduced, preferably by air seasoning, to not more than 20 per cent of its oven dry weight. The temperature in the treating cylinder should never be raised above 260 deg. Fahr. in steaming, nor above 200 deg. Fahr. during oil immersion. In the boiling process the oil temperature may be increased to 220 deg. Fahr. The minimum duration of treatment, except with easily penetrated woods, should be equivalent to one hour for every radial inch on the sticks treated. All structural timber should be framed before treatment, and, in lieu of this, unimpregnated wood exposed by framing after treatment, should be thoroughly painted with hot creosote oil. All ties should be bored and adzed before treatment. Although sawn ties may have a uniform surface, the boring increases the penetration at the point where most needed. Efficiency of treatment should be based primarily on the extent of distribution of a stated amount of preservative, rather than on final retention per cubic foot. The report concluded with a discussion of regional considerations with regard to the best preservatives to be used and the best methods of application.

The report of the committee on plant operation recommended that the term "creosote" be used only to designate an unadulterated distillate of a pure coal tar, and stated that the application of this term to a mixture of creosote with any other substance, such as tar, tar oils or petroleum was misleading and bad practice. Recommendations regarding the properties and methods of use of creosote were also included. With regard to zinc chloride the report said that, since established records indicate that ½ lb. of dry chloride of zinc per cubic foot of timber is essential to insure proper protection against decay, the use of smaller quantities is not considered standard practice. All material treated with zinc chloride solution should be treated to refusal.

Ties that are stored at plant for seasoning should be stacked on treated sill ties, with ample provision for air circulation through and between the stacks. It is not good practice to stack ties in a yard that is not properly drained, nor to stack them on wholly or partially decayed timber, nor to leave pieces of decaying timber about a tie yard or treating plant. Green ties should not be stacked in the same stack with more or less seasoned ties. Poles should be peeled and seasoned under conditions permitting ample air circulation, and, in addition, all roofing, gaining and boring should be done before treatment. Wherever it was possible to arrive at a unit base from which to work, all handling of material at a treating plant should be done at a fixed price per unit. In treating green or unseasoned timber, piling, ties, etc., steaming should be considered good practice, but in no case to exceed a maximum temperature of 280 deg. Fahr., steaming to be followed by a vacuum of not less than 22 in., temperature in cylinder being maintained at as high a point as possible during time of vacuum. As general tests and observation prove that creosote evaporates rapidly from freshly treated material it should no longer be considered good practice to stack creosoted material in open stacks, but material treated with zinc-chloride should be stacked openly to facilitate the evaporation of water injected during treatment.

PAVING

The report of the committee of wood-block paving included a history of treated wood-block pavements in the United States, and gave an outline of the development of the modern treated wood pavement. In an inspection of experimental pavements made in Minneapolis last July the different species of woods in use at present for paving block were classified in the order of their efficiency as follows: longleaf pine, white birch, Eastern hemlock or tamarack, Norway pine, and Western larch. Details of manufacture were discussed, including such matters as depth of blocks, preservatives, method of treatment, methods of laying joints and filler, and top dressing. A discussion of the qualifications of wood-block pavements followed. This included consideration of first cost, durability, ease of maintenance, ease of cleaning, and the like. A bibliography and a table showing the amount, kind and condition of treated wood-block paving in the country concluded the report.

A paper entitled "The Bleeding and Swelling of Paving Blocks" cited results from a number of tests. All of the results seem to indicate that bleeding is caused to a large extent by the expansion of air in the wood cells. Other contributing causes which no doubt aggravate bleeding are expansion of the preservative in the wood, external pressure exerted upon the blocks, excessive absorption of preservative by some of the blocks, and the use of rapid-growth woods. Sapwood is also a factor, largely because of the excessive absorption.

In general, the tests seem to indicate that longleaf-pine paving should be treated in the green condition after being well steamed. While it is true that a preliminary and final vacuum greatly retard bleeding and to some extent the swelling of air-seasoned wood, a preliminary vacuum will tend to make the absorption of oil too rapid during treatment, resulting in uneven penetration. A steaming period, therefore, is advisable to render the absorption less rapid and allow a longer and intense pressure period to be applied. Furthermore, if seasoned blocks are steamed they will take up moisture and expand and should be less liable to give trouble from swelling after laying in the street. For these reasons it would be preferable to treat green material when it is possible to obtain it.

If for any reason the blocks cannot be laid soon after treatment, they should be covered and perhaps wet down occasionally to prevent them from drying out. It is likely that if the blocks are wet when laid, expansion troubles will be much reduced.

It would seem to be desirable to give a vacuum treatment after the steaming period and also after the oil has been removed from the cylinder. If tar mixtures are used, a final steam bath should succeed the final vacuum to remove carbon and dirt from the blocks. Absorptions of more than 16 lb. per cubic foot hardly seem necessary. Heavier absorptions do not greatly retard swelling and they tend to increase bleeding.

The use of tar mixtures will not prevent swelling, although they tend to retard it. Therefore, the only justification for mixing tar in oils to be used for treating paving blocks is to lower its cost. The waterproofing effect of the oil or treatment should not receive much consideration. The main points to be considered (aside from the selection of wood) should be to have sufficient oil of good grade to obtain a thorough penetration in order to avoid decay and to specify a method of treatment that will not cause the blocks to bleed. Swelling should be controlled principally by having the blocks in the green condition when laid in the street and by taking special care with the filler and method of laying so that water will not permeate to the bottom of the blocks.

In a paper on the relative accuracy of laboratory analyses after treatment as opposed to actual records during treatment of creosoted wood paving blocks in determining the average quantity of injected creosote oil per cubic foot of timber, it was stated that modern creosoting methods involve the treatment at one time of some 30,000 individual, and very different, paving blocks. These are placed in the same creosoting cylinder and subjected to the same temperature and same pressure. It is impossible to give each block an individual treatment, and since blocks of varying structure must be treated collectively, it is but consistent to insist that an extremely small proportion of the whole, selected at random for analysis, cannot be conclusively indicative of the average absorption secured on the entire charge. The records of the operation, however, give definitely the average amount of injection of preservative per block.

TREATED CROSS-TIES

A paper entitled "Additional Facts on Treated Ties" called attention to the increasing cost of creosote treatment and the use of emulsions of zinc chloride and creosote and of zinc chloride, glue and tannin. Figures were cited to show that the former gave a lower annual cost per tie than either the creosote or straight zinc-chloride treatments. Results obtained with the zinc-chloride-glue-tannin treatment on the C. & E. I. Ry. showed a life of fourteen years for 75 per cent of a large number of ties.

A simple method for finding the annual charges for ties was suggested in another paper, this being based on the statement that the annual maintenance charge on each tie was equal to the first cost of tie in track divided by the average years of life (as determined by number of removals), plus the annual interest on investment, or first cost of tie in track, plus also the taxes on investment. The authors assumed interest at 6 per cent and taxes at 1 per cent and stated that a good tie in main track costs at least $1 and that the tie, unless treated, wears out in seven years, giving an annual cost of $0.213. At this rate it would cost a road with 25,000,000 ties $4,000,000 a year more than it did twenty years ago. Creosote, at a cost of 25 cents, and heavy tie plates at a cost of 35 cents more, raised the first cost to $1.60. Such a tie would have to last 16 years to give a yearly cost of $0.213. Assuming that it lasted ten years, the annual cost would be $0.273. This involves $5,500,000 a year more than the expense in 1905.

There is at present no immediate prospect of an economical substitute for wood. A certain cast-iron tie, which the patentee thought could be made for $3.50, involved interest and tax charges alone of $0.245. Assuming the tie to last thirty years and to have a scrap value of $1, the tie would cost $0.328 to maintain. There is still nothing fulfilling the purpose as cheap as a good wooden tie. It is at present unreasonable to consider anything, even with a certain life of 20 years that costs more than $1.67, since 20 cents a year is sufficient at the present time to maintain best main-line ties.

In general, careful buying insures a price reduction of about 10 per cent and a quality increase of about 20 per cent. To allow ties to lie fallow for, say, two years shortens the life two years and adds about 14 cents to first cost. Many ties are removed from one year to five years before they are really gone. A new, rotten tie costing 80 cents to lay in track and lasting two years, costs $0.456 per year, or more than twice as much as the maintenance of the best main-track tie, plated and preserved.

A paper on the mechanical life of ties as affected by ballast stated that fine, light materials such as gravel, cinders, granulated slag, etc., hasten the rail cutting on the top of the tie by the finer particles working under the rail. The coarser and heavier ballasts, such as crushed stone and slag, bruise and cut into the bottom and the sides of the ties largely under tamping. However, comparatively few ties are destroyed from this latter cause, while many more are removed from track on account of the former.

A specification for a coal-tar-creosote solution was suggested in another paper with the idea of avoiding any misunderstanding on the part of the purchaser regarding the material for which he was paying. A paper on air seasoning of cross-ties emphasized the necessity that all ties, soft wood ties especially, should be carefully piled on sound stringers but never on the ground, and either with spacing strips between layers, or that they be piled so that the faces do not have full bearing against each other, as experience has shown that ties piled close soon show damage. Also it is not safe to buy softwood ties while the sap is up, no matter how carefully the ties are piled for proper seasoning, as they are liable to be damaged before they are loaded.

Electric Railway Statistics

Figures Compiled by the Bureau of Fare Research Based on Returns from 80 Per Cent of the Electric Railway Industry for Four Months' Operation

By a resolution passed at the mid-year meeting of the American Electric Railway Association on Jan. 30, 1913, the committee on cost of passenger transportation service was directed to consider the matter of the establishment by the American Electric Railway Association of a permanent organization to study the problems of rates and fares. Such a bureau was established on May 1, 1914, and, as mentioned in this paper at that time, F. W. Doolittle was appointed director. Part of the work done under the direction of the committee on the cost of transportation service was represented by a report on the method of estimating remunerative passenger haul in urban transportation systems and of the relations between traffic and population. The results of this study were published in the ELECTRIC RAILWAY JOURNAL for June 20, 1914. Another part of the work of the bureau has been the collection and compilation of operating statistics of the industry. At present the bureau is receiving monthly reports from companies representing a considerable part of the operating revenues of the entire industry in this country. From the reports already obtained the director of the bureau has prepared a comparison of four months' business during the summer of 1914. The absence of reports covering similar statistics for the previous year made a comparison with such reports impossible, but comparisons are made with statistics of steam railroads, bank clearances and building operations for the same months. The report follows:

BASIS OF REPORT

While the collection of the operating statistics by the bureau of fare research has not yet been under way a sufficient length of time to permit comparisons month by month with the previous year, some interesting facts have been observed concerning the trend of earnings and expenses during the four months, June to September inclusive. The accompanying tables representing returns from 137 companies classified according to the Interstate Commerce Commission's geographical grouping of companies indicates that the falling off of revenues occurred uniformly throughout the country.

TABLE I—OPERATING REVENUES OF 137 COMPANIES IN THE UNITED STATES

	United States	East	South	West
No. of companies	137	76	21	40
June	$28,132,324	$22,058,585	$1,488,808	$4,584,930
July	28,378,996	22,192,993	1,525,474	4,660,528
August	27,949,219	21,881,679	1,515,602	4,551,937
September	27,073,682	21,184,602	1,432,884	4,456,195
Per cent				
July of June ...	100.88	100.61	102.46	101.65
August of June..	99.35	99.20	101.80	99.28
September of June	96.24	96.04	96.24	97.19

TABLE II—OPERATING REVENUES AND EXPENSES OF 120 COMPANIES IN THE UNITED STATES

	United States	East	South	West
No. of companies	120	60	20	40
Operating revenues				
June	$22,598,682	$16,616,420	$1,397,331	$4,584,930
July	22,751,376	16,658,070	1,432,778	4,660,528
August	22,436,710	16,460,202	1,424,570	4,551,937
September	21,780,976	15,978,982	1,345,798	4,456,195
Per cent				
July of June....	100.68	100.25	102.53	101.64
August of June..	99.28	99.06	101.95	99.28
September of June	96.38	96.16	96.31	97.19
Operating expenses				
June	$12,738,310	$9,573,546	$766,175	$2,398,588
July	12,784,221	9,283,111	774,624	2,726,485
August	12,458,013	9,058,867	745,218	2,653,927
September	12,115,174	8,839,204	716,328	2,559,641
Per cent				
July of June....	100.36	96.96	101.10	113.60
August of June..	97.80	94.62	97.26	110.65
September of June	95.11	92.33	93.49	106.71
Operating ratio				
June	56.37	57.61	54.83	52.31
July	56.19	55.73	54.06	58.50
August	55.53	55.03	52.31	58.30
September	55.62	55.32	53.23	57.44

The totals shown in these tables contain revenues reported by both city and interurban lines. The relation between the operating revenues of the companies located in the Eastern, Western and Southern districts and the total for all companies for 1912 and the relation occurring in the above figures are here compared:

	1912	Table I
United States	100	100
Eastern district	67.5	78.4
Southern district	10	5.3
Western district	22.5	16.3

Of the 137 companies whose figures are shown in Table I, 120 reported operating expenses excluding taxes (see Table II) and eighty-eight showed also revenue car-miles and number of passengers (see Table III). It would be of value to compare these figures with figures for the same companies at corresponding periods in 1913 and in 1912, but such figures are not available at this time.

IN EXPLANATION OF TABLES

In reading the tables, there should be borne in mind that there is a normal seasonal variation of traffic from month to month and that the variation in the length of the months and in the number of Sundays and holidays is easily observed in traffic statistics. During the five years, 1907-1912, there was an increase in an-

TABLE III—OPERATING REVENUES, EXPENSES, CAR-MILES AND PASSENGERS OF EIGHTY-EIGHT COMPANIES IN THE UNITED STATES

	United States	East	South	West
No. of companies	88	38	15	35
Operating revenues				
June	$9,907,747	$5,648,800	$616,293	$3,642,652
July	10,088,682	5,773,963	644,589	3,670,129
August	9,979,368	5,742,817	641,088	3,595,461
September	9,557,950	5,479,628	585,475	3,492,845
Per cent				
July of June.....	101.83	102.21	104.59	100.80
August of June..	100.72	101.66	104.02	100.75
September of June	96.47	97.01	95.00	95.89
Operating expenses				
June	$6,059,255	$3,811,623	$337,232	$1,910,398
July	6,074,909	3,504,275	354,676	2,215,957
August	5,916,024	3,430,865	342,428	2,142,730
September	5,762,028	3,373,498	321,478	2,067,050
Per cent				
July of June....	100.26	91.94	105.17	116.00
August of June..	97.63	90.01	101.54	112.16
September of June	95.09	88.51	95.33	108.19
Operating ratio				
June	61.16	67.48	54.71	52.45
July	60.22	60.69	55.02	60.38
August	59.28	59.74	53.41	59.60
September	60.29	61.56	54.91	59.18
Car-Miles				
June	33,290,437	18,181,532	2,382,471	12,726,434
July	34,588,159	19,138,446	2,474,952	12,974,761
August	34,353,180	19,075,495	2,489,788	12,787,897
September	32,383,777	17,752,971	2,320,033	12,310,773
Per cent				
July of June....	103.90	105.26	103.95	101.85
August of June..	103.19	104.92	104.45	100.35
September of June	97.27	97.64	97.40	96.80
Passengers carried				
June	246,207,158	136,893,985	13,865,061	95,448,112
July	250,013,398	139,444,703	14,413,498	96,155,197
August	246,541,498	137,699,251	14,290,541	94,551,706
September	238,052,912	133,769,637	12,935,175	91,348,100
Per cent				
July of June....	101.55	101.90	103.96	100.85
August of June..	100.08	100.65	103.10	98.95
September of June	96.75	97.75	93.40	98.00

TABLE IV—U. S. STEAM ROADS—FIVE YEARS' AVERAGE OF REVENUES AND EXPENSES, STATED AS PERCENTAGES OF JUNE FIGURES

	Revenues	Expenses
June	100.0	100.0
July	102.7	102.2
August	107.6	104.4
September	109.3	104.5

nual operating revenues of about 25 per cent of the yearly revenues at the end of the period. Assuming that this rate of increase is normal at the present time, we might conclude that July, 1914, should show a 5 per cent increase over July, 1913, and that the amount by which this 5 per cent increase failed of realization is in effect a loss. The ELECTRIC RAILWAY JOURNAL for Nov. 28, 1914, page 1217, compares the earnings of a number of companies in September, 1914, with their earnings in September, 1913. Very roughly, these figures indicate a falling off of 1 per cent in gross and falling off of 2 per cent in net. A study of the records of past years of a large number of companies widely scattered indicates that, in general, the operating revenues of June and July are substantially equal from year to year to those in August and September, July and August being normally larger than either June or September. Table IX reflects the comparative results of variation on this basis of comparison.

As illustrating the effect upon net earnings in the traction industry of slight variations in revenues, it is worth while to point out that when operating revenues decrease to 97.4 per cent of normal and operating expenses are slightly greater, or 98.2 per cent of normal, the net returns of the industry, because of the small margin on which the electric railway is operated, decrease more than 17 per cent, or from a dividend rate of 2.68 per cent to 2.22 per cent.

RESULTS COMPARED WITH STEAM ROAD STATISTICS

A comparison of the steam road figures for 1914 with those for 1913 raises, of course, the question of the normality of 1913 results. Table IV, showing the variation of operating revenues and operating expenses for the months of July, August and September in per cent of the month of June, is based on the return of all steam roads for five years and should be fairly typical.

The figures shown in Table V were compiled by the bureau of railway economics from reports to the Interstate Commerce Commission and indicate that operating revenues disclose the usual seasonal variations, and operating expenses show less than the usual increase during the summer months. A comparison of the decrease in earnings per mile of line in 1914 as compared with 1913, indicates that the decrease in railroad business due to the present depression, has for some time been general. While the percentage of seasonal variation has therefore been normal, the absolute increase has not been as great as indicated by the percentage figures.

Since comparative figures of seasonal variation in the traction industry are not available for 1913, it is not possible to determine whether the same absolute changes have taken place in the traction industry as are here observed for all steam railroads. From such comparative figures as are available, covering perhaps 20 per cent of the traction industry in 1913, however, the comparisons indicate that the present depression has been felt to a greater extent in the traction industry than with the steam roads.

BANK CLEARINGS AND BUILDING OPERATIONS

Bank clearings are usually supposed to be fairly representative of business conditions as a whole, although they are only so if they are an index of total bank transactions. A study of this basis of comparison appears in a recent number of the *Times Annalist*, where a number of the factors which tend to destroy the use-

TABLE V—REVENUES AND EXPENSES OF U. S. STEAM ROADS IN DOLLARS PER MILE OF LINE

	Operating revenues				Operating expenses			
	1913	Per cent June	1914	Per cent June	1913	Per cent June	1914	Per cent June
United States:								
June	$1,135	100.0	$1,079	100.0	$801	100.0	$768	100.0
July	1,183	104.2	1,124	104.2	837	104.5	785	102.2
August	1,244	109.6	1,175	108.9	856	106.9	789	102.7
September	1,257	110.7	1,182	109.5	854	106.6	781	101.7
Eastern District:								
June	$1.999	100.0	1.860	100.0	1,438	100.0	1,355	100.0
July	2,087	104.4	1,939	104.2	1,504	104.6	1,373	101.3
August	2,185	109.3	2,045	109.9	1,533	106.6	1,377	101.6
September	2,142	107.2	2,024	108.8	1,534	.106.7	1,374	101.4
Southern District:								
June	$862	100.0	860	100.0	638	100.0	646	100.0
July	876	101.6	884	102.8	660	103.4	665	102.9
August	908	105.3	887	103.1	673	105.5	658	101.9
September	944	109.5	860	100.0	675	105.8	642	99.4
Western District:								
June	$820	100.0	788	100.0	560	100.0	535	100.0
July	863	105.2	828	105.1	583	104.1	554	103.6
August	914	111.5	867	110.0	599	107.0	559	104.5
September	948	115.6	901	114.3	595	106.2	553	103.4

TABLE VII—VALUE OF BUILDING PERMITS

	1914 in per cent of 1913			
	June	July	August	September
Eastern	112.0	119.0	117.0	61.0
Middle Western	102.5	107.7	110.0	77.0
Southern	77.0	156.0	86.0	59.0

TABLE VIII—GENERAL STATISTICS FOR UNITED STATES, STATED AS PERCENTAGES OF JUNE FIGURES

	Electric railways—Revenues	Steam railways—Revenues		Bank clearings—Amount	
	1914	1914	Five 5 Years	1914	Two 2 Years
June	100.00	100.0	100.0	100.00	100.00
July	100.68	104.2	102.7	102.44	97.44
August	99.28	108.9	107.6	70.88	86.66
September	96.38	109.5	109.3	71.66	98.58
	Expenses	Expenses			
June	100.00	100.0	100.0	......	......
July	100.36	102.2	102.2	......	......
August	97.80	102.7	104.4	......	......
September	95.11	101.7	104.5	......	......

TABLE VI—COMPARATIVE VARIATIONS OF BANK CLEARINGS

	1914		1913		1912	
	Amount	Per cent June	Amount	Per cent June	Amount	Per cent June
June	$13,957,920,852	100.00	$14,285,148,875	100.00	$14,023,514,015	100.00
July	14,298,135,055	102.44	13,606,778,167	95.25	13,914,322,760	99.22
August	9,893,707,373	70.88	12,107,833,345	84.76	12,417,937,512	88.55
September	10,004,972,993	71.68	13,729,012,230	96.11	14,168,737,039	101.04
Total	$48,154,736,273	......	$53,728,772,617	......	$54,524,511,326	......

TABLE IX—GENERAL STATISTICS

	June and July	August and September	August and September in per cent of June and July, 1914	August and September in per cent of June and July prior period	1914 in per cent of prior period
Am. Steam Rys., oper. revs., 1914	$500,527,765	$536,509,757	107.19	......	.....
Am. Steam Rys., oper. revs., av. 5 yrs	535,111,718	573,000,699	......	107.08	100.0
Am. Steam Rys., oper. exp., 1914	352,736,052	357,250,688	101.28	......	....
Am. Steam Rys., oper. exp., av. 5 yrs	376,501,043	398,894,290	......	105.95	96.0
C. P. R. & Can. Nor., revs., 1914	23,785,993	23,149,504	97.32	......	....
C. P. R. & Can. Nor., revs., 1913	27,774,492	27,411,242	......	98.69	98.5
Bank clearings, 1914	28,256,055,907	19,898,680,366	70.42	......	....
Bank clearings, 1912-1813	55,829,763,817	52,422,520,126	......	93.90	75.0
Am. Elec. Rys., 137 cos., oper. revs., 1914	56,511,320	55,022,902	97.37	......	....
Am. Elec. Rys., oper. revs., prior period	....	....	......	*100.00	97.4
Am. Elec. Rys., 120 cos., oper. exp., 1914	25,522,531	24,573,189	96.28	......	....
Am. Elec. Rys., oper. exp., prior period	....	....	......	*98.00	98.2
Am. Elec. Rys., 88 cos., car miles, 1914	67,878,596	66,736,957	98.32	......	....
Am. Elec. Rys., 88 cos., No. pass., 1914	496,220,556	484,594,410	97.66	......	....

*Estimated normal figures.

fulness of clearings as an index of transactions are pointed out. In general, however, the clearing transactions should vary approximately as the variations in the entire volume of banking business. Table VI, based on figures prepared by the *Commercial & Financial Chronicle*, indicates the relation of July, August and September to June for each of the last three years. The months of June and July for each of the three years are approximately the same, but the months of August and September of this year show about 75 per cent of the transactions during these months in the previous years.

Bank clearings are probably the most widely-quoted barometer of trade conditions. We are not justified, however, in comparing these variations with those noted in the traction industry without important qualifications which it is not desirable to enumerate here.

Building operations are not as easily measured nor as fully reported as financial transactions or as utility earnings but Table VII, compiled from statistics appearing in the *Engineering News*, may be of interest in connection with figures given above.

It is interesting to note for the Eastern and Middle Western districts that the falling off did not occur until September, and this is accounted for probably on the grounds that building operations are usually financed before they are undertaken and that practically all the building begun in August and credited to this month is being done with funds which were made available before the first of August. Figures for the Southern district show very wide fluctuations, and this is partly accounted for by the fact that smaller totals are involved and any accidental variation makes, therefore, a large percentage variation. It is also quite possible that the unfortunate situation in which the cotton states found themselves immediately upon the beginning of the war in Europe affected the conditions in that district more seriously than elsewhere. The decrease from August to September was proportionately about the same as it was in the other districts.

Table VIII combines percentage relations from the preceding tables and indicates the extent to which business as indicated in the several comparisons decreased for the present year, between the months of June and September, and for purposes of comparison there are also included in this table similar figures for previous periods.

The Railways and the Manufacturers

Public Relations and Present Business Conditions Discussed in Boston by Guy E. Tripp

The speaker of the New England Street Railway Club on Jan. 21 was Guy E. Tripp, chairman board of directors, Westinghouse Electric & Manufacturing Company. Mr. Tripp first referred to the early days of electric traction, in which he took a part, and said that the equities which were in those days fondly imagined to be the reward of courage, industry, intelligence and pioneering risks have since been attacked by increasing wages and taxes, heavy rolling stock, non-paying extensions, etc., on the one hand and decreased purchasing power of the nickel on the other. The public has paid far less for thirty years of masterful work which produced a new era in human existence than it has paid for jimcrack novelties and patent medicines. That period was also a delusive one for the electrical manufacturing companies. Their original profits have since dwindled, and curiously enough the smallest profits are now to be found in the street railway department. Thus both the manufacturer and the customer are concerned in this problem, and their fortunes are closely linked.

One matter upon which they could co-operate to advantage would be in standards, particularly standards of cars and trucks. The various types now used and built require a large variety of types and sizes of motors, gears, etc., which prevents the manufacturer from operating his plant on the most economical basis. Again, a business has sprung up by which small manufacturers copy certain small parts of apparatus in large quantities and sell them at a very low price. The speaker believed it would be good business for the railway companies to buy their repair parts, not only of electrical apparatus but of cars, trucks, etc., from the original manufacturer. This would not only mean that these parts would be built under the direction of those responsible for the original apparatus but the closer contact brought about by such a trade would be of great benefit to both.

Mr. Tripp then urged co-operation on public questions. He also spoke of the great power of public opinion and the silence of some whose voices were most needed in such a situation. He had often thought that one reason why serious-minded property owners, big and little, fail to make a better showing on these questions is partly because they do not easily submit to leadership and partly because it meant some personal sacrifices. In comparison he cited the sacrifices which members of labor unions make in the case of strikes, and said it was this quality which makes labor unions stronger than their numbers.

In discussing the general business stagnation he said he thought it would have been just as bad or worse, even if there had been no war. The prevailing feeling in England and France when the war broke out was that a terrible situation confronted Europe but that great benefits would come to the United States; nevertheless, after six months the situation is just the reverse. For example, his English company is running at full capacity, while that in this country is operating at only between 50 per cent and 60 per cent of its normal output. The English company is not working on war orders but on the usual character of goods. The French works are running full time, but to a large extent on orders from the French war department. The Italian works are also running full time, and, judging from the very infrequent and vague news received through Austria, the Vienna company is enjoying usual prosperity. Therefore, so far as the interests of his own companies are concerned, they are very much more prosperous in Europe than in the United States.

It is true that some war orders have been received in this country, but the effect has been a great deal more than offset by the great disturbance of foreign exchange and the difficulty of handling our large indebtedness to Europe. The war has also obscured the effect of the recent anti-trust legislation and tariff reductions and will obscure the proposed bill for government ownership of a merchant marine, should such a bill pass Congress, which the speaker hoped would not be the case.

While anything that helps the export trade is good, prosperity still rests upon our home market. The speaker believes that this home market should be in a fair degree protected against foreign competition, even if we have to let the export trade take care of itself, and to that end he believed there should be a popular demand for a tariff commission, which can intelligently pass upon this complicated and delicate question. In the meantime the home industry needs a stimulant, and the most sensible way in which all can help at this time is to join hands in bringing about a better business state of mind. Crops have been plentiful and other conditions are good. The question is, how can railroads, mills and other industries be set in motion? If there should be a general movement and everybody should make a cautious start, taking a little but not too much, the result would be surprising.

COMMUNICATIONS

Causes of Corrosion of Water Pipes and Other Underground Structures

NEW YORK, Jan. 11, 1915.

To the Editors:

The article in a recent issue of the ELECTRIC RAILWAY JOURNAL on "Corrosion of Metals in Natural Soils" by Messrs. Scofield and Stenger recalls some very interesting personal experiences.

About 1887 the writer built the dam at First Beach for the Newport (R. I.) Water Company. This dam was built of sand which was pumped by means of a hydraulic pump. Underlying the upper strata of sand we found beds of peat ranging from 18 in. to 5 ft. in thickness. All about the region of the excavation we found springs which were thoroughly impregnated with sulphuretted hydrogen. The corrosive effects of this were so great that shovels left sticking in the sand would be so badly corroded in a week as to become useless. Of course this action extended to underground pipes which were very rapidly pitted and corroded by the sulphuretted hydrogen. I have seen pipes taken out at Newport, after having been in the ground only three or four years, on which the effect of the corrosion had very much the appearance of that produced by electrolytic corrosion. A very similar action at Swampscott, Mass., was caused by salts in the soil. Both of these cases occurred before electric railways were built.

At Utica, N. Y., we found electrolytic action upon iron located in the ground near the bridge approach at New York Mills. This was caused by currents generated from iron filings and old iron dumped on each side of the bridge abutment. Acting chemically upon this iron was the acid which was discharged into the canal water from several neighboring factories. This, of course, created a wet battery. We made tests when the power house was shut down at night and found currents under emfs up to 1.2 volts. The currents flowed from the ground into the rail, and we were several months in determining their source. Finally we found it to be as above.

While living at Elmira, N. Y., the writer made a detailed electrolytic survey. As the local company owns the natural gas plant, the artificial gas plant, the water works, the electric light plant and the street railways, the survey at Elmira was probably one of the most fair and most logical ever made. It was made to ascertain the real conditions existing in order that the company's property might be fully protected. During this investigation we discovered a number of very peculiar conditions, but, although our track was in very bad shape in many sections and there was a large amount of current escaping, we found very little action upon the pipe lines of any of the companies.

Returning to the experience in Newport and Swampscott, the outcome of the matter was that we laid cement pipes all through these towns, taking particular care not to expose the metal at the joints. We found, particularly in Newport, that some sections of the pipe were much more likely to be affected than others. It has been my own experience that, in many places where it was claimed that pipes were being injured by electrolysis from stray railway currents, the damage was due more to the condition of the soil than to the stray currents. One of the best plans for ascertaining whether pipe lines are being affected or not is to open up the lines at approaches to bridges. I found that the stray currents are inclined to leave the pipe at such bridge approaches and to follow the course of the stream. In consequence if there is any electrolytic action taking place on these pipe lines, it can be almost invariably detected there.

I am interested to learn that the very exhaustive tests made by Messrs. Scofield and Stenger corroborate the results of my own experience.

W. W. COLE, Consulting Engineer.

Calculation of Starting Resistances for Railway Motors

PURDUE UNIVERSITY
LAFAYETTE, IND., Jan. 15, 1915.

To the Editors:

The article bearing the above title, written by F. Castiglioni and appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, 1914, sets forth a very interesting graphical method of predetermining the proper resistances for use in the control of railway motors using series-parallel connections. This method will doubtless simplify the work of properly designing resistances for such control, and is therefore of primary interest to the manufacturer of railway equipment. While the operating engineer should make a very careful and continuous study of the proper resistance adjustments for the rolling stock under his supervision in order that the maximum of economy may be secured with the best possible service and minimum maintenance, yet it is the opinion of the writer that this cannot be done to advantage by any such method as indicated in the article.

The problem is not unlike that of determining the proper taps to be used on the starting compensator of an induction motor in order to apply a standard motor to the particular requirements of a single installation to best advantage. These taps may be worked out ever so carefully in the design room and yet it will be found, when the equipment is installed, that some peculiarities of the load or variation of voltage from that assumed in the design will necessitate the shifting of compensator taps if good service is to be rendered.

With the railway motor installation the possibility of absolute predetermination of control resistances is even more remote, since the variables involved in the installation are very much more numerous and complex. This problem is similar to that of the selection of proper gear ratio for a given equipment and service. I believe that railway officials will agree that the equipment which has been continued for a long period of time in service with the identical gear ratio that was specified when the installation was made is the exception to the rule.

Furthermore, the resistances of grids, as now manufactured for the control of railway motors, will vary in magnitude over a very wide range with the temperature at which they are operated, which may change from that of a cold winter morning to that corresponding to nearly red heat. Recent tests show more than 25 per cent change in resistance with a much less range of temperature than indicated above. This does not mean that no attempt should be made to predetermine the necessary resistance desirable for a given equipment and service, but it is merely an additional argument against the waste of too much time in preliminary calculations and high degrees of accuracy as contrasted with a simple test after the apparatus is installed on the car, involving the reading of an ammeter and the shifting of connections or resistance grids.

It is another case of the old story of theory versus practice, and, as in most cases where these two factors are in competition with one another, good engineering judgment in the field must be exercised to determine the extent to which theory and practice are to be consulted in the problem at hand. C. FRANCIS HARDING,

Professor Electrical Engineering.

American Association News

President Woodrow Wilson, Senator John W. Weeks and Representatives Swagar Sherley and A. J. Montague Will Speak at Washington Meeting—Details of Association Activity Are Given

THE WASHINGTON CONFERENCE AND DINNER

BY E. B. BURRITT, SECRETARY AMERICAN ELECTRIC RAILWAY ASSOCIATION

With President Wilson as one of the speakers at the mid-year meeting and dinner the program is, by all odds, the most attractive that the association has yet offered to its membership, since, in addition to the President, addresses are assured from former Governor A. J. Montague of Virginia; Hon. Swagar Sherley of Kentucky, one of the administration leaders in the House of Representatives; Senator John W. Weeks of Massachusetts who, besides representing the "Bay State" in the Senate of the United States, where his work in connection with the currency bill won him universal applause, was a pioneer in the financing of electric railways and a banker of national reputation; N. C. Kingsbury, vice-president of the American Telephone & Telegraph Company, whose remarkable work for this organization has entitled him to be considered as one of the leading exponents of publicity as applied to corporation affairs; Colonel T. S. Williams, head of the great Brooklyn Rapid Transit System, who assisted in drafting the code of principles which he will discuss; C. L. Henry, a veteran in the development of interurban railways; C. C. Peirce, who speaks for the Manufacturers' Association, and C. Loomis Allen, president of the American Electric Railway Association. In addition, Arthur Williams, president of the American Museum of Safety and general inspector of the New York Edison Company, will announce the winner of the Anthony N. Brady medal, offered by the museum, through the kindness of the family of the late Anthony N. Brady, to the electric railway which has done the most during the year to conserve the life and health of its passengers and employees.

Program Mid-Year Meeting and Dinner

NEW WILLARD HOTEL, WASHINGTON, D. C.
JANUARY 29, 1915.

Morning Session

10:00 A. M.—"THE CODE OF PRINCIPLES," T. S. Williams, president Brooklyn Rapid Transit System, Brooklyn, N. Y. Discussion by Guy E. Tripp and M. C. Brush.

11:30 A. M.—"PUBLIC SERVICE AND PUBLICITY," N. C. Kingsbury, vice-president American Telephone & Telegraph Company, New York, N. Y. Discussion by W. Caryl Ely, E. G. Connette and Wilbur C. Fisk.

Afternoon Session

2:00 P. M.—"ELECTRIC RAILWAYS FROM FINANCIAL VIEWPOINT," Hon. John W. Weeks, United States Senator from Massachusetts. Discussion by J. H. Pardee and J. D. Mortimer.

3:00 P. M.—Address by the President of the United States.

7:00 P. M.—JOINT DINNER A. E. R. A.—A. E. R. M. A. C. Loomis Allen, president of the American Electric Railway Association, presiding.

ADDRESS—C. C. Peirce, vice-president American Electric Railway Manufacturers' Association.

ADDRESS—Hon. Swagar Sherley, Representative in Congress, Fifth District of Kentucky.

ANNOUNCEMENT OF WINNER OF THE ANTHONY N. BRADY MEDAL—Arthur Williams, president American Museum of Safety.

ADDRESS—Hon. A. J. Montague, former Governor of Virginia and Representative in Congress from the Third District of Virginia.

ADDRESS—C. L. Henry, first vice-president American Electric Railway Association.

There will be two sessions of the conference proper, the first at 10 o'clock in the morning, at which Messrs. Kingsbury and Williams are to speak, and the second at 2 p. m., to be addressed by Senator Weeks, who is to be followed at 3 o'clock by the President.

The dinner takes place at 7 p. m. at the New Willard Hotel, where the conference proper will also be held. The dinner committee has perfected plans which indicate one of the most enjoyable events that has ever been held under the auspices of the allied associations. The New Willard Hotel has a reputation for serving handsome banquets, and the management in this case has promised to eclipse its previous efforts.

Reservations at the hotel and applications already received for tickets indicate a large attendance. A special train will be run from New York leaving at 12:30 a. m. on Jan. 29 and arriving in Washington at 7 a. m., in ample time for the first session of the conference. The New York train is in charge of a committee consisting of Bertram Berry, J. A. Kucera, H. G. McConnaughy and H. C. Clark. Transportation committees have been organized in other cities, the chairmen being: Chicago, H. J. Kenfield, *Electric Traction;* St. Louis, Edwin B. Meissner, St. Louis Car Company; Cincinnati, D. H. Ackerson, Cincinnati Car Company; Cleveland, L. G. Parker, Cleveland Frog & Crossing Company; Pittsburgh, M. E. Johnson, Pittsburgh Steel Company; and Philadelphia, Thomas Cooper, Westinghouse Electric & Manufacturing Company.

The officers of the association are anxious to make the coming meeting and dinner an event of note. They believe that the opportunity is offered for presenting to the country the side of the electric railways and that the publicity to be obtained will be of incalculable benefit to the industry. The executives of the member companies are responding to the appeal for a large attendance and there seems to be reason to believe that the optimistic views which are held by the officers will be amply fulfilled.

A noteworthy guest list consisting of high officials of the United States government has been prepared and many acceptances are being received. Secretary Tumulty and others of the President's colleagues have cooperated heartily with the association committee in arranging the details of the program.

In view of the great interest manifested in the address of President Wilson and the limited capacity of the room in which the meeting will be held, it has been decided that admission will be by badge, and railway men and manufacturers attending the meeting are urged to register upon their arrival in Washington at the association's registration bureau in the New Willard Hotel. Upon registration badges will be distributed which will admit to the meeting.

MANUFACTURERS' ASSOCIATION 1915 CONVENTION TRANSPORTATION COMMITTEE

Bertram Berry, Heywood Brothers & Wakefield Company, 516 West Thirty-fourth Street, New York, chairman; H. G. Barbee, Pennsylvania Steel Company; Edwin Besuden, Jewett Car Company; Warren L. Boyer, Bemis Car Truck Company; R. M. Campbell, Detroit Graphite Company, 135 Broadway, New York; H. C. Clark, editor *Aera;* Thomas Cooper, Westinghouse Electric & Manufacturing Company; Henry C. Evans, Lorain Steel Company; L. E. Gould, ELECTRIC RAILWAY JOURNAL; Frank N. Grigg, Transportation Utilities Company; Arthur Hale, Griffin Wheel Company; W. S. Hammond, Jr., Consolidated Car-Heating Company; Ross F. Hayes, Curtain Supply Company; Frank Johnson, Ohio Brass Company; J. E. Johnson, Laconia Car Company; H. J. Kenfield, *Electric Traction;* W. R. Kerschner, W. R. Kerschner Company; H. N. Latey, General Electric Company; J. C. McQuiston, Westinghouse Companies; F. L. Markham, J. G. Brill Company; Edwin B. Meissner, St. Louis Car Company; S. W. Midgley, Acme Supply Company; Frank D. Miller, National Brake Company, Inc.; Ralph Moore, General Electric Company; W. I. Ohmer, Dayton Fare Recorder Company; A. H. Sisson, Southern Car Company; H. M. Sperry, General Railway Signal Company; Frank Steffner, Chattanooga Armature Works; D. A. J. Sullivan, Galena-Signal Oil Company; Langdon B. Valentine, Valentine & Company.

PUBLIC SERVICE SECTION INAUGURATES NOVEL PROGRAM

The regular meeting of the Public Service Railway Company Section, held in Newark on Jan. 21, was attended by 300 or more men from all parts of the State of New Jersey. Twenty applicants were elected to membership. A letter from Association President C. Loomis Allen, complimenting the Section upon its progress and expressing good wishes for the future, was read. In this letter Mr. Allen directed attention to the code of principles and suggested that all members of the Section familiarize themselves with it. Handsome loose-leaf notebooks, containing data sheets and blank pages, were issued to the members of the Section. The first sheet contained the text of the code of principles. The purpose in distributing these notebooks was to encourage systematic filing of data, especially such as relate to the work of the Section.

J. L. O'Toole, publicity agent, delivered a scholarly and interesting address on the development of transportation facilities, particularly in the State. He called attention to the meagerness of historical information on the subject, as "transportation men had been too busy to write history." He used a large chart, showing the trunk, limbs, branches and twigs of a tree which represented Public Service and its 115 constituent parts. Mr. O'Toole stated that the local history began with a stage line between Burlington and Perth Amboy in 1732. This formed a part of a boat-stage route between Philadelphia and New York. In 1765 a competing line was put in and another competitor entered the field in 1766, driving out the others by using spring seats.

The first horse car appeared in the State in 1859, and in the early seventies a cable line was tried in Newark unsuccessfully soon after the first introduction of the system in San Francisco in 1873. In 1883 an ordinance was passed in Newark authorizing the use of electricity, and electric service was actually introduced in 1890. Since that year progress has been rapid and, since the opening of the "fast line" binding the northern and southern sections of the system, the Public Service Railway has been a united whole. It now comprises 876 miles of track, uses more than 2400 cars and serves 2000 square miles of territory and 2,100,000 population.

R. E. Danforth, general manager, began the educational program outlined in an earlier issue of this paper, which is to be known as "Public Service Economics." He gave exact information regarding the operation of the property and showed how the cost of service is divided. He explained the unusual items of operating cost and showed how co-operation could effect savings. He showed how nearly the estimated unit operating cost for 1914 had been reached and what this cost should be for 1915. He explained and illustrated the methods used by the company for arranging data for ready reference and urged the use of system in such matter by the members of the Section. This talk was introductory to a series which will continue for many months.

COMING COMMITTEE MEETINGS

Jan. 25, New York, University Club, dinner and conference of the American Association committee on public relations, Thomas N. McCarter, president Public Service Railway, chairman.

Jan. 26, 27, New York, 10 a.m., meetings of sub-committees of the joint committee on block signals, J. M. Waldron, Interborough Rapid Transit Company and J. W. Brown, Public Service Railway, co-chairmen. The plan of these meetings, originally scheduled for Jan. 4 and 5, was described in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, page 1393.

Jan. 27, New York, 10 a.m., Engineering Association committee on equipment, W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, chairman. (See outline on page referred to above).

Jan. 28, New York, 10 a.m., sub-committee on specifications for line materials, of the Engineering Association committee on power distribution.

Jan. 28, Washington, New Willard Hotel, 10 a.m., American Association executive committee, C. Loomis Allen, Allen & Peck, Inc., chairman.

Jan. 29, Washington, New Willard Hotel, hour to be announced, Claims Association executive committee.

The Engineering Foundation

The Engineering Foundation, inaugurated by the United Engineering Society, is the name given to a fund to be "devoted to the advancement of the engineering arts and sciences in all their branches, to the greatest good of the engineering profession and to the benefit of mankind." The administration of this fund will be entrusted to the Engineering Foundation Board, elected by the trustees of the United Engineering Society and composed of eleven members, nine from the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, and the American Institute of Electrical Engineers, and two chosen at large. The initial gift for the Engineering Foundation is from a noted engineer whose name will be announced at the inauguration ceremonies on Jan. 27, at 8:30 p. m. in the auditorium of the Engineering Societies' Building, New York. The speakers at this inauguration meeting will be: Gano Dunn, president of the United Engineering Society and past-president of the American Institute of Electrical Engineers; Dr. Henry S. Pritchett, president of the Foundation for the Advancement of Teaching; Dr. Robert W. Hunt, past-president of the American Institute of Mining Engineers; Dr. Alexander C. Humphreys, past-president of the American Society of Mechanical Engineers.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Steel Tie Construction in Electrically-Warmed Concrete

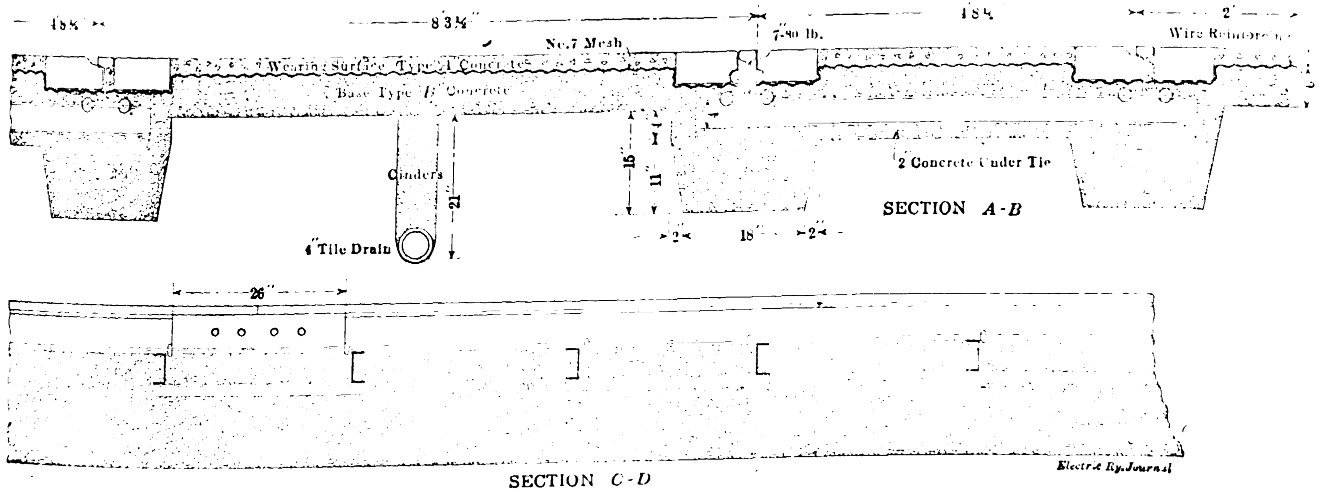
BY JULIAN M. BAMBERGER, VICE-PRESIDENT SALT LAKE & OGDEN RAILWAY

During November, 1914, under the direction of the writer, the Salt Lake & Ogden Railway installed 2937 ft., measured as single track, of concrete track construction, consisting primarily of 7-in. 80-lb. T-rails Pennsylvania Section No. 227 and the International Steel Tie Company's box-girder ties, 32-in. over all, spaced 5 ft. centers. Wooden ties were used only under special work. As shown in the accompanying drawings, two classes of concrete were used, as follows: Type "A" for topping, containing 1 part cement, 1½ parts sand and 2½ parts of gravel, graded to pass a ¾-in mesh; Type "B" for foundations, containing 1 part cement, 3 parts sand and 6 parts of gravel, graded to pass a 2-in. mesh. The top concrete was laid to a depth of 2½ in. on a screen of No. 7 American Steel & Wire mesh, the latter being used as reinforcement against expansion, and was applied before the initial set of the foundation concrete. The standard depth of the foundation concrete was 6 in., except between running rails, but the depth of the beams under the rails varied from 8 in. to 11 in., in accordance with the sub-soil conditions. It will be observed that the roadway along this street conforms to the construction between the running rails, and that the only other paving comprises the nose and plain blocks of sandstone which sandwich each rail.

SALT LAKE & OGDEN RAILWAY—VIEW OF TRENCH READY TO RECEIVE THE STEEL TIES

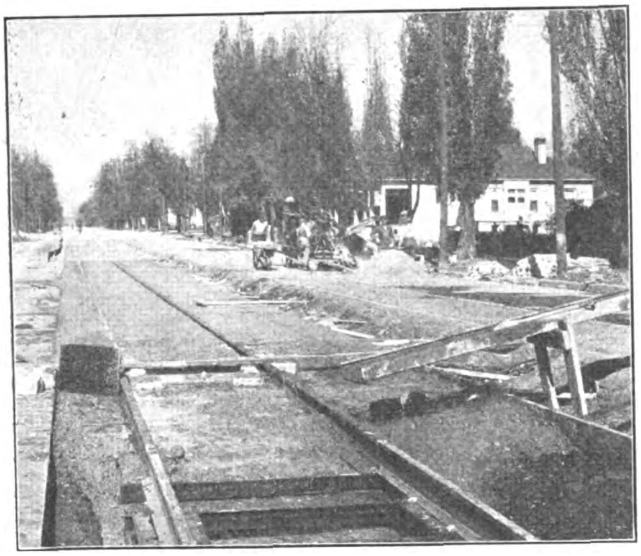
SALT LAKE & OGDEN RAILWAY—RAILS FASTENED TO TIES AND CLIPS IN PLACE; TILE DRAIN AT RIGHT

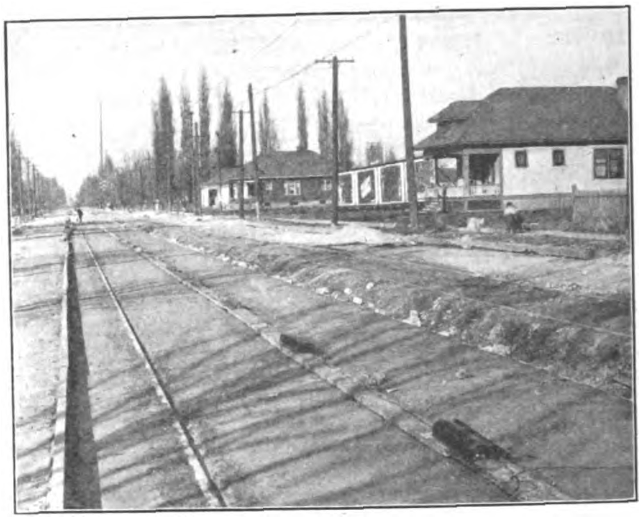
The accompanying halftones will give a good idea of the manner in which this work is done. The first halftone shows the excavation ready to receive the ties and the trench in which the drain tile is laid. The second view shows the rail fastened to the ties and the clips all in place, before surfacing, and with the tile drain in the devil strip in process of laying. The third and



SALT LAKE & OGDEN RAILWAY—STANDARD CONCRETE TRACK WITH STEEL TIES fourth views show the actual process of laying concrete. Traffic was maintained in the dirt track while the concrete construction was being placed. To make this possible large chutes were constructed, and these were moved only during the time cars were actually passing. The concrete was poured through these chutes direct from the mixer to the track. The topping, however, was wheeled in barrows from a smaller mixer. Previous to commencing the work a supply of sand and gravel had been dumped along the side of the street so that there was very little wheeling of raw material.

The fifth view shows the finished job, with Consolidated Heater Company electric car heaters, connected ten in series on 720 volts, each placed at intervals of 10 ft. Canvas was stretched over the whole and the heaters were placed in circuit with the trolley wire by means of a fishpole connection in order that the entire mass of fresh concrete might be kept warm.


SALT LAKE & OGDEN RAILWAY—WORKING ON ONE TRACK WHILE MAINTAINING TRAFFIC ON THE OTHER


SALT LAKE & OGDEN RAILWAY—ELECTRIC HEATERS KEEPING THE CONCRETE WARM

The detail labor costs of this job per running foot follow in the next column. The tracks were laid 15 ft. center to center.

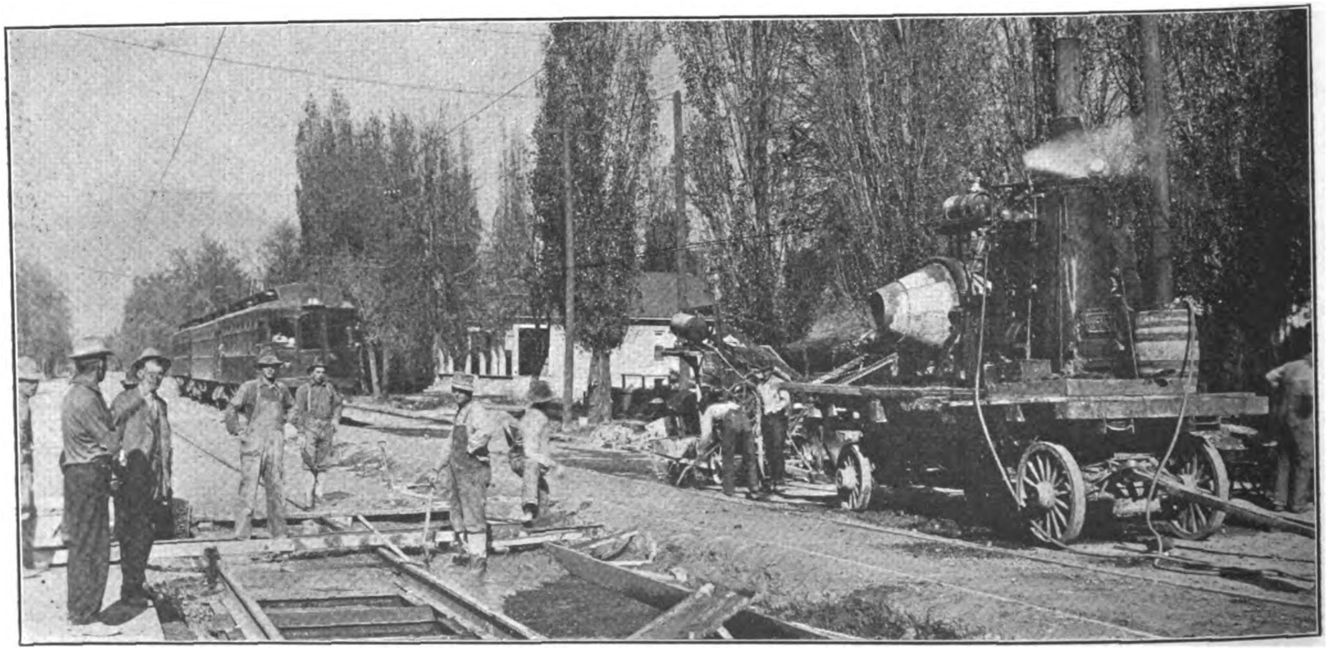
Except for the cement the material costs were very nominal, the various grades of washed sand and gravel being obtained from the bed of the Weber River near Ogden, where we constructed a temporary spur track to enable us to load by steam shovel. We contemplate the building of an additional 2 miles of this construction in the spring.

TRACK LABOR COSTS

Removing old track, per lineal foot	$0.070
Grading (elevation of old track about 6 in. higher than new track)	.487
Drain	.054
Laying and blocking up track	.197
Bonding	.014
Placing paving block and reinforcement	.109
Concreting:	
Base	.282
Wearing surface	.156
Total	$1.369

Wage scale:	
Laborers	22½ cents to 27½ cents per hour
Finishers	30 cents per hour
Engineers	35 cents per hour
Block setters	55 cents per hour
Foreman	50 cents per hour

At a meeting in the general office of the Columbus Railway, Power & Light Company, Columbus, Ohio, recently, S. G. McMeen, president, addressed more than 100 of the company's employees who are members of the various committees in the "safety first" movement.


SALT LAKE & OGDEN RAILWAY—CONSTRUCTION VIEW, SHOWING ALSO THE CONCRETE MIXER MOUNTED ON A WAGON

Location of Trolley Wire on Curves—IV

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Common Chord Method of Locating Trolley Wire on Curves—The correct location of the trolley wire on curves can be found in an even easier and simpler manner than by the last derived formula, namely, by the use of a common chord of dimension $2\sqrt{K}$. This method puts the whole matter safely into the hands of the foreman, after the exact length of this chord has been calculated for him, and makes him independent of tables, blueprints and figuring.

It has just been seen that the correct distance that the trolley should be moved inside the center of the track on curves can be expressed by the equation

$$\text{Versed sine} = R - \sqrt{R^2 - K} \qquad (13)$$

Where R = Radius of curvature

K = A constant when the dimensions and equipment of the cars, the height of the trolley wire and the track gage are constant.

In Fig. 7 we have the following

DCA = An arc of a center line of a track curve

R = Radius of curvature

$V.S.$ = Versed sine or distance that the trolley wire should be moved inside the center of the track for least friction

Then

$$AB = \tfrac{1}{2}AD = \sqrt{R^2 - (R - V.S.)^2} \qquad (16)$$

$$2AB = AD = 2\sqrt{R^2 - (R - V.S.)^2}$$

$$= 2\sqrt{V.S.\,(2R - V.S.)} \qquad (17)$$

Substituting the value of $V.S.$, as given in equation (13), in equation (18) we get:

$$\text{Chord } AD = 2\sqrt{(R - \sqrt{R^2 - K})\,(2R - R + \sqrt{R^2 - K})}$$

$$= 2\sqrt{K} \qquad (18)$$

This means that from constant K for a given car, height of trolley and track gage a length can be found for a chord common to all curves, the versed sine at whose center will be the distance the trolley should be set in for least friction, if there is no elevation of the outer rail. If there is elevation of the outer rail the versed sine obtained by this common chord method should be increased by $\frac{eh}{g}$

where

e = Elevation of outer rail

h = Height of trolley wire above top of rail

g = Gage of track or distance between the two rails of one track.

Example: Taking the data from the example just given we see that after determining K as 240.85 the length of the common chord is readily found from $2\sqrt{K}$ to be 31 ft. ½ in.

A tape line 31 ft. ½ in. long with marked center will locate all curve trolley wires in the city for the linemen if the cars, track gage and height of trolley wire are uniform.

The men have only to stretch the line as a chord of an arc of the rail curve where it is uniform in the central part of the curve, to note how far away from the rail the center point on the line is, and to use this for plumbing the trolley inside the center of the track.

If there is elevation of the outer rail that must be allowed for, furnish the men a track level and constant multiplier. For example, if the trolley is uniformly 19 ft. above the rail and the gage is 4 ft. 8½ in. the elevation should be multiplied by 4.035 or roughly, 4, to get the distance to move the trolley wire in addition to that found necessary from the common chord method as due to the car and trolley height alone.

Example: If 5 in. is found by the level to be the elevation of the outer rail 5 × 4 = 20 in. is the distance the trolley should be moved in addition to the amount found by the stretched cord. This on a 150-ft. radius curve would be about 10 in., or a total of 2 ft. 6 in. is the distance the trolley should be moved in this case.

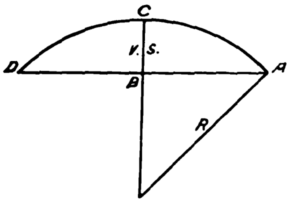


FIG. 7—COMMON CHORD METHOD

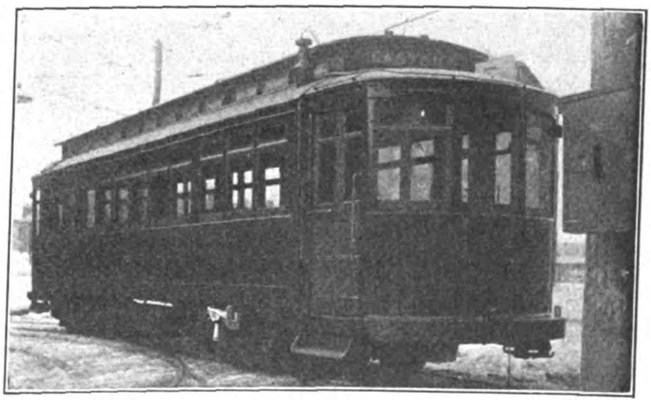
The lineman, using a stick equal in length to half the gage with inches and subdivisions marked on it and with the common chord length, will thus be enabled to do rapid and accurate work without any tables, blue-prints or mathematical assistance.

If there is more than one type of car on the system, the line foreman should be given a chord length suited to each type of car. If more than one type of car passes around the given trolley curve the average of the different chord lengths appropriate for the different types of cars and their relative number should be used in locating the curve.

Brackets for Carrying Lifting Jack Under Side Sill

BY HARRY BRANSON, SUPERINTENDENT OF EQUIPMENT LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

The accompanying halftone shows the scheme which was devised by the writer for mounting the lifting jack and lever with which each of our cars is equipped. The jack is of 15-ton capacity and is swung from a side sill of the car by means of brackets made of 1½-in. x ½-in. strap iron. The base of the jack rests on an L-shaped hook which passes through the opening at the bottom. The load end of the jack rests on a second and similar hook fitted with a swinging latch which holds the jack quite rigid but allows it to be easily removed in case of need.



JACK AND LEVER SUSPENDED FROM SIDE SILL OF LEHIGH VALLEY TRANSIT COMPANY CAR

The wooden lever employed is of standard length and has a screw-eye attached near the small end which rests in a hook fastened to the car. The jack end of the lever fits into a loop made of ¾-in x ⅛-in. banding iron which holds it in position. The entire labor and material cost for mounting this equipment did not exceed 80 cents per car.

Sales of Scrap Metals

BY J. P. ALEXANDER

The average scrap value of copper and brass sold during a period of four years ending 1911, for an electric street railway averaged 20 cents per pound. The fact that the present price of copper is 11 cents shows that the policy of the larger roads to dispose of scrap materials at regular intervals during the year is wise, because the ups and downs of the market are averaged and the money derived can often be made to earn enough to even up any losses occasioned by not holding it. When prices go to unreasonable figures, however, it seems to be the policy of all roads to unload, if possible, before a drop in prices occurs.

As a rule, old rails and mixed railroad scrap vary enough in value to be held, though opportunities often occur where such scrap can be handled to some advantage on low market, as when old rails are taken direct from the tracks to the railroad car. In this case the company saves the unloading, storing and reloading, which for rails may run as high as 50 cents per ton for every gross ton moved. This price is with mid-winter hand loading, with crews of from ten to fifteen men.

The cost of handling brass and copper scrap runs about 15 cents per 100 lb. handled. This is on the basis of collecting and delivering the scrap at one point. It appears high as compared with rails or mixed scrap, yet it is to be remembered that the pieces of these metals are smaller, and that the cost of carrying the sale is the same as for more extensive tonnage sales.

The following are actual costs of loading the materials mentioned from the points of collection to adjacent cars. Just under these costs I have placed the cost of handling copper and brass scrap for comparison. The cost of handling, it will be seen, runs under the cost of loading railroad scrap and rails:

COST OF LOADING SCRAP

	Per Gross Ton	Per $100 Worth	Basis of Value
Old car wheels	$0.245	$1.68	$22.50 per ton
Mixed railroad scrap metals	0.897	6.19	14.50 per ton
Old rails	0.475	2.77	17.50 per ton
Copper and brass	3.00	1.00	0.15 per lb.

In the case of the foregoing figures, the scrap car wheels, mixed railroad scrap and rails were all loaded by hand, and the distance traversed was from 10 ft. to 40 ft. The figures are conservative, and as they are for cold weather loading, they also represent a maximum cost.

As the "scrap business" is carried on to a great extent by foreigners, and classes of collectors who are constantly going beyond the limit of the law, all sales where such people become bidders are best handled on a strictly cash basis, and with an exact agreement in writing as to the details of each sale.

A form that the writer found useful for receiving prices on material for sale, subject to the "OK" of the legal advisor of the sellers, is shown in the next column, at the top.

A person reading this might consider the document too extended, yet the writer has found it hardly sufficient to cover all the points that come up in a sale. If any reader adopts it to collect prices on material, he will do well to stick to every detail of it, for it covers almost every point of dispute that can be brought up, where the seller desires to get several competitive bids and make the award to the highest bidder.

As mentioned above, this form, before use, should receive the "OK" of the legal advisor of the sellers, as the laws of contracts have in some states legal loopholes which the form may not cover entirely.

Every paper in connection with a sale, from the price sheets to the memorandum of weights, should be kept and filed, as anyone who handles scrap sales is sure sooner or later to be accused of dishonesty by unsuccessful bidders. He will need all the figures and details to clear himself.

Place ....
Date ....

Gentlemen:

The..............Traction Company will hold a sale on Feb. 21, 1915, at 2 p.m., when the following approximate amounts of scrap metals will be disposed of:

Located at Blenktown carhouse.
Material can be inspected from
2 p.m. to 5 p.m. any week day.

Approximate weight, pounds	Metals	Please insert prices you will offer in column at right, per 100 lb.
2500	Copper wire, bare	
1500	Copper scrap	
1300	Brass, red	
500	Brass, yellow	
300	Trolley wheels	
100	Copper turnings	
100	Brass turnings	
100	Phosphor bronze	
50	Old rubber	
100	Old leather	
50	Old rope	
125	Tin foil	
50	Scrap lead	

The company wishes it understood that the prices you insert will be exact prices for the material as it stands, with no allowances. The material is to be weighed on the company's scales, after the successful bidder is satisfied with their accuracy. Bidders will be expected to name highest figures they will pay for any item, and will also be expected to take any or all awarded them and remove same before the date..........1915, settlement being made by cash or equivalent certified check on the prices named in the bid, no matter how the market may change after date of sale to date of taking away.

The acceptance at the bottom of this letter must be signed and witnessed before the prices named are considered. The company reserves the right to reject any or all bids or stop the sale to avoid controversy.

The successful bidder will be expected to furnish two laborers to help handle the material to the scales and load same, and one representative to check the scale weights. Boxes, containers, wagons, trucks or cars to be provided at such times, and places, as shall be agreed on in accompanying memorandum to avoid delay and unnecessary expense.

BLANK TRACTION COMPANY,
Per.................

ACCEPTANCE:

The undersigned has placed the prices given above as a bid for the material to be sold and hereby agrees to the terms mentioned above.

(Signed)..................................,
BLANK FOUNDRY & MANUFACTURING COMPANY.

Witness:
....

Sheets or a record book ruled as follows will be found useful in recording weights. A permanent record book of sales is recommended. Weights are inserted to show how the columns are extended:

Place..........................
Date..........................

Copper: Dept.	Kind of Material	Gross Wgt., Lb.	A	B	Tare, Lb.	Net Wt., Lb.	Price, Cents	Amount of Credits		Total	Credit Acct., No.
								Shop	Line		
Shop...	Wire	350			40	310	15				
		500			50	450	15	$136.50			
		600			50	550	15				
	Copper scrap	450			50	400	15	60.00		$256.50	36
Line...	Wire	600			50	550	15				
		400			30	370	15				
		300			50	250	15		$170.50		
	Copper scrap	400			50	350	15		52.50	$228.00	23
Brass: Shop.	Red brass	250			50	200	11	22.00			
		300			40	260	11	28.60			36
	Yellow brass	250			50	200	10	20.00		70.60	
Line...	Red brass	300			50	250	11				23
	Yellow brass	200			60	140	10		41.50	41.50	
Miscellaneous: Shop...	Rubber	150			25	125	10	12.50		12.50	32

Summary:		
Total of Shop credits,	Acct. No. 32	$12.50
Total of Shop credits,	Acct. No. 36	327.10
Total of Line credits,	Acct. No. 23	269.10
Total		$608.70

The metal prices used are taken for illustration and are not prevailing prices to-day.

If the foregoing sheet is made large enough, it will take all figures in any ordinary sale. It will be found an excellent practice to have representatives of the company selling material put their initial in column "A" and the representatives of the buyer put his initial in column "B" after every weight taken.

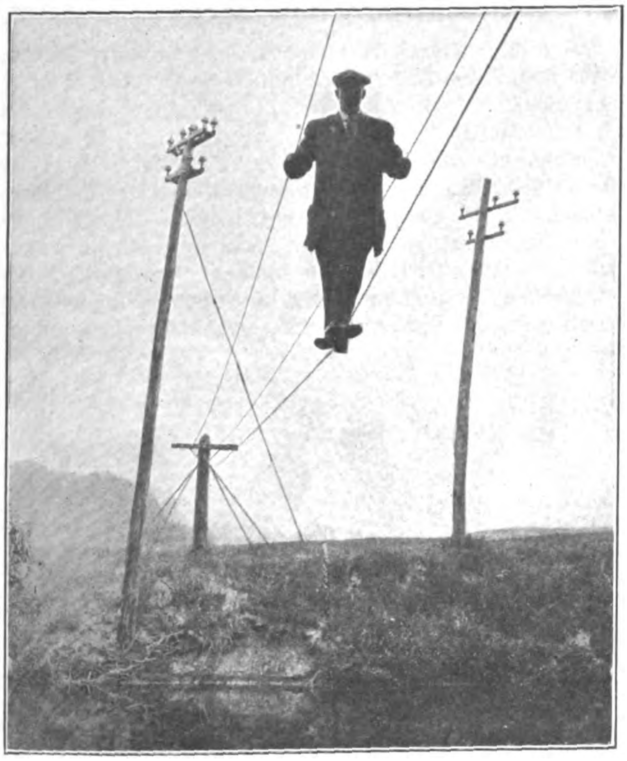
Most companies have to use portable scales of 1000 lb. capacity or less to handle such sales, and, as much of the material is handled in boxes, a tare weight is often used. Writing the word "no" in the tare column will indicate: "no tare to be deducted," and thus prevent confusion. Confusion is something that is not wanted in a "scrap" sale, as it is usually a cash sale, and often there is no chance to check back and see where the mistake was made.

The weights should be taken accurately and the figures checked by both seller and buyer.

As scrap material accumulates at the rate of about $50 per car run per annum, the amount of revenue from this source is certainly worthy of the trouble and cost of handling.

Linemen as Tight-Wire Walkers

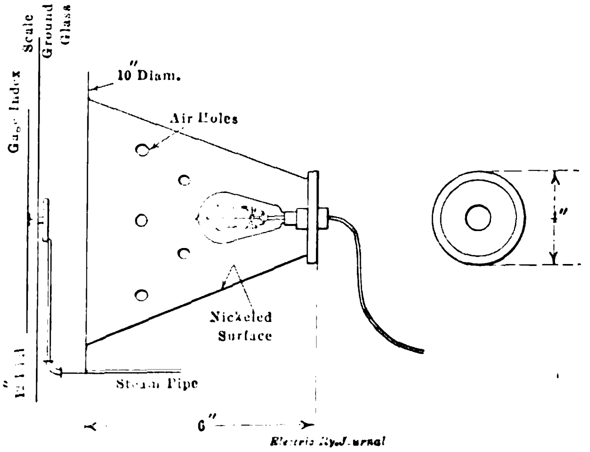
On the system of the Cumberland County Power & Light Company, which operates the electric railway lines in the Portland district of Maine, three of the transmission lines leading from the company's hydroelectric plants cross the Stroudwater and Presumpscott Rivers at points where a long detour by road is required to follow the lines on foot in inspection work. To enable the inspectors to avoid these tiresome detours, the rivers are spanned by stranded steel cables about ¼ in. in diameter, as shown in the accompanying illustration. The cables are spaced 36 in. apart in an equilateral triangle and are attached by 1-in. eyebolts to double cross-arms fastened to strongly guyed poles at each end of the span, which is about 150 ft. in the case shown.



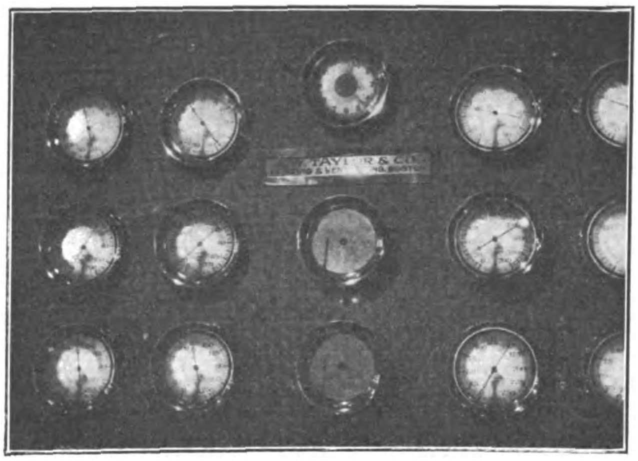
LINEMAN WALKING OVER CABLE TO SAVE A LONG WALK ON THE GROUND

Lighting a Gage Board from Behind

An unusually effective method of lighting a gage board is illustrated in the accompanying halftone and sketch. The various steam and vacuum gages in the plant are mounted on a marble board on which each gage is equipped with an individual 30-watt incandescent lamp. Each lamp is mounted about 6 in. behind the dial in a 4-in. circular brass nickel-plated reflector screwed to the orifice of a conical holder, which covers the registering mechanism in place of the usual solid metal plate. Holes drilled in the holder provide for the dissipation of heat radiated by the lamp. The gages can each be read with ease at a distance of from 50 ft. to 75 ft. from the board. The lamps are wired on the local 110-volt service mains. It is desirable to bore a number of holes in the conical reflector in order to prevent cracking the scale glass by the heat of the lamp.



SKETCH SHOWING LIGHTING OF GAGE BOARD FROM BEHIND



VIEW OF GAGE BOARD WITH LIGHTING FROM BEHIND

The tabulations of the State Tax Commission of Ohio show that the value of the real estate owned by the street railway, suburban and interurban companies in that State aggregates $9,092,020. The valuation placed on the realty of the Cleveland Railway is $2,076,680, while that of the Cincinnati Traction Company is $1,352,960. Real estate of the Northern Ohio Traction & Light Company is valued at $891,000. The valuation of all the public utility properties of the State aggregates $1,096,134,250, according to the commission. Of this $122,218,880 is real estate and $973,915,370 personal property.

General Electric Exhibit for San Francisco

It is announced that the exhibit of the General Electric Company in the Transportation Building at the Panama-Pacific International Exposition will include electric locomotives, railway motors and control, signal accessory electric devices, electric apparatus and equipment for railway shops, electric illuminants, etc.

Among the electric locomotives will be the type built for the Butte, Anaconda & Pacific Railway. A 60-ton electric locomotive of the type built for interurban freight and passenger service for both 600-volt and 1200-volt d.c. operation will also be on exhibit. Further, there will be shown a 16-ton electric locomotive for industrial freight and switching service and two types of mining locomotives.

The display of the commutating-pole ventilated-type motors will embrace 600, 1200 and 2400-volt types. Type MK control equipments will be shown on exhibition racks placed end to end with control jumpers and air-brake hose connections for train operation. Each control equipment consists of a master controller, contactor box, etc., completely wired up for operation of two GE-247 motors mounted on a truck beneath the rack. These equipments also include completely installed straight and automatic air brakes.

Another rack will carry a complete Type M multiple unit control designed for three-speed operation in city service. The controller exhibit will include the K-35, K-36, K-51 and K-201 types, fuse boxes, rheostats, switches, lightning arrestors, gearing, gear cases, etc. Railway lamps will demonstrate effectively systems of lighting cars with Mazda lamps; also both incandescent and luminous arc headlamps with semaphore lenses and parabolic reflectors.

The signal accessories will include transformers, vacuum and multi-gap lightning arrestors, motor-generator set, switchboard, instruments, etc. The new apparatus will include a multi-recorder for attachment to switchboards to keep automatically a record of the time of the manipulation of the various switches.

Headlight Test at Mobile

An unusually thorough headlight test has been recently recorded by the Esterline Company, Indianapolis. This resulted in an order for the complete re-equipment of the Mobile Light & Railroad Company's cars, at Mobile, Ala., with "Golden Glow" equipment, the detailed investigation having been made under the supervision of P. P. Crafts, general manager, and S. M. Coffin, master mechanic of that company, with F. O. Grayson, representing the Esterline Company.

The tests were made on two different occasions when conditions were as severe as possible, the nights being very dark. A special car was equipped with a standard 5-amp arc headlight, a "Golden Glow" interurban headlight, and a "Golden Glow" city-type headlight for use with 23-watt and 46-watt bulbs. On the first night the trial was made on an isolated piece of track. A man, about 5 ft. 6 in. tall, dressed completely in black, was started up the track. He was lost to sight with the arc light at 280 ft., with the "Golden Glow" interurban headlight at about 500 ft., with a 46-watt bulb at approximately 300 ft., and with a 23-watt bulb at about 250 ft.

It was decided after this test that the interurban-type "Golden Glow" lamp would give too great an illumination for city service, and, therefore, that a decision had to be made between the 23-watt and 46-watt bulbs in the "Golden Glow" type SM-95 headlight. Accordingly, on the next night, another car equipped with the same arc light and the "Golden Glow" SM-95 headlight was tested on a different line. The car was stopped at the end of the line, throwing a light on the public highway immediately ahead. Again the test of picking up a man dressed in black was made, and it was found that he could readily be seen for distances from 250 ft. to 300 ft. with a 23-watt bulb, whereas with the arc headlight he could be seen only at a distance between 150 ft. and 200 ft. The investigating party then walked ahead of the car and found that they could readily read the second hand on a watch at a distance of 700 ft. from the car, indicating that even at this distance the light would be noticeable to a person on the track.

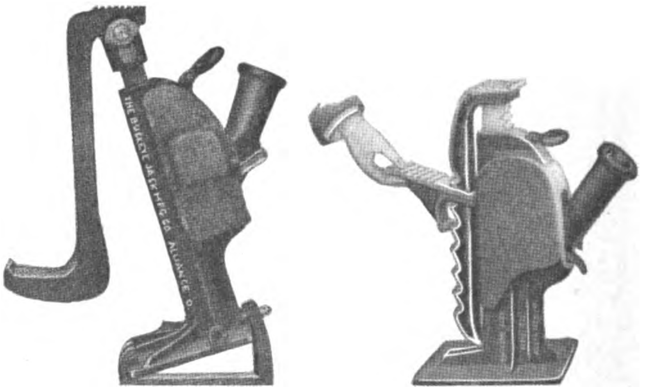
A still more thorough test was then made by sending two men ahead on a preceding car. These men were let off at a point unknown to the test party and instructions were given to the motorman to apply the brakes on the special car when opposite these men. This was done to determine how many feet it would take at a certain rate of speed to bring a car to a full stop after reaching the men at the side of the track. This test was made at a speed of approximately 30 m.p.h. The motorman applied his brakes in the usual manner when coming opposite the men and had his car under control after running approximately 100 ft., making a full stop in 200 ft. This test was then repeated except that an emergency stop was made, the car being brought to rest within 150 ft.

Two additional stops were made by letting men off of the preceding car at an unknown point and having the test car stop as soon as they came within the vision of the motorman. In each case the car was stopped a considerable distance before reaching the men.

Emergency Jacks

The Buckeye Jack Manufacturing Company, Alliance, Ohio, has recently brought out several types of emergency jacks, of which the No. 14 special and the No. 239 are illustrated.

The salient feature of the No. 14 special is an adjustible auxiliary foot which allows almost instantaneous adjustment to practically any height. Furthermore, this adjustment requires no tool, so that the jack is most properly entitled to the name of "emergency." The No. 239 jack is distinguished by the use of a swivel top which permits the user to operate the jack in any position, either side or front. In addition, the jack may be used either with or without the auxiliary heel, whereby the operator can use the jack at an angle without the usual blocking up. The No. 239 special is like the No. 239 except that a quick adjustment for height is provided within the original lifting limits. The company also makes, among other types, the No. 21, a double-acting trip jack for trackwork, and the No. 50, a 5-ton jack for shop work. The forgings in all of these jacks are specially heat-treated, the steel and malleable castings being of grades suitable for severe service.



JACKS WITH AUXILIARY HEEL AND FOOT RESPECTIVELY

Messages of the Governors

Additional Extracts to the Various State Legislatures of Interest to Electric Railways

Extracts from the messages of the Governors of Connecticut, Montana, Oregon, Washington, Pennsylvania, Ohio, South Dakota, Iowa and South Carolina follow, supplementing those published last week:

GOVERNOR S. V. STEWART OF MONTANA

"There is little need for drastic or radical legislation. No great revolutionary principles are involved in the matters that I shall suggest, or in the subjects that will otherwise come before you for consideration. If you can devise some means of organizing an emergency State police, for use in rare instances where the necessity may arise, contingencies may be met and without any expense to the public. If it had been possible to send fifty experienced, determined officers into Butte under the leadership of some good man instead of spending $125,000 in quelling the disturbance with the militia after it had assumed vast proportions, the whole matter would have been adjusted effectively for a nominal sum.

"It would seem to me that it is incumbent upon this Legislature to enact a reasonable, fair and proper compensation act."

GOVERNOR JAMES WITHYCOMBLE OF OREGON

"The State Tax Commission may well be abolished, and the work of the present body transferred to the office of the Railroad Commission, which should be given authority to employ an expert in taxation and assessment to conduct this branch of the office. It is my opinion that the scope of work handled by the Railroad Commission makes its title inadvisable and I recommend the substitution of the name 'Commission of Public Utilities.'

"I favor the creation of hydroelectric power districts somewhat along the line of existing irrigation district procedure, whereby groups of individuals in a community may band together for the co-operative development of the water-power resources of their neighborhood."

GOVERNOR ERNEST LISTER OF WASHINGTON

"It is probable that there will be introduced for your consideration some bills providing for a curtailment of the powers of the public service commission in relation to the regulation of public utilities within the boundaries of municipalities. Personally I feel that the tendency ought to be to increase rather than to decrease the power of the State commission and that the State commission ought to be given regulative power over municipally-owned utilities."

GOVERNOR MARTIN G. BRUMBAUGH OF PENNSYLVANIA

"We must enact a fair and certain workmen's compensation act. The present liability act needs amendment to the end that it may be in full accord with the above proposed act, and that both alike may guarantee to our workers the certain and speedy relief they merit and should have."

GOVERNOR RICHARD I. MANNING OF SOUTH CAROLINA

"I recommend the appointment of a commission to study the question of a workmen's compensation act and to report, by bill or otherwise, to the Legislature to convene in 1916, a measure that will bring relief to plaintiffs and defendants."

GOVERNOR MARCUS H. HOLCOMB OF CONNECTICUT

"The New York, New Haven & Hartford Railroad has in the past provided efficient and economical service to our people and industries, and has, until within a recent period, annually contributed in taxes a very substantial part of the revenues required to defray the expenses of our State government. By reason of existing conditions in its affairs, in part at least created by actions brought against it by our federal government, the financial strength of this corporation has materially lessened, resulting in a yearly loss to the State of some $600,000 in taxes and a prospective enforced decrease in efficiency and increase in expense of service. It is apparent that its managers are making commendable efforts to solve the difficult problems which confront them, including those which with increasing seriousness confront all public service transportation companies throughout the United States."

GOVERNOR FRANK B. WILLIS OF OHIO

"The present workmen's compensation law was placed on the statute book by unselfish, non-partisan effort; it is hoped that no amendment will be made to the law which will in any way decrease the benefits now enjoyed by working men under its provisions, and that so soon as the state of the insurance fund will admit of it the amount to be paid to injured working men or their families in case of death or total disability shall be increased."

GOVERNOR FRANK M. BYRNE OF SOUTH DAKOTA

"Laws should be passed giving the Railroad Commission control of light and power companies in the State, and generally extending their authority in the direction of a general public utilities board."

GOVERNOR GEORGE W. CLARKE OF IOWA

"Under our present methods everybody knows there is no such thing, and cannot be, as an intelligent selection of at least half of our public officials. But I will not rediscuss the question. It ought to have your most earnest and careful attention. I might, however, suggest that certainly the office of railroad commissioner ought to be made appointive. Neither will I rediscuss the question of public utilities. I discussed that question two years ago and I now reiterate all I then said."

Pay-As-You-Enter Patent Decisions

The United States Circuit Court of Appeals for the Second Circuit, sitting in New York, handed down last week two decisions relating to the original pay-as-you-enter patent. The first of these cases was that of the Prepayment Car Sales Company against the Orange County Traction Company, appealed by the defendant, and the patent in the suit was that issued to Ross and McDonald in 1905 for improvements in passenger cars.

The opinion in the Circuit Court of Appeals was rendered by Judges Coxe, Ward and Rogers. The court refers to the previous trial of the case in the lower court, where the patent was upheld, and to the various clauses in the patent and particularly to a patent issued to Moore in 1888, which, the court said, described a structure similar to that shown in the patent in suit. In conclusion, the court said that if there was no exercise of the inventive faculties in locating the conductor upon the rear platform of cars shown in the prior art for the purpose of collecting the fares of passengers at that point, the lower court erred in submitting the case to the jury and should have directed a verdict for the defendant. The judgment of the lower court in upholding the patent was therefore reversed.

At the same time the court handed down a decision in the case of the Pay-As-You-Enter-Car Corporation against Douglas Robinson, as receiver of the Metropolitan Street Railway Company, involving the same patent, and in this decision said in part, "In view of what we have said in the Orange County case, we think a broad construction of these claims is out of the question."

Mr. Casey, president of the Prepayment Car Sales Company, in answer to a request for a statement on the situation, said that he would have to await the formal rendering of judgments in the cases, in order to see their wording, before the company would decide upon its definite future action. He further stated that the company does not consider this decision by the Court of Appeals, which in any event refers to one only of their various patents, as final, and that it will, if necessary, carry the case to the United States Supreme Court.

News of Electric Railways

NEW YORK COMMISSION REPORTS

Summaries of the Work of Both Commissions Presented to the Legislature

The Public Service Commission of the Second District of New York presented its report to the Legislature on Jan. 15. Two hundred and ninety-eight entire days of the calendar year were devoted to hearings, 630 in number, in Albany, Buffalo, New York and elsewhere in the State. Formal and informal cases numbering 2195 were settled between March 16, 1914, the date the present personnel of the commission was organized, and the first of the year. During the latter period 1756 new cases were filed with the commission—slightly more than the usual number for a like period in other years. On March 16 there were 390 formal and 558 informal cases pending. On Jan. 1 there were but 182 formal cases and 327 informal cases, all in active process of settlement.

Important changes in the public service commissions law are recommended to the Legislature. These include the extension of the authority to suspend proposed rates, pending determination of their reasonableness, to the rates of telephone, telegraph, gas, electric and all corporations subject to rate regulation, in the manner provided last year in the case of common carriers in conformity with the interstate commerce law. Amendments are also asked to the "long and short haul clause" and for a provision compelling carriers to furnish shippers with written statements of rates on demand, in conformity with the interstate commerce law.

A year's experience with auto-bus lines has convinced the commission that the law making them common carriers and subject to the regulation of the commission should be repealed. "There seems to be no sound reason why any person or corporation should not use the highways under proper regulations drawn by the highways department," the commission says, and adds that these applications take the time of the commission from more important matters.

In the matter of grade crossing elimination in general the commission shows that while no work under way has been held up, and while many new eliminations have been authorized during the year, the fact that no appropriation for this purpose has been made in three years has resulted in a condition where the State finds itself confronted with grade crossing cases in which the State's share of the expense is $1,000,000 and which are ready to be proceeded with as soon as an appropriation is available. Grade crossing accidents are the only class of railway casualties which show an increase during the last year.

The commission for the first district reported to the Legislature the continuation of its work under the dual-system agreements in letting new construction contracts and in supervising the work under those already awarded. From Jan. 1 to Dec. 31, 1914, it awarded twenty-four construction contracts besides several contracts for track materials, installation of tracks, and station finish, aggregating in contract prices about $52,000,000. This is more than double the amount awarded in 1913.

The running expenses of the commission during the year amounted to practically $3,000,000. Of this amount $2,500,000 was chargeable to rapid transit, and under the dual system contracts these expenses of the commission are included in the cost of construction of the rapid transit lines; that is to say, they become a part of the city capitalization upon which the companies make interest and sinking fund payments. The increase in expenses of the commission on its rapid-transit work is due to the large increase in the amount of its engineering work. The remaining expenses of the commission, about $500,000, are incurred in connection with the duties of the commission under the public service commissions law and the railroad law, on regulation work.

Transit relief, the report says, will be provided in a measure during the year 1915 by the temporary operation of the Steinway tunnel and the Fourth Avenue subway, in Brooklyn, both of which are expected to be opened in the spring. The next relief, it is stated, will come from the beginning of operation of the new elevated railroads, third-tracking, and extensions.

For the year 1914 the total number of accidents on transportation lines was 71,510, a decrease of 121 from the year 1913. This figure includes 292 deaths and more than 2000 cases of serious injury of a permanent character.

For the fiscal year ended June 30, 1914, the total number of passengers carried by all street railroads in the First District, that is, elevated, subway, and surface lines, was 1,813,204,692, an increase of 43,328,184 over the previous year. The total receipts of such companies for the year were $94,153,673.93, an increase of $2,012,068.89. Estimating the population of the greater city at 5,400,000, this is $17.43 per capita for street-car fares.

REPORT OF MASSACHUSETTS COMMISSION

Summary of Second Annual Report, for Year Ended June 30, 1914

The second annual report of the Massachusetts Public Service Commission was submitted to the Legislature on Jan. 20, covering the year ending June 30, 1914. Brief mention is made of the careful enunciation of principles in the Middlesex & Boston rate case. A special report will be submitted later upon the transportation needs of the Boston district.

Returns were received from fifty-three electric railways. The total main track operated is 2927.7 miles, a gain of 9.15 miles over 1913. The gross assets are $217,960,086; the gross liabilities, $206,974,502; the surplus, $10,985,578, or a surplus representing 11.19 per cent of the capitalization, compared with 11.18 per cent last year. There was a gain in surplus of $112,609 in the year. The aggregate capital stock is $98,194,775, an increase of $910,400, and the total amount of dividends declared was $5,109,368, or 5.2 per cent of the capital stock, compared with 5.17 per cent last year. The net divisible income exceeded dividends declared by nearly $100,000. The net debt is $100,590,688, compared with $97,069,948 in 1913. The total cost per mile of main track is $70,646, compared with $68,881 last year, and the capital investment per mile is $70,179, against $68,623 in 1913. Of the present investment per mile, $37,882 represents construction cost, $13,112 equipment, and $19,652 other permanent property, chiefly lands, buildings, parks and power plants.

The total operating revenue for the year was $39,703,706, and the total income $41,625,904, the latter representing an increase of $1,611,870 over 1913. The total expenditures were $41,526,865, an increase of $1,382,394 over last year. Operating expenses, $26,665,220, gained $938,166; taxes, $2,461,321, decreased by $39,118, and dividends increased $77,641. The surplus for the year, $99,039, was $229,476 ahead of 1913, when there was a deficit of $130,437. The revenue from passengers was $37,942,313, an increase of $1,382,770, and the revenue from the carriage of mails and merchandise, $811,090, gained $252,371 in the year. The net operating revenue, $13,038,486, was $641,847 above last year. The estimated number of passengers carried, computed on the basis of 5-cent or 6-cent fares collected, was 766,628,535, or 261,853 per mile of main track operated, a gain of 8809 per mile during the year. The percentage of operating expenses to gross earnings was 67.16, against 67.48 last year. A brief summary of various unit figures follows:

	1913	1914
Gross earnings per mile of main track..........	$13,461	$14,017
Operating expenses per mile of main track......	9,084	9.414
Net earnings per mile of main track............	4,377	4.603
Gross earnings per car-mile, in cents...........	29.19	29.99
Operating expenses per car-mile, in cents.......	19.70	20.14
Net earnings per car-mile, in cents.............	9.49	9.85
Gross earnings per passenger, in cents..........	5.16	5.18
Operating expenses per passenger, in cents......	3.48	3.48
Net earnings per passenger, in cents............	1.68	1.70

During the year the companies ran 132,355,825 car-miles, compared with 130,588,851 car-miles in 1913; the number of cars owned is 8364, against 8154 last year; and there are 23,412 employees, compared with 24,136 in 1913.

A feature of the report new this year is a description of the work of its various bureaus. The commission points out that a form is being perfected to enable electric railway tariffs to be filed satisfactory at the office of the board.

During the year 2471 electric car inspections were made and no serious defects were found, the number of cars found defective with reference to wheels, brakes, lighting, seat frames or untidiness investigated on electric railways was: Collisions, forty; broken axles, journals and wheels, 396; defective track, 326; miscellaneous 248. Jacks were used six times to extricate persons from beneath cars, the time required being from five minutes to ten minutes. The number of passengers killed was thirty-two, employees, nine, and other persons, seventy-six; a total of 117, against 133 last year. The number of passengers injured was 6229; employees, 638, and others, 1415, a total of 8282, compared with 8796 last year. A new and valuable exhibit in the report consists of a number of tables of data upon steam and electric railway signal installations in the State, with percentages of track equipped, types of signals in use, etc.

KANSAS CITY REORGANIZATION

Board of Control Work Essential Irrespective of Successful Completion of Reorganization

Judge William C. Hook of the Federal Court at Kansas City, Mo., delivered an opinion on Jan. 13 that the board of control provided as a feature of the management of the Kansas City Railways under the franchise granted six months ago, but not yet effective, should assist the receivers in the management of the property pending the readjustments required by the franchise. The franchise was to become effective only after a reorganization under certain terms, in which case the receivership should end and the property be turned over to the Kansas City Railways, the new company. Soon after the granting of the franchise the board of control named in it, specifically, as William P. Wood, representing the city and Philip J. Kealy representing the railway, was established by the receivers to assist in the running of the property, and especially to establish the work on the lines that it would operate in case the reorganization was effected and the Kansas City Railways got the property. There was said to be some conflict of authority between the board and the officers of the Metropolitan Street Railway and complaint had been made that the board was unnecessary.

Judge Hook ruled in the recent opinion that whatever the outcome of the receivership and the present court proceedings might be, it was highly necessary that the obligations of the previous franchises and ordinances be fulfilled, as to service, equipment and extensions; that these matters were specially designated in the new franchise as duties of the board of control, and that it would be very advantageous to the city and to the citizens, in case the reorganization was effected, to have the operation of the street railway already well established under the conditions of the franchise with the plans of the board of control well under way. If the reorganization were not effected the work of the board would have been necessary and valuable. The court made it plain, however, that the board is merely working under the receivers, to make recommendations to them, although such recommendations, in case of successful reorganization, must later be looked upon in the light of official action by the board. The work of the board, the court said, would be well worth the compensation to be paid from funds under the court's control. Explicitly, Judge Hook declared the province of the board of control to be: character and condition of cars, routing, schedules, transfers, and like matters of service; extension of old lines, improvements, and construction of new lines, meeting old obligations in arrears; specifications for equipment and improvements, construction, such as will outlast the receivership; determining whether specifications have been observed; decisions as to what part of disbursements are properly chargeable to capital account within the intention of the new franchise ordinance. The opinion closes with the following sentence: "The trouble in the past has been due to the confusion of an exceptional situation and not to intention."

WESTERN MASSACHUSETTS TRANSPORTATION

Report of Special Legislative Commission Suggests Electric Railway Construction by the State

The commission on transportation in western Massachusetts has submitted an exhaustive report to the Legislature suggesting the construction by the State of an electric railway through Hampshire County from Williamsburg to Hinsdale at a cost of about $1,200,000, recommending the expenditure of about $2,000,000 by the State for new highways, the extension of the authority of the Public Service Commission to permit the ordering of extensions of street railways into adjoining towns having no such service, and to permit the ordering of street railways to carry freight and express at the discretion of the board.

In the territory covered there are thirty-three towns without railway facilities. Regarding the developing of new trolley lines, the commission has been advised by President Howard Elliott that neither the New York, New Haven & Hartford Railroad nor the Berkshire Street Railway is in a position to undertake comprehensive additions to the facilities of the district. The report points out that the proposed interurban railway in Hampshire County might be operated by gasoline-electric motor car service, with a saving in first cost of about $5,000 per mile over the usual trolley system. Mr. Elliott stated that should the State decide to build some of the local extensions of street railways referred to in previous legislation, he would be willing to recommend to the Berkshire and the New Haven companies that a traffic agreement be entered to operate such extensions under a yearly contract as agent for the State.

J. T. Harmer, president of the New England Investment & Security Company, Springfield, Mass., sent a communication in response to inquiries relative to the willingness of the Springfield Street Railway to build a line between Huntington and Cummington. The company could not favor this undertaking because of more pressing needs in the way of local extensions. Mr. Harmer stated that the projected line would probably not earn operating expenses and fixed charges for some time and pointed out that the possibility of the assumption by public ownership of existing lines is a deterrent to capital. He outlined the terms under which the company would operate the line as the agent of the State if financed by the latter. Among the conditions would be the furnishing by the State of rolling stock approved by the company, provision for arbitration of disputes, five years' operation by the company without charge for its services, with compensation thereafter for such administration, a minimum contract period of fifteen years, and the option of having the company supply the rolling stock subject to reimbursement for operating expenses, interest and depreciation. An alternative plan submitted by Mr. Harmer provides that the company shall operate the line at its own expense for fifteen years. In the latter case the State would assume the expense of maintenance and all taxes; fares to be maintained at not less than 5 cents with 2 cents per mile for any trip in excess of 2 miles, and half-fare provisions for school children; determination of schedule by the Public Service Commission based on the equivalent of two cars operating between terminals in the summer and one car in winter; authorization of the company to carry freight and express on the line, and provision for the purchase of the line by the company at the end of fifteen years.

The commission does not definitely recommend the construction of new electric railway lines by the commonwealth in view of the radical departure this involves from the established policy of the State, and it emphasizes the possibilities of development of the hill towns through highway construction and motor-truck service. It is of the opinion, however, that the Public Service Commission should have authority to require companies to extend their lines into adjoining towns having no street railway facilities, and appends the above extracts from correspondence and conferences with the railway companies, as evidence of the desire of the latter to co-operate to a reasonable degree in case the Legislature commits the State to build lines which at present cannot be financed by private capital.

BEMIS DETROIT APPRAISAL TOTALS

The Detroit street railway commission announced on Jan. 18 that Prof. E. W. Bemis, who has been in charge of an appraisal for the commission of the properties of the Detroit United Railway within the one-fare zone, places $22,957,970 as the reproduction value of the properties. The average depreciation is fixed at 23 per cent by the appraiser, leaving a depreciated valuation of $17,476,742, including $1,062,910 worth of paving which Corporation Counsel Lawson declares belongs to the city although laid by the company.

The total of $22,957,970 is exclusive of remaining franchises, bond discount and intangible values. In addition, no allowance is made for material on hand and the construction of lines completed since the beginning of the appraisal last summer. The company, in its inventory, set the reproduction value at about $32,000,000.

The company's main track measured 198 miles, with 24 miles in sidings and yards. The total number of revenue cars is fixed at 1312. The summary of valuation as compiled by Professor Bemis and Edward P. Burch, engineer in charge, is as follows:

Way and structures, $11,364,741, less 19 per cent for depreciation, $9,216,083.

Equipment, $5,730,319, less 25 per cent for depreciation, $4,322,061.

Power, $2,043,394, less 35 per cent for depreciation, $1,325,688.

General and miscellaneous, $2,048,000, less 25 per cent for depreciation, $1,550,000.

Paving, $1,771,516, less 40 per cent for depreciation, $1,062,910.

The commission expects to receive Professor Bemis' figures on franchise and intangible values within a week's time.

TORONTO MAYOR ON TRANSPORTATION

Mayor Church, of Toronto, Ont., in his address to the Council on Jan. 11 said he was not content with having helped to defeat the purchase deal, but proposed to lay before the Board of Control a program for a proper transit system, radial entrances, and conservation and extension of the civic car lines. He urged the Council to apply to the Legislature to empower the city to spend $50,000 on motor buses without the consent of the people, so as to try out this form of transportation with a view to giving relief and acting as an auxiliary to the existing system. He announced himself as opposed to the formation of a transportation commission and said he considered the Commissioner of Works to be administering the civic car lines efficiently and economically. He was opposed to any increase in the fares on the civic lines. He believed that the solution of the rapid transit problem was to be found along the lines of the Harbor Commissioners' plans. The purchase agreement and negotiations were now of the past, but the problem of adequate street railway service remained to be solved. The Harbor Board should be requested to prepare detailed plans, specifications and estimates of cost and the Council should request the Harbor Board, with the assistance of two representatives to be named by the Ontario Hydro-Electric Power Commission and representatives of the Council, to form a committee to prepare and present a full report as to what, if any, permissive legislation was required at the coming session of the Legislature. If the committee submitted its report by September or October the decision as to "fast traction" could be put before the people on Jan. 1, 1916.

NEW DES MOINES FRANCHISE DRAFT

Efforts of the Des Moines (Ia.) City Railway to secure a franchise were ended when the district court issued an order restraining the city from holding the proposed franchise election on Jan. 16, as advertised. Judge Utterback issued the restraining order. Judge Ayres, of the same court, refused an injunction asked by the city railway to prevent the city from submitting proposed amendments to the franchise in connection with the franchise election. He held that the election would be invalid in any case because Mayor Hanna had proceeded to advertise the amendments along the franchise in the notices of the election. He ruled that under the Iowa law the election should be held on the original franchise as petitioned for by more than 11,000 voters of the city. His ruling was, in effect, a victory for the company, but the proceedings came too late to save the validity of the election. His decision was a basis for the later ruling of Judge Utterback in refusing to allow the election to be held.

The City Council now is drafting a new franchise ordinance which is to be submitted to Emil G. Schmidt, president of the company, in the hope that the city and company may be able to agree upon a compromise franchise to be submitted to the people. The chief issue at stake is that of capitalization. The general sentiment in the city is that the franchise would have carried if Mayor Hanna had not confused the issue and invalidated the election by his procedure in attempting to offer his amendments in connection with the franchise upon which the people had petitioned for a vote.

SEATTLE MAYOR'S VETO

Mayor Hiram C. Gill of Seattle, Wash., on Jan. 18 sent to the City Council his veto of the bill to submit to the voters on March 2 the question of issuing $80,000 of 5 per cent bonds for the extension of Division "A" of the Seattle Municipal Railway into Ballard. He said in part:

"The $80,000 of bonds for the construction of a street railway into Ballard and for a temporary bridge over the Lake Washington Canal would not cover half the cost of the work, but would simply open the way to get the work started. Because of the opportunity which the plan offers for the diversion of funds, I cannot see my way clear to take any other course than to veto the matter. Moreover, automobiles are about to supersede car lines. If the city, in the face of this fact, begins to spend money on further extensions, we are fools rushing in where angels fear to tread."

The opinion is entertained in the Council that the bill will receive the required number of votes to pass it over the Mayor's veto.

The Council has voted to submit at the March municipal election the bill to establish a municipal motor-bus service between the south terminus of Division "A" and the Highland Park & Lake Burien Line.

CLEVELAND TAX DISPUTE

After tendering payment of $230,875 to the treasurer of Cuyahoga County, Ohio, as its taxes for 1914, the Cleveland Railway filed suit in Common Pleas Court for a temporary injunction to prevent the collection of $318,624, the amount fixed by the State Tax Commission. The commission valued the property of the company for 1914 at $22,412,500, almost $500,000 more than for 1913, although suit is now pending concerning the 1913 figures. The company's estimate of the value of the property is $16,504,701. It is on this amount that taxes were tendered. A willingness was expressed some time ago to pay on a valuation of about $19,000,000 as a compromise, but the commission would not accept the amount and insisted that its valuation is correct. Under the circumstances, it would seem that the Public Utilities Commission will have to accept the Tax Commission's valuation when any question as to fares comes up, or, on the other hand, the Tax Commission will be compelled to accept the valuation placed upon the property by the Public Utilities Commission, if it makes it less than the present tax figures.

Air Brakes in Waco.—The Southern Traction Company, Dallas, Tex., has announced that it intends to equip all of its double truck cars in use in Waco with air brakes.

Rapid Transit Ordinance Accepted.—The ordinance giving the Cleveland Rapid Transit Railway the right to build subways under certain streets and signed by Mayor Baker, has been accepted by the company.

War Losses of German Company.—The Allgemeine Company, Berlin, Germany, has been a heavy sufferer on account of the war. The official publication of the company says that up to Nov. 30 seventy-four workmen and thirty-eight officers had been killed in battle.

The Crosser Bill.—The Crosser bill for the municipal ownership of the street railways in the District of Columbia was not brought up for consideration in the House on Jan. 11. This, it is said, reduces to a minimum the chances of debate on the measure this session.

Briefs Concerning State Accounting Asked by I. C. C.—The Interstate Commerce Commission will receive briefs until Feb. 27 and hold a hearing in Washington on March 4, relative to the subdivision of primary accounts (subject to certain restrictions), in order to comply with local state requirements.

New Haven Charter Change.—The New York, New Haven & Hartford Railroad has petitioned the Legislature for a change in its charter, which would empower it to sell, pledge, or dispose of, in any way, any shares of capital stock which it may hold in any other steam railroad or street railway corporation.

Offer to Sell to City.—The City Council of Alexandria, La., is expected to act this month on a proposition which has been made by the Southern Traction & Power Company, operating the Alexandria Electric Street Railway, for the sale of the property to the city. The company operates 7 miles of line in Alexandria. The question of municipal ownership will have to go before the voters.

Toledo Municipal Ownership Question.—The evening of Jan. 20 was the date for the City Council to sit as a committee of the whole to discuss City Solicitor Thurstin's ordinance authorizing the issue of $4,000,000 bonds for the purchase of street railway lines. Mr. Thurstin was assailed recently by some of the labor organizations because he did not ask for a bond issue of sufficient size to purchase the entire property of the Toledo Railways & Light Company.

Toronto Appraisal Costs.—The report on and valuation of the property of the Toronto (Ont.) Railway and the Toronto Electric Light Company carried out by John MacKay & Company will cost the city $42,000, according to the bill sent to the city. This valuation was ordered by Mayor Hocken during the negotiations for purchase of the assets of the two corporations. The receipt of the bill of MacKay & Company increases the total cost in connection with the purchase deal to $67,123.

Examination Asked in Cincinnati.—Walter Schoenle, city solicitor of Cincinnati, Ohio, addressed a communication to the City Council on Jan. 16, in which he asked permission to examine the books and records of the Cincinnati Traction Company and the Cincinnati Street Railway. The State Public Utilities Commission, he said, will soon submit its report on the physical valuation of the property, but he contends that this information is only part of the material to be considered in determining the cost of carrying passengers.

Daily Paper Analyzes Public Utility Bond Issue.—The Boston *Commercial*, in its issue of Jan. 16, published a detailed analysis of the first consolidated mortgage 5 per cent gold bonds of the Bangor Railway & Electric Company, Bangor, Maine. This analysis, which fills two columns, takes up the question from the points of view of geographical location, franchises, property, capitalization and earnings. It is concluded that the issue is a good investment, offering a high degree of safety, a fair yield and easy marketability.

Short Municipal Lines Opened.—The new $35,000 municipally-owned street car lines in Tacoma, Wash., were placed in operation on Jan. 10 by the Tacoma Railway & Power Company. One line runs out Eleventh Street to the shops of the Chicago, Milwaukee & St. Paul Railway on the tide flats. The other runs over St. Paul Avenue to the tide flats. The Tacoma Railway & Power Company is to operate the lines in connection with its other lines for seven years and furnish the equipment under a partnership arrangement with the city.

Ohio Labor Legislation.—George R. Davies, president of the Cleveland branch of the Amalgamated Association of Street & Electric Railway Employees, said on Jan. 19 that it would not be possible to give out any detailed information regarding the legislation that will be asked of the present General Assembly until the results of the meeting held in Columbus are put into shape and discussed for a second time by the committee. Mr. Davies said the men feel that there should be a minimum day of so many hours, perhaps eight, and that the law should be made clear regarding the number of hours of continuous rest. There are eighteen local organizations of the Amalgamated Association in Ohio.

Duplication of Utilities to Be Prevented.—The Public Service Commission of the State of Washington has decided to recommend to the Legislature a change in the public service commission laws by which public utilities desiring to compete with an established utility of the same character would first have to obtain from the commission a certificate of "public convenience and necessity." C. A. Reynolds, chairman of the commission, says that the object is to prevent unwarranted duplication of public utilities, the cost of which the public ultimately has to pay. It is thought that this amendment would make it possible for the commission to deal promptly and effectively with "jitney" bus lines operated in competition with well established street railway lines.

Municipal Motor Bus Fund in Seattle.—Mr. Hesketh recently introduced a resolution in the City Council of Seattle authorizing the transfer of $50,000 of bonds from the Municipal Street Railway issue to a fund to operate motor buses to connect Division "A" with Division "C," the Highland Park & Lake Burien branch of the municipal railway, and submitting the proposition to the voters at the general election on March 2. The resolution proposes that motor buses meet all Division "A" cars at Third Avenue and Pine Street and carry passengers through the center of the city on transfer privileges to the south city limits on the Lake Burien Line. This resolution has since been acted upon and approved by the Council as noted on page 198 of this issue.

Report on London and Paris Facilities.—The New York (N. Y.) Railways has printed a pamphlet of 126 pages covering a report on the transportation facilities of London and Paris as of October, 1913. This report was prepared by George Keegan and F. T. Wood, who are assistants to Frank Hedley, vice-president and general manager of the Interborough Rapid Transit and New York Railways Companies, respectively. These gentlemen visited London and Paris in 1913 to see wherein any of the transportation practices in those cities could be adapted for New York conditions. Particular attention was given to the question of accidents, franchise agreements, taxation and motor buses. In view of the present applications of various interests to operate motor bus service in New York, these data, originally made as a private report, are of peculiar timeliness. Copies of this publication have been sent to the New York newspapers.

Arguments for Reopening of Passaic Gas Case.—Counsel for the cities of Passaic and Paterson on Jan. 14 began arguments for a reopening of the Passaic 90-cent gas rate case before the New Jersey Court of Errors and Appeals. The previous decision of this court, countenancing intangible franchise values in rate-making cases, was abstracted in the ELECTRIC RAILWAY JOURNAL of Dec. 19, page 1331. In opening the present arguments, municipal counsel attacked the qualification of E. J. Heppenheimer, lay judge, on the ground of his status as president and presumably as stockholder of the Colonial Life Insurance Company, which holds securities of the Public Service Corporation of New Jersey and its subsidiaries. The court unanimously decided, however, that the relation of the insurance company to the utility was that of creditor and did not give rise to the alleged disqualification. Decision was reserved by the court in regard to the reopening of the case.

New York Commission Investigation.—On Jan. 21 both Houses of the Legislature of New York passed the Public Service Commission inquiry resolution after amending it so the investigators would be specifically instructed to inquire into alleged duplication of work by the Public Service Commission and the Interstate Commerce Commission. The size of the committee was increased to five Senators and six Assemblymen. The Democrats did not oppose the passage of the resolution. Lieutenant-Governor Schoeneck announced that the Senate members of the committee would be Senator George F. Thompson of Niagara County, George Cromwell of Richmond, Ogden L. Mills of New York, R. R. Lawson of Brooklyn, Republicans, and James A. Foley of New York. Speaker Sweet of the Assembly has selected Assemblyman McQuiston of Kings as one of the six he will name. Senator Thompson, chairman of the committee, announced on the day the resolution was passed that there would be a meeting for organization at once and that he expected the committee would get to work by Jan. 23.

San Francisco Company Questioned as to Policy.—The Board of Supervisors of San Francisco, Cal., has passed a resolution calling upon the United Railroads to answer seven questions as to policy regarding extensions and plans for improving service in specific cases, in order that the board "may be better able to prescribe certain actions on the part of that company (United Railroads) for service betterment." The seventh question reads: "If the United Railroads finds itself financially unable to meet with the call for improvement in the service in this community, why will it not adopt the policy of non-obstruction to the process of enlargement of municipal lines, it being the evident purpose of the citizenship, in finding that the United Railroads cannot cope with the situation, to provide their own service. By the above is meant that the policy of non-legal interference in the constructive policy in municipally-owned railroads should be recognized by the United Railroads as an effort on the part of this Board of Supervisors to relieve a very pressing problem."

Massachusetts Bills.—A bill directing the Public Service Commission to construct a new street railway line west of the Connecticut river, at an expense not exceeding $1,500,000, and authorizing the commission to lease such line of railway to any railroad or any electric railway now operating in Massachusetts, was filed at the State House. The Boston Elevated Railway has petitioned the Legislature to amend the acts of 1913 relative to investments of savings banks. Bills have also been introduced into the House providing for the public ownership and operation of electric railroads throughout the State; that street railway car dispatchers shall not be required to work more than eight hours per day within ten consecutive hours; that all electric street cars shall be equipped with combined automatic and manually controlled fenders; that no car shall carry more passengers than 50 per cent. in excess of its seating capacity; that all tunnels and subways shall be equipped with emergency exits in the discretion of the fire commissioner, and that pupils of State normal schools shall be transported between school and home by street railways at half fare; that "jitney" bus lines shall be under the supervision of the Public Service Commission.

Bay State Arbitration Continued.—Hearings have been continued during the last week by the arbitration board in the investigation of the wages paid by the Bay State Street Railway, Boston, Mass. It was testified that the average hourly wage of all blue-uniformed employees for a typical week ended May 16, 1914, was 20.4 cents and the weekly total $13.45. George T. Seibel, superintendent of the Taunton, Fall River and Newport divisions, described the efforts of the company to provide lobby furniture and shower baths and the abuse of these facilities by the employees. Fred Huff, chief instructor for the lines north of Boston, testified that he receives $3 per day and explained the work of the company's instruction car which new men are required to visit on its first trip to their districts. Mr. Huff also testified that the work on a large part of the Bay State system was less arduous than that required in city service. Furthermore, the cost of living was less in outlying districts on account of lower rents and the possibility of truck garden farming by employees. James H. Murphy, superintendent of the Taunton division, said that conductors in his district are less burdened with tickets than in previous years. He submitted an off-hand list of about thirty trainmen living in homes equal in comforts to his own.

Chinese Engineers Return from Train Lighting Investigation.—Three Chinese engineers arrived in New York City on Jan. 17 on the *St. Louis* after an investigation of train lighting systems in England, authorized by the Chinese Ministry of Communications. The members of the party consisted of Chan Y. Hoey of the Pekin-Mukden Railway, W. H. Hsen and C. Y. Fung. Owing to the European crisis the engineers were obliged to return to their native country by the circuitous Western route. They left for Chicago after remaining in New York for two days. They will sail from San Francisco on Jan. 30. In discussing Chinese conditions with a representative of the ELECTRIC RAILWAY JOURNAL Mr. Hoey stated that little new railway construction is contemplated in China owing to the lack of available capital and the present unsettled state of the Chinese government. Steam railroad electrification has not yet attracted much attention in China owing to the abundant coal supply now available. The only new street railway system contemplated, so far as Mr. Hoey knew, was in Pekin. The government a short while ago granted a franchise to a private company to build a street railway in this city. The company, however, neglected to carry out its end of the agreement so the government accordingly revoked the franchise and is now considering building a municipally-owned line.

Philadelphia Transit Mass Meeting.—A mass meeting was held in Philadelphia on Jan. 14 to further the plans for bettering rapid transit conditions in that city. A. Merritt Taylor, director of city transit, made an appeal for the support of the rapid transit plan of May 27, 1914, by which a co-operative program was arranged and tentatively agreed to by the Department of City Transit and by the officials of the Philadelphia Rapid Transit Company. The program provides among other things that when the city builds the initial high-speed lines at a primary cost of approximately $46,000,000, the Philadelphia Rapid Transit Company shall equip them at a primary cost of about $12,000,000 and operate them in conjunction with its present system. Mr. Taylor said that plans and specifications for the construction of the sections of the delivery loop would be ready for bidders in March, but that bids could not be invited or contracts let for this work until after a special election has been called by City Councils and the people have voted for an increase in the city's indebtedness to provide the necessary money. The method of working out the details of the mass meeting were probably unique in the annals of American urban transportation. The Philadelphia *Ledger* said that at the mass meeting the people wrote a new chapter in the city's annals by an ultimatum to the municipal legislators that a special election shall and must be called for March 1 in order that the loan for improved transit may be floated. Bands and red fire and even a rapid fire gun were used in connection with the meeting. Words covering the people's transit message were put to the airs of "It's a Long, Long Way to Tipperary," "You're a Long Way from Home" and "Marching Through Georgia."

PROGRAM OF ASSOCIATION MEETING

Chamber of Commerce of the United States

As previously announced in the ELECTRIC RAILWAY JOURNAL the annual meeting of the Chamber of Commerce of the United States will be held at the New Willard Hotel, Washington, on Feb. 3, 4 and 5. President Wilson will speak at the dinner on the evening of Feb. 4. The foreign trade situation will be dealt with at length by both the Secretary of State and the Secretary of Commerce. Secretary Redfield will deal with the general development of the foreign trade, and his presentation will be supported by Dr. Edward E. Pratt, chief of the bureau of foreign and domestic commerce, and other prominent speakers on different phases of the subject, such as Latin-American and Oriental commerce. Samuel McRoberts, vice-president of the National City Bank, New York, will lead the discussion on the relation of the federal reserve act to trade expansion. Following this will come a report of the foreign trade committee of the Chamber of Commerce of the United States in favor of permitting a greater degree of combination for the development of foreign trade. The question of an American merchant marine will be dealt with by Secretary of the Treasury McAdoo. He will voice the administration sentiments and another speaker will be heard on the other side. Supplementary to the discussion there will be a report of the committee on merchant marine of the Chamber of Commerce. Joseph E. Davies, commissioner of corporations, will explain the new federal trade commission act.

Financial and Corporate

SEATTLE MUNICIPAL RAILWAY LOSING

Report of City Superintendent of Public Utilities for First Six Months Shows Loss of Nearly $6,000 Per Month

An abridged form of the report of the Seattle Municipal Street Railway for the six months ended Nov. 30, 1914, as compiled by A. L. Valentine, city superintendent of public utilities, follows:

Revenues:	
Division "A," June 1 to Nov. 30	$10,763
Less book credit for car rental	2,845
Net	$7,918
Division "C," from May 23 to Nov. 30	9,628
Total	$17,546
Operating expenses:	
Division "A," from June 1 to Nov. 30	$15,049
Division "C," from May 23 to Nov. 30	$15,847
Less book charge rental of cars, Division "A"	2,845
Net	$13,002
Total operating expenses	$28,051
Loss to Nov. 30	$10,505
Add:	
Six months' bond interest on $300,000 at 1½ per cent.	6,750
Interest on $75,000 borrowed from garbage fund and $9,000 from general fund at 4½ per cent	1,890
Six months' taxes on $375,000 of investment, Division "A," basis 45 per cent valuation	3,750
Six months' depreciation at 4 per cent on $375,000, Division "A"	7,500
Six months' interest on $27,500 at 4½ per cent borrowed from general fund for Division "C"	612
Six months' taxes on $150,000 of investment, Division "C," basis 45 per cent valuation	1,500
Six months' depreciation at 4 per cent on $150,000, Division "C"	3,000
Total loss six months, Divisions "A" and "C"	$35,507

There was only one month in which either Division "A" or Division "C" showed an excess of traffic receipts above the operating expenses. This was July, when Division "C" showed an excess of $145. The receipts for passenger traffic for Division "A" fell from the high record of $1,482 in July to $1,118 for November, the low record, and for Division "C" from $2,184 in July to $1,058 for November. The operating expenses varied from $2,197 in October, the lowest for Division "A," to $2,804 in November, while the amounts for Division "C" ranged between $1,997 in June to $2,680 in November. The passenger receipts of either division are not at present sufficient to pay the wages of employees.

The approximate loss of $6,000 per month shown by the foregoing statement is quite exclusive of any charges for accounting or superintendence. Such work was performed by the public utilities department without any charge being made against the railway. Furthermore, the services of the legal department have been furnished continuously to the municipal railway without charge, as have also the services of the comptroller's and treasurer's departments. The time spent by the employees of these departments would represent a large sum of money. Lastly, no fire, damage, personal injury or employees' injury insurance funds have been provided.

RAILWAY INVESTMENT IN MASSACHUSETTS

The Public Service Commission of Massachusetts has submitted a special report to the Legislature in regard to the amount invested in street and elevated railways within the commonwealth and the estimated cost of the acquisition of such lines by the State. The board finds a total investment of $206,442,630, composed of capital stock, $98,194,775; funded debt, $86,575,700; floating debt, $14,655,722; premiums on stock, $8,995,200; premiums on bonds, $961,191, with a deduction of $2,939,958 for discount on bonds. If a physical valuation should be determined as the basis of acquisition, the valuation would cost about a minimum of $230,000; whereas, if the capitalization basis were accepted, the necessity of a physical valuation might perhaps be eliminated.

Any estimate that would be useful in the consideration of the larger problem of State ownership could only be made after some definite policy of valuation has been established by the State. From the earliest enactments in the State, the basis for the taking over of railroads has been fixed in the granting of their charters, and has invariably been the actual amount invested in the property with a return of 10 per cent net per annum from the time of the investment, with deductions for dividends paid. Among the companies provided for in this way were the Metropolitan Railway, the Cambridge Railway and the Boston & Chelsea Railway. This basis for the purchase power, however, has not been fixed as a definite policy of the State in relation to the taking of street railways, and it is considered unlikely that such a basis will be established. If it were accepted, however, the result would be an apparent actual investment of more than $200,000,000, to which would be added a net return of 10 per cent per year from the time of the investment.

The Commission was also asked to state whether any part of the cost of taking over the street and elevated railway lines could properly be assessed upon real estate to be benefited by such acquisition. Assuming that the language of the resolution would be held to describe real estate situated upon or contiguous to existing street railway lines, the commission feels that such real estate would not be subject to any separate assessment for any part of the cost of taking the lines. The entire report of the commission will be published by the State printer with an appendix reviewing the attitude of the State on the subject of public ownership of transportation facilities, as shown by various charters and general laws.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark.—It is announced that the Central Arkansas Railway & Light Corporation will retire for its sinking fund on tenders to the Columbia Trust Company as many of its first lien fifteen-year 5 per cent bonds as can be purchased for $20,000.

Charleston (W. Va.) Interurban Railroad.—The Charleston Interurban Railroad has increased its capital stock, authorized and issued, from $100,000 to $1,500,000 in $100 shares. This company leases the Kanawha Valley Traction Company under a ninety-nine year lease, which gives it the right to make extensions under the latter company's own bond issue. When the lease was taken over there were in operation 11 miles of track, with an outstanding bond issue of $875,000; there are now in operation 24 miles of track, with $1,225,000 of bonds outstanding.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—On Jan. 14 the attorneys for John W. Griffith, a bondholder of the Chicago & Milwaukee Electric Railroad, requested before Judge Landis the return of $210,000 which has been held as security by the master in chancery for two years since a bid of $4,000,000 was made by Mr. Griffith for the purchase of the railway. This bid superseded the reorganization committee's bid of $3,250,000, which was later declared void. A resale was ordered, but this has not yet taken place on account of unsettled financial conditions. Judge Landis granted the petition with the understanding that a bond be substituted so that the matter might be kept intact.

Chicago (Ill.) Elevated Railways.—The National City Bank, New York, is offering for sale first mortgage thirty-year 5 per cent gold bonds, dated 1911, of the Northwestern Elevated Railroad, at a price to yield about 5.7 per cent. These bonds are part of an authorized issue of $25,000,000, of which $12,500,000 are outstanding. They are due on Sept. 1, 1941, but callable as a whole but not in part, except for sinking fund, at 102 and interest on any interest date upon thirty days' notice.

Cleburne (Tex.) Street Railway.—The District Court at Cleburne on Jan. 9 appointed C. Hack Warren as receiver of the Cleburne Street Railway and ordered him to sell the property of the company. The receiver was appointed on application of A. M. Morgan, president of the company, and others. According to the latest information, there is authorized and outstanding $65,500 of capital stock. The length of road is 8 miles.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The directors of the Columbus Railway, Power & Light Company have declared a regular quarterly dividend of 1¼ per cent on the preferred stock, series B, and the common stock, both payable Feb. 8 to stockholders of record Jan. 27. The date of payment is changed from the usual time of Feb. 1 because the transfer books were closed on Dec. 26 to remain closed until the special meeting on Jan. 26 to act on the proposed purchase of the Columbus Light, Heat & Power Company.

General Gas & Electric Company, New York, N. Y.—The various committees representing bondholders and stockholders of the Atlantic Gas & Electric Company, New York, have approved a reorganization plan under which the controlled properties will be taken over by the General Gas & Electric Company, which controls the Northwestern Ohio Railway & Power Company and the Rutland Railway & Light Company. The Atlantic Gas & Electric Company controls the electric lighting properties in Easton, Stroudsburg, Bangor, Bath and Sayre, Pa.; Philipsburg, Boonton, Dover and Rockaway, N. J., and Binghamton, N. Y. It also controls gas properties in Easton, Philipsburg and Nazareth. After the change of control, the Atlantic Gas & Electric Company, which has been under receivership, will go out of existence. Holders of its "A" bonds will receive ten-year 5 per cent gold bonds of the General Gas & Electric Company, secured by the same collateral or its equivalent. The "B" bonds will be paid off. To provide for immediate construction requirements a 6 per cent five-year secured note issue of the General Gas & Electric Company has been created. The proceeds of this note issue will retire $650,000 of the old General Gas & Electric Company 6 per cent notes and also provide part of the requirements for new construction in 1915. Unsecured creditors, preferred stockholders and common stockholders of the Atlantic Gas & Electric Company will be allowed to participate in the reorganization through common stock and a new issue of convertible preferred stock.

Glendale & Montrose Railway, Glendale, Cal.—The name of the Glendale & Eagle Rock Railway has been changed to Glendale & Montrose Railway by decree of the Superior Court for the County of Los Angeles. This company has received authority from the California Railroad Commission to execute a new mortgage on its properties to cover $115,000 of bonds previously authorized by the commission. The former trust deed is amended by eliminating from the provided security the equity in certain real estate, and in lieu thereof placing in escrow $35,000 of the bonds to be issued to F. J. Walters, president. The bonds in escrow shall draw no interest until it shall have been found by the commission that the railway has earned its operating expenses, taxes and interest on outstanding bonds for a period of three years, and that for one year it shall have earned, in addition, interest charges on the $35,000 of bonds that are to be placed in escrow.

Interstate Railways, Camden, N. J.—John A. Rigg, president Interstate Railways, has addressed a circular to stockholders in connection with a reconsideration of the plan advanced on March 28, 1913, for making the preferred stock of the company a permanent investment. This company controls numerous electric railways, which are divided into four groups leased to and operated by the Reading Transit & Light Company, the Wilkes-Barre Railway, the Trenton & Mercer Traction Corporation, the Southern Pennsylvania Traction Company and the Wilmington & Philadelphia Traction Company (the two last named companies being operated under one management). Mr. Rigg states that five years have elapsed since the making of the leases and that the lessees have paid all their obligations promptly and expended about $4,500,000 in betterments. The board of directors recommends that the preferred stockholders agree to exchange the present certificates for a new $1,000,000 issue of preferred stock without the redemption instalment clause, thereby giving the issue the quality of permanency.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The Kansas Public Utilities Commission has authorized the Kansas City, Kaw Valley & Western Railway to issue $2,500,000 of first mortgage ten-year gold bonds, $812,500 of second mortgage bonds and $1,137,000 of capital stock. These securities are to provide for building and equipping the line for complete operation. Of the 40 miles projected 17 miles are now in operation.

Lincoln Railway & Light Company, Lincoln, Ill.—The Lincoln Railway & Light Company was sold on Jan. 14 at public auction by Master in Chancery Mangas to J. R. Patton, Chicago, for $9,900. Mr. Patton is a director of the Patton-Gibson Railroad Construction Company. Previous items regarding the receivership and ordered foreclosure sale of the railway appeared in the ELECTRIC RAILWAY JOURNAL of June 13, Aug. 1 and Dec. 5, 1914.

Little Rock Railway & Electric Company, Little Rock, Ark.—The stockholders of the Little Rock Railway & Electric Company have voted to increase the company's capital stock from $1,500,000 to $2,000,000, in order to raise funds to pay for the Merchants' Lighting Company and the Arkansas Cold Storage Company, recently purchased, and to make improvements in service. The stockholders may subscribe at par in proportion to their present holdings.

Medway & Dedham Street Railway, Westwood, Mass.—E. H. Mather, Brookline, who since March, 1912, has been acting as receiver of the Dedham & Franklin Street Railway and the Medfield & Medway Street Railway, has filed his final accounting and received his discharge. The two companies were sold under foreclosure in September, 1913, to H. M. Verrill and R. H. Johnson, representing the bondholders. On June 9, 1914, the properties were transferred to a new corporation, organized under Massachusetts laws and known as the Medway & Dedham Street Railway. This new company is now operating the two lines as one system, from Dedham to Franklin, a distance of about 21 miles.

Mexico Tramways, Mexico City, Mexico.—In a recent advertisement U. de B. Daly, secretary Mexico Tramways, says: "The board regrets that owing to the continued unsatisfactory condition of affairs in Mexico they have no alternative but to defer payment of the half-yearly coupons due on Jan. 1 on the company's 6 per cent five-year mortgage bonds. The same action has been taken with regard to the payment of the half-yearly coupons on the 5 per cent first mortgage bonds of Mexico Electric Light Company, Ltd., which is controlled by the allied Mexican Light & Power Company."

Minneapolis & Northern Railway, Minneapolis, Minn.—F. H. Hunter, whose appointment as receiver of the Minneapolis & Northern Railway to succeed the Minnesota Loan & Trust Company was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, has filed a petition with the District Court for the Fourth Judicial District of Minnesota, setting forth the fact that all rights granted by the Soo Railway terminated on Jan. 17, that the contract with this company could not be extended and that it would be impractical to operate the electric line without such a contract. Moreover, the electric railway is now being operated at a loss and the cars are in a bad state of repair. An order is asked, therefore, authorizing the receiver to discontinue operations and allowing his account and reasonable compensation for services as a first lien upon the corpus of the property in the possession of the court. A hearing has been set for Jan. 23 for creditors to argue against such an order.

Monterey & Pacific Grove Railway, Monterey, Cal.—The Monterey & Pacific Grove Railway has defaulted in the payment of interest due on Jan. 1 on its first mortgage 6 per cent bonds. Earnings during the last year have fallen far below the interest charge, on account of the severe competition of an automobile bus line.

Moose Jaw (Sask.) Electric Railway.—The directors of the Moose Jaw Electric Railway have announced that no semi-annual dividend can be declared on the company's $596,700 of stock on account of the general depression throughout the West and the decrease in traffic. The notice to stockholders states, however, that the resumption of dividends is not far off, and that the company has the distinction of being almost the only one west of Winnipeg which is paying its way.

New York (N. Y.) Railways.—Benjamin Catchings, who has represented the accident and tort creditors of the New York City Railway and the Metropolitan Street Railway, predecessors of the New York Railways, for years past, recently appeared before the United States Circuit Court of Appeals and argued in support of a motion to vacate all orders made by Judge Lacombe in surface traction litigation since the abolition of the United States Circuit Court on Jan. 1, 1912. Mr. Catchings contended that no judge had a right to place himself in exclusive control of any particular kind of litigation. Through Judge Coxe the court denied the motion on the ground of no jurisdiction. Mr. Catchings stated that he would appeal to the United States Supreme Court.

Northampton Traction Company, Easton, Pa.—F. C. Williams, Easton, Pa., has succeeded David King, Newark, N. J., on the board of directors of the Northampton Traction Company.

Pacific Gas & Electric Company, San Francisco, Cal.—Subject to the approval of the California Railroad Commission, the Pacific Gas & Electric Company has sold through Bond & Goodwin $4,000,000 of one-year collateral trust 5 per cent notes. These notes, as mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 16 in connection with the application therefor, are to provide for refunding a like amount of notes maturing on March 25, the balance of an original $7,000,000, of which $2,521,000 were retired last December.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—E. H. Rollins & Sons, Boston, are offering at 98 and interest the unsold portion of the initial block of $500,000 of first mortgage thirty-year 6 per cent gold bonds of the Salt Lake & Utah Railroad. These bonds are dated April 1, 1914, and due on April 1, 1944, but are redeemable at 102 and interest on any interest date. They are issued in denominations of $1,000, $500 and $100. This company has in operation about 50 miles of standard-gage electric railway extending from Salt Lake City to Provo City.

San Francisco (Cal.) Municipal Railways.—According to a statement just issued by the bookkeeping department of the Board of Public Works, the total expenditures of the San Francisco Municipal Railways for the month of November totaled $68,652, divided as follows: way and structures, $2,348; equipment, $4,870; power, $13,213; conducting transportation, $34,995; traffic, $26; general and miscellaneous, $2,748, and undistributed stores, $10,350. Of the total, $9,553 represented undistributed accounts, the balance of $59,099 being for demands audited. The deduction of this amount from the total month's receipts of $111,225 left an excess of receipts of $52,126, and after a further deduction of $1,599 in compliance with the Boynton Compensation Act, the net receipts totaled $50,527.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The California Railroad Commission on Jan. 7 issued a supplemental order authorizing the San Joaquin Light & Power Corporation to issue $150,000 of its series B first and refunding mortgage forty-year 5 per cent bonds. These bonds are secured by deed of trust to The Trust Company of America. The time within which the company may issue these bonds is limited to June 30, 1915. The company has also been authorized by the commission to renew certain promissory notes totaling $92,500.

Slate Belt Electric Railway, Pen Argyl, Pa.—J. A. Miller, Nazareth, Pa., has been elected a director of the Slate Belt Electric Railway, succeeding D. M. Leopold, also of Nazareth.

Tri-City Railway & Light Company, Davenport, Iowa.—The Tri-City Railway & Light Company, a subsidiary of the United Light & Railways Company, is asking, through the New York Trust Company, for tenders to Feb. 10 of $150,000 of its collateral trust first lien 5 per cent bonds for the sinking fund, at a price not to exceed 105 and interest.

Washington Railway & Electric Company, Washington, D. C.—The Public Utilities Commission of the District of Columbia on Jan. 12 denied the application of the Washington Railway & Electric Company for authority to issue $644,000 of bonds to finance improvements made between Jan. 1, 1909, and Nov. 30, 1914, and for contemplated future improvements. The action of the commission is based on a belief that it should not issue bonds to cover the cost of the improvements made prior to Nov. 30, 1914, because it is not in possession of information showing the relation which the value of the property bears to the company's outstanding shares of stock and bonds. This information cannot be supplied until the commission has finished its valuation of the company's property. The commission, however, will consider application for a bond issue to cover future improvements.

York (Pa.) Railways.—A scrip dividend of 2½ per cent has been declared on the $1,600,000 of 5 per cent cumulative preferred stock of the York Railways for the half year ended Nov. 30, 1914, and payable on Jan. 30 to holders of record on Jan. 20. The scrip will be dated Jan. 20, will mature on Jan. 30, 1918, and will bear interest at the rate of 5 per cent per annum, payable semi-annually. It will be redeemable at the company's option on any interest period before maturity on thirty days' notice, and will be registered.

DIVIDENDS DECLARED

Boston & Suburban Electric Companies, Newtonville, Mass., $1, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred, series B; quarterly, 1¼ per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Denver & Northwestern Railway, Denver, Col., quarterly, 1 per cent.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Electric Bond & Share Company, New York, N. Y., quarterly, 1½ per cent, preferred; quarterly, 2 per cent, common.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

Railway & Light Securities Company, Boston, Mass., 3 per cent, preferred; 3 per cent, common.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, 2½ per cent.

York (Pa.) Railways, 2½ per cent, preferred, payable in scrip.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., Nov., '14	$15,705	*$9,445	$6,260	$2,054	$4,206
1 " " '13	15,481	*9,379	6,102	2,099	4,003
12 " " '14	178,083	*114,296	63,787	25,071	38,716
12 " " '13	161,126	*100,491	60,635	24,409	36,226
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., Nov., '14	$8,056	*$8,721	$665	$1,140	†$1,805
1 " " '13	7,671	*8,500	829	1,028	†1,857
12 " " '14	121,375	*101,495	19,880	13,075	6,805
12 " " '13	124,563	*98,361	26,202	13,041	13,161
CAPE BRETON ELECTRIC RAILWAY, SYDNEY, N. S.					
1m., Nov., '14	$30,045	*$17,847	$12,198	$6,601	$5,597
1 " " '13	34,849	*18,080	16,769	5,998	10,771
12 " " '14	356,269	*209,974	146,295	77,252	69,043
12 " " '13	379,170	*208,445	170,726	72,228	98,498
DALLAS (TEX.) ELECTRIC COMPANY					
1m., Nov., '14	$180,303	*$96,199	$84,104	$33,389	$50,715
1 " " '13	198,259	*116,034	82,225	26,703	55,522
12 " " '14	2,226,381	*1,310,289	916,092	364,242	551,850
12 " " '13	2,163,823	*1,260,599	903,234	300,935	602,289
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Nov., '14	$56,868	*$31,412	$25,455	$8,606	$16,849
1 " " '13	45,088	*29,942	15,146	4,910	10,236
12 " " '14	672,441	*403,390	269,051	96,240	172,811
12 " " '13	415,872	*254,890	160,983	25,122	135,861
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Nov., '14	$91,713	*$42,184	$49,529	$4,179	$45,350
1 " " '13	80,761	*40,549	40,213	4,296	35,917
12 " " '14	1,041,126	*579,966	461,160	51,375	409,785
12 " " '13	880,388	*471,289	409,099	56,960	370,609
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Nov., '14	$69,870	$43,201	$26,669	$23,089	$3,580
1 " " '13	71,497	48,732	22,765	22,704	61
12 " " '14	845,466	557,273	288,193	274,880	13,313
12 " " '13	821,722	577,504	264,218	256,645	7,573
TAMPA (FLA.) ELECTRIC COMPANY					
1m., Nov., '14	$80,922	*$41,927	$38,995	$4,422	$34,573
1 " " '13	75,743	*43,030	32,713	4,779	27,934
12 " " '14	978,607	*527,137	451,470	55,123	396,347
12 " " '13	828,630	*451,475	377,156	55,482	321,674

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*Includes taxes.

Traffic and Transportation

THE "JITNEY" BUS

Developments Are Recorded in Los Angeles, in Texas Cities, in San Francisco and in Portland

Councilman Roberts, chairman of the public utilities committee of the City Council of Los Angeles, Cal., which has before it the "jitney" bus problem, was to confer on Jan. 15 with President Whiffen of the Council and chairman of the finance committee on the question of establishing a traffic bureau, separate and apart from the police department, to handle the "jitney" bus business after regulatory measures have been adopted by the Council and gone into effect. Mr. Roberts reported on Jan. 14 that his committee and City Attorney Stephens had made considerable progress in the matter of planning for the adoption of bus regulatory measures and expressed the hope that the work would be completed in a few days.

In a statement dealing with the "jitney" bus which he made public on Jan. 10 Mayor Rose of Los Angeles declared that the menace of the bus called for vigorous action and that he saw no reason why Council should delay action. His summary of the needs of the case follows:

"Summing up the question, I find, first, the need of relieving the congested streets, the remedy for which is the rerouting of the 'jitneys' in the manner proposed; rigid examination of each applicant for license as to his qualifications and character; specific route stipulated over which licensee shall operate his bus; license fee paid in proportion to gross receipts, the same as other public carriers. For reckless driving, or for violation of traffic regulations in any wise, power for revocation of license should rest with the city. I have given my views about the halting points for loading and unloading of passengers. One other important item is the necessity for fixed responsibility in case of accidents; not less than $10,000 indemnity bond for each auto bus operated should be demanded, for the full protection of the public. These indemnity bonds should be closely investigated by the authorities as to the reliability of the insurance company carrying the risk. Lastly, overloading should be rigidly prohibited."

The Los Angeles Railway has laid off practically 100 men in the Fifty-fourth Street shops and stopped the building of 250 cars that were being turned out there in expectation of the 1915 business. G. A. Henderson, assistant general manager of the company, in explanation said:

"Two months ago Vice-President Dunn stated that this would have to be done, if earnings lost through the 'jitney' bus competition could not be made up. We held the men at work till after the holidays in order to keep the resulting gloom from as many homes as posible during the Christmas festivities. There was the corresponding hope that the new licenses required for the new year would result in the removal from the streets of a large number of the nickel snipers, and for a few days this seemed possible, for there was a falling off in the number of buses operating. At present, however, the new licenses are being taken out in wholesale fashion, and within ten days there will be more buses on the streets than ever.

"Two years ago the Los Angeles Railway adopted the policy of building its own cars and buying the materials in Los Angeles. Since that time we have been able to give employment to a large number of men. The loss of revenue to the company is the only thing that stops the continued building of new cars. Under the régime of the present State Railroad Commission a street railway is like a savings bank, for no bonds can be sold unless earnings are shown, and the loss of earnings stops the flow of bond money for improvements. On Dec. 31 we were overrun with 'jitney' buses. On Jan. 2, when the licenses had run out, their number decreased so that on certain lines additional cars could have been run. To-day the buses are coming back, after an absence of nine days. We must trim our sails to meet the conditions that we face."

It is stated that an effort will be made to secure the enactment of a law by the Texas Legislature prohibiting the operation of competing lines of transportation upon streets occupied by electric railway lines. In Houston, Austin, El Paso, San Antonio and other cities the "jitney" automobiles are doing a large business hauling passengers in direct competition with the street railways. The fare per passenger is 5 cents and most of the buses operate on the same streets as the railways and snipe passengers waiting for the street cars. The first bus in San Antonio was placed in operation on Jan. 8. It is being operated from Alamo Plaza to San Pedro Place. The manager of the company has announced that eighteen other machines have been ordered for use in that city. He is quoted as follows: "The new automobile service we have started has come to stay. Our company has plenty of capital, most of which has been subscribed by San Antonians." It is stated unofficially from Houston that the Houston Electric Company has asked for estimates on motor buses and tire equipment.

The United Railroads posted an observer on a downtown corner in San Francisco on Jan. 11 to count the passing "jitney" buses. In one hour and twenty minutes eighty of the 5-cent buses passed in one direction, carrying a total of 420 passengers. It is estimated at the headquarters of the San Francisco Jitney Bus Association that 200 cars are now engaged in this business in San Francisco, and that the number will be doubled in a short time. In addition to the street railways the Board of Supervisors and the State Railroad Commission are giving attention to the problems involved in the regulation of the new method of transportation. The Railroad Commission has heretofore ruled that the buses are not under its jurisdiction, but it now intimates that if it becomes established that the buses interfere with common carriers, then they must be regulated as common carriers. The Board of Supervisors is framing a proposed ordinance covering the regulation of "jitney" buses, on the recommendation of T. A. Cashin, superintendent of the San Francisco Municipal Railways.

The "jitney" bus has entered into competition with the Portland Railway, Light & Power Company, Portland, Ore., at a 5-cent fare. The service started by the Auto Bus Company is under the direction of Jonathan Conway, said to have been connected with the transportation departments of the electric railways in Brooklyn and Buffalo.

To meet the competition of the so-called "jitney" bus the Massachusetts Street Railway Association has filed a bill with the Legislature setting forth the conditions under which such business may be carried on and providing for responsibility in case of damages caused by such bus lines.

ST. LOUIS TRANSIT HEARING CONCLUDED

The hearing conducted by the Missouri Public Service Commission into the service furnished by the United Railways in St. Louis was concluded at the session at the Planters' Hotel in St. Louis on Jan. 15. Briefs must be filed with the commission by opposing counsel within ten days after the transcript of the testimony is prepared. It is expected that oral arguments will be offered about Feb. 15.

The United Railways began the presentation of its part of the case on Jan. 13. P. J. Kealy, of the board of control of the Metropolitan Street Railway, Kansas City, Mo., said that the standard of service for St. Louis recommended by Mr. Harrop, engineer of the commission, was the severest of its kind of which he had any knowledge. Mr. Kealy said that operating managers were generally opposed to trailers, but that general managers who had to look out for the finances generally favored them.

Richard McCulloch, vice-president and general manager of the United Railways, said that the company would have no money left for improvements and extensions if it was compelled to pay the mill tax. The revenues of the company for December, 1914, showed a decrease of more than $100,000 over December, 1913. The decrease in the number of passengers carried in December, 1914, over December, 1913, was about 7 per cent, or 2 per cent less than the revenue decrease. The company paid the city $774,080 in taxes in 1914. Had the company paid the mill tax the total of taxes would have been $1,009,713, or 8.11 per cent of the gross earnings. In addition between $200,000 and $250,000 was expended annually for repaving and maintenance. This amount should be added to the taxes.

The daily newspapers of St. Louis recently contained references to the division of profits between the railways in Chicago and the city itself. In this connection Mr. McCulloch said that the United Railways would be very glad to make such an arrangement if, by so doing, it could be relieved of all the taxes it now pays to St. Louis. Transfer privileges in St. Louis were unlimited and the records of the company showed that for several years the average fares had been but slightly in excess of 3 cents. In a supplementary statement addressed through the newspapers to the public he said:

"It has always been and still is the desire and intention of the United Railways to give the best service. This communication is not written in a spirit of criticism or ill temper, but it is intended to be a plain statement of facts to be placed before the people of St. Louis, who have a right to be made acquainted with the conditions and who, we hope, will judge them in a reasonable manner."

At the hearing at which the question of heating and ventilation was considered it was testified that of the 1400 cars of the company, 870 are heated by coal-burning water heaters and the others by stoves. Mr. Harrop stated that the present heating and ventilating systems are adequate. D. I. Cook, Chicago, declared that the existing heating arrangements are antiquated and that the ventilation system is only one-fourth up to the average standard. He said that in New York, Boston, Philadelphia and Chicago electric heaters, controlled by thermostats, are used on all cars. Mr. Harrop admitted that cars might be heated more rapidly by the electric system, but said that they heated the car seats more and the passengers' feet less than the coal heaters. The hearing was continued.

TRANSIT PUBLICITY IN BROOKLYN

The Brooklyn (N. Y.) Rapid Transit Company is carrying its case direct to its patrons. Pamphlets dealing with the problems before the company are being distributed through the medium of the boxes installed in the elevated cars and the cars of the surface system. Recent pamphlets, all of uniform size, 4 in. x 7 in., are introduced as follows: "Why We Need the Nickels," "A Few Facts About Taxes and Transportation," "Brooklyn Transportation Before Grand Jury," "Why Spend $300,000,000?" "Diminishing Receipts and Increasing Service," "That P. S. C. Inquiry." The pamphlets dealing with the inquiry into the service of the company by the Public Service Commission are being issued in a series.

The first two pamphlets carry the sub-titles, "The Light of Evidence on Mr. Johnson's Report" and "Knowledge vs. Ignorance on Fulton Street Traffic." The campaign of publicity now under way is in effect a new service for the patrons of the company supplementing the daily papers. In this service it has been the effort of the company to present facts both timely and important, which patrons do not receive through their newspapers as adequately and as correctly as they should. Considering the pressure and time under which newspapers are produced and of the material demanding attention, the company says that the wonder is that the newspapers succeed as well as they do in their endeavor to chronicle occurrences.

The first of the series issued by the company dealing with the inquiry by the Public Service Commission into its affairs had to do with the examination of Joseph Johnson, the head of the transit bureau of the commission, whose recommendations for changes in the method of operation of the company were referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 9, page 108. The company says that when the hearing began this was its first chance to defend itself, except for such opportunity as the newspapers had given it, and that it naturally sought to discover the qualifications which led the commission to make Mr. Johnson its transportation prosecutor, and which gave his recommendations such weight as to make them the basis of the tentative order accompanying the report. According to the company this proposed order was based upon conclusions which found no warrant in the accompanying report, and if adopted would seriously interfere with the physical ability of the company to give such service as it is now trying to give under difficult conditions in Brooklyn.

The circulation of each issue of the bulletin has been about 250,000 copies. That is to say, about one person in every eight in the population of Brooklyn takes one of the pamphlets placed by the company in the boxes in the cars.

The inquiry being conducted into the service of the elevated lines of the Brooklyn Rapid Transit Company by the Public Service Commission will be discontinued pending a conference.

CHICAGO SERVICE BEFORE COMMISSION

Up to this time the Public Utilities Commission of Illinois has not taken part in controversial questions between the city of Chicago and its public utilities regarding service, but the filing of a number of complaints on Jan. 9 by the president of the Cook County Real Estate Board has put the matter before that body. According to the commission's rules of procedure, the complaints must lay over for ten days before a formal hearing can be called. On Jan. 12 representatives of the companies were invited to an informal hearing, and instructed to furnish the commission with information which would serve as a basis for a comprehensive investigation. It was agreed that the cases against the Chicago Surface Lines and the Chicago Elevated Railways shall be consolidated and heard on Jan. 25 and 27 respectively.

At the preliminary hearing before the commission the city was represented by the chairman of the local transportation committee and the commissioner of public service. While the city administration has hesitated to commit itself before the State Public Utilities Commission, lest it appear to surrender the principles of "home rule" for which it has contended, the department of public service has submitted to the commission records compiled by the traction bureau of the department during the last six months.

James E. Quan, chairman of the Public Utilities Commission, in an interview stated that since the commission had been called upon to render a decision in connection with the complaints filed regarding Chicago's transportation service, it proposes to make a thorough investigation of the difficulties. This is taken by some as evidence that the commission intends to continue to make use of its full powers under the public utility law and remove the control of Chicago's public utilities from local politics.

At a recent meeting of the Chicago City Council, the city budget was railroaded through. It contains among other things a $3,000,000 appropriation for motor buses and a $2,000,000 appropriation for subways. It is proposed to take this money from the Chicago traction fund, and complete authority to do this will be asked for in referendum at the primary election to be held in February.

"Skip-Stop" in Cleveland.—At a meeting on Jan. 14 the East Cleveland Chamber of Commerce approved the service of the Cleveland Railway to that suburb. The alternate stop system has been adopted there.

I. C. C. Decision.—The Interstate Commerce Commission on Jan. 16 refused the application of the citizens of Somerset, a suburb on the Washington & Rockville Railroad, to declare the proposed increases in rates unreasonable. The increase rates became effective on Jan. 20 at midnight.

Detroit's Accident Record.—Of the 310,000,000 passengers carried in 1914 on the Detroit (Mich.) United Railway's city and interurban system only two passengers lost their lives as the result of collisions. Not one of the deaths from boarding or alighting occurred on a car with folding doors and steps.

Discontinuance of Smoking to Be Recommended.—J. L. Harrop, chief engineer of the Public Service Commission of Missouri, has announced that, as a result of his investigation into service in St. Louis, he intends to recommend to the commission that it issue an order to prevent smoking at all times in the street cars in Missouri.

"Skip-Stop" in Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has filed with the Railroad Commission a complete list of stops to be eliminated by it as part of the "skip-stop" schedule in that city. The company has asked the commission to conduct a hearing to obtain the views of citizens on the subject.

Atlanta Service Hearings Concluded.—The hearing in connection with the application of the Georgia Railway & Power Company, Atlanta, Ga., to the Railroad Commission of that State for permission to discontinue certain extra car services on fourteen different lines was concluded on Jan. 13 and the commission took the matter under advisement.

I. C. C. Ruling Accepted.—The Public Utilities Commission of Ohio has accepted the recent increased freight-rate decision set down by the Interstate Commerce Commission as a basis for intra-state rates. This decision has enabled all the electric lines in Ohio to increase their freight rates 5 per cent in accordance with the ruling of the Interstate Commerce Commission.

Service in Seattle.—An informal meeting between the representatives of the Public Service Commission of Washington and the officers of the Puget Sound Traction, Light & Power Company was held in Seattle on Jan. 9 to consider the subject of service. The company offered the schedule now operated in Seattle and figures on operating expenses and other facts pertinent to the subject at hand as a basis of study, so that the commission would be in a better position to judge whether improved service should be required under existing conditions.

Gentlemen's Agreement in Buffalo.—An understanding referred to in the Buffalo papers as a "gentlemen's agreement" has been reached regarding service complaints between Charles Rohlfs, representing the Business Men's Central Council, and E. G. Connette, president of the International Railway. Under it provision is made for the settlement of service questions without their reference to the Public Service Commission. Devoe P. Hodson, Buffalo, a member of the commission for the second district, says he is prepared to make the suggestion informally to Mr. Connette that two-car trains be run during the rush hours.

Rehearing Denied in Albany.—The Public Service Commission for the Second District of New York has denied the application of the United Traction Company, Albany, for a rehearing on its recent order regarding improvements in service and equipment in Albany and vicinity. Charles F. Hewitt, general manager of the company, has appealed to the local civic associations for leniency toward the company, pointing to the statements embodied in the recent letter of C. F. Sims, vice-president of the company to the commission, as referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 16. It is regarded as likely that certiorari proceedings will be resorted to.

Decrease in Accidents in Akron.—The Northern Ohio Traction & Light Company, Akron, Ohio, reports a decrease in accidents of 34 per cent for 1914 as compared with 1913. The fatalities decreased 45 per cent and personal injuries decreased 11 per cent. The number of vehicles struck decreased 43 per cent, pedestrians struck by cars decreased 30 per cent, persons injured getting on cars decreased 33 per cent, and persons injured getting off cars decreased 35 per cent. In 1913 nine employees of the company were killed and in 1914 two employees were killed. These figures were conveyed to the employees of the company in a circular addressed to them on Jan. 9 by E. H. Clinedinst, supervisor of safety.

Boston Subway Station Issue. — In a recent statement, President W. A. Bancroft of the Boston Elevated Railway pointed out that the demand for an additional station at Arlington Street in the new Boylston Street subway is based upon a misconception of the traffic requirements on the part of local business interests. A recent count shows that 52.2 per cent of the passengers riding through or past Arlington Street would not be affected by such a station and that of those who would be affected, 98.1 per cent would be discommoded. The district in dispute is well served by surface lines which interchange transfers with the subway cars. A bill has been introduced into the Legislature to require the building of a station at this point.

Proceedings to Inforce Service Orders.—The Public Service Commission for the First District of New York has instructed its counsel to proceed by mandamus or injunction to stop alleged violations of its orders by the Interborough Rapid Transit Company in the subway and by the New York Consolidated Railroad and Nassau Electric Railroad on the West End line in Brooklyn. The Interborough Company is charged with violating the commission's order during the non-rush hours, when it is required to provide seats enough for all passengers offered during every twenty-minute period. The Brooklyn companies are charged with violating the order requiring the operation of five-car trains on a ten-minute headway during non-rush hours.

Personal Mention

Mr. W. A. Bibb has resigned as general manager of the North Alabama Traction Company, New Decatur, Ala.

Mr. C. H. Robertson has resigned as general manager of the Central California Traction Company, Stockton, Cal.

Mr. E. B. Thompson has been elected treasurer of the Batavia (N. Y.) Traction Company, to succeed Mr. Frank W. Garnier, who resigned several months ago.

Mr. Norman Morrison, a division superintendent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been appointed general manager of the North Alabama Traction Company, to succeed Mr. W. A. Bibb, resigned.

Mr. W. L. Davis, formerly connected with the Texas Traction Company, and the Southern Traction Company, Dallas, Tex., in the capacity of auditor, has resigned his connections with these companies to enter the public accounting field in Cincinnati.

Mr. P. O. McCarthy has resigned as superintendent of the Fort Smith Light & Traction Company, Fort Smith, Ark., owing to ill health and has been transferred to the San Diego Consolidated Gas & Electric Company, San Diego, Cal., also owned and operated by H. M. Byllesby & Company, Chicago.

Mr. B. L. Callahan, for six years manager of the new business department of H. M. Byllesby & Company, having direction of the new business activities of the thirty-five properties under its management, has resigned to become district manager of the Westinghouse Lamp Company, with offices and headquarters at Chicago.

Mr. Arnold von Schrenk, formerly general superintendent of the United Traction Company, Albany, N. Y., has become associated with the firm of Von Schrenk & Kammerer, consulting egineers, St. Louis, Mo. Mr. von Schrenk is taking the place of Mr. A. L. Kammerer, who has temporarily retired from business to take a much needed rest.

Mr. T. Curtis has been made division superintendent of the Aurora, Elgin & Chicago Railroad, with headquarters at Aurora, Ill. His duties will include supervision over the Aurora city lines as well as the interurban lines to Yorkville and to Elgin. Mr. Curtis has been in the employ of the engineering and operating departments of the company for a number of years.

F. E. FISHER

Mr. F. E. Fisher, general superintendent of the Chicago, Ottawa & Peoria Railway, Joliet, Ill., was elected president of the Illinois Electric Railways Association at the annual meeting held in Chicago on Jan. 15, 1915. Mr. Fisher was born in Elyria, Ohio, in 1860 and entered steam railroad service at the age of twenty-one. He spent seventeen years in various branches of the transportation and traffic departments of the central branch of the Union Pacific, the Wabash, the Chicago, Peoria & St. Louis and the Ohio Southern Railroads. In 1898 he entered electric railroading as general manager of the Joliet Railroad, then owned by Mr. W. B. McKinley and his associates. During the six-year period he was in charge of this property, it was entirely rehabilitated and the Chicago & Joliet Electric Railway, a double-track interurban line, was constructed. In 1904 Mr. Fisher became associated with his brother, Mr. H. A. Fisher, and his nephew, Mr. L. D. Fisher, who together promoted and constructed the Joliet, Plainfield & Aurora Railroad, and in 1906 built the Joliet & Southern Traction Company's line between Joliet and Chicago Heights, Ill. In 1911 Mr. Fisher again accepted a position with the McKinley interests, taking charge of the construction of an extension of the Chicago, Ottawa &

Peoria Railway between Morris and Joliet, Ill. Upon the completion of this extension he was made general superintendent of the entire property, which position he now holds.

Mr. W. B. Tarkington has been appointed superintendent of the Fort Smith Light & Traction Company, Fort Smith, Ark., in charge of the operation of the railway. Mr. Tarkington has long been connected with electric railway and steam railroad work, having begun his career in the mechanical department of the Chicago & Northwestern Railroad. In his steam-road service he was advanced to the position of division master mechanic on the Iowa division of the Chicago & Northwestern Railroad, which position he resigned to become connected with the Omaha & Council Bluffs Street Railway, Omaha, Neb., as general superintendent. Later he accepted a position as superintendent of transportation of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis. Other electric railway positions held by Mr. Tarkington include that of general superintendent of the Chicago & Southern Traction Company, Chicago, Ill., which he resigned in April, 1912, to become superintendent of the Rock Island Southern Railway.

Mr. H. T. Jones, whose appointment as general superintendent of the United Railroads, San Francisco, Cal., was announced in the ELECTRIC RAILWAY JOURNAL for Jan. 16, has been actively engaged in street railway work for thirty-three years. Mr. Jones was born in Bristol, England, in 1866. In 1882 he entered the employ of the late Sir Clifton Robinson, who was then engaged in constructing the Higat Hill cable railroad in London. In 1884 Mr. Jones operated the first car over this line, the first road of its kind in Europe. Mr. Jones remained in the London offices of the company until 1889. Sir Clifton then went to Los Angeles, Cal., to install a cable road there for the Los Angeles Cable Railroad, and Mr. Jones was appointed assistant superintendent. In 1890 Mr. Jones entered the employ of the Market Street Cable Railway, San Francisco, as conductor. Since that time he has remained in San Francisco and has steadily risen through the ranks to the position he now holds. After serving successively as inspector, car dispatcher and timetable expert, he was appointed superintendent of employment by Mr. Chapman when the United Railroads was organized in 1902, and in 1904 was made division superintendent. This position he held for nine years, at which time he advanced to the position of acting general superintendent. In addition to the usual duties of his office during this time, he was also continued as the company's timetable expert as well as chief of the employment bureau. In fact, Mr. Jones personally has employed all of the men in the rank and file which the United Railroads has added to its payroll since the company was formed in 1902. In the strenuous period after the earthquake and fire of 1906 and in the strike that followed he added much to his record for long and faithful service.

H. T. JONES

OBITUARY

J. Grant McCollum, of the Public Service Corporation of New Jersey, died of pneumonia at Newark on Jan. 13. Mr. McCollum became connected with the Public Service Electric Company on Jan. 26, 1914, as superintendent of construction of the Burlington power station and was transferred to superintendent of construction for the Essex power station at Newark when that work was started several months ago. Previous to entering the employ of the Public Service Electric Company he was connected with Westinghouse, Church, Kerr & Company. Mr. McCollum was graduated from Cornell University with the class of 1909. He was a member of Phi Kappa Sigma fraternity and was a Cerberus man. He was also a member of the Cornell University Club and Squadron C of Brooklyn.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Riverside, Rialto & Pacific Railroad, San Francisco, Cal.**—Application for a charter has been made by this company in California to build a 10-mile interurban railway to connect Riverside, Bloomington and Rialto. Capital stock, $500,000. Incorporators: W. G. Henshaw, Tyler Henshaw, Henry Chickering, William H. Metcalf and William Lees.

***Palm Beach & Everglades Railway, Miami, Fla.**—Application for a charter has been made by this company in Florida to build a 40-mile railway from West Palm Beach to Lake Okeechobee. Charles H. Baker, New York, president; H. G. Geer, West Palm Beach, vice-president; James A. Moore, Hotel Halcyon, Miami, general manager; W. H. DaCamera, secretary, and T. J. Campbell, West Palm Beach, treasurer.

FRANCHISES

***Birmingham, Ala.**—Henry Key Milner, president of the Milner Land Company, has asked the Council for a franchise to build an electric line from Fifteenth Avenue and Twentieth Street south to Key Circle in the Land Company's new division.

San Jose, Cal.—The San Jose Terminal Railway has asked the Council for an extension of time on its franchise in the northern part of San Jose. It is the aim of the company to build from Alviso through San Jose and the Willows district.

Santa Barbarra, Cal.—The Riviera Company has asked the Council for a franchise for an extension east from the State Normal School in Santa Barbara. The franchise will be assigned to the Santa Barbara & Suburban Railway.

Meriden, Conn.—The Connecticut Company has asked the Council for a franchise for a line from West Main Street at Capitol Avenue along Capitol Avenue to Lockwood Street in Meriden.

New Haven, Conn.—The Connecticut Company has asked the Council for a franchise for a line on Whalley Avenue, New Haven, through either Hudson Street, County Street or Goffe Street into New Haven County property; also from West Main Street and Capitol Avenue, Meriden, along Capitol Avenue to Lockwood Street.

Carbondale, Ill.—The Murphysboro & Southern Railway has received a franchise from the Council in Carbondale. A. B. Minton, Murphysboro, president. [E. R. J., Jan. 9, '15.]

Quincy, Ill.—The Quincy & Western Illinois Electric Railway has asked the Council for a three-year extension of time on its franchise in which to begin the construction of its line between Quincy and Niota. Henry F. Dayton, Quincy, president. [E. R. J., Jan. 21, '14.]

Evansville, Ind.—The Board of Works has approved the franchise granted the Public Utilities Company for the extension of the Bell Street line from the present terminus at Kentucky Avenue to the city limits of Evansville.

Schenectady, N. Y.—The Schenectady Railway has received a franchise to extend its Nott Street line as far as the city line on Grand Boulevard in Schenectady.

Cincinnati, Ohio.—Mayor Spiegel of Cincinnati, Ohio, has signed the twenty-five-year franchise granted the Cincinnati, Newport & Covington Street Railway for the use of certain streets between the business district of Cincinnati and the Ohio River Bridge on Jan. 14. The City Council refused requests to reconsider the vote on the franchise ordinance, the formal action being taken Jan. 13. Notice has been served for a referendum vote on the franchise.

Corvallis, Ore.—Because it failed to complete and operate 2 miles of lines within two years from the time the franchises were granted, the franchises of the Portland, Eugene & Eastern Railway have been revoked by the City Council. The bonds of the company, amounting to $5,000, put up as an evidence of good faith, has been declared forfeited.

***Knoxville, Tenn.**—M. K. Bell, Knoxville, will ask the Council for a franchise in Knoxville. This is part of a plan to build an electric line from Knoxville to Bristol and Newport, Tenn., 120 miles.

Dallas, Tex.—Edward T. Moore and associates, representing the Stone & Webster interests, have received a franchise from the Council on Ray Street, Wood Street, Akard Street, Jackson Street, Lane Street and Browder Street in Dallas. The franchise provides entrance facilities to the proposed interurban terminal station in Dallas. The station will be modeled in a general way after the large interurban terminal which is used by the electric railways which enter Indianapolis.

***Marshall, Tex.**—Business men from Shreveport have asked the Council in Marshall for a franchise to build an electric railway in Marshall and for right-of-way through Harrison County.

Ogden, Utah.—The Ogden, Logan & Idaho Railway and the Salt Lake & Ogden Railway have accepted the franchise to build over Lincoln Avenue between Twenty-third and Twenty-fourth Streets to the interurban terminal on Twenty-fourth Street between Grant Avenue and Lincoln Avenue in Ogden.

Clarkston, Wash.—The Council has granted a franchise to A. G. Nortz and associates for an electric railway in Clarkston. The electrical equipment will cost about $15,000. The generators and transformers will be made after the order is placed. It is reported that the company will spend $750,000 in the valley. [E. R. J., Jan. 2, '15.]

TRACK AND ROADWAY

Alabama City, Gadsden & Attalia Railway, Gadsden, Ala.—Plans are being made by this company to lay new track and build a loop in Gadsden.

Calico Rock, Ark.—Preliminary arrangements are being made by this company to build its line between Calico Rock and Hoxie. S. J. Johnson, Calico Rock, is interested. [E. R. J., Dec. 19, '14.]

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its lines through the East Side to the station site at the end of East Eighth Street in Riverside.

Sacramento Valley Electric Railway, Sacramento, Cal.—During 1915 this company plans to build 17-miles of new track from Dixon to Woodland. Eventually this line will be built to Red Bluff.

San Francisco (Cal.) Municipal Railway.—In accordance with the instructions of the Supervisors, City Engineer O'Shaughnessy is preparing plans and specifications for the construction of the Church Street municipal railway line as far as the available money will carry it. The understanding now is that the proposition of creating an assessment district to pay for opening a new street over the hill may be dropped, and that only the city's bond fund will be drawn on for building the line. In this event it can be constructed as far as Twenty-Second Street. The original plan was to build it to Thirtieth Street in San Francisco. The company reports that in all about 9.28 miles of new track will be constructed by it in San Francisco during 1915.

Sandpoint & Interurban Railway, Sandpoint, Idaho.—During 1915 this company plans to build its 5-mile return line from Shoshone Falls to Twin Falls, Idaho.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—During 1915 this company plans to build 12 miles of new track to connect the towns of Glen Park, New Chicago and Hobart.

New Albany, Ind.—The Louisville & Southern Indiana Traction Company, which operates the New Albany city lines, has been notified by the city authorities that it must remove unused tracks in Market Street, between East Fourth and East Thirteenth Streets, ten days being allowed for compliance with the order. The track formerly was used by the Silver Hills line.

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—About 4 miles of new track will be built by this company during 1915.

Mississippi Valley Electric Company, Iowa City, Ia.—During 1915 this company plans to build 1½ miles of new track.

Arkansas Valley Interurban Railway, Wichita, Kan.—As soon as the weather permits, this company plans to begin the construction on the extension to Hutchinson. During the year 1915 this company plans to build 22 miles of new track.

Louisville (Ky.) Railway.—Residents of sections in Louisville and vicinity now without electric railway are presenting petitions addressed to officers of this company and the Louisville & Interurban Company, for extensions of the lines and service of these companies. Among the extensions suggested are lines to Parkland and Mount Washington.

Texas-Louisiana Traction Company, Shreveport, La.—Plans are being considered by this company to build its line between Shreveport and Marshall. It is planned eventually to build extensions through Longview, Tex., Vivian, La., and Mansfield, La. A. B. Blevins, Jefferson, president. [E. R. J., Oct. 5, '15.]

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—During 1915 this company will complete its 14½-mile line.

St. Paul Southern Electric Railway, St. Paul, Minn.—The 30-mile line between Cannon Falls, Zumbrota, Pine Island and White Rock will be built by this company during the year 1915.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—At a recent meeting of the directors of this company plans were considered to begin work in the spring on this line to connect Randolph Springs, Moberly and Huntsville. Charles H. Dameron, Huntsville, president. [E. R. J., April 25, '14.]

United Railways of St. Louis, St. Louis, Mo.—This company is asked to consider plans to extend the Lee Street line from its present terminus on Taylor Avenue to the city limits in St. Louis.

Northern Ohio Traction & Light Company, Akron, Ohio.—During 1915 this company plans to build 2.67 miles of new track.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—It is reported that this company contemplates the construction of an electric railway from Berlin Heights, via Wakeman to New London and thence to Plymouth, New Washington and Bucyrus.

Oklahoma (Okla.) Railway.—Preliminary arrangements are being made by this company to begin work on the 17-mile extension between Edmond and Guthrie.

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—During 1915 this company plans to build its 50-mile line between Ottawa and Morrisburg.

Southern Oregon Traction Company, Medford, Ore.—About 1 mile of new track will be built by this company during 1915.

Harrisburg, Pa.—The Public Service Commission has refused the application of the Perkiomen Electric Transit Company, a Delaware corporation registered to do business in Pennsylvania, for a certificate of public convenience to permit it to operate a trackless trolley system on public roads in this State.

***Monaca, Pa.**—John W. Reid, John J. Allen, D. J. Mitchell and H. L. Grimmell, citizens of Monaca, will organize a company to build an electric railway between Monaca and Coraopolis.

West Penn Traction Company, Pittsburgh, Pa.—A 7-mile line will be built by this company between Leisenring and Uniontown during 1915.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—Contracts have been awarded and work will be begun at once by this company on its 2-mile extension to North Charleston.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—Plans are being made by this company to lay new track on Elmwood Avenue in Columbia.

Chattanooga (Tenn.) Traction Company.—This company plans to build 20 miles of new track during 1915.

Brenham, Tex.—Plans are being considered to build a 15-mile line between Brenham, Independence, William Penn and Bryan. Preliminary details will be settled and actual work will be begun in the near future. [E. R. J., Dec. 19, '14.]

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—About 1 mile of new track will be built by this company in Corpus Christi during 1915

San Antonio Traction, Gas & Electric Company, San Antonio, Tex.—Preliminary arrangements are being made by this company for extensions and improvements of its lines in San Antonio.

Ogden (Utah) Rapid Transit Company.—Plans are being contemplated by this company to extend its tracks from Wellsville to Brigham City.

Blue Ridge Light & Power Company, Staunton, Va.—Actual construction of this railway has been begun. The line will be about 40 miles long.

Portland, Vancouver & Northern Railway, Vancouver, Wash.—Preliminary arrangements are being made by this company to begin work about May 1 on the construction of this electric line to connect Portland, Ore.; Vancouver, Wash., and interurban lines in Clarke County, Wash. Capital stock, authorized, $300,000. Officers: Henry Crass, 511 United States Bank Building, Vancouver, Wash., president; G. W. Ford, Vancouver, Wash., secretary. [E. R. J., Jan. 9, '15.]

Charleston-Dunbar Traction Company, Charleston, W. Va.—Plans are being made by this company to build 18 miles of new track during 1915.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its lines through the East Side to the station site at the end of East Eighth Street in Riverside.

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company on its new depot at Gardena.

Piedmont & Northern Railway, Charlotte, N. C.—This company has opened its new passenger station on Spring Street in Spartanburg.

POWER HOUSES AND SUBSTATIONS

United Railroads, San Francisco, Cal.—This company contemplates building a new substation in the Richmond District in San Francisco.

Potomac Electric Company, Washington, D. C.—An order for one 150-kva three-phase, sixty-cycle, 2200-volt high-tension, 240-220-volt low-tension O. I. S. C. transformers has been placed by this company with the Westinghouse Electric & Manufacturing Company.

Cushing (Okla.) Traction Company.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 500-kw, 1500-volt, 900-r.p.m. d.c. geared generator with compound winding; one turbine complete with reduction gear, condenser, etc., and one three-panel marble switchboard for its power house in Cushing.

Utah Light & Traction Company, Salt Lake City, Utah.—The installation of an added unit to the company's storage-battery system has been completed, increasing the capacity of the system between 25 per cent and 30 per cent. The original storage-battery system was installed six years ago in the company's power station and transmission plant in the square bounded by First South and Second South Streets and Main and West Temple Streets. The plant was installed as an emergency equipment for use in the event of trouble with the generating and transmission plants supplying service in the business district.

Virginia Railway & Power Company, Richmond, Va.—A 375-kva a.c. generator has been ordered by this company from the General Electric Company.

Puget Sound Traction Light & Power Company, Seattle, Wash.—Two 500-kva, three-phase, sixty-cycle, 52,500-volt high-tension, 13,800-volt low-tension out-door O. I. S. C. transformers have been ordered by this company for its power house in Seattle.

Manufactures and Supplies

ROLLING STOCK

Warren (Pa.) Street Railway will purchase one interurban car during 1915.

Lincoln (Neb.) Traction Company is contemplating the purchase of one snow sweeper during 1915.

Concord, Maynard & Hudson Street Railway, Maynard, Mass., will equip all its open cars with double running boards.

St. Paul (Minn.) Southern Electric Railway will purchase during 1915 six additional passenger cars of the same general type as those recently purchased.

Long Island Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1915, as expecting to purchase twenty all-steel trailers, has ordered this equipment from the Standard Steel Car Company.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has ordered one motor freight car, two trailer box cars and eight flat cars from the Laconia Car Company. This order includes truck equipment for all the cars.

Toronto (Ont.) Civic Railway has placed an order through Works Commissioner Harris, of the city of Toronto, with the Preston Car & Coach Company, for three double-end, single truck, pay-as-you-enter cars, mounted on Brill 21-E trucks, 8 ft. wheel base, cast iron wheels. The electrical equipment will be G.E.-80 with K-10 control. Car bodies will be 21 ft. long with clear space inside of sheathing in each vestibule of 6 ft. The cars are to be especially wide for single-truck cars, being 8 ft. 5-in. over side sheathing. The vestibules are to be extra wide, being 8 ft. wide. The outside of cars will be painted Pullman color; interior will be finished with golden oak; the seats will be of the "walk-over" style cross seats, upholstered in woven rattan, spring upholstered cushions and backs. There will be six automatic ventilators in the ceiling of each car. Sano hand straps will be fastened to the ceiling over each short longitudinal seat at each end of car. The seating capacity will be 32.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9 as having ordered seventy-five center-entrance trailers from The J. G. Brill Company, has specified the following details for this equipment:

Weight of car body,	18,000 lb.
Bolster centers, length,	24 ft.
Length over vestibule,	48 ft. 2½ in.
Width over sills,	8 ft. 5 in.
Width over all..	8 ft. 9¾ in.
Height, rails to sills,	variable
Body	all-steel
Interior trim	aero metal
Headlining..	Agasote sides. carlin finish, upper deck
Roof	monitor
Underframe	metal
Bumpers	angle iron
Couplers	Tomlinson
Curtain fixtures,	Cur. Sup. Co.
Curtain material..	Pantasote
Hand brakes	Brill with Pittsburgh drop handle
Journal boxes	Brill
Sash fixtures	Brill
Seats	Brill "Winner"
Seating material,	mahogany slats
Springs	Brill
Trucks	Brill 53-F
Ventilators	Perry

TRADE NOTES

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed L. F. Brahmer, formerly with the Chicago Association of Commerce's smoke abatement and terminal electrification engineering staff, to a position in its line material division at East Pittsburgh, Pa.

National Carbon Company, Cleveland, Ohio, has appointed W. H. Arkenburgh, for a long time publicity manager of the Union Switch & Signal Company, to a position in its sales department. Mr. Arkenburgh will have charge of railway and signal work in the Canadian territory.

Bucyrus Company, Milwaukee, Wis., prints in the January, 1915, number of the *Excavating Engineer* an article on successful results from electrical shovel operation on the Wilkes-Barre (Pa.) Railway on which an electric revolving shovel manufactured by this company has been operating for about a year.

John A. Roebling's Sons Company, Trenton, N. J., on Jan. 18 suffered a complete destruction of its insulated wire plant. The shops and machinery for the manufacture of all kinds of wire rope and bar iron, steel and copper wire were not damaged and are still running.

Anchor Webbing Company, Woonsocket, R. I., has changed its Chicago agency from F. T. Finney, 614 West Adams Street, to E. P. Bartlett, 1368-1370 Grand Avenue. This company has also established a new agency in St. Louis, Mo., in the name of Brown & Hall, 620 Central National Bank Building.

Hoeschen Manufacturing Company, Omaha, Neb., has recently received orders from the Oregon Electric Railway, Detroit (Mich.) United Railway, Spokane & Inland Empire Railway, Pennsylvania Railroad, Louisville & Nashville Railroad, and several other steam roads for its magneto-mechanical highway crossing bell.

John R. Dickey, director and sales manager of the Philadelphia Holding Company, has taken the agency of the Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa. Mr. Dickey will look after the steam railway and industrial interests of that company in the Philadelphia district, but is prepared to handle electric railway spring business without any territorial limit.

Bemis Car Truck Company, Springfield, Mass., is located in a new, enlarged plant. On Dec. 14 last year the old plant of the company was destroyed by fire and on Dec. 22 the company moved to a new plant with new machinery and enlarged facilities generally for the production of trucks, wheels, axles, bearings, springs, gearing, castings and special machinery which it manufactures.

E. P. Roberts, Cleveland, Ohio, will resign, effective Feb. 1, 1915, from his position as commissioner of smoke abatement and will reopen his office as consulting engineer about that date. From 1893 to 1912 Mr. Roberts acted as consulting engineer for a large number of electric railways, electric light and other public utility corporations and also many manufacturing plants. In addition he will now make a specialty of smoke abatement.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" lamps, has made a sales connection for the United Kingdom with the Forest City Electric Services Supply Company, Clegg's Court, Chapel Street, Salford, England, and for the Kingdom of Italy with Giovanni Chechetti, Piazza Sicilia No. 1, Milan, Italy. These European concerns will have the exclusive sales rights for "Golden Glow" equipment in their respective territories, and will be direct sales representatives. The Esterline Company has also appointed Firth & Marshall, 81 New Street, New York, as its Eastern representatives for curve drawing instruments, pyrometers and production recorders. This firm will handle the state of New York, including New York City, and the New England states.

ADVERTISING LITERATURE

American Electrical Works, Phillipsdale, R. I., has issued a price list of Jan. 15, 1915, of its wire and cables.

Electric Railway Equipment Company, Cincinnati, Ohio, has issued Catalog E, which illustrates its lamp standards for supporting type C high efficiency Mazda lamps, also ornamental lamp brackets of different designs to be attached to trolley span-wire poles.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has issued Bulletin No. 1533, superseding Bulletin No. 1524, which contains a price list of its repair parts for auxiliary air-brake apparatus, including Types E and E-3 electric governors, ½-in. and ¾-in. rotary engineer's valve, ½-in. slide engineer's valve, brake cylinders, air gages, stop cocks, drain cocks, safety valves, whistles and valves, reservoir and hangers, box and cage, fuse and base, insulators, hose and couplings and switches.

Pelton Water Wheel Company, San Francisco and New York, has issued Bulletin No. 8, which illustrates and describes its Pelton-Doble tangential water wheels and Pelton-Francis turbines for direct connection to generators in hydroelectric plants. The water wheels range in units capable of developing from 20 hp to 20,000 hp, delivered from one shaft. The catalog contains illustrations of installations where both types of prime movers are employed, and also views of pipe lines furnished by this company.

Guaranty Trust Company, New York, N. Y., has issued a 111-page cardboard-bound book on the subject of railway equipment obligations. Short descriptions are presented of the more important equipment obligations of the principal railways in connection with date issued, outstanding amounts, interest dates and maturity dates. By way of introduction the book contains a general discussion bearing upon the history and present investment position of equipment obligations. An analysis is also made of how equipment obligations have fared in receiverships and reorganizations.

Armspear Manufacturing Company, New York, N. Y., has issued Bulletin No. 15, which describes its spheroidal lens railway lamps for night indication, including tail-lights, classification, switch and semaphore lamps. With this spheroidal lens lamp it is possible to procure an effective long range of slightly less intensity than the concentrated light given from a smooth faced lens, but performing all the functions of the present lamps and in addition a divergent light is provided covering an arc of 90 deg. from each section. The bulletin contains a colored graphical drawing which illustrates the range and limits of the smooth-faced semaphore lens in comparison with the spheroidal lens. The lens is of multi-colored sections. From one to four sections are used, according to the service. Each section is contiguous, and when assembled and locked in position becomes rigid and air-tight, virtually making a luminous globular lamp transmitting all the rays impinging on the glasses.

NEW PUBLICATIONS

Ancient Double Entry Bookkeeping. By John B. Geijsbeek. The Ronald Press Company, New York, 1914; 182 pages, illustrated; buckram, $5, prepaid.

While in many respects this book is for the scholar, it contains material that should be of absorbing interest to everyone interested in accounting practice. Important as the accounting profession is in the affairs of modern business, it is popularly supposed that such work has been almost entirely developed in the last few decades as a direct result of the very complexity of the business organizations whose transactions it records. It may come as a surprise, therefore, to have presented to one's view translations in English of the first known writings on the subject of double-entry bookkeeping, beginning with those of Pacioli in Italy in 1494. From these it appears that even in that day there were well-defined principles of bookkeeping and accounts, and in endeavoring to systematize the recording of commercial transactions the ancient practitioners encountered many of the problems met to-day. The chief value of Mr. Geijsbeek's book is that it makes available to all the contents of medieval books that are either out of print or so rare as to be out of reach of the average accountant. Photographic reproductions from the original authors in various languages are shown on the left-hand pages, with a modern English translation on the right, and the book is replete with illustrations of early forms. Through these means the accountant of to-day can see how faithfully he is following the footsteps of his medieval predecessors. If he is a real book-lover and is interested in more than the humdrum of his every-day practice, he will find in this book not only an intrinsically valuable additon to his library but also a means of giving him that breadth of view that comes from a real knowledge of the history of his profession.

Practical Rate Making and Appraisement. By William D. Marks; office, President's House, South Hadley, Mass.; 269 pages; cloth, $2, postpaid.

The author of this book has endeavored to collate, digest and systematize the results of his experience in appraisal and rate-making cases in the United States. A few of the briefer reports are printed in full, and then the general principles involved in rate making and appraisement are discussed and illustrated by practical examples of their application. Some of the most important chapters are those dealing with the various bases of appraisals, overhead charges, law of demand, London sliding scale, and quantity rates for electricity. It is the author's opinion that the utmost caution and thoroughness of research must be exercised by appraisers, and that in most instances appraisals must be made regardless of book values. Almost all the examples used in the book are from the gas and electric light fields, but practical lessons for electric railways can be drawn from the information given.

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SPIRIT OF THE WASHINGTON MEETING

Simplicity, dignity, concentration, sincerity characterized the mid-year meeting of the American Electric Railway Association to which we appropriately devote a large part of this issue. Divested of the usually-attendant committee meetings, with the President of the United States an honored guest, and amid inspiring surroundings, the meeting was an unqualified success. By the design of the committee in charge and the inclination of the members in attendance, the focus of interest was the code of principles, which was discussed from every angle. To use a musical simile the high notes struck in the addresses evoked responsive chords in an appreciative audience indicative of continuing harmonies. Apparently the time has come for harmony, not only in and among our electric railways but in the whole public utility orchestra. If one depresses the "loud" pedal of a piano and strikes a key firmly, many strings other than the one first set vibrating will sound by sympathy. Just so yesterday's audience responded to the eloquent and therefore stirring phrases of men of experience and acumen. What appealed to us most forcibly was the notion that the acceptance of the code of principles gives liberty of expression to those who have secretly cherished many of the ideas therein set forth but who hesitated to express them for fear of giving offence. The past ten years have seen among public utility men the gradual crystallization of the sentiments so tersely expressed in the code by processes closely analogous to those involved in the growth of natural crystals in saturated solutions of chemical compounds. The next ten years will see a new public appreciation of the railways and other utilities both as public servants and investment opportunities, at least they will if the spirit of the Washington meeting is significant.

THE PRESIDENT'S ADDRESS

The address of President Wilson at the Washington meeting was an assurance to the electric railway men and manufacturers present that the Government and public are not jealous of bigness or prosperity in bigness. The president laid great stress on the advantage which business will have in knowing what kind of regulation is proposed and to have dissipated the mists of uncertainty which have existed in the past. The public has never been suspicious of big business as such, but bigness should not be used to take improper advantage of others. Coming then to specific acts by which the corporations can win the favor of the public, the president mentioned four. Of these he placed publicity first, because publicity not only prevents wrong action but disarms suspicion that anything improper is being planned. Second, he placed the rendering of a full equivalent in service for the return received. The third was conscience in business, or acting according to the standards of those whose good opinion we respect and desire, and the fourth was the spirit of service, or the pride of doing a thing as it ought to be done. The address was a strong plea for confidence in the fair attitude and intentions of the public toward the corporations. It was a fitting conclusion to a convention devoted to the plea of the corporations, as expressed in the code of principles, for confidence in their fair attitude and intentions toward the public. It is satisfactory to hear these expressions from the chief executive of the nation. Let us hope that they will assist in a better understanding of the problems of the railways by the public. If all other authorities should adopt the views of the president as given in his Washington speech, it is all the railways can ask and all they desire.

THE ANTHONY N. BRADY MEDALS

At the mid-year meeting of the American Electric Railway Association a significant event was the awarding of the Anthony N. Brady memorial medals to the Boston Elevated Railway, to its general attorney and to a mechanic in its employ. Our congratulations are extended to the recipients with the hope that the encouragement thus afforded will still further assist the officials of the company in reducing accidents and removing any dangers to health that may remain. The founding of these medals is indicative of a spirit of the times and it appropriately comes when the safety movement is at its height. The foundation takes its place among a constantly growing number of gifts which have been made for the purpose of commemorating achievement in efforts for the public welfare. To our mind the function of such awards is commemorative rather than directly stimulating. The possibility of securing a medal cannot be an impelling motive in the safety movement and, if it could be, the motive would not be a worthy one. Experience has shown that unless conditions are such as to stimulate a development without an award the prospect of an award will not furnish the impetus. A medal and the honor that goes with it are not things to be earned, they only indicate the accomplishment of what they stand for. The word "competition" often used in connection with medals and prizes is unfortunate, it is undignified. In the present case American electric railways were invited to state what they had done to safeguard human life, as this was the only way in which the information could be obtained. A number of companies gave the information desired, many did not. It is to be hoped that an even better response to the request for information will be made next year, so that the committee may have a full perspective view of the safety movement. As a central clearing house for safety information the medal committee should be invaluable, entirely aside from its primary function. It is valuable also for the companies periodically to marshal their safety facts, for their own information if for no other purpose.

PRACTICING PUBLIC RELATIONS While R. M. Howard's paper in this week's issue on "Experience with the One-Man Electric Car in a Small City" will attract deserved attention for the economies achieved, emphasis should be placed upon what Mr. Howard has to say about public relations in practice. There was no doubt in the mind of the Wisconsin Railway, Light & Power Company's management that the modern one-man car would do for the conditions in a town like Winona, Minn.; but it also knew that the best car might prove a failure if imposed upon the public without due explanation. The company, therefore, took the local City Council and commercial body into its confidence to an unusual degree. First it submitted its earnings to show that they were too small to justify new two-men cars; second, it offered to install new one-man cars if the citizens were satisfied with the type proposed and with the changes in operation that their use would involve. The frankness of the company has evidently been appreciated, for not only did the bodies mentioned approve the company's plan at the time, but since then the public at large has also shown its satisfaction with the new service. The success of this experiment in public relations in practice is all the more noteworthy since nothing is more likely to get a public service corporation in hot water than any step which calls for a big cut in the number of employees.

THE ENGINEER'S PLACE IN BUSINESS At the recent Philadelphia meeting of the American Association for the Advancement of Science, Martin Schreiber, engineer of maintenance of way Public Service Railway, presented a paper epitomizing his experience with "the engineer out in the world." That the engineer plays an important part in the electric railway "game" is evident from the activities of our Engineering Association, of which Mr. Schreiber is a past president. His conclusions, therefore, should be of interest to a large proportion of the readers of the ELECTRIC RAILWAY JOURNAL, particularly as they may be extended to include many effective men who had not been fortunate enough to have had a technical education thrust upon them. He believes that we must get away from the notion of an engineer as one who merely designs, builds and operates plants of one kind or another. Administrative positions demand the application of the same principles to management, and many men who have come up through the engineering ranks now occupy such positions. But engineers should not be limited to corporations or private industry, for there is a big field in public life. They should take a prominent place in regulative bodies, for there is urgent need of first-hand technical information in rightly performing the regulative function. It is up to the engineer himself to change his status. Mr. Schreiber believes that the best way in which the individual can prepare himself for broad responsibilities is by becoming an expert in some particular line. The theory is that one who can master one subject can master more, and that success in a specialty inspires confidence in the ability of the expert to handle larger propositions. We agree with Mr. Schreiber in the fundamental principle which we understand him to have in mind. Engineering training is primarily to give facility and assurance in solving problems. The engineer is trained on technical problems because they are the most tangible and interesting. Their place in the technical schools is analogous to that of manual training in the secondary schools. But he must not confine himself entirely to these problems through life, or he misses the larger opportunities for which he has been ostensibly prepared.

THE CODE OF PRINCIPLES

The paper by Colonel Williams on the code of principles, presented at the mid-year meeting yesterday, was a clear exposition of the need for the code and the purposes which underlay its preparation. The fundamental spirit of the code is that of the mutual obligations existing between all public utilities and the public, whom they serve. These obligations, while expressed in the code in ten principles, can be reduced in essence to two, as follows: The public utility should provide the best service possible for the fare charged and should adopt a frank, open policy in all of its affairs so that the public will know that it is doing the best it can. The second principle is similar to the first except that it expresses the duty of the public. The public should co-operate in securing good service by authorizing efficient operating conditions and should permit the company a fair return on a fair capitalization. On these two laws hang the entire ten principles of the code. They are so self-evident that they should commend themselves to all who give any thought to the reciprocal relations between public utilities and the public. They are essential if private ownership is to continue for public utilities. The only alternative is municipal ownership and operation, which is generally admitted by those who have studied the subject to be out of harmony with our political system of government and to be of great potential danger to the community.

As Colonel Williams says, the most important thing about the code is the spirit behind it. Railway companies and all who believe in the private ownership of public utilities are not obligated to accept its exact phraseology. There is nothing sacrosanct about the wording. Its chief purpose, so far as the railway companies are concerned, is to emphasize the idea that their first duty is to deserve support and then to remove prejudice. There is no greater fundamental truth than that the interest of the public utility and of the community which it serves are one. If either forgets this principle, both suffer. The growth and prosperity of the community is dependent to a large extent upon the fair treatment by it of the public utility, just as the growth and prosperity of the public utility is largely dependent upon fair treatment by it of the community. Independent of all other considerations, unless new capital can be secured a railway company will find it impossible to extend its lines into the new sections of a city when these lines are needed. Railway managers understand the reasons for the present lack of investment in electric railway enterprises better than do the public. It is their duty to explain the facts so that there shall be no misapprehension on the subject.

OPERATING COSTS ON THE NEW HAVEN

In a paper read at a joint meeting of technical societies in Philadelphia last week W. S. Murray gave interesting and valuable data of operating costs on the New Haven electrified section. This paper is the third of a series presented to the American Institute of Electrical Engineers by Mr. Murray during the past eight years for the purpose of giving the facts regarding this pioneer electrification. The choice of the a.c. system for New Haven conditions has been widely criticised, largely, he thinks, on account of ignorance of the facts. Mr. Murray explained that these costs had not been given earlier because, in the first place, only a part of a whole division was electrified and an extremely expensive interchange of steam and electric operation had to be maintained; second, the first construction costs were excessively high, and, third, the motive-power equipment was handicapped in having to operate on both direct and alternating currents. All of these factors combined to produce high operating costs. The speaker stated frankly that of the $15,000,000 invested in electrification more than a third could be saved if the work were to be done again, this $5,000,000 being the contribution of the New Haven to the development of the industry.

The primary purpose of the paper was not to give cost data but to emphasize one phase of electrification which Mr. Murray believes to have been inadequately considered, namely, administration. It would seem to be obvious that when a new form of motive power is adopted, the characteristics of the novel equipment should be studied and every effort should be made to adapt the best methods of operation to them. The electric motor is inherently different from the steam engine which it replaces in this field, as it was different from the horse which it replaced in the street railway. The organization of the steam railroad is, by the process of natural selection, highly developed to utilize the steam locomotive to the limit. The shops, the roundhouses, the enginemen, the firemen, in fact everything and everybody in the operating department, revolve about the locomotive. When radically new and different equipment is injected into this smoothly-working maintenance machine a process of adaptation must take place. This requires adaptability, time and co-operation, otherwise the savings possible through electrification will be negative in character and electrification will be a disappointment. This is the principal point brought out by Mr. Murray, outside of the valuable figures on cost of construction and operation presented.

PUBLIC SERVICE AND PUBLICITY

The exhaustive paper on this subject by N. C. Kingsbury, vice-president American Telephone & Telegraph Company, read at the mid-year meeting and published in abstract elsewhere in this issue, is one of the most enlightening ever presented at a meeting of the American Electric Railway Association. Mr. Kingsbury's thesis is briefly that in all countries public opinion is irresistible and that the utilities should spare no efforts to supply the data which the public needs to be intelligently informed on utility matters. Mr. Kingsbury speaks with authority because his company, on account of its national extent and the intimate character of its service which enters the homes of so many citizens, has been obliged to meet this situation more extensively than perhaps any other company or union of interests. In consequence of this condition its executive officers have made a very thorough study of the subject and the success of their efforts is notable.

In his paper Mr. Kingsbury speaks frankly of the methods of financing the early public utility companies, but while he recognizes the fact that many of these enterprises would not have been begun except for the large rewards which the promoters hoped to gain, he believes that the period of the promoter and of abnormal profits has passed and that a fair return on the investment is all that should be earned or promised. If this view is accepted, what is the proper course to pursue? To this there is but one answer—full and frank publicity as enjoined by the tenth principle in the code. This policy should not be followed as a last resort because of fear. Instead, it should be adopted as a frank acceptance of conditions as they are and as an effort to prove the honesty of intentions and a real desire to serve. When viewed in this light the problem is a simple one, although its execution requires tact as well as sincerity of purpose.

Mr. Kingsbury emphasizes the possibilities of enlisting the interest in the work of improving public relations of both the stockholders and the employees, both of whom should be valuable allies. He also shows that the problem discussed is not only common to all public utilities but that their interests are closely inter-related, because any unfair action on the part of one utility will react in the minds of the public upon all. We are especially glad to see this point mentioned and hope that its statement by Mr. Kingsbury will lead to beneficial results. It certainly emphasizes the importance of the action of the committee on public relations this week in appointing a sub-committee to investigate the subject of co-operation on public relations between the American Electric Railway Association and similar associations of public service companies of other classes.

President Wilson Addresses Association

OUTLINES HIS VIEWS ON BUSINESS AND PUBLIC UTILITY POLICIES

Other Speakers Discuss the Code of Principles, the Reserve Banking Law and the Relations Between the Utility Corporations and the Public—The Meeting Closes with a Brilliant Banquet

The seventh annual mid-year meeting of the American Electric Railway Association was held in Washington, D. C., on Jan. 29, preceded by a meeting of the executive committee on Jan. 28. The sessions were held in the ballroom of the New Willard Hotel. The meeting was unique in that President Woodrow Wilson was one of the speakers. The conference was devoted to discussion of public relations, with particular reference to the code of principles. The list of speakers at conference and banquet included, besides well-known railway men, Senator J. W. Weeks and Representatives Swagar Sherley and A. J. Montague. The meeting closed with a splendid joint banquet of the American and Manufacturers' Associations.

MORNING SESSION

The morning session was opened at 10:20 o'clock with the announcement by President Allen that W. Caryl Ely, E. W. Rice and Guy E. Tripp had been appointed as a reception committee to escort President Wilson to the afternoon session. The next order of business was a paper entitled "The Code of Principles," which had been prepared by Colonel T. S. Williams, president Brooklyn Rapid Transit System. In the unavoidable absence of Colonel Williams the paper was read by S. W. Huff, vice-president Brooklyn Rapid Transit System. It appears on page 220. Abstracts of discussions by Guy E. Tripp, chairman Westinghouse Electric & Manufacturing Company, and M. C. Brush, vice-president Boston Elevated Railway, follow:

DISCUSSION BY GUY E. TRIPP

I find it exceedingly difficult further to illuminate a subject which has been so thoroughly and admirably covered by the address of Colonel Williams.

At the outset I wish to express my entire assent to the proposition that the adoption of the code of principles places the men in charge of the street railway industry in a position to do exactly what Colonel Williams points out, viz., "to nail their flag high and to defend it." I have for a number of years had the feeling that there was nothing to which a flag could be nailed, and that attempts at defense for the very want of a platform were too often construed by the public to be nothing but the selfishness or obstinacy of local interests. For the lack of a platform this association, as such, has made but little impression upon public opinion, and the individual efforts of local companies, however vigorous and wisely conducted, have had an essentially local effect and have been exerted with little reference to furthering the aims and influence of this association.

The code of principles is not simply a statement of what the association believes to be sound economics but it furnishes the opportunity for centralization, organization and most of all for the establishment of something akin to discipline in the defense of sound economics as applied to street railway work. The success which will attend the effort of the association in forwarding a better understanding and sane ideas on public utility ownership and operation will depend a great deal upon how frequently and how conspicuously the code of principles is carried to the front by the member companies. Therefore, every local company ought to use it as much as possible in its dealings with the public, and endeavor so far as possible to concentrate discussion upon the principles themselves to the end that the progress of the great question of government versus private ownership may tend to be directed along broad lines and the vital issues not be obscured by the details of local conditions.

As Colonel Williams has stated, it is quite possible that the code might have been differently expressed, and perhaps improvements might be made, and, after due time has elapsed, there may be no objection to amending them in essential particulars but for the time being they should be accepted as they are and the best use possible made of them. Each one of the ten principles has received a great deal of consideration and great care was exercised in the use of language in order to avoid embarrassments which might arise under possible constructions which may be placed upon it by hostile critics.

For example, under Section 5, it was found very difficult to express the idea that a street railway is entitled to a fair return on a fair investment and provide for the application of that axiom to a new community which demands service, ahead of its time, with the same accuracy that it would apply to a populous center which already has a proved earning capacity. That is to say, a fair return is of course one that will cause capital to flow into the business, but, as it varies with time and locality, it cannot be permanently fixed, and a new community, with the risks that future growth and prosperity may not come, must pay more for its capital on account of these risks. It might be necessary to sell securities for 50 cents on the dollar in order to obtain the capital, and the code says the other 50 cents is fair capitalization under these conditions. This is only an example to illustrate that any suggestions of changes should be carefully weighed before being adopted.

I have been a non-combatant in the matter of relations between public utilities and the public because I recognize the futility of antagonizing the public. I have believed and now believe in co-operation with the public; but, with Colonel Williams, I am in favor of a vigorous militant defense of the principles upon which the business should be conducted, because, unless the business can be conducted substantially in accordance thereto, the only alternative seems to be municipal ownership.

The decreasing purchasing power of the nickel on the one hand and increasing wages, taxes, heavy rolling stock and non-paying extensions on the other, tend to bring about conditions under which only the public can own and operate street railways. The government is the only agency that can successfully deny the applications of a community for improvements in facilities, the demands of labor for higher wages, avoid the payment of taxes and obtain capital without reference to net earnings. Even a non-combatant must fight the propagandists who are trying to teach the public in effect that shares of stock or bonds of a public utility or any other corporation, for that matter, may on occasions be treated as mere "scraps of paper."

A dollar invested in a municipal or government bond is considered property to be jealously safeguarded, and notwithstanding any disclosures of waste, graft or corruption, the investment liquidates eventually at par, and, in the meantime the interest is paid. But a dollar invested in a corporation appears to be an entirely different dollar in spite of the probability that it is working more efficiently for the public than the other. It not only has no protection (of which no complaint is made), but upon suspicion it is often legislated, taxed, regulated and theorized to 50 cents, and upon disclosures of waste, graft or corruption often absolutely obliterated.

So much for the dollar actually invested. But how about the share of stock or that part of it representing the so-called unearned increment of value? In the first place there is much less of it than is popularly believed, particularly in the street railway business, for bonus stock that was issued to the pioneers in the business has since been paid up by these same men, who with courage, faith and energy have stood by their properties through thick and thin with time and money; and where they did not stand by but sold out to the public the result has been more often than not bankruptcy for the abandoned concern, and thus the pioneers, by the loss of their investments, have paid back the bonus. But for the sake of argument suppose it still exists. It was legally issued at a time when public opinion did not deny that the increase in value of a railway line was just as sound wealth as the increase in the value of real estate along the line. And since there is no fundamental right of property ownership, but all rights proceed from the laws and customs of organized society, destruction or reduction in street railway security values, for the purpose of taking back this unearned increment, is repudiation.

The limit of time allowed me will not permit, and it is not necessary before this audience, to enlarge upon the proposition that those companies which have heretofore capitalized the future to an extent which is out of proportion to the growth of value in the average investment in its community will not be able to collect.

As to the future, the code itself proposes a square deal which is in harmony with all sound advanced thought, and it will support all arguments for a demand that the rights of a street railway and all other corporations to the peaceful possession and enjoyment of their property be considered as binding upon society as the right of individuals, subject, of course, only to such restrictions as will protect the liberties of the people and secure just dealings.

I am pleased to have this opportunity to say a word in support of the code, and from which I hope much, and to enlist under Colonel Williams' banner of honesty and militancy.

DISCUSSION BY M. C. BRUSH

Colonel Williams has presented a most interesting and instructive discussion and explanation of the code of principles. There are probably few, if any, electric railway men, either officers or stockholders, but who would agree with the code as adopted and with his discussion and conclusions. As to whether or not others whose opinions and actions vitally affect the electric railway industry would also concur in these principles there is considerable question.

Colonel Williams states "What we have done is merely to nail our flag high and indicate that we intend to defend it." There can be little question but that, with the advocacy of such a code of principles, we shall have ample opportunity to exercise our defensive powers.

I believe that the public as a whole is fair and willing that capital honestly invested in public service corporations should receive a reasonable return. The difficulty, however, lies in a measure in the company's representatives themselves having failed in the past to persevere in a well-defined and perpetual campaign to acquaint the great majority of the public with the facts.

The tenth "principle" reads "Full and frank publicity should be the policy of all transportation companies, to the end that proper information may be available to the investor and the public." This without question is wise and proper and the most sensible thing to do from the standpoint of properly conserving the interests entrusted to street railway companies. I think, however, that all railway officers should first be sure that they honestly agree with the code of principles. This ought not to be difficult. Next, however, they should be sincere in their determination to practice what they believe.

Those empowered with the administration of affairs of electric railways have failed to avail themselves of a power which they possess and which, if they carried out the code of principles in its entirety and with entire sincerity, would be automatically placed at their disposal. I refer to the great army of men and women directly or indirectly vitally affected by the success or failure of the electric railway industry. In other words, if all of the directors, all of the stockholders, all of the associates of the stockholders, all of those who have confidence in the integrity and honesty of one or more stockholders, and all of those who are dependent in whole or in part upon the success, financially or otherwise, of any stockholders, were not only thoroughly informed about the present actual conditions prevailing on street railway properties as a whole, but were also made to realize how essential the right attitude of critics, legislators, commissioners, and others is to the success of the industry, there would be set in motion machinery which in its far-reaching power would be beyond anyone's present comprehension.

While it may be difficult for an overtaxed executive to prepare statements, data and information with a view to enlightening the stockholders of public service corporations on the general question of the relation of their company to the community, is it not feasible and is it not one of the duties of the association to see that a well-organized campaign is carried out with a view to disseminating such information to all stockholders of electric railways in the United States?

We all appreciate what has been accomplished by cooperation in the "safety first" campaigns throughout the country. Now I believe that if all public utilities should unite in a similar campaign of financial education much would be accomplished. It is an art to prepare brief data in attractive phrases to capture the public's attention, but it does seem as if a concrete effort could be successfully made when we consider the enormous amounts of money involved in the large number of corporations whose interests would be promoted by such an action.

We talk a great deal about educating the public. Do you not think that if we deliberately and systematically educated each of our stockholders, they in turn would do more towards proper education of the public than we could accomplish by any other means? Could they not impress upon their associates in business and in organizations, upon their neighbors, friends and acquaintances, the fact that the electric railway to-day is a co-operative institution in which the interests of their friends and themselves, that is, of the public and the stockholders, or the public and the company, are substantially identical, and that the attitude of antagonism towards a street railway, merely because it happens to be a public service corporation, is suicidal to the community served by such company?

We meet together from time to time, a large body of men all interested in this industry, many of us with no asset whatever other than that which lies in the industry, the return to ourselves being governed entirely by the success or failure of the industry. But do we practice fully what we preach by our code of principles, that is, frank publicity?

Is it not a fact that with the present method of conducting public service corporations, with the present supervision by public service commissions, and with the present comparatively low rate of return upon street railway investments, we are extremely unwise in not deliberately and systematically living up to our tenth principle which advocates full, frank publicity to the end that proper information may be available to the investor and the public? It does us but little good to have a code of principles if we hang copies of it upon the walls of our own offices but fail to promulgate it through the many channels open to our use.

Is it possible that each member of the association, whether an individual member, or connected with a company member, has, since the day when this code of principles was printed and circulated, done all in his power to see that it was printed and distributed broadcast in his community, and has he in all cases done all in his power to see that the community served by his company is particularly informed of what his company means to do in regard to such code of principles?

Do we at all times endeavor to meet and eliminate from the minds of those who are misinformed the thought that an electric railway is a great secret monopoly with dishonest officers and insincere principles? There is a play being produced in this country to-day which is meeting with tremendous success. The theme throughout is based upon the story of a rich old gentleman who was president of a railway company and was trying to spend $200,000 to bribe the mayor of the city to get a franchise for him. Here is a play that is probably seen by several hundred thousand people in the course of a year, and it is fair to presume that by far the larger part of the audiences are at least unconsciously carrying away with them a thought which emphasizes, either at the moment or at some future time, the imagined rottenness and dishonesty of electric railway management.

If we are going to live up to our code of principles is it not the duty of our association or of its members, either individually or collectively, to endeavor to persuade either the author or the producer of such a play that he probably could accomplish the same result with his drama with some other theme than the dishonesty of street railway administrations?

One of the elements which it is extremely essential that the officers, stockholders and their friends, associates and dependents reach and educate in carrying out these principles is the legislative body. The practice of prescribing the prices at which public utility securities shall be sold is absolutely wrong. Prices cannot be legislated unless the rate of return also be legislated, and this can be done only if at the same moment are legislated conditions, revenues, etc., which will guarantee the legislated return.

The practice is in vogue in some states of prohibiting the issuing of securities by public service corporations other than at prices specified by the commission, which is the creature of the legislature. In the case, however, where the state itself issues securities, the rate of return is specified but the prices at which the securities are sold are governed entirely by the one real governing feature of price, that is the law of supply and demand. The securities thus sold bring such prices as the public desire to pay at public auction.

This, too, is a field for the operation of the code of principles, for does it not say "that the rate of fare should be sufficient to permit the companies to meet the reasonable demands of patrons and to yield a fair return on a fair capitalization"?

Is it not time, therefore, that the executives who are directing the policies and administering the affairs of the electric railways of this country should make it their business to create an army of backers by properly informing their stockholders and then to go out frankly in the open and with plenty of backbone and with an absolute knowledge that their business is being conducted in a particularly fair, frank and honest manner, to defend their properties? Should they not insist that those sitting in the legislatures, commissioners' rooms, editors' chairs and critics' homes should give to the individual who has happened to buy a share of street railway stock, or a bond of some public utility, the same fair chance and opportunity for a proper return on his investment as is given to his neighbor who has bought a state or municipal bond?

PUBLIC SERVICE AND PUBLICITY

The second paper of the morning was that on "Public Service and Publicity," prepared and read by N. C. Kingsbury, vice-president American Telephone & Telegraph Company, New York. This paper is published in abstract on another page.

DISCUSSION BY W. CARYL ELY

The discussion on Mr. Kingsbury's paper was opened by Mr. Ely, who first touched briefly on the chaotic state of mind that seemed to be affecting the whole world at this time. The declaration of the code of principles was most important at this juncture when nothing should be hidden. It was a declaration, as he put it, for " a square deal from us to the public and a square deal from the public to us." To get that square deal depended much upon what the railways would do. He agreed with Mr. Kingsbury that all the public utility interests should get together to the end of giving full publicity about their business, reaching not only those transacting the business but the people outside upon whom the welfare of the public utilities depended. There were two branches of publicity—within and without. The publicity without was that which related to the public, and the publicity within was that which related to the publicity between the railways themselves. He recalled that as long ago as the convention of 1906 ideas similar to those expressed in the code of principles had been advanced by different members of the association. But the difference to-day was that the thoughts on the subject had been collated and publicly declared to be the doctrines of the organization. At last the atmosphere was clarified, and the men who had believed for years in these principles were no longer obliged to hold them back for fear of offending other and more powerful individuals or interests. If this code had been adopted ten years ago, he felt that conditions would have been much better. Now the railway men should be as quick to adopt full and frank publicity as they had been slow before.

In conclusion Mr. Ely said that the mere fact that Mr. Kingsbury's corporation had permitted him at this time, in this place and under these circumstances, to promulgate the declarations contained in his able address was a very significant event. It indicated that every one of the public utility corporations should be willing to court and invite investigation and discussion and to submit to every one all the evidence in their possession relative to their business.

DISCUSSION BY E. G. CONNETTE

The second speaker to discuss Mr. Kingsbury's paper was E. G. Connette, president International Railway, Buffalo, N. Y. Mr. Connette said that a few years ago what almost amounted to an indignation meeting occurred at one of the sessions of the association because a number of the members thought that the public was treading on the toes and rights of people who directed corporate interests. He had not been in accord with that sentiment and had left it behind years ago. As early as 1890 he had taken charge of a broken-down property in bad grace with the public. Eventually the red figures were converted to black, and this result was achieved largely by applying the remedy of publicity. He had taken the newspaper representatives into his confidence, and they in their turn had educated the public. Within a year or two the company which had formerly been oppressed was considered a public benefit.

In more recent days after he had left the service of the Public Service Commission of the First District of New York, to take care of the International Railway at Buffalo, he found a strong antagonism against the company and that representatives of the Public Service Commission of the Second District had been on the ground for three months making investigations of the service. On his arrival in the city he was invited by the Men's Brotherhood Clubs of the churches and by many civic associations to address them on railway service conditions. He accepted every invitation, although this required him to speak about twice a week for about five months. At these meetings he made many acquaintances whom he tried to convert into friends by explaining what problems the company had to meet and how it could be helped by them in many ways. Newspaper men were always present at these meetings and published his remarks the next morning. He found that he reached the populace better in that way than could be done in any other way. As yet scarcely any money has been spent in the newspapers for electric railway publicity. Mr. Connette stated that he had strong faith in newspaper advertising, believing that it paid to spend substantial amounts since the investment brought good returns in two ways, namely, it made patrons of the public and it was helpful to people in suggesting where they could ride for pleasure, especially during the summer months. Newspaper advertising was, therefore, one of the remedies for poor public relations.

Continuing, Mr. Connette said that codes of principles could be formulated forever but they were a good deal like catechisms learned in Sunday schools which were repeated rather than observed, as "we are all sinners."

He stated that he had been connected with a public service commission for two years and believed that such commissions were a benefit. The condition of the public mind was such that there must be a brake upon the wheels, first that the public may be protected and second that the interests that the public is attempting to attack will not be destroyed. The commissions were not only an aid to the public but they protected the companies, particularly against the municipal attacks which had been so serious in the past, and also against attack by individuals or associations. So far as rates were concerned, it was the duty of commissions under the law to grant to companies such rates as would yield an income sufficient to take care of operating costs, taxation, gradual reproduction and a reasonable return on the investment. The great difficulty which commissions have had to meet in rate cases has been that of over-capitalization. When commissions attempt to appraise property for rate adjustments they do not find the property there. Even by stretching their consciences by adding large percentages for indefinite things they find it difficult in some cases to arrive at a value equal to the capitalization. This question has brought more condemnation on commissions than anything else. The fundamental principle of regulation was right. A few years ago the association had not believed that it was right, but to-day it was on the right track and going in the right direction.

In conclusion Mr. Connette said that the code of principles should be lived up to and that any money spent to take the public into the confidence of the railway was well invested.

AFTERNOON SESSION

The afternoon session was opened at 2:15 p. m. with an address entitled "Financial Legislation as Affecting Public Utilities" by Hon. John W. Weeks, United States Senator from Massachusetts. An abstract of Senator Weeks' address is printed elsewhere in this issue. His address was discussed in a written communication by J. H. Mortimer, president North American Company. This communication was read by F. W. Doolittle and appears on another page.

ADDRESS BY PRESIDENT WILSON

Amid great enthusiasm Woodrow Wilson, President of the United States, was introduced to the convention.

President Wilson said he knew how important the interests represented by the association were, for they represented some of the chief channels through which the vigor of the nation flowed. He was very glad to have the delegates look at some portion, at any rate, of the Government of the United States. Many things were supposed about that Government, and it was worth while to see it for themselves. In his experience the only way to know people was to meet them. If he believed everything he read in the newspapers he would not understand anybody for he had found on meeting people that the horns they were supposed to have dropped away.

A fine thing about the United States was its large number of get-together associations, but it was a great mistake to confine such associations to groups of individuals in the same business. The important thing was for people in different enterprises to understand one another in order to comprehend our life as a nation.

President Wilson said that he firmly believed that we were now on the brink of a new era of prosperity. For twenty years enterprises in this country had been checked because men were moving amongst a mass of interrogation points. They did not know what was going to happen to them. All sorts of regulations had been proposed, and they were uncertain which of them were going to be adopted. Yet, in spite of this, men knew that most business men are honest and public-spirited citizens, but the many were made afraid because a few did not do right. It had been necessary to agree on the main things that ought not to be done, and then to put our laws in such a state as to correspond with that general judgment. This was a necessary preliminary not only to a common understanding but also to a universal co-operation. Except upon a basis of thorough understanding of law and propriety of conduct it was impossible to pull together. The great majority of the American people believed in doing what was fair and honorable, but a method of control by law of the small recalcitrant minority was a thing difficult to determine upon. What those laws should be was a very great burden to fall upon a particular Administration. The business of final definition had been attempted by the present Congress. It was simply attempting to define something for which the country had already been trying to get ready for half a generation. Of course it would take time to determine what changes may be found desirable in the laws, but no one disputed that such laws were necessary.

Electric railway men whose business it was to join community to community were surely in a better position than others to understand how communities constitute units; that what was hurtful to one part was detrimental to all. One could not demoralize some of the forces of a community without putting in danger of demoralization all the forces of a community.

In this connection, President Wilson said that he realized that the interests of the electric railway companies were not in the congestion of life but in the release of life; not in isolation but in union—the union of parts of this great country so that every energy in those parts will flow freely and with full force from county to county throughout the whole nation.

Continuing, President Wilson said that while he would not dare to make any predictions he would venture some prognostications. The thought of no single man could comprehend the life of a nation like ours, yet men in public life were burdened with a certain degree of guidance, and they must attempt to comprehend as much of the nation's life as they can. Their strength must lie in common counsel with the men in each field in which they have to deal, but a time must come when they are obliged to make some kind of prognosis. He felt that the mists and miasmic airs of suspicion that the commercial world had felt have been blown away and that we had come into an era of confidence. This confidence in enterprise meant that no one was going to be suspicious of any business merely because it was big. If his judgment had been correct, no one ever had been suspicious of business because of its bigness but because people felt that bigness was being used to take unfair advantage. It was easier for a big man to take unfair advantage than a little one. That was why the big fellow was watched. Now that a bond had been given for the behavior of the big fellow to keep the peace we could sleep o' nights provided always that there would be fair dealing and real service.

The characteristic of modern business was this: Most men do not do business on their own private capital but with other people's money. In the case of a stock company the partners are constantly changing. Hence as the managers are using the money of everybody their responsibility is to everybody. Their business is a public business and the public must be taken into the confidence of the managers. The oxygen that the lungs of modern business must take in is the oxygen of public confidence. If it did not business was essentially paralyzed and asphyxiated.

A common understanding was the only stable basis of business. What we want for business hereafter, he said, was the same kind of liberty that we want for the individual. The liberty of the individual was sharply defined by the limits where he comes into contact with the rights of the community in which he lives. Business must not ask for more liberty than the individual. To use an expression from the world of sport the motto should be "A free field and no favor." There had been times when favors had been granted to friends at court, when some had been allowed to travel on the inside track and when others had been granted positions which would block the other runners. The race might have looked all right from the grandstand, but there were many who were never allowed to reach the track. He did not mean that the corporations were going to be penalized for bigness, but they were going to be made to observe the rules of the track. If they won it would be because they possessed more vigor and skill.

When we get to understand that we are all sports and that we are not going to ask nor even going to condescend to take advantage of what does not belong to us the atmosphere will clear and the spirit of true sportsmanship will get into everything. Men who squeal when beaten under such conditions will not deserve our pity.

President Wilson said that he appreciated that there were different degrees of capacity in the world, and that some men had heads that were not particularly well furnished. To illustrate his point, he told of a conversation where two men in speaking of a third referred to him as one whose head was simply a knot which the Almighty had put on him to keep him from raveling out. Liberty did not mean putting men of that type at the front and making others travel the same pace, but no matter how feather-headed the other man was no one must arbitrarily interfere with him.

One of his rules was: Don't do anything under cover. Many businesses had fallen under suspicion for secretiveness where there was nothing to secrete. The same publicity which is required in sport was required in business: The questions were: How do you run the game, and are you giving a full equivalent in service for the money that you receive? The operators should try to make the profits proportional to the service they give. If the service to the people was satisfactory the people would not grudge them any profit because they were getting a quid pro quo.

Again, business was a game that also required a certain kind of conscience—a certain feeling that we are in this world to make good according to the standards of the people we live with. He did not fear to pass a penitentiary, but he did fear to look into the eyes of an honest friend if he had done anything that his conscience did not approve. We are sustained, he said, by the moral judgment of honorable men; nothing else in this world was worth while. Honors achieved dishonorably were as arrows in a man's heart. Therefore conscience in business was the motive spring of the whole thing—the pride of doing a thing as it ought to be done.

All of us were employees of the public in so far as the money we get comes from the public. A clean conscience toward our employers is the basis of our success.

Last was the spirit of service. By this he did not mean a sentiment or state of mind but something very concrete, namely, that the thing we get money for from the public is the best thing of the kind that can be done.

Government was an endeavor to represent the public conscience. If it went too fast it would have to be pulled up. If it went too slow it would have to be whipped up. He thought he understood what his audience was after, and he hoped that his audience understood what he was after. If anything was being done that ought not to be done the fault in it should be conclusively pointed out and the way to correct the mistake should be conclusively shown. There was a homely old rule: "Put up or shut up." The way in use was the best way until some one could show a better one. In saying this he did not mean any disrespect to the ideas of others. The market for ideas was a highly competitive market. In this country men who have ideas were invited to the platform, and nothing better had been found for trying out ideas than exposure to the atmosphere. If enough people heard the idea expounded often enough it would reach its proper level. He believed in free speech—he got plenty of it himself. The President's office seemed a clearing house for ideas. Sometimes the ideas did not register on him, but if the railway men had ideas to submit his register was entirely at their service.

After a standing ovation to the President the meeting was adjourned.

The Banquet

Co-operation Between Men in Public Life and in Business was the Keynote

The banquet which was held on Friday evening in the beautifully decorated dining room of the New Willard was notable both for the high quality of the addresses and for the number of distinguished public men who attended as guests of the association. Music was furnished by the United States Marine Band Orchestra.

MR. PEIRCE'S REMARKS

The first speaker was C. C. Peirce, vice-president American Electric Railway Manufacturers' Association, who spoke for President E. H. Baker, as the health of the latter did not permit him to exert his voice. Mr. Peirce mentioned with enthusiasm the new functions which the Manufacturers' Association have added to its work, such as a bureau of information on foreign trade and on the increased facilities of the home offices in New York. Even a system of consular reports was contemplated. He hoped that some day Washington would erect a permanent convention hall to give the electric railway industry a chance to bring to the attention of the law-makers its needs and its good works. Referring to the great question before the industry he said that the fundamental trouble of many electric railway properties was one of not following the rules for good merchandising. They have been selling goods below cost and had not been as profitable as had been expected because of the continued demands of and concessions to the public.

CONGRESSMAN SHERLEY'S REMARKS

The next speaker was Hon. Swager Sherley, representative in Congress, Fifth District of Kentucky, who thought there were plenty of grounds for optimism in the business outlook. First of all, he was sure that the people of America believed in the intelligence, courage and honesty of their business men. Second, there were still great national resources of the United States open for development. Third, a comparison of conditions in the United States and Europe to-day certainly should inspire optimism. Our competitors were now mortgaging their future for many generations. Out of this was bound to come a wonderful opportunity for America. One difficulty in America to-day was that the men in business did not understand those in public life and vice versa. Change, and consequently new laws from time to time, was inevitable, but he hoped that such new laws would always be tempered by justice. Congress was judged too often by what some individual member says rather than by what Congress itself does. Congressmen may say foolish things, but Congress usually does wise things. Naturally the press plays up the unusual features and not the everyday but more important happenings. The growth of great corporations had made it necessary for the government to step in as the only factor of sufficient size to deal with gigantic aggregations of capital. But the "thou shalt not" period was approaching its close. Punitive laws had helped to make the situation clear and now the government was entering the era of helpful legislation of which the trade commission act and the federal reserve act were illustrations. The government was not sitting up nights to worry and punish business. In conclusion, Mr. Sherley said that the political representatives of the people would never have the necessary knowledge to make satisfactory laws unless they received help in full candor from the business men affected by the laws.

ARTHUR WILLIAMS' REMARKS

Arthur Williams, president American Museum of Safety, then announced the winner of the Anthony N. Brady medal as detailed elsewhere in this issue. Mr. Williams described the origin of safety medals in other lines of industry and in conclusion expressed his thanks to James H. McGraw, president McGraw Publishing Company and a member of the committee on award, for his kindness in printing a report of the medal committee and for other services to the electric railway and lighting industry.

CONGRESSMAN MONTAGUE'S REMARKS

The next speaker was Hon. A. J. Montague, former governor of Virginia and representative in Congress from the third district of Virginia. He had no particular subject for the guests, he said, but would talk "by and large" and allow them to fill up the interstices. Referring to Congress as a mirror of the American people he said that if the mirror seemed dirty it was up to the American people to wash their faces. He was proud that he came from Richmond which had been the first city to operate electric railways with commercial success. Of course, he admitted, some other cities had electric railways before Richmond but only to see if they would operate. He was doubtful as to how far the United States could succeed in competition with China and Japan because those countries underlive us, but much might be done in South America, for that part of the world was the most expensive place to live in that he had ever heard of. This country should send its best men not to Great Britain or Germany, but to Brazil and Argentina. They should not only know the language of the country but should be men of such unquestioned character at home that they would command respect and homage abroad. In seeking the trade of South America we cannot tell them what we think they ought to have but give them what they think they want.

MR. HENRY'S REMARKS

The last speaker was C. L. Henry, president Indianapolis & Cincinnati Traction Company. He said that as representatives of two great closely-allied industries they had been permitted to confer at first hand with representatives of both the law-making and executive branches of the government. He hoped that their coming to Washington would not only give them a clearer view of their relations with the government but also tend to a better understanding by the executive and legislative departments of the government of the place filled by the manufacturing and transportation industries represented. Mr. Henry then discussed the international balance of trade for the last twenty-six months, showing that up to the beginning of the war the United States had immensely increased its purchases abroad, while at the same time its sales abroad had fallen off hundreds of millions of dollars. Since then the raising of emergency currency and heavy purchases from the warring nations have brought about a change for the better in the financial situation, and it would not be strange if in the near future England would have to commence shipping gold to the United States. If the war continued but one result would follow, namely, that the United States would have ample money and be so favorably affected that employment could be given to every willing hand and prosperity would be abroad in the land. The important question was to make this temporary, or more properly feverish, financial and industrial improvement a permanent one. Let Americans produce from the farm and factory everything that Americans need, and, in addition, export what they can find a market for in foreign countries. In conclusion, Mr. Henry spoke of the unnecessary public regulations which had occasioned heavy expense to electric railways and had been injurious to the service in so many instances that the word "regulation" had been transformed into "strangulation."

The Code of Principles*

The Keynote of the Code Is Responsibility, Frankness and Fair Dealing, and the Utilities Should Insist on Equally Fair Treatment to Themselves in the Interests of Humanity, Business and Future Civic Developments

BY COLONEL T. S. WILLIAMS, PRESIDENT BROOKLYN RAPID TRANSIT SYSTEM

The subject upon which I have been asked to address you is not so dull as its title, without explanatory preface, might imply. It embodies, in fact, an attitude and a determination full of business significance and human interest. The workers in an industry employing 282,461 persons and representing $4,596,563,292 of invested capital have not merely formulated a declaration of the principles which shall animate their purposes and guide the conduct of their business—they have asserted and propose to defend a sound and honest basis of business opportunity. More than any other public utility, the street railways of the country stand in close relationship with both people and government. The opportunity of their development is, unfortunately, public privilege. The continuous performance of their functions is a public necessity, and the manner of that performance is, of all public services, the most intimately associated with the time, the comfort and the welfare of the people. Wide-reaching then, and of universal interest, is the standard of obligation assumed by such an industry and the conception of fair play which it contends for.

I regard as perhaps the most important and timely work ever undertaken by the American Electric Railway Association the effort which has culminated, during the past year, in committing the association to earnest and intelligent propaganda for encouraging among its member companies the recognition of a high standard of business obligation, and for disseminating among the people clear and sound ideas of that mutual relationship which must prevail if street railways, under private ownership and operation, are properly to perform their functions. Necessarily preliminary to such propaganda was the attempt to formulate certain underlying principles of belief and action—called, perhaps too comprehensively, our Code of Principles. From these were to radiate illustrative studies based upon all the information which is furnished by our industry. The association was to be not merely a storehouse of facts, figures and experiences but a ready disseminator of these, both among our members and throughout that great collateral constituency with which our activities are so intimately related. We became by this undertaking an alert and aggressive force, combining varied and expansive experiences under concentrated leadership, for efficient methods and broad ideas. I am sure I voice the unanimous feeling of the committee which, at the direction of the association, outlined the scope of this large educational program, when I pay tribute to the sincere co-operation which the committee received in its work from the members of the association, and if the earnestness of spirit which characterized the strong men in the organization toward our undertaking be typical, as I believe it is, of the general attitude, a new and useful era is before us.

IN SPIRIT OF HONESTY AND MILITANCY

What we have done is merely to nail our flag high and indicate that we intend to defend it. We do not ask you to indorse the precise language in which our principles have been phrased. You may like all of them or you may question some of them. You might phrase them differently. We believe them to be generally sound, and the association has approved them. But the important thing is the spirit behind them. And you will all agree that this spirit is an honest one and a militant one. This is their note of triumph and courage. This is their significance in these days of mollycoddling in business, politics and economics.

Because public privilege in the shape of franchises has usually been incident to the existence and growth of street railways, evils have arisen for which we perhaps, equally with official representatives of the public, are responsible. History will determine the relative measure of that responsibility. Whether blackmail or theft, involves merely the definition of the crime. I have no apologies to present for those instances of corrupt alliance between franchise-giver and franchise-taker, which have brought discredit both upon business and upon politics, nor for those dishonest and reckless financial manipulations which have beclouded some railroad operations and covered some reputations with scandal.

Nor would I urge that we should forget and forgive these deplorable incidents as the products of a lower moral standard and not likely to recur. The remembrance of them is a wholesome deterrent. But it must be borne in mind that no business, large or small, has been free from similar evils, and we have a right to insist that public service corporations should not be the special victims of public prejudice excited by such misdoings.

The street railway corporation is under specially severe restrictions in the development of its business. Its obligation is to serve the public with transportation, but it cannot occupy a foot of public street without express official consent. The difficulties of procuring such consents have, in many of our cities, become almost insuperable—and they exist largely because of prejudice and suspicion generated easily by demagogues who still thrive on some possible wrongs of the past. This same antagonistic spirit, too prevalent against all manifestations of enterprise, seeks to impose all kinds of exacting burdens as well as to prevent expansion, with the result of withholding from the people those facilities which ought to be theirs even without the asking.

It is this fact of dependence upon privilege, with the concurrent atmosphere of suspicion and envy of possible rewards, which makes all public service activities a doubtful business—doubtful in permanency of private control, doubtful in opportunity of profit, doubtful in assurance of fair play—and we may well feel at times that the inexorable logic of conditions (not of results) points inevitably to government control and government operation.

The public service most difficult of all to render in our large cities is transportation, and because the railroads are brought into such constant association with the people and are expected to furnish facilities which they are not always allowed to furnish, they are likely to be among the first victims of public prejudice or political demagogy.

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*Paper presented at mid-year meeting of American Electric Railway Association, Washington, D. C., Jan. 29, 1915.

NO SECURITY FOR UTILITIES

The situation which confronts the street railway business is thus a peculiar one. There is in the first place no free field of effort. There is no assurance against competition. There is little security in rates. There are incessant and increasing demands for improvement in the character and frequency of service. There is the frequent deadlock which springs from the irreconcilable conflict of demand and inability to comply. There is the daily prejudice of ignorance and of unreasonable dissatisfaction. And there is, from the viewpoint of public concern, the constantly menacing evil of government railroading, with its certain train of extravagance and inefficiency. The situation is further complicated by the existence of some perpetual franchises which have proved profitable, and in eagerness to attack these is forgotten the almost invariable sequence that, for every dollar of profit to street railway owners, the people of a community, its business and its real estate, its growth and its social environment, have received many fold in diverse dividends.

Confronted by these conditions, the American Electric Railway Association has taken the manly and intelligent course. It seeks first to remove prejudice and then to deserve support. Frankly avowing the sense of public obligation inherent in the transportation business, it makes the recognition of that obligation the fundamental precept of its platform. The keynote of its code is responsibility, frankness and fair play. Mark the courageous tone of its first paragraph:

"The first obligation of the public utilities engaged in transportation is service to the public. The first essential of service is safety. Quality of service must primarily depend upon the money received in fares. For this reason it is necessary that the rate of fare should be sufficient to permit the companies to meet the reasonable demands of patrons and to yield a fair return on a fair capitalization."

THE PLATFORM EPITOMIZED

Here is the whole platform in one paragraph. But the association has properly realized that in its own councils and in the contact of its members with the public an expression of opinion and attitude is called for upon many questions which involve the life of street railway corporations and the correct settlement of which determines the scope of their usefulness. The association's code meets these with equal straightforwardness. It holds that regulated private ownership and operation of electric railways are more conducive to good service and the public welfare than government ownership and operation, because the latter are incompatible with administrative initiative, economy and efficiency and with the proper development of cities through the extension of transportation lines; that in the interest of the public and good local service transportation should be a monopoly and should be subject to regulation and protection by state, rather than by local, authorities; that short-term franchises are detrimental to civic welfare and growth because they ultimately check the extension of facilities and discourage good service; that in order to render good service, fair return must be allowed on a fair capitalization, and the issuance and sale of securities representing such capitalization should be legally authorized on such terms as will produce the requisite funds; that securities lawfully issued should be regarded as valid obligations; that the relation of adequate wages to efficient operation should always be recognized, but electric railways, being public servants regulated by public authorities, should be protected against excessive demands of labor and strikes; that the principle of holding companies is economically sound for the reason that the securities of local companies have protection against the varying business conditions of a single locality or company, and because money for construction and improvements can thus be more readily obtained; that in the appraisal of an electric railway for the purpose of determining reasonable rates all methods of valuation should have due consideration; and, finally, that full and frank publicity should be the policy of all transportation companies, to the end that proper information may be available to the investor and the public.

MUTUAL RESPONSIBILITY

There is thus presented in this code of principles a two-sided obligation—the obligation of the carrier to the public, and the obligation of the public towards the carrier. The mutual responsibility is so self-evident that argument would seem to be unnecessary, but the real evils from which our corporations in common with others are suffering to-day arise from the failure to appreciate this mutual responsibility. The obligation of the railways to the public is forced home upon them in many ways, but the obligation of the public towards the railways is not only not recognized but is often contemptuously repudiated. I speak now not of obligation in the sense of debt, for I appreciate that people dislike to be regarded as debtors and particularly to corporations of their own creation, and I make no mention of those great participations in town and country upbuilding which have followed the courageous lead of transportation—achievements often due exclusively to the nerve and determination of railroad pioneers who are, in this sense, indeed public benefactors. But I speak of obligation which involves only justice and fair play. I call attention, particularly in municipal transportation, to that close relationship to which I have before referred, as being so essential between city and corporation—first, that the city may get the transportation which it wants, and, second, that the corporation may give it. People forget or overlook the interdependence of this relationship. So long as our municipal policy is to employ private agencies to furnish and conduct its transportation, so long must there be two parties to the contract, so long two contributors to the results. If you expect your street railways to furnish facilities of transportation, you must give them the power; if you give them the power, you must see that they properly exercise it, and if they do properly exercise it and succeed by their effort, do not penalize them or attempt to strip them of their just reward.

Our association aims, as I understand it, to impress upon its own members a full sense of our own obligation towards those whom we serve, and also to drive home to the people a few plain economic truths which must be self-evident to sensible men but which unfortunately are not always the basis of popular action, although they involve merely a recognition of reciprocal honesty. Transportation is a commodity. It resembles other commodities in that it is bought and sold. The city is the buyer, bartering its privileges for the benefit of its people. The railroad company is the seller, furnishing the facilities of transportation in such streets and places as the buyer determines and under such restrictions and conditions as the buyer dictates. Self-interest on each side, to the extent reconcilable, inspires and formulates the bargain. Once made, it is supposed to be carried out. The results may be disappointing to one side or to the other or to both, but there must be absolutely good faith between buyer and seller. Long is the list of enterprises in street railways where investors have lost, but the railroads have continued their operations; they have kept the faith, while the city, the other party to the contract, and its people, have received all the benefits. The experience of the comparatively few successful enterprises has not always shown that they have been allowed their full reward, however. Their success, even when accompanied by vastly greater compensations to city and people, has too often meant the exaction of new concessions, the imposition of new burdens or the creation of competing lines.

CONTRACTS SHOULD BE SACRED

We stand on unassailable ground when we insist upon the sacredness of contract and upon honest and fair dealing. In order to demand it of others, we require that we should respect it ourselves. We therefore favor "full and frank publicity." We propose to take the people into our confidence and give them the facts and figures of our business, not alone the official periodic reports which they have generally had under the direction of law, but the live information which helps the public promptly to form accurate judgments. We admit the desirability of regulation, but we believe that regulation, too, should have a moral code—that it should be honest, fair and intelligent, not an official instrumentality for oppression, punishment, unreasonable exaction or political baiting. We insist upon the square deal, whether it relate to capitalization, to rate making, to franchise burdens or to taxation. We recognize the increasing demands for both the quality and quantity of electric transportation, but we urge with insistence that should not be necessary the dual interest of expanding facilities, and that no extensions and improvements can be permanently forthcoming without a sound basis of credit.

Such a basis for expansion implies an equitable margin of profit—compensatory returns for both labor and capital. I am often impressed with the fact that we have become the victims of our own liberality and optimism. Electric power has so improved and cheapened transportation that we have deceived both ourselves and the public as to its possibilities. Too careless accounting and too many official impositions have been extravagant accompaniments of lower fares, longer hauls and generous free transfers. The nickel is called upon to do too much. Having learned by the difficulty of enlisting new capital in traction ventures of the narrowing margin of profit and of the lessening ability for expansions and even for the maintenance of high physical standards, we owe it to the public, as well as to ourselves, that the truth should be emphasized. Our patrons are equally interested with us that fares should be adequate and that operating and fixed charge costs should be proportionate. This is not an academic proposition. It affects vital interests. Our invested hopes and dollars are only a small factor. Our past optimism and prodigality may now seem to have been ill-advised, but they have built up great communities, scattered urban homes over long distances, choked the only avenues of distribution permitted to us, and in our large cities have brought about a situation which cries aloud for relief, in the interest of humanity, of business and of future civic progress. To the real and important sufferers from this situation every fact bearing upon the explanation and the remedy should be pressed home, if we are to be the instrumentalities of their relief.

WHAT THE CODE HAS DONE

What our association has done by its code of principles and its proposed propaganda is merely to take a virile, aggressive stand for honest business and co-operative development. We have been taught to respect the dignity of labor, and although modern business is the enlarged definition of labor, it has stood in recent years timid, supine and cowering before the attacks of demagogues and politicians. The structure of industry has tottered because those who should be its defenders have been either conscience-stricken or invertebrate. Business everywhere may need honesty, but it also needs backbone. Methods must be clean and straightforward, but business men must have the courage of convictions and the militant spirit to fight for them. There is little danger of injustice in our country if facts are known and rights are defended. Why should politicians have it in their power by invective, legislation and official mandate to frighten capital, restrict commerce and drive willing labor out of employment? Why should these same influences in our cities be able to excite popular prejudice against the agencies which give them public service? Clearly, such a situation cannot prevail if, in the first place, business is honest and efficient, and in the second place, if it is frank with the people and aggressive in the defense of its rights. Politicians would then quickly run to cover, or they would be overwhelmed with the assertion of popular common sense.

The American Electric Railway Association has properly recognized the necessity for aggressive, concerted action in behalf of honest methods and fair play.

The Federal Reserve System*

BY SENATOR JOHN W. WEEKS

The principal functions of the federal reserve system, which went into operation Nov. 16, 1914, are as follows: (1) The United States is divided into twelve districts, each one having a Federal Reserve Bank. (2) Through these Federal Reserve Banks the government will hereafter conduct all of its financial operations. (3) All banks belonging to the system will hereafter keep with the Federal Reserve Banks all of their reserves which the law does not require them to keep in their own vaults. (4) A general rediscount system is provided, limited by law, enabling member banks to rediscount qualified paper and to add the rediscount to their reserves or obtain circulation for it, as their needs require. (5) A system of bank-accepted bills is provided according to the practice which has been common in European countries for many years. (6) The system enables a concerted action in the future to control the national gold supply. Heretofore no such power has existed and the country has frequently lost gold when, with a proper system, it could have paid its debts in other ways. (7) It provides for a foreign banking system, or rather for foreign branch banks, which are needed in the development of foreign commerce. (8) It provides new national currency by authorizing the issuing of treasury notes, and loaning them to the banks under conditions provided in the act. (9) It enables the use of the combined resources of the country to aid a business community wherever and whenever such assistance becomes imperative.

When in full operation, the system should affect every class of corporation and business enterprise through adding stability to business. If there is one mistake in the new banking system, it is that there is too much government and too little scientific banking control in its conduct. Electric railway officials could take no wiser course than to discourage every step which is now being taken or may be taken to put the government into competition with private capital and private operation, and to discourage every attempt at legislation which is going to put unreasonable restriction and burdens upon their operations.

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*Abstract of paper presented at mid-year meeting of American Electric Railway Association, Washington, D. C., Jan. 29, 1915.

Public Service and Publicity*

Public Opinion Is Irresistible and the Public Utilities Should Recognize This Fact and Govern Themselves Accordingly—The Author Outlines His Suggestions

BY N. C. KINGSBURY, VICE-PRESIDENT AMERICAN TELEPHONE & TELEGRAPH COMPANY.

The President of the United States has advised business men to be confident of the future, and so we should be. Money is here looking for investment. We have an improved and, we think, a scientific currency system. The railroads have recently been granted the long-needed increase in rates. Our abundant crops are finding a world-wide market. We owe Europe less and less. New foreign markets are opening up to us. Public relations are improving. Progress is in the air, and we must grasp the opportunity.

No line of business endeavor has shown greater initiative or assumed greater business risks in the settlement and development of the United States than the so-called public utility companies. Nearly one-fifth of the total wealth of the United States is invested in the business of furnishing transportation, light, heat, power, water, gas and telephone service. This is an investment well worth conserving. Indeed, if the public service corporations of this country are not to be successful, if the twenty-eight billions of dollars representing the investment in this line of business does not have a real, definite, permanent earning power, it is absolutely certain that the earning power of the rest of the investments and wealth of the United States will be greatly impaired and general good times in business impossible.

It is my belief that there has been a great change in the attitude of these corporations toward the public during the past few years, and one of the great problems, if not the greatest, of the business is to bring about a corresponding change in the attitude of the public.

It is easy to understand some of the reasons for the feeling of distrust and suspicion with respect to public service corporations which we often encounter in the public mind. It naturally arose at the very inception of the business. The great majority of these corporations were started by men of broad vision. Indeed, many of them had visions so extremely broad that we might call them visionary, and in many instances they capitalized their hopes, then sold out and moved on to conquer other fields. These men left some hard situations to work out. Now, I do not mean to condemn the promoters, the pioneers, in these various lines of public service. In fact, I have never been able to figure out how the great majority of these institutions so beneficial to the public could have been started in any other way. But the time of the promoter has passed. Public utilities should not in these days be placed on a speculative basis, in my opinion. A fair return on the investment is all that should be earned or promised. Stability of investment, constant earning powers, sufficient to return a fair margin of profit and thus attract necessary new capital, we should have, and the only way to attain this is to abandon all speculative methods. It is only very recently that we have come to a complete realization that the operation of a street railway is charged with such a public interest that it is not a private business at all.

All companies have not accepted this new theory of obligation to the public in all matters concerning it as fully and as quickly as the public and public authority have required them to do and this has caused a good deal of friction. There has been a tendency to resist any improvement in the laws concerning the business. The lobbyist of the public service corporation was long a familiar figure in legislative halls, and a great deal of permanent harm resulted in the obstructive tactics that some of the companies followed whenever any progressive legislation was attempted.

I remember very well, as many of you doubtless do, that the passage of laws requiring street railway companies to equip their cars with vestibules in the winter time was strenuously resisted. The officials of the companies bombarded the legislators with pages of reasons against such laws, and they even got their motormen, in some instances, to declare that the vestibules would be dangerous to their health, as well as making it difficult to operate the cars. From what little I know of the electric railway business, I should say that such laws would not be strenuously resisted at this time. Other laws, rulings of commissions and city ordinances, which, in the main, have been for the benefit of the public or the employees of the companies, or of the companies themselves, have often met with such opposition as to fill the public mind with distrust and suspicion.

I appreciate the fact that in many cases demands have been made for refinements and improvements which, while in themselves reasonable, were far in advance of the financial ability of the companies and therefore unreasonable. In all such instances, my opinion is that a frank statement to the public and the lawmakers of the exact financial conditions will receive just consideration and that the old method of blind opposition and intrigue was a mistake.

These are but a few of the many causes which have combined to bring about a relation between the public and the companies serving the public which we all deplore, and which we all earnestly desire to improve. How can we do it? That is the question. A great many different things have been suggested. Time permits of a discussion of very few of them this morning.

I am by no means overlooking the first great obligation of every public utility company to give the very best service possible. That is the one reason for the existence of the business. I am assuming that this paramount duty has been recognized and met. Argument here is not necessary along that line.

FEASIBLE CO-OPERATION BY PUBLIC UTILITIES

In the first place, I think the public service corporations should all get together. In all matters which have to do with relations between the corporations and the public there should be the fullest and most cordial co-operation. We have a common cause. The electric railway, in the very nature of things, when it adopts a policy which pleases the public, helps the telephone company operating in the same territory, and when the telephone company offends the public, and thereby injures its own public relations, it also injures the public relations of the street railway company. The public does not clearly discriminate between the different public service corporations, but in its attitude almost invariably puts them all in the same class.

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I do not feel that the public service corporations have been well enough acquainted with each other in the past, and I think it is high time we all recognize a common danger, a common purpose and a common interest. I am glad to say that recently a common danger brought about a joint consideration of the mutual use of outside plant facilities rather than the continuation of building up of conflicting and duplicate transmission lines, and a remarkable result has been obtained in decreasing the number of accidents to employees and to the public.

We are all interested in the orders and decisions of the various public service commissions throughout the country. In many of such orders and decisions the underlying principles apply equally to the various types of public service corporations, and there should be a full and frank discussion between the corporations in regard to all cases and complaints in which such mutual interests exist. Of course, a public service corporation is often in grave doubt because of conflicting rulings of various commissions, state and national. By working together, in my opinion, the corporations can do much to eliminate many of the uncertainties arising from the multiplicity of regulating bodies.

We are all mutually interested in the effort which is now being made to induce the government to enter realms of business heretofore occupied by private interests. The attitude of the corporation which I have the honor to represent is not to oppose violently any such proposition, as we recognize the supreme right of the American people to make the decison as to what the government shall do or shall not do; but we do think it our duty to advise the public as to what is involved in such a decision.

PUBLICITY AND THE FORCE OF PUBLIC OPINION

Many other opportunities for co-operation could be mentioned, but I wish to call your attention to what, in my mind, is the most important method of securing and maintaining proper relations with the public.

I refer to the tenth section of your admirable code of principles, which has been discussed here this morning. Questions will doubtless arise in many minds as to certain policies involved in some sections of the code of principles; but I believe that we will all agree that the time has come for making known to the public freely and frankly everything which the public wishes to know concerning our business.

The one great purpose and end of our modern publicity is the formation and control of public opinion. The world to-day is ruled by public opinion. Almost without exception the governments of the world are governments by public opinion. The aggregate of private opinion gives us public opinion, which in nations finds expression in the form of government, the selection of officials and the adoption of codes of manners, morals and laws.

No greater example of the power of publicity to mold public opinion could be drawn from human affairs since the world began than the efforts which the various warring nations in Europe have set forth in the last few months to convince their own people and the rest of the world and God Almighty that their cause was the just and righteous one.

It has been interesting to note, ever since the war started, how anxious the different governments involved have been to convince the people of this country as to the righteousness of the individual national causes. And how has this been attempted? By exactly the same means employed by the Ivory soap people to convince the American public that Ivory soap is a good thing to buy. Newspaper advertisements, magazine articles, news clips sent to individuals, newspapers devoted exclusively to setting forth one side or the other; all these ordinary forms of publicity are now being employed.

Could there be a more striking example of the use of publicity? All these governments realize, of course, that the die has been cast, the war is on, and after men are through killing and destroying there must be a settlement. The recourse to arms cannot settle everything. In fact, it is probably true that the most the war can do is to force the nations into an attitude where they must get together and arrange for a settlement; where, in short, they must negotiate; they must give and take. And in such a conference justice, right and wrong are carefully weighed and are considered no less than the actual results of campaigns. And so it becomes of paramount importance that the world shall know as fully as possible the reasons for the war and the immediate events leading up to it. No government on earth, no matter how autocratic its head, would dare to enter upon war without first being sure there existed public opinion supporting it.

What is true in governmental affairs, what is so apparent in the publicity campaigns of these great governments, is equally true in business. More and more must we appeal to the people, and the people must answer the appeal and assume the responsibility to a greater extent than ever before in the conduct of business.

In comparatively recent times even political power was considered as a private possession. The doctrine of the divine right of kings recognized no obligation of accountability to the people. We all know what happened to that doctrine; it was swept away by an irresistible flood of public opinion, and public officers now do account to the people.

But our business interests in general have been entirely too slow to appreciate the necessity for publicity and its influence on public opinion, and I believe that fact is responsible for much of the distrust and suspicion which has arisen in the past with respect to business affairs. Many business institutions have doubtless suffered from hostile publicity, from sensationalism. In most of such instances the fault, in my opinion, has been with the secret methods employed and the constant suspicion and danger of misrepresentation.

The crisis has been fast approaching, and it seems to me the only way to avoid disastrous consequences is to seek continually to enlighten the public by various methods of publicity as to just what our business means in all its relations to the public. I do not believe that publicity in any case should be the result of fear, envy or avarice, but the honest urging of intrinsic worth and honest methods born of a real desire to serve.

The idea which has existed for so long a time on both sides of this controversy that the other side is all wrong and that our side is all right must be eliminated. It is a dangerous attitude, and one which stops all progress in arriving at a mutual understanding. As a matter of fact the time has come when there can be few, if any, secrets in a public service corporation. The reports required by the various commissions are searching and should reveal the exact condition of the public service corporation from almost every possible angle.

I recognize, of course, the fact that in many cases the public service corporation finds itself in a most embarrassing position. There is the continual need for new capital, which the public does not adequately understand or realize. The physical property of a public service corporation is not like a building, which requires a certain amount of money to complete it. A public service corporation never completes its plant. New capital for extensions and improvements is constantly needed. But suppose the company is not making money. Suppose the return upon the investment is inadequate. Where is the new capital coming from? The public will not invest in the securities of a company which has proved to be a losing venture, or which does not earn an adequate rate of return upon the investment, and with such a company there is, of course, a tremendous temptation, when additional capital is required, not to reveal the exact present state of affairs, often with the hope that the new capital will result in better earnings and adequate return. But even in such cases it is better to make the facts known. In fact, in most states the public service commissions require a full statement as to financial condition before the issuance of new capital is allowed.

THE VALUE OF ADVERTISING

I am a firm believer in that form of publicity which we call advertising. But the advertising of a public service corporation must be the embodiment of truth. There was a time not far back when advertising consisted for the most part of blatant and highly-colored statements. It was largely the hawking of goods in the market place. But more recently it has developed into a very fine art with real moral purpose and apt expression.

It is comparatively easy to secure the attention of the public by printing some great, startling piece of news, but to further a great idea with aptness and power requires intellect and art of the highest order. And it seems to me that the time has now come when the public service corporations of our country must face this proposition. Their aims must be honest and true, and their aims must be made known candidly and fully to the public.

I am so impressed with the protective value of publicity that I make bold to say that had the railway interests of this country taken the public fully into confidence much of the railway legislation of the past few years might have been tempered and formulated to consider with more sympathy the interests of the great business of transportation.

RAILWAY REGULATION

Doubtless the doctrine of public control with respect to railways has been pushed beyond proper limits. The railway managers have been content to allow the politician and the radical to cry out against them, in many instances solely for political purposes. One of the surest ways of perpetuating a man in office in recent years has been to bait the railways. I believe now that the railways have learned the lesson and are willing to give the fullest publicity to all their affairs, and that the effect of publicity so given will result in a betterment of their condition. As an evidence of this attitude on the part of the railways you all remember that only a few weeks ago the President of the United States was requested by the railroads to publish broadcast throughout the country his ideas of what was due this great business of transportation—a stroke of publicity which seems to have marked the turning point of the attitude of the general public with respect to the railways.

There may be, there doubtless is, grave danger that this doctrine of public control may be pushed beyond proper limits. The pendulum may swing too far in that direction; but let us hope not. Initiative must not be chased from the industrial field. Capital must not be frightened into hiding. The leaders in business will not work out the great problems of production, distribution and communication without definite hopes of reward. To much control would soon lead to socialism, or something worse.

It is doubtless true that in the past the great leaders of corporations did not possess a proper feeling of accountability to the public they were serving. But are we not also in danger of going to such an extent in the direction of state and federal regulation that the commissions will feel their accountability to the radical politicians, rather than to the public and private interests which they are presumed impartially to serve? I sincerely hope this may not prove true. I really do not believe it will prove true; in fact, I believe that the great majority of men serving on our public service commissions are earnestly striving to do the right thing, both by the public and by the corporations.

SECURITY HOLDERS AND EMPLOYEES

The public service corporations have a great audience to address in their own security holders. It has been estimated that a million or more of voters own securities of public service corporations. These investors are always listening for announcements concerning the affairs of the corporations. But in order to reach and influence such a scattered clientele, the corporations must at all times be right in their statements and in a position to make known their innermost affairs.

In my opinion, it is incumbent upon public service corporations to confide absolutely in their employees the true conditions relating to the operation and financial conditions of their companies. If you will look into this question I think you will be surprised when you find out how little your employees really know about the business in which, with you, they are engaged. Every employee should be close to the balance sheet. A man connected with one of our telephone companies has been doing some excellent work right along this line. He has gone out into the country and given talks and illustrated lectures before meetings of our employees, and he has tried to make clear to them by examples which they would easily understand just what the company is doing. In one of his illustrations he compared the investment of the telephone company for which they were working with an investment of $1,000 in the chicken business. He then assumed that the revenue on this investment of $1,000 would be in the same proportion as was the gross revenue of the telephone company upon its investment and that the expenses of operation would be in the same proportion in both, and when he got down to the net revenue applicable to dividends, the men were greatly surprised to understand that the net result of the investment of $1,000 in the chicken business was a profit of slightly more than $60 for the year.

Our employees should know just what the company is doing, so that they may realize the result of their own endeavors and be in a position to discuss intelligently statements which are continually made to them by patrons who are not fully informed.

I wish I could adequately express the importance of the attitude of every employee in his contact with the public. He can enhance the value of your means of publicity many times each day and, likewise, he can destroy that value. And this applies to every employee. There should be no specialization in this effort. From the president of the corporation down to the humblest employee the constant endeavor should be to reflect a sincere desire to serve and to please; and the attainment of the desired result is so difficult that it is absolutely impossible unless the desire to serve and please is an honest, sincere desire. No mere lip service nor mere civility will answer. A great governing policy which all understand and in which all have been carefully trained must really exist.

Many of our companies are carrying on an extensive campaign of education by means of lectures, often illustrated with stereopticon views. We have found in many places that the children in the public schools are eager to know all about our affairs, and we are, of course, glad to tell them. We have had recourse to the moving picture films, showing various operations connected with our business, and these films have been received with enthusiasm all over the country.

OTHER CONSIDERATIONS

There should be nothing to conceal in the business of any public service corporation. It should be a legitimate enterprise, conducted under the sanction of the nation's laws; and if there is some policy or practice in the affairs of a public service corporation which the officials hesitate to make known to the public, the best thing those officials can do is to abandon that policy and give up that practice. I firmly believe that until we reach the time when we are willing to do just those two things we shall not be successful in acquiring proper relations with the public, nor in the handling of our business as a whole. No utility can ignore the rights of the public as to service or information without great injury to its own affairs, and also to the affairs of other public utilities. In our relations to the public we do not and cannot stand alone. In such experience as I have had I am glad to say I have found the American public is generally inclined to fair play, and if the public can be made to understand the problems which public service corporations are continually called upon to solve, the great factors in fostering hostility, the factors of ignorance, of suspicion are eliminated.

Another thing we should do is to make it known that we are not adverse to the local ownership of our securities. If the people of a community believe that a great amount of money is being made by the public service corporations, a good way to dispel the idea that a corporation is making too much money is to offer the securities of that corporation to local investors. You may be sure, before the investor puts up his money, he will investigate carefully the financial returns of the corporation, and if the returns are good and there is profit in holding the securities so much the better.

There is an idea prevalent in this country that these public service corporations belong to the very rich and that their ownership is controlled by a comparatively small coterie of men. This is not true. The securities are widely disseminated throughout the length and breadth of the land. We have something like 60,000 stockholders, the majority of whom are women, and I dare say many of your companies are similarly owned. The savings banks, the insurance companies, trust funds, large and small, are heavy owners in the securities of public service corporations, and these facts should be made known to the public.

This is an enormous business in which we are interested, but mere size, bigness is not a crime. Size breaks no law, human or divine. Our country is large. Our government departments are large. Our business institutions which cater to the needs and well-being of this great people are necessarily large. If we furnish service to this great country, if we cover the territory, we cannot escape size, even if it were a good thing to do.

In Europe there is a great clash of arms between warring nations, nations with different languages, with different ideals, with different rulers. In America we are at peace, with one language, one set of ideals, one ruler—the Public. And I firmly believe that the public service corporations have had much to do with the beneficient conditions under which we live and that had Europe been settled at a time when public utilities were developing and if those utilities had kept pace with settlement or had gone ahead of settlement and development as they did in this country, there would have been a homogeneous country in Europe.

The people of this country ride on railways, steam and electric, about 31,000,000 times every day; they talk together over the telephone about 50,000,000 times every day; and so long as there is this tremendous intermingling of the people made possible by transportation and this universal interchange of ideas by the people made possible by intercommunication, so long, I believe, we shall continue to be a homogeneous people. We should be proud, we who are connected with public utilities, because in truth and in fact we have made a community of this continent.

Mr. Mortimer on Electric Railway Finances

A written discussion on electric railway finances by J. D. Mortimer, president North American Company, was read at the mid-year meeting of the American Electric Railway Association at Washington yesterday as part of the discussion on Senator Weeks' paper on that subject.

He said that the dangers of government participation in business activities were certainly not less than those referred to by Senator Weeks. He also mentioned tax extravagance as a fault common to practically all of the divisions of our government. The electric railway business is beginning to experience the effects of increased taxes, which effects, when augmented by other burdens imposed under the guise of governmental authority, have brought electric railway development to a standstill and harmed the character of electric railway investment.

Mr. Mortimer emphasized the fact that in the long run the public pays in the price of a ride. Legislators, by the imposition of special tax burdens, may apparently change the incidence of such taxation, but eventually it will rest on the street railway patrons. Taxes thus often fall upon those least able to pay, while the citizens upon whom the tax should properly fall, escape this burden. An instance like this, but more indirect in its effect, is that of the federal income tax. This tax in the electric railway industry is imposed on both the corporation and the income derived from securities. It directly affects the cost of production through the normal tax on the corporation and indirectly increases the cost of production through the normal and super-tax on the income of individual investors, by raising the cost of capital. The securities issued by a corporation owning a regulated monopoly might properly be freed from the income tax if the lowest costs of production are to be obtained. Were such the case, the annual cost of money for regulated public utilities would be lowered and tend to approach the interest yield on municipal and state bonds now free from income tax.

As regards the Federal Reserve System, Mr. Mortimer felt that it would not have any material influence on public utilities, different from that which it exerted on all other classes of business. If it resulted in a reduction in interest rates for long time investments, it would prove beneficial to public utilities and other enterprises. If it resulted in an inflation of currency as some have alleged, it would in time affect electric railways differently. During times of inflation, the value of money decreases when compared with the value of articles of commerce. In such event, the price of an electric railway ride would remain at, say, 5 cents, in accordance with franchise requirements and custom, while the cost of all things making up electric railway operating costs would necessarily increase.

Fireproof Carhouse at Vancouver, B. C.

A Reinforced Concrete, Sprinklered Carhouse Two Stories High, with Indirect Heating from Oil Fuel for Working Quarters and Direct Steam for Trainmen's and Other Rooms

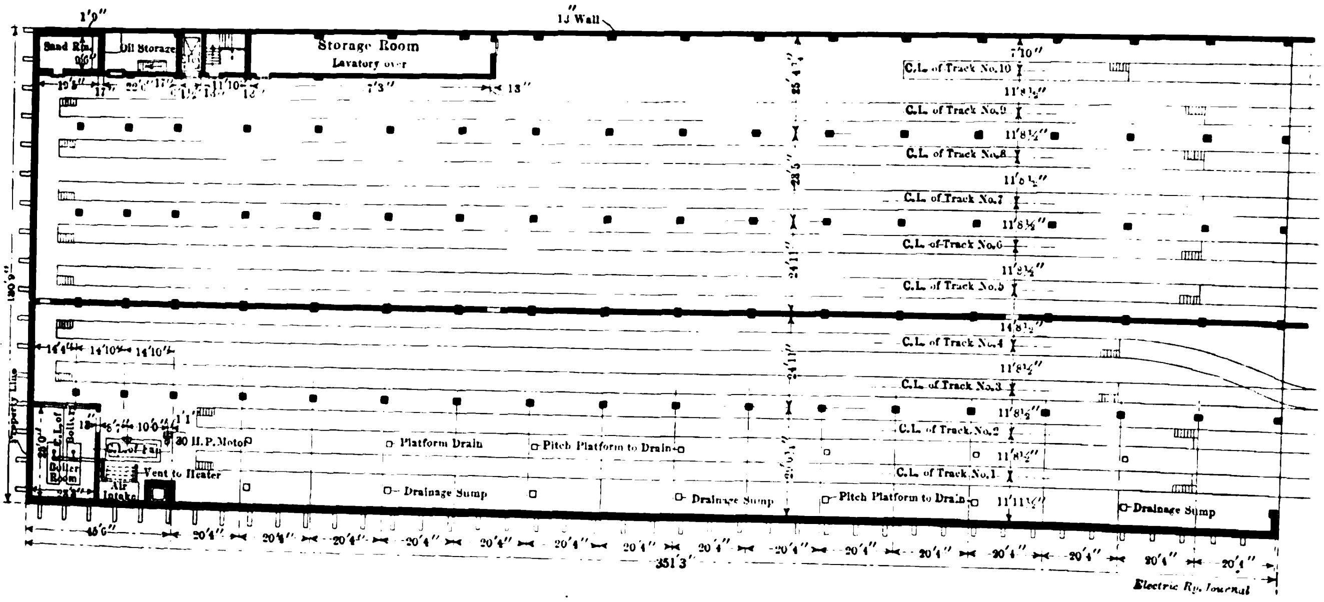
Work is being completed on the construction of a carhouse for the British Columbia Electric Railway at Vancouver, B. C. The estimated cost of the structure is $350,000.

Some years ago the company purchased an entire city block in the Mount Pleasant district with the idea of utilizing the block for carhouse purposes. The block fronts on Main Street, one of the principal car line streets in the district, and extends to Quebec Street, the other boundary streets being Thirteenth and Fourteenth Avenues. Several years ago the company erected on the north half of the block two carhouses of galvanized iron construction, capable of housing sixty cars.

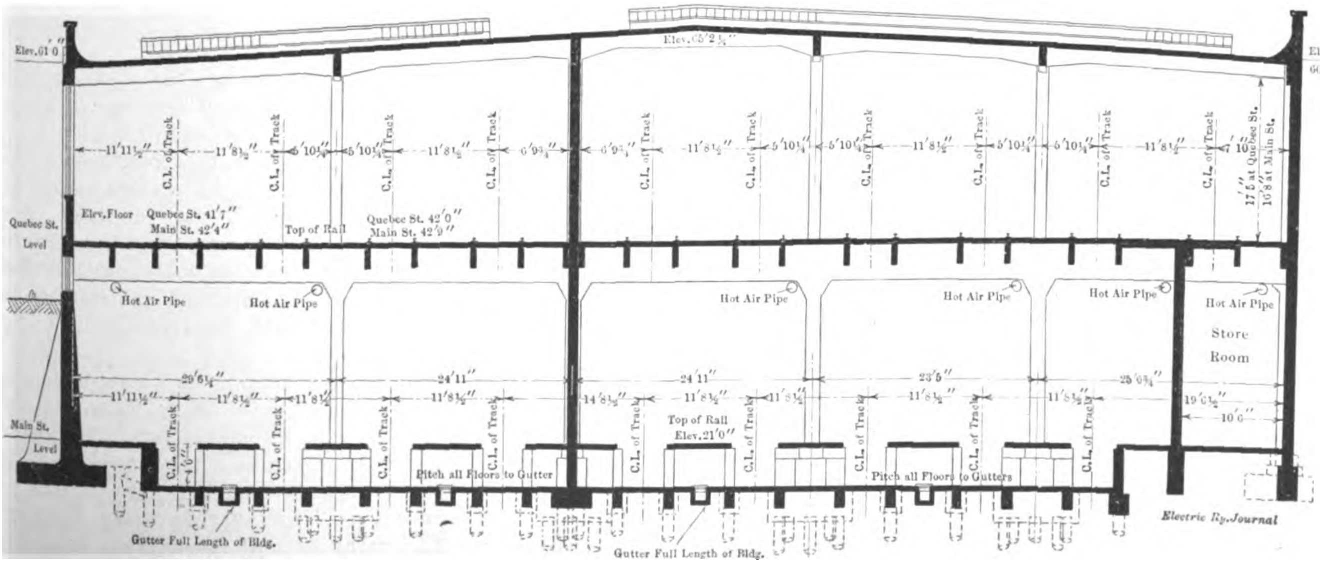
The new building is on the south end of this block and adjoins the old structure. It is two stories high on Main Street and one story high on Quebec Street, the difference in grade between the two streets making this plan possible. The dimensions are about 350 ft. x 130 ft., the height of each story being approximately 20 ft. On the ground floor the entire area is available for the housing of cars, the ten tracks making provision for sixty-two cars. The Quebec Street frontage of the second story is placed 45 ft. back from the street line, thus giving a floor area of 302 ft. x 130 ft., sufficient to accommodate fifty-eight cars. This makes the total capacity of the new building 120 cars. The total capacity of all structures on the block is 180 cars.

CONSTRUCTION

The block naturally lies low, and after investigation of the soil the engineers decided that a pile foundation was advisable for the new building. The average length of the piles driven is 20 ft. The building is so designed that the entire load is carried on the piles, no allowance


Sand Rm.
Oil Storage
Storage Room
Lavatory over
13" Wall
C.L. of Track No. 10
C.L. of Track No. 9
C.L. of Track No. 8
C.L. of Track No. 7
C.L. of Track No. 6
C.L. of Track No. 5
C.L. of Track No. 4
C.L. of Track No. 3
C.L. of Track No. 2
C.L. of Track No. 1
Property Line
Boiler Room
Air Intake
Vent to Heater
30 H.P. Motor
Platform Drain
Pitch Platform to Drain
Drainage Sump
351'3"
Electric Ry. Journal

VANCOUVER CARHOUSE—FIRST FLOOR PLAN, SHOWING TRACK LAYOUT, LOCATION OF INDIRECT HEATING PLANT AND THE UTILITY ROOMS


Elev. 61'0"
Elev. 65'2½"
Elev. 66'6"
C.L. of Track
Elev. Floor Quebec St. 41'7" Main St. 42'4"
Top of Rail
Quebec St. 42'0" Main St. 42'9"
Quebec St. Level
17'5" at Quebec St.
16'8" at Main St.
Hot Air Pipe
Store Room
Main St. Level
Top of Rail Elev. 21'0"
Pitch all Floors to Gutter
Pitch all Floors to Gutters
Gutter Full Length of Bldg.
Electric Ry. Journal

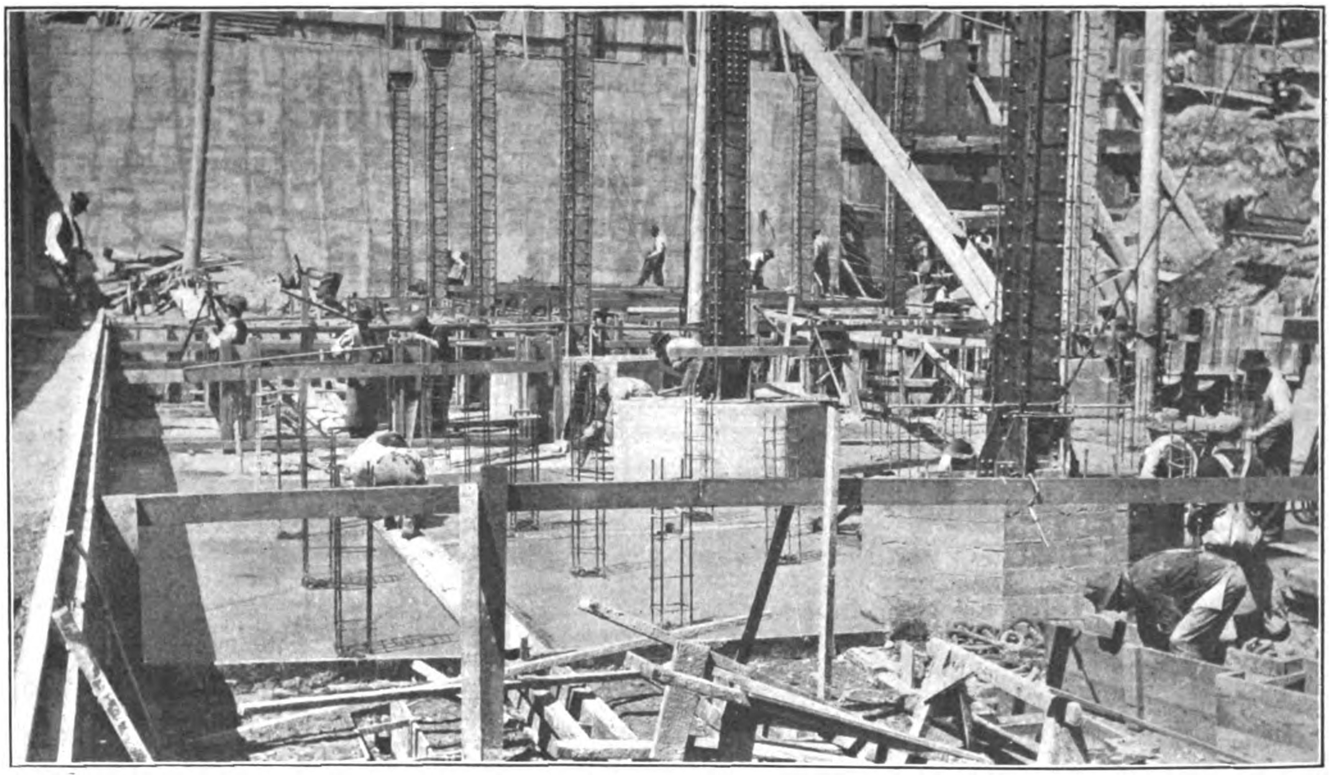
VANCOUVER CARHOUSE—CROSS-SECTION, SHOWING TWO-FLOOR CONSTRUCTION, OPEN PITS AND INDIRECT HEATING being made for any carriage by the soil. The general type of construction throughout the entire building is reinforced concrete skeleton, with the exception of the columns between the first and second floors where steel is used to save floor space. The building is finished with 13-in. brick walls on the outside. In these walls are fixed steel sash glazed with ¼-in. wired glass and chain-operated steel doors of the rolling type. Practically all the tracks on the first floor are provided with inspection pits.

The floor consists of 5-in. reinforced concrete slabs between the rails, these being supported on 12-in. square concrete piers, placed at about 7 ft. centers, extending from the pit floor. The pit floor is 4½ ft. below the level of the carhouse floor and is formed of 6-in. concrete with piles under each of the track pedestals and building columns. The floor is graded to drain into four channels 10 in. wide, which run the whole length of the building and are covered with iron gratings.

through ducts running through the building by a 130-in. fan. For the rooms set apart for the use of house employees and car men a direct steam heating system is employed. In accordance with the requirements of the fire underwriters a steel tower carrying a water tank with a capacity of 35,000 gal. was installed above the second story. This is connected with a sprinkler system which provides 2450 roof and aisle sprinkler heads throughout the building. Both floors are divided into two sections by a 13-in. brick fire wall.

One track on each floor is arranged for the washing and painting of cars. On the lower floor provision is made for a room for sand drying and the storage of oil. On this floor also is located a shop for carrying out minor repair jobs, a freight elevator 5 ft. x 8 ft. in size connecting the shop with the second floor.

The cars enter the first floor direct from Main Street. The company has also constructed a track from Main Street along Thirteenth Avenue and Quebec Street to reach the second-story entrance. The plans provide for the continuation of the façade of the new carhouse along the entire Quebec Street frontage of the block.



VANCOUVER CARHOUSE—FIRST FLOOR OF BUILDING DURING THE CONSTRUCTION PERIOD AND BEFORE INSTALLATION OF PITS

The second floor will be used merely for storage purposes, no provision being made for inspection pits, etc. It includes 5-in. reinforced concrete slab construction, with reinforced concrete girders 8 in. x 24 in. placed under the rails. The second story is supported on concrete-covered steel columns placed between each pair of tracks, the centers varying from 23 ft. 5 in. to 29 ft. 6¼ in. and the lengthwise spacing being about 20 ft. 4 in. The cross-girders between the columns are 3 ft. 10 in deep. The roof of the building is 3½-in. reinforced concrete slab, carried on cross concrete beams 18 in. deep. For the construction of the building it was necessary to excavate about 12,000 cu. ft. of earth. The approximate amount of concrete was 5500 cu. yd. and the construction plans called for the use of about 400 tons of steel.

The building is heated by an indirect heating system, oil fuel being used. This installation consists of two 70-hp boilers, the heated air being driven

The new building is designed to accommodate the cars of the company operating in the eastern section of Vancouver as well as its South Vancouver lines. For the accommodation of its cars operating in the western section of the city the company in 1913 constructed a large carhouse in the Kitsilano district, as described in the ELECTRIC RAILWAY JOURNAL for Dec. 27, 1913.

The record of passenger train performances on the steam railroads of the State of New York for the month of September, just issued, shows that during the month the number of trains run was 64,215. Of the number of trains run 81 per cent were on time at the division terminals. The average delay for each late train was 22.7 minutes and the average delay for each train run was 4.3 minutes.

New Haven Operating Results

W. S. Murray, at a Recent Meeting in Philadelphia, Gave Construction and Operating Costs for the Electrified Division of the New Haven Railroad and Discussed the General Principles of Successful Steam Railroad Electrification

Under the title "Conditions Affecting the Success of Main-Line Electrification" William S. Murray, consulting engineer of the New York, New Haven & Hartford Railroad, delivered a paper in Philadelphia on Jan. 20 before a joint meeting of the Franklin Institute and the Philadelphia section of the American Institute of Electrical Engineers. The meeting was held in the Franklin Institute lecture hall, 15 South Seventh Street. The paper was heard by a large audience and was discussed by several prominent steam railroad officials. The full text of the paper will appear in due course in the publications of the two institutes. The following abstract gives in substance some of the most striking statements made by the speaker.

Mr. Murray first outlined the history of main-line electrification development, commenting particularly upon the pause in the demand for electrification, which has permitted a careful study of the subject. He then gave statistics of the New Haven electrification and explained the reasons for the choice of the system used and how it was developed to meet operating conditions. Upon this basis he outlined the principles of successful electrification of steam roads, comparing the electric locomotive with the steam locomotive. He then gave data of actual construction and operating costs of the New Haven electrical equipment, mostly in tabular form. Summing up the results of actual experience with electrifications, he urged in this connection a conservative attitude on the part of the public.

A few years ago a movement was started by the public to require the railroads to electrify, the demand being directed particularly toward roads of large size with regard to their city yards and terminals. This demand was unjust because at that time there was little information available regarding the details of electrification and the financial situation was such that the railroads could not possibly carry the necessary increased financial obligations. The result was that there came a pause in the demand, which gave the railroads an opportunity to learn many things in regard to electrification. To-day there are many places where conditions are such as to insure successful electrification, but the change of motive power might not be warranted because, for roads sufficiently large to consider it, the economies effected would be small in comparison to the existing capital investment. A proper relation must first be established between capital already invested and the return upon it before further charges against capital account are made, no matter how attractive the return on the proposed betterment may be.

SOME FACTS REGARDING THE NEW HAVEN ELECTRIFICATION

During 1913 on the electrified section of the New York, New Haven & Hartford Railroad 2,182,000 electric passenger locomotive-miles were recorded, representing 600,000,000 ton-miles. The route mileage electrified is 73, of which 61 is four-track and 12 is six-track, the total main-line mileage in single-track equivalent being 316. There are 184 miles of yards, sidings and spurs, making a total of 500 miles of single track. One electrified yard contains 35 miles, another 25 miles. The present electric power supply is taken from a single station at Cos Cob, but it will shortly be supplemented at the east and west ends of the electrified zone. There are 100 passenger, freight and switching electric locomotives and sixty-nine multiple-unit cars, all of which are maintained at one main electrical shop with facilities for inspection at various points. The electrification has cost more than $15,000,000, although against this should be credited the value of 150 steam locomotives transferred to other parts of the system, the steel bodies of the multiple-unit cars which would have been purchased even had not the electrification been undertaken, and other items of this sort.

The winter time-table now in effect, excluding Sundays, calls for sixty-eight trains per day into Grand Central Terminal, two through trains originating in Harlem River Station, and the same number of trains out of both stations, a total of 140 trains per day. The Harlem River Branch service includes nineteen trains each way per day, except Sundays, between New Rochelle and Harlem River. On the New Canaan Branch sixteen trains are operated each way between Stamford and New Canaan. Additional trains in and out of Grand Central Terminal are operated on Saturdays, and extra trains are also run on the Harlem River Branch on Sundays. Of the seventy through trains per day, thirty-six are electrically operated the entire distance, steam locomotives being used between New Haven and Stamford on the remaining thirty-four trains. Of the 210 daily trains, 114 are handled by electric locomotives, multiple-unit equipment being used on the remaining ninety-six. Forty-eight a.c.-d.c. locomotives are used in passenger service and the multiple-unit equipment at present comprises four a.c. motor cars, twenty-one a.c.-d.c. motor cars, and forty-six trailers. The average number of electric train-miles per day is about 6600, of which 1400 are made by multiple-unit equipment. The passenger locomotives make an average of 6200 miles per day, some of the individual mileages being as high as 450 to 500. The multiple-unit motor cars make an average of 2100 miles per day, the proportion of trailers to motor cars for a.c.-d.c. equipment being two to one, except on the New Canaan Branch, where the proportion is one to one, and on the Harlem River Branch where one-half of the trains have two trailers per motor car, the remaining trains consisting of one motor car and one trailer.

New flash boilers have recently been installed on many of the locomotives to provide for steam heating of through passenger trains between New York and New Haven.

ECONOMICS OF ELECTRIFICATION

After outlining the general principles as above, Mr. Murray took up the underlying conditions of success of main-line electrification from a combined public and railroad standpoint. He stated that success is entirely dependent upon density of traffic. Economy can be secured by electrification in saving in fuel, saving in motive power maintenance and repairs and saving in train-miles. There may be also assets created by electrification through, for example, reclamation of city terminal property after the removal of gas and smoke.

Experience has shown that a pound of coal burned under the boilers of a central electric power station and transmitted to an electrical engine will develop twice the drawbar pull at the same speed as if burned in the firebox of a steam locomotive. The maintenance and repair costs on electric locomotives of the straight a.c. type are about one-half of those of steam locomotives of equal weight on drivers.

The problem of electrification then depends upon the density of traffic in which these economies can be practiced. If the schedule of train movements for all roads were the same, then, based upon the number of tons translated, it would be a simple matter to plot a chart which would show two intersecting curves, one representing the savings per annum to be effected by the substitution of electricity for steam, and the other the summation of the costs per annum of interest, depreciation, maintenance, insurance and taxes on electric power plants, inclusive of power house, lines, locomotives and shops, necessary to affect these savings. The analysis, however, is not as simple as this, for while a number of roads might translate equal tonnages over equal distances, the local conditions might require a wide variation as to schedule, etc.

ADMINISTRATION IN ELECTRICAL OPERATION

One of the essentially real conditions affecting the success of main-line electrification is administration. Electricity as an agent of power development is essentially different from steam. The electric locomotive is increasing in ruggedness, but it can never be the great mechanical brute that the steam locomotive is to-day. On the other hand, the steam locomotive can never reach into the zones of usefulness which are open to the electric engine.

It is possible to keep the maintenance and repairs of the electric locomotive down to one-half those of the steam locomotive under the most favorable conditions of steam maintenance, and in many cases below this figure. Due, however, to the peculiar nature of the electric engine this can only be done by the most rigorous and careful inspection and conformity to rules of operation. If electric engines be treated as has been the custom of treating steam locomotives, then their repairs instead of costing less will cost far more than those of steam engines. The electric engine, like an overwilling horse will, if permitted, work itself to destruction. The days are passing when the steam operating man points with pride to the electric locomotive as having been able to perform twice the duty for which it was designed and the next day wonders why it "blew up" on half load. Successful electrification, therefore, requires that there be in the administrative forces men trained to the necessity of a different viewpoint from that which has been developed in eighty years of steam service.

An inheritance by the New Haven Railroad of the old steam locomotive engineers for the operation of their electric engines is a case where the "tail of the dog wags the body." While it is a good argument that these men understand the roadbed and signals better than anyone else, this argument fails when engineers without electrical experience or training can bid in the electric runs, depending upon their seniority and records of service. It is a long time before the steam locomotive engineer divorces himself from the fact that he is not operating a steam locomotive. Electrically-trained men are therefore necessary, and one of the successes of electrification depends upon this feature.

NEW HAVEN OPERATING STATISTICS

Mr. Murray gave a number of tables showing the operating statistics of the electrical equipment. He called attention to the fact that the electrical plant had from its inception been handicapped, both from the construction and the operating point of view. The conditions applying to the New Haven electrification re-

TABLE OF EQUIPMENT FAILURES

	Classes of Service							
	Passenger		Freight		Switch		Multiple	
	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.
Heated parts...	1	4	1	2	....	....	3	....
Broken parts...	2	1	1	2	....	....	2	1
Grounds	20	25	3	2	....	....	2	....
Miscellaneous ..	12	6	....	1	....	....	11	11
Total failures...	35	36	5	7	....	....	18	12
Miles per failure	7,071	7,328	13,183	9,506	40,964	39,624	3,554	4,331
Minutes detention per failure	11	13	56	60	....	....	18	7

TABLE OF LINE AND EQUIPMENT FAILURES

	November		October	
	No. of Failures	Total Delay, Min.	No. of Failures	Total Delay, Min.
Type of failure:				
Catenary insulator	3	22	1	14
Dead end	3	....	1	....
Other line failures..........	7	61	10	62
Equipment	10	169	7	166
Signal	1	15	1	....
Outside interference	4	....	3	....
Employee	1	....	....	....
Totals	29	267	23	242

CONDENSED TABLE OF ENERGY DATA

	November		October	
	Total	Per Kw-hr.	Total	Per Kw-hr.
Coal consumed......	12,439 tons	2.78 lb.	12,281 tons	2.75 lb.
Water consumed (gallons)	38,778,000	4.33	35,835,000	4.01
Cost of coal........	$34,084	0.381 cent	$33,527	0.375 cent
Cost of water.......	$1,582	0.017 cent	$5,016	0.057 cent
Cost of other supplies	$317	0.004 cent	$656	0.007 cent
Maintenance of power plant and machinery	$3,655	0.041 cent	$3,434	0.038 cent
Wages and salaries.	$6,057	0.068 cent	$6,704	0.075 cent
Total cost, maintenance and operation	$45,695	0.511 cent	$49,337	0.552 cent
Fixed charges (interest, taxes and insurance)	$16,107	0.180 cent	$16,107	0.180 cent
Total cost	$61,802	0.691 cent	$65,444	0.732 cent
Energy consumption (kw-hr.)				
Passenger service (electric locomotives)	2,894,465	......	3,072,145	......
Passenger service (multiple unit cars)	630,039	......	499,367	......
Freight service.....	1,508,306	......	1,494,082	......
Switching service...	984,255	......	848,613	......
Non-revenue service.	10,340	......	6,191	......
Total used by electric locomotives and motor cars	6,027,405	......	5,920,398	......
Signals	107,465	......	117,445	......
Other company purposes	389,652	......	399,401	......
Line loss	543,235	......	617,804	......
Total used for company purposes	7,067,757	......	7,055,048	......
New York, Westchester & Boston Railway	676,144	......	636,058	......
Other companies ...	1,205,699	......	1,255,139	......
Total energy used	8,949,600	......	8,946,245	......
Maximum daily output	Tuesday, Nov. 24 343,300 kw-hr.		Friday, Oct. 30 316,630 kw-hr.	
Maximum swing.....	Friday, Nov. 6—7 p.m. 30,000 kw		Sunday, Oct. 4—8.27 a.m. 29,800 kw	
Minimum daily output	Tuesday, Nov. 3 249,800 kw-hr.		Sunday, Oct. 18 256,155 kw-hr.	
Average daily output	301,902 kw-hr.		288,589 kw-hr.	
Energy Purchased from New York Central:				
Energy purchased (kw-hr.)	1,244,021	......	1,306,017	......
Cost of power......	$16,097.67	......	$16,348.47	......
Cost per kw-hr. (cents)	1.294	......	1.252	......
Total Energy				
Total energy consumed (kw-hr.)..	10,193,621	......	10,252,262	......
Total cost of power (including fixed charges)	$77,899.87	......	$81,792.32	......
Cost per kw-hr. (cent), including fixed charges.....	0.764	......	0.798	......

quired that its motive power be designed to operate on both alternating and direct current. Further, on account of past inadequate shop facilities, heavy repairs have been necessary throughout the entire electric motive-power equipment since the new shops were completed. Last October the repairs to electric passenger locomotives cost 8.56 cents per locomotive-mile, while for November they were increased to 10.61 cents. This fact is explained by the condition that all of the passenger engines had been undergoing general repairs, and invoices for material were passed in greater amount for November than for October. Many of the electric locomotives had not received a general overhauling since 1907, and during this time some of them have made more than 350,000 miles.

Taking the first ten locomotives of the a.c.-d.c. type to be overhauled, their records show an average cost of less than 5 cents per locomotive-mile. The first one overhauled has now operated 93,140 miles at an average cost of 3.6 cents per locomotive-mile. The general table of passenger engine operating costs (printed herewith) shows a larger cost of maintenance than this and emphasizes the lack of maintenance to which the electric locomotives were subjected in the early days of their operation. Had conditions permitted the electric passenger engines to be of the straight a.c. type, in Mr. Murray's opinion their average maintenance would not have exceeded 4 cents per locomotive-mile.

TABLE OF PASSENGER AND FREIGHT OPERATING COSTS

	Locomotive repairs		Power		Locomotive supplies		Engine house expenses		Enginemen		Trainmen		Total	
Passenger trains hauled by locomotives:	November	October	November	October	November	October	November	October	November	October	November	October	November	October
Cost per train-mile (cents)	17.15	13.80	19.33	19.89	2.23	1.53	0.57	0.54	8.81	8.37	9.51	9.55	57.60	53.68
Cost per locomotive-mile (cents)	10.61	8.56	11.96	12.29	1.39	0.95	0.38	0.34	5.41	5.20	5.88	5.91	35.63	33.25
Cost per car-mile (cents)	2.45	1.93	2.76	2.79	0.32	0.21	0.08	0.08	1.26	1.17	1.36	1.34	8.23	7.52
Multiple unit trains:														
Cost per train-mile (cents)	15.27	11.83	11.39	11.42	0.24	0.16	0.91	0.78	5.17	5.20	8.84	7.53	41.82	36.92
Cost per motor-car-mile (cents)	10.51	7.98	7.84	7.70	0.17	0.11	0.62	0.53	3.56	3.51	6.08	5.08	28.78	24.91
Cost per car-mile (cents)	4.32	3.12	3.22	3.01	0.07	0.04	0.25	0.21	1.46	1.37	2.52	1.98	11.84	9.73
Freight trains hauled by locomotives:														
Cost per train-mile (cents)	15.51	15.98	28.51	27.90	0.54	0.63	0.48	0.58	10.66	10.44	17.83	17.46	73.53	72.99
Cost per locomotive-mile (cents)	9.69	10.19	17.82	17.79	0.34	0.40	0.30	0.37	6.67	6.66	11.14	11.13	45.96	46.54
Cost per 1000-ton-mile (cents)	9.95	10.16	18.30	17.73	0.35	0.40	0.31	0.37	6.84	6.63	11.45	11.09	47.20	46.38

Mr. Murray gave statistics of electric energy consumption in the different classes of service as follows, the values for eastbound service being given first in each case: New Haven express trains, 31.4 watt-hours per ton-mile, 32; Stamford express, 34.2, 40.3; Stamford local, 59, 63.7; Port Chester trains, 66.7, 77.3; New Rochelle trains, 90.2 (westbound not given). The average for eastbound passenger trains was 42.2 watt-hours per ton-mile and for westbound trains, 47.4. The average values for freight trains were: eastbound, 32.8, westbound, 33. The differences in the "power rate" constants for passenger service are due to the relative numbers of stops per mile. In the freight service allowance for the weight of the electric engine reduces the rate to 26 watt-hours per ton-mile, and it may be said that 30 watt-hours is a reliable figure to cover electric freight operation on level track in a combination of fast and slow service.

CONSTRUCTION COSTS

Mr. Murray gave detailed construction costs of the different features of the New Haven electrification. He stated that the cost of electric locomotives of approximately 100 tons weight will, under present conditions of costs of labor and materials, vary between 18 cents and 20 cents per pound. This figure is practically irrespective of speed torque characteristics, a high-speed passenger locomotive and a low-speed switcher not varying greatly in cost upon a pound basis. Multiple-unit cars, now usually built of steel, do not vary greatly from these figures, but, if anything, would be slightly higher in cost per pound. A first-class, high-speed, 100-ton, straight a.c. electric passenger locomotive, capable of handling a 250-ton trailing load in normal, large-city suburban service, should cost $40,000. A steam locomotive to do the same work would probably cost about $15,000. For every electric engine purchased the railroad would be justified in making a capital investment of $40,000 to cover the cost of electric power houses and transmission equipment necessary to supply the electric engine with current.

The costs per mile for six-track catenary construction of the compound type, that is with an auxiliary messenger wire, with 300-ft. spans, are as follows: Tangent track, $38,760 and curved track from $43,000 under 1 deg. curvature to $59,230 up to 4 deg. curvature. The costs for four-track construction are $25,490, and from $27,550 to $40,940 respectively. The corresponding figures for two-track catenary are $19,190 and $21,610 to $24,960, while the cost for two-track construction with curvature greater than 4 deg., requiring a pull-off pole, is $34,450. The cost for two-track, single catenary is $13,720, for tangent track and curves up to 2½ deg.; $15,110 to 3½ deg. and 260 ft. span; $19,385 up to 4½ deg. with 200 ft. span, and $28,850 above 4½ deg. with pull-off pole and 200 ft. span.

The total cost of an anchor and sectionalizing bridge including steel, concrete, floor on upper deck of bridge, control apparatus and connections, and sectionalizing are as follows: Compound catenary, six-track, $14,000; four-track, $9,730; two-track, $6,660, and for single catenary, four-track, $9,020; two-track, $6,120.

CONCLUSIONS

In conclusion Mr. Murray made a plea for a conservative point of view on the part of the public with respect to electrification. While the savings to be effected under certain conditions of electrification may be considerable, on the other hand the construction investment necessary for these savings may be very great. Only a healthy condition of finance throughout the country will warrant the consideration of electrification. Partial electrification, such as that applying to yards only and no main lines, might prove a serious and unfair burden for a railroad to carry. The electrification of great railroad terminals in particular presents conditions in which the maximum cost is combined with a minimum direct return upon the invested capital, and without some reasonable assurance of adequate return it will be more difficult to secure the necessary capital for such improvements.

A meeting is to be held in Pittsburgh in the near future by committees from New York, Pennsylvania and Ohio to co-operate in the establishment of standard rules and laws governing safety and sanitation. The idea is said to have originated with the Industrial Commission of Ohio in its efforts to reduce the number of accidents in industrial plants, but the co-operative effort of the three states is due in a large measure to suggestions of large manufacturing concerns which have plants in all three states.

Proceedings of the Wisconsin Electrical Association

One-Man Car Operation as Successfully Introduced into a Town of 20,000 Population After Approval by the Local Public, Public Utility Financing Under Legislative Restrictions, the Cost of Workmen's Compensation Insurance in Wisconsin With Results in Improved Safety Conditions, and Other Topics of Interest Were Discussed at this Convention

The seventh annual convention of the Wisconsin Electrical Association and the fourteenth annual convention of the Wisconsin Gas Association were held jointly at Milwaukee on Jan. 20 to 22 inclusive. President Korst, in his annual address, stated that during the past year public utilities in the state of Wisconsin had not been seriously affected by the general business depression.

In his paper on "Financing of Public Utility Properties" Andrew Cooke said that extensions to Wisconsin utility properties were stagnated, paralyzed and helplessly crippled by unwise legislation and commission rulings. Money cannot be obtained for extending utility services if the commission and the courts allow a return of only 7 per cent upon the investment. The channels of investment open to municipal bonds are closed to utility bonds bearing the same rate of return because of the greater risk incurred in the purchase of utility securities. Mr. Cooke suggested a campaign of publicity to change public sentiment in favor of better rates of return for Wisconsin utilities. The discussion of the paper by Edwin Gruhl, assistant to the president, Watertown Gas & Electric Company, Watertown, Wis., entitled "Increased Taxation in Wisconsin and Its Effect on Public Service Companies" brought out the fact that some of the public utilities were paying as much as 10 per cent of their gross revenue in taxes. A paper by Carl Muskat on "Practical Effect of the Workmen's Compensation Act" was also presented and briefly discussed. Abstracts of the papers by Messrs. Gruhl and Muskat are presented on page 234.

In the discussion following R. M. Howard's paper on "One-Man Electric Car Operation in a Small City," abstracted on page 233, F. W. Walker, general manager, Milwaukee Northern Railway, Cedarburg, inquired regarding the safety of operating one-man cars over steam railroad crossings. He stated that his company had a test case in the State Supreme Court in which a street railway company was endeavoring to force the distribution of the cost of protection and crossing installation. He requested that until this case was decided all street and electric railway companies in the State of Wisconsin refuse to pay the entire cost of crossing installations voluntarily, so as not to embarrass his company's contention in the court.

Mr. Walker added that his attorneys had made a very careful study of the Wisconsin law and that in presenting their case they questioned whether any of the cost of installation belonged to the electric road occupying the street. The basis for this contention was on the fact that the extraordinary danger was created by the steam road on the private right-of-way, the operation of street cars and interurban cars on city streets was nothing more nor less than a form of conveyance which rightfully belonged there. Mr. Walker also stated that a decision in this case would determine the power to divide the expense as affected by past contracts. His legal advisors were of the opinion that, since these crossing contracts affect rates, they came under the jurisdiction of the railroad commission and could be annulled in making rate adjustments. In these test cases Mr. Walker stated that his company was endeavoring to clarify the crossing situation for future investors in electric railway projects, and to force a cost distribution where both his road and the steam road occupied private right-of-way.

Another point which was brought out in Mr. Walker's discussion of railroad crossings was that, where safety devices were necessary, it had been the custom to place the derails in the electric line to be operated either by the motorman or from a tower, while the steam road tracks were not equipped with similar protective devices. Since the steam road produced the hazard, Mr. Walker contended that there was nothing in the law to prevent electric lines from forcing the steam roads also to provide protection at the electric crossing. The derail on the electric line only served as a protection for the steam road cars against the electric, when it was just as important that the electric cars be similarly protected against high-speed steam trains.

In response to an inquiry by a delegate Mr. Howard stated that the steam railroad crossings on his property were located where traffic was light, and that he permitted his cars to run closer to the actual track crossing than has been the custom heretofore. He also stated that he had found that steam roads would permit their flagmen to flag street cars over a crossing, if the electric line would pay a portion of the cost. Mr. Howard advised that since he had installed the one-man cars on his road he had ceased selling tickets on the cars.

The paper by Professor D. W. Mead, of the University of Wisconsin, entitled "Latent Water Powers and Difficulties of Development Under the New Wisconsin Water-Power Law" was discussed by M. C. Ewing, general manager of the Wausau Street Railroad, Wausau, Wis. He emphasized the fact that the Wisconsin State laws governing the construction and operation of hydroelectric power plants had worked a great hardship on both the public and the owners. He stated that under the existing act it was absolutely impossible to obtain money to develop water powers. Other papers of interest to electric railways presented and briefly discussed included "Practical Suggestions for Increasing the Efficiency of Small Steam-Electric Power Plants," by W. F. Lathrop.

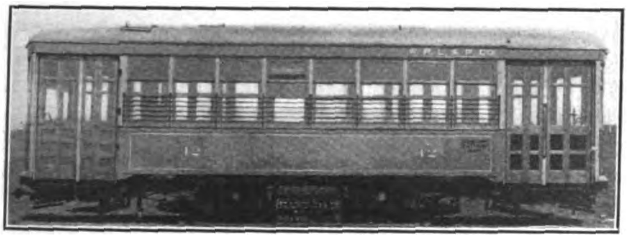
Immediately following the close of the regular program the following officers were elected: President, M. C. Ewing, treasurer and general manager Wausau Street Railroad, Wausau, Wis.; first vice-president, W. E. Haseltine, secretary and treasurer Ripon Light & Water Company, Ripon, Wis.; second vice-president, B. F. Lyons, vice-president and general manager Beloit Water, Gas & Electric Company, Beloit, Wis.; third vice-president, A. E. Peirce, general manager Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., and secretary and treasurer, George Allison, comptroller Clement C. Smith properties, who was re-elected to office.

EXPERIENCE WITH THE ONE-MAN ELECTRIC CAR IN A SMALL CITY

BY R. M. HOWARD, GENERAL MANAGER MINNESOTA DIVISION, WISCONSIN RAILWAY, LIGHT & POWER COMPANY, WINONA, MINN.

The operation of the Winona Railway from its electrification in 1891 to 1911 did not yield sufficient revenue to take care even of the operating expenses. In August, 1911, the property changed hands, and as the result of a number of improvements the gross earnings increased more than 40 per cent with only a temporary rise in operating expenses. The service was then as good as could be reasonably expected in a town of 20,000. Careful study showed that no further opportunities for important reductions in operating expense were available except by the adoption of one-man near-side cars.

The company realized, however, that the co-operation of both the public and employees would be necessary before such a system could be introduced successfully. The matter of buying one-man cars was therefore laid before the local City Council and commercial association, and the economies to be effected were frankly admitted. Photographs of the proposed cars and a description of their equipment and operation were submitted, upon which the proposition of the company was approved and it was urged to go ahead. An order was then placed with the St. Louis Car Company for four new cars and for door-operating mechanisms to equip the old cars retained for one-man service. In all, eight cars are now operated on regular schedule.



WINONA ONE-MAN CAR—VIEW OF CAR

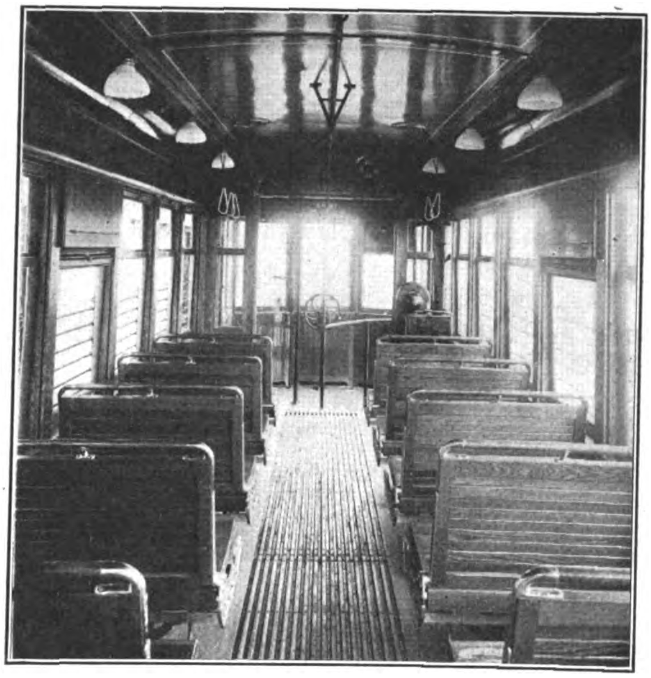
The new cars are of double-end type, 34 ft. 10½ in. over the bumpers, with 6-ft. 3-in. vestibules and an opening 5 ft. wide at the entrance and exit sides. They have steel underframes, steel sides and arch roof, are mounted on St. Louis No. 46 trucks of 8-ft. wheelbase, and are heated with Smith No. 3 hot-air heaters. The controller and brake staff are mounted to the left of the usual location to place the motorman out of the way of entering passengers. The register cord is also located to permit the motorman to ring up fares without moving from his operating position. The entrance and exit vestibule steps of folding type are operated from levers placed between the controller and brake rigging. The electrical equipment consists of two GE-54 motors with K-10 controllers. The old cars measure 29 ft. over all, but have vestibules only 4 ft. 6 in. long with entrance and exit door openings of 26 in. These cars were remodelled for the one-man operation, including the addition of push-buttons and the removal of the bulkhead doors.

For ten days prior to inaugurating the new system the company displayed in the daily papers and also distributed on the cars in dodger form an advertisement which explained the reason for the adoption of the new system, including a frank statement that the earnings did not justify new two-man equipment. Each trainman also received typewritten instructions covering the operation of the new cars, including the registration of fares, issuance of transfers, etc. Fares must be paid before the passengers enter the car, but transfers are issued to passengers as they leave the car.

One-man operation began on May 3, 1914. As the public was well informed regarding the change, the new system went into operation without a hitch. No difficulty has arisen in maintaining the average schedule of 9 m.p.h., but if loops for turning cars at the ends, air brakes and air-operated doors were used an operator could doubtless make faster schedules if traffic conditions so demanded.

PERFORMANCE WITH ONE-MAN CARS

After one and a half months the company saw what one-man cars could do for heavy traffic. The earnings on July 15, 1914, were the largest in its history, exceeding the previous record by 90 per cent. The average earnings for that day were 41 cents per car-mile, the largest number of fares on a single trip 126 and the turn-in from one man, $70.50. Operation on this day was a little slow because all fares had to be collected before the cars were started, but not a step accident occurred. In any event such heavy days form too small a percentage of the yearly operating period to offset the expense of conductors. Railroad crossings are flagged by the motorman in the usual manner, but the saving in the wages of conductors would warrant the maintenance of flagmen on one or two crossings if local conditions made this necessary.



WINONA ONE-MAN CAR—INTERIOR VIEW

ADVANTAGES AND SAVINGS.

The operation of both the new and remodeled cars has produced the usual operating advantages of eliminating step accidents, because the doors are not opened or closed while the car is in motion; of avoiding arguments regarding payment of fare and of easier checking by inspectors because fares are registered as passengers enter. Further the one-man system has greatly decreased the extra list. The percentage of trainmen's wages has also decreased from 29 per cent to 19 per cent of the gross revenue, so that an increase in wages would not affect so materially the ratio of operating expenses to gross income. The apparent discrepancy in the percentages quoted is explained by the fact that the conductors did not work to the end of the line but turned back at the last switches. Hence their hours did not equal those of the motormen.

The total expense of rebuilding old cars and purchasing new cars was $11,893.55. During the first seven months' operation a saving of $3,549.02 was effected. On the basis of equal mileage for the corresponding period of 1913 and 1914, the difference in the ratio of operating expenses, insurance and taxes to gross earnings is 10.52 per cent in favor of one-man operation. If the two-man system had been retained the net earnings would have been 38.67 per cent less. The savings effected during the first twenty-six months will amortize the entire investment. Only the investment in car bodies and trucks has been considered in the amortization statement because a company which operates old motors can amortize the investment for new motors by applying the saving in motor maintenance cost to the purchase of new motors.

The company's experience has led it to the conclusion that it would be a mistake to remodel small short platform cars and attempt to put the one-man system into operation with such equipment only. At least part of the equipment should be modern with long platforms especially designed for one-man prepayment operation. When all is said and done, the public is the final arbiter and the question is too important to risk the chance of failure due to the lack of proper equipment. If platforms are long enough and the motorman attentive and courteous, the system is bound to be satisfactory from every standpoint. Few street railways can afford to spend anything more than is absolutely necessary, and the one-man car will often place the balance on the right side of the ledger.

INCREASED TAXATION IN WISCONSIN AND ITS EFFECT UPON PUBLIC SERVICE COMPANIES

BY EDWIN GRUHL, ASSISTANT TO THE PRESIDENT, WATERTOWN GAS AND ELECTRIC COMPANY, WATERTOWN, WIS.

The increases in taxes of public service corporations during the last few years have been proportionately greater than the general increase in taxes. The increases have, moreover, far exceeded the rate of growth of the business, whether measured in terms of new capital or in terms of gross or net earnings.

The summarized reports of the several utilities to the Railroad Commission show that during the period 1910 to 1914 taxes paid by gas utilities increased 44.72 per cent as compared with an increase in operating revenues of 24.79 per cent and an increase in gross income before deducting taxes of 14.97 per cent. Where in 1910 gas companies paid 6.07 per cent of their operating revenues in taxes this ratio has increased steadily to 7.04 per cent of their operating revenues for the fiscal year 1914. The percentage of taxes to gross income before deducting taxes shows a similar increase from 21.26 per cent to 26.76 per cent. An examination of the returns of all electric utilities to the Railroad Commission discloses the same tendency to increase. Where during this five year period operating revenues increased 80.33 per cent and gross income before deducting taxes increased 35.83 per cent, taxes paid increased 112.74 per cent. Where electric utilities in 1910 paid 4.45 per cent of their operating revenues as taxes this ratio increased to 5.25 per cent in 1914, while the proportion of gross income available for taxes and return upon the investment which has been paid in taxes increased from 10.17 per cent to 15.92 per cent. Electric railway operating revenues during the five years increased 19.30 per cent, and gross income available for taxes and return upon the investment decreased 10.37 per cent, while taxes continued to increase 15.82 per cent.

Much of the reason for increased assessment of public service corporations rests on the theory that the intangible values of such corporations are peculiar in themselves and are entitled to special classifications and special treatment. These intangibles are frequently referred to in statutes as "rights," "privileges," "franchises" or "corporate excess." Before the advent of commission regulation there was greater reason why unregulated monopolies should be taxed in excess of the amounts contributed by competitive businesses or other classes of property, but such taxes are not levied upon the theory that they were a proper and fair contribution of the corporation to the conduct of government but as a compulsory form of profit-sharing.

While these general descriptive titles may have had their use in the past as a justification for placing larger tax burdens upon public service corporations, the conditions justifying their use have largely disappeared. Under regulation both the commission and the public are demanding that service should be furnished at cost to the utility plus a fair return upon the investment, and in Wisconsin more than in any other state the element of cost has been the controlling factor in the regulation of rates of service. Special taxes, whether in the form of large assessed valuations attributed to franchises or as other public burdens, merely increase the cost and are ultimately shifted upon the customer. It is a mistaken notion, prevalent in many quarters, that this is merely taking money from one pocket to put it in another.

Were even a part of the $1,315,000 contributed by gas companies in taxes last year, the $2,642,000 contributed by electric companies and the $2,412,000 contributed by traction companies applied to finance additional miles of gas mains, electric lines and new tracks, there would be less of criticism that there has been no expansion of the utility business in Wisconsin. Considering that taxes paid in 1914 amount on an average to 7 cents of the cost of gas per 1000 cu. ft. to ½ cent on the cost of electrical energy, to $4 on the annual cost of an arc lamp, and to nearly ½ cent on the cost of carrying a passenger, it is very apparent that the imposition of such indirect taxes has a far-reaching effect upon the average customer's use of the service.

WISCONSIN'S COMPENSATION LAW

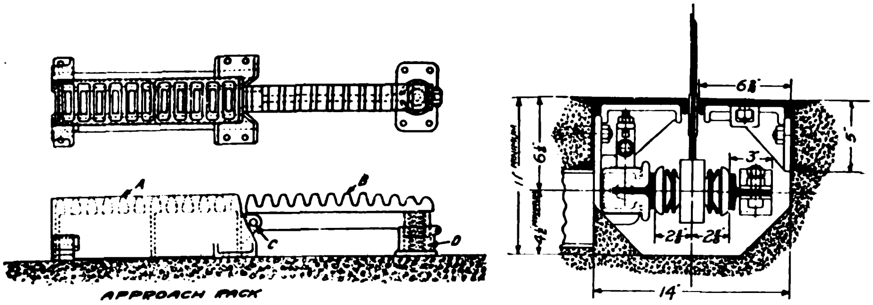
BY CARL MUSKAT, MILWAUKEE

Mr. Muskat first mentioned the wide adoption of compensation acts and quoted a large number of judicial opinions concerning their constitutionality and justness. The present Wisconsin act now covers about 250,000 employees and about 600 employers. He noted that public service corporations, unlike others, could not pass the cost of compensation on to the ultimate consumer because they are permitted to charge only a fixed rate for their product.

As to the actual cost of compensation, Mr. Muskat said that the Wisconsin law had already been amended by increasing the maximum payment for permanent total disability to six times the average annual earnings instead of four times. The aggregate compensation payable in Wisconsin also exceeds that of twenty of the twenty-three states with such acts. In Oregon the entire cost does not fall upon the employer. The latter deducts 0.5 per cent of the employee's monthly earnings, not less, however, than 25 cents per month, and himself contributes six times this amount. The state itself contributes one-half of the amount paid by both classes. Compared with this practice and the similar one of Germany, the Wisconsin schedule was certainly very liberal to the employee and should not be increased.

According to the reports of the Wisconsin Industrial

Commission the cost of compensation to the employer, if he carries his own insurance or is insured in a mutual company, is hardly, if at all, greater than under the old common law liability. Like the commission, Mr. Muskat had found that those who insured in the so-called bureau or conference rate of the old-line companies paid much more than those who were self-insured. In any event, he had learned from inquiries directed to some seventy-five industries that the cost of compensation under the new law was greater than under common-law liability regardless of the character of insurance. Thus The Milwaukee Electric Railway & Light Company, which employs 3000 to 4000 men, found an increase of 90 per cent when comparing the averages of the three-year periods just before and after the compensation act became effective. This company carries its own risk at about 94 cents per $100 of payroll, whereas the old-line rate is $4.41 per $100 of payroll for urban street railway workers, $7.28 for electric light and power workers and $14.57 for interurban railway workers. In spite of various adjustments, the old-line rates still appeared to be too high. For example, in 1913 two-thirds of the premiums collected by the bureau insurance companies were used for expenses and profits, only one-third going for indemnities and medical aid. To-day the rates of the bureau companies are six times the cost of self-insurance. Mr. Muskat also pointed out several inconsistencies in the rates of the bureau which placed Wisconsin employers at a disadvantage when compared with other states. The Industrial Commission had determined that if the New York rates were adequate the Wisconsin rates of the bureau should be reduced by at least 40 per cent; and if the Massachusetts rates were adequate, the Wisconsin rates should be reduced at least 35 per cent. The commission had further stated that if the old-line companies would not grant equitable rates, mutual insurance or state insurance would have to solve the problem. A further remedy, Mr. Muskat said, is suggested by the decision of the United States Supreme Court in the case of the German Alliance Insurance Company vs. Kansas 233 U. S. 389, wherein it is held that the State has the constitutional power to pass laws regulating and fixing insurance rates the same as the rate of the railroad and other public utilities.



ELECTRIC TOWING AT PANAMA—RACK-RAIL APPROACH AND CROSS-SECTION OF CONTACT RAILS AND PLOW

EFFECT OF THE SAFETY MOVEMENT

Referring to the effect of safety education and equipment Mr. Muskat said that the Industrial Commission had reported that one-third of the reduction in accidents had been accomplished by means of safety devices while two-thirds had been accomplished by the education, inspection and co-operation of the workmen. The commission had shown commendable zeal and ability especially in organizing a volunteer committee of experts from laboring, employing and municipal bodies to organize safety committees, suggest safety equipment and distribute safety literature. As a result some companies had decreased their accidents as much as 70 per cent. One of the most useful bulletins issued by the committee was one on shop lighting. In one plant improved lighting had increased the output more than 10 per cent, and this better lighting also promoted safer operation.

In conclusion Mr. Muskat made the following points:

The Wisconsin commission has administered the law fairly and efficiently and has done much to promote co-operation between employer and employee, but it is undoubtedly true that the commission desires to obtain a favorable reception of the law and will not report and publish facts that tend to bring the law into disrepute, since it seeks to establish the law as a permanent institution.

Compensation has been certain, prompt and reasonable, if not liberal.

The cost of compensation is greater under the act than it was under the common-law system. In this respect the law has placed a greater burden upon the employer than heretofore.

Because of the abolition of all defenses, it is cheaper to come in under the law than remain outside. The employee in the aggregate has been benefited.

There should be no increase in the amount of compensation.

Experience will demonstrate what changes are needed in the present law.

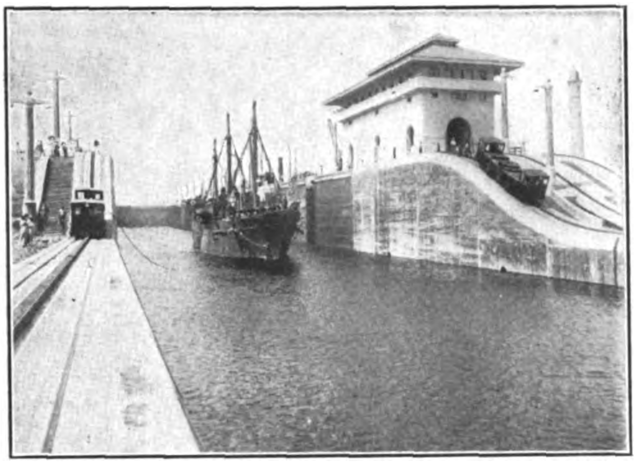
Electric Towing at Panama

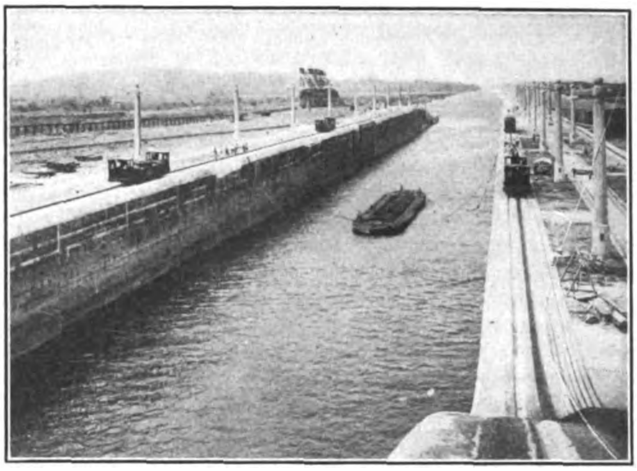
Vessels Prohibited from Using Own Power to Pass Througu Locks—Rack-Rail Locomotives Used for Propulsion

When the various plans proposed for the construction of a canal across the Isthmus of Panama were under consideration, the possibility of a grave disaster caused by a great ocean steamship breaking through the gates of an upper lock and plunging down through those below made it evident that vessels should not be passed through the locks under their own power. The various systems in vogue in dry docks, generally, are based on the principle that the operator sees the result of his action, and the employment of winches, or capstans, has been looked upon with a great deal of favor. These do not, however, possess the flexibility and reliability required for the operation of the locks of the Panama Canal, neither can they eliminate the breaking of the lines at critical moments. This is regarded as one of the essential requirements in the successful handling of ships in canal locks, and, in consequence, a towing system with electric locomotives was adopted.

A vessel that passes through the Panama Canal from the Atlantic to the Pacific enters the approach channel in Limon Bay, which extends to Gatun, a distance of about 7 miles. At Gatun it enters a series of three locks in flight and is raised 85 ft. to the level of Gatun Lake. It may then steam at full speed through the channel in this lake, for a distance of 24 miles, to Bas Obispo, where it enters the Culebra Cut, which has a length of 9 miles. At Pedro Miguel it enters a lock and is lowered 30 ft., and then passes through Miraflores Lake for a distance of 1½ miles until it reaches Miraflores, where it will be lowered 55 ft. through two locks, to the sea level, finally passing out into the Pacific through an 8½-mile channel.

In all of the locks there are two ship channels, one for traffic in each direction. The channels are sepa-





ELECTRIC TOWING AT PANAMA—LOCOMOTIVES IN OPERATION

rated by a center wall. There are two systems of tracks, one for towing and the other for the return of idle locomotives. The towing tracks are naturally placed next to the channel side, and the system of towing utilizes normally not less than four locomotives running along the lock walls. Two of them are opposite each other in advance of the vessel, and two run opposite each other behind it. The number of locomotives is, however, increased when the tonnage of the ship demands it.

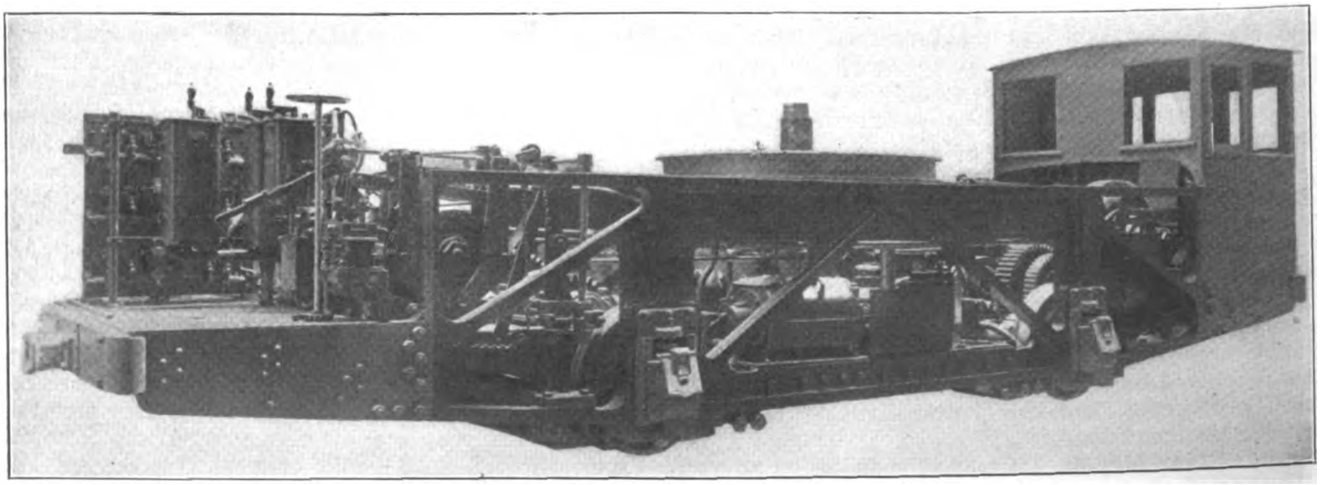
Cables extending from the locomotives connect with the bow and quarters of the vessel, the lengths of the four cables being adjusted by a special winding drum on each locomotive so as to place the vessel substantially in mid-channel. The leading locomotives tow the vessel, followed by the trailing locomotives, which keep all the cables taut, guide the vessel and stop it when necessary. Therefore, the vessel is always under complete control quite independent of its own power, and the danger of injury to the lock walls and gates is very greatly lessened.

The towing tracks have a specially designed rack-rail extending the entire length of the track and located centrally with respect to the running rails. Through this the locomotive exerts the traction necessary for propelling large ships and climbing the steep inclines, but when running light the traction motors are disconnected from the gear by means of a clutch and drive the locomotive through the axles and wheels.

A rack-rail is also provided on short portions of the return track so as to lower the locomotives safely from one level to the next, the steepest slope being 26 deg. or 44 per cent. The rack-rail is of the shrouded type, and each tooth space has a drain hole cast in the bottom so as to carry off water and other accumulations to suitable drain pipes or ducts set in the concrete of the walls. A further feature of the rack-rail is the projecting edges, which permit thrust wheels attached to the locomotive to run along the under side and prevent overturning of the locomotive in case some unforeseen operating condition should produce an excessive pull on the towline. These thrust wheels serve to counteract the lateral component of the towline pull and the flanges act for emergency only, as the weight of the locomotive is sufficient to prevent overturning with a normal pull of 25,000 lb. on the towline.

Three-phase, twenty-five-cycle, 220-volt alternating current is used for operating the locomotives, and this is supplied through an underground contact system. The collecting device is adjacent to the running rail on the side remote from the lock. It has T-rails which form two legs of the three-phase circuit, the third leg being formed by the main track rails. A specially designed contact plow slides between the two T-rails and transmits the current to the locomotive, to which it is flexibly connected.

The locomotives, which were described in the ELECTRIC RAILWAY JOURNAL for April 11, 1914, are equipped each with two 75-hp slip ring induction motors. Each of these, with all its gearing and clutches, is mounted upon the wheels independent of the frame of the locomotive, to which it is connected only by the springs. In connection with each motor a powerful brake is installed; and, as the motors are at all times geared either to the axles or to the cog wheels, the truck wheels are not provided with any brake rigging. The brake



ELECTRIC TOWING AT PANAMA—VIEW OF LOCOMOTIVE WITH CAB AND SIDE HOUSING REMOVED is operated through a solenoid which is in circuit with the controller of the motors, so that when the current is turned on to energize the motor windings the solenoid will lift its core and thereby release the brakes. The first point of the controller raises the brakes without applying power to the motors, thereby providing a coasting point. But should the motor current be shut off, either intentionally or accidentally, the core will instantly drop by gravity, and its weight will exert a heavy pressure upon the brake levers to stop the motor and the locomotive.

During the first three months of commercial operation of the Canal, from Aug. 15 to Nov. 15, the cargo towed through the locks by the locomotives amounted to 1,079,521 tons. During the fiscal year ending June 30, 1914, the Panama Railroad had carried 643,178 tons of through freight between the two seaboards, and in the preceding fiscal year 594,040 tons. From this it is seen that between six times and seven times as much cargo is passing over the Isthmus now as passed over this route when goods were transhipped by rail.

American Wood Preservers' Convention Proceedings

Some Modifications Were Made in Committees' Recommendations as Published Last Week—New Officers Were Elected

The American Wood Preservers' Association held its eleventh annual convention at the Congress Hotel in Chicago, Jan. 19-21, at which time reports from the numerous standing committees were presented. These were given in abstract in last week's issue. In some instances the recommendations of the committees were modified. In the report of the committee on plant operation, under the topic of the proper amount of zinc-chloride to be injected, the specified minimum was ½ lb. of dry chloride of zinc per cubic foot of timber. This was questioned, and it was stated that the quantity would vary from ¼ lb. to 1¼ lb. per cubic foot. The amount used should be varied to protect against the most adverse condition, depending both upon the character of the wood and the service it was to perform. This committee report was adopted as information to be considered again by the committee for 1914.

The committee on miscellaneous subjects, which reported on the treatment of red-oak ties, stated that red-oak ties should be air seasoned for at least one year before attempting to treat them, and that it was practically impossible to season a red-oak tie so as to render it dry throughout, but that they may be treated satisfactorily with any standard process. In the report of the committee on specifications for the purchase and preservation of treatable timber the summary of fundamental principles was approved for publication in the manual, but it was decided to eliminate the recommendation that the minimum duration of treatment, except with easily penetrated woods, should be equivalent to one hour for every radial inch on the sticks treated. Another important change in this committee's report included the reduction from 30 per cent to 20 per cent in the amount of refined coal tar that should be used to adulterate creosote. This is the same figure as that which will be adopted by the American Railway Engineering Association at its next annual meeting.

In the discussion on creosote specifications it appeared that the members of the association in closest touch with this situation believe that there is no reason for apprehension on the part of treated-timber users that the shortage in imported creosote is going to compel the use of untreated timber. Another interesting point brought out was that decayed timber created an additional fire hazard, since it burned more readily than sound timber, the object of this discussion being to present to the wood preservers information which would lead them to consider more thoroughly the application of preserved timber in building construction.

At the closing business session of the convention a committee on constitution and by-laws reported a number of revisions which were made necessary by the rapid growth of the association and which would permit the acceptance of applications of members who were not eligible under the old constitution and by-laws. The following new officers were elected for the ensuing year: President, J. H. Waterman, superintendent of timber preservation C. B. & Q. Railroad, Galesburg, Ill.; first vice-president, H. S. Loud, chief engineer U. S. Wood Preserving Company, New York City; second vice-president, Lowry Smith, superintendent tie plant Northern Pacific Railroad, Brainerd, Minn.; third vice-president, F. D. Beal, superintendent St. Helens Creosoting Company, Portland, Ore., and secretary and treasurer, F. J. Angier, superintendent timber preservation B. & O. Railroad, Baltimore, Md. The next annual meeting of the association will again be held in Chicago.

The Engineering Foundation

As announced in last week's issue the "Engineering Foundation" was inaugurated formally on Jan. 27. This is a fund to be "devoted to the advancement of the engineering arts and sciences in all their branches, to the greatest good of the engineering profession and to the benefit of mankind." The initial gift of $200,000 to the foundation has been made by Ambrose Swasey, a member of the well-known firm of Warner & Swasey, of Cleveland, Ohio, manufacturers of astronomical instruments, and machine tools. Mr. Swasey has contributed largely to many other enterprises for the public good.

The foundation was accepted by the United Engineering Society, comprising the American Institute of Mining Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers. The American Society of Civil Engineers has promised co-operation and will have equal representation with each of the other societies on the board of directors. The dedication exercises were well attended and impressive addresses were made by Gano Dunn, Henry S. Pritchett, Ambrose Swasey, Robert W. Hunt and Alexander C. Humphreys. No definite plans for administering the income of the fund have been announced as yet, further than that it is to be used in engineering research.

Increase in Revenue for New York State Railways in 1914

The Public Service Commission of the Second District of New York, in its annual report, states that electric railroads show a substantial increase over 1913 in the matter of net revenue, despite increases in expenses, and the astonishing growth of 66 per cent over 1907. The figures for electric roads do not include freight traffic, as this is insignificant compared to the passenger business of such lines.

Operating revenues increased 6.6 per cent over 1913 and 66.2 per cent over 1907; the increase in expenses was correspondingly 7.2 per cent and 66.3 per cent, and net revenues increased 3.6 per cent during the year. Electric roads in this State paid dividends of $3,662,433 in 1914 as compared with $4,298,982 in 1913. But dividends were almost the same as those paid in 1912 and very much larger than for any year previous to that.

COMMUNICATIONS

Calculations of Starting Resistances for Railway Motors

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., Jan. 25, 1915.

To the Editors:

Recently there appeared in the ELECTRIC RAILWAY JOURNAL an interesting article on a graphical method of calculating ohmic values of starting resistors for railway equipment. A general scheme employing a simple graphical method for determining the ohmic value of grid resistors for the proper acceleration of cars and locomotive equipments has long been desired.

If, in designing resistors, it were possible to choose the ideal number of notches for a given equipment and to demand a certain average current for all acceleration with no restrictions as to present standards, weights, etc., the general problem of designing resistors would be comparatively simple. However, there are many features which must be considered in a large percentage of the cases, some of which are as follows:

Motor equipment—Number of motors; motor characteristic curves; nominal, or one-hour rating; continuous rating; total resistance of each motor (including brush resistance); resistance of car wiring. Gear ratio. Diameter of wheels. Total weight of car or locomotive. Line voltage (maximum and average). Class of service—Passenger car; freight car used as hauling locomotive; passenger, freight and switching locomotives. Type of control—Number of running notches, in series, in series-parallel, in parallel; shunt or "K" type; bridging, open-circuit, or "L" types. Lag of torque in motors—Desirability of employing resistor elements which are interchangeable with existing equipment; special features such as very heavy grades, emergency accelerations, method of emergency braking, etc.

As a rule, data on the entire motor equipment, including motor ratings, characteristic curves, wheel diameter, weight of equipment, voltage conditions, class of service and type of control, are all known quantities at the time the starting resistor is designed, and having all of these elements fixed, the problem usually resolves itself into the designing of a resistor suitable for a particular arrangement of control steps and given weight of equipment, and a predetermined motor characteristic.

For a simple case, such as a double equipment of motors for, say, a K-36-J controller, which is arranged for shunt transition with four notches in series and four notches in parallel, it is a comparatively easy matter to lay out the ohmic values of a resistor that will give equal increments of tractive effort per notch, if it is assumed that resistor elements of any convenient ohmic value and current-carrying capacity are available. However, as it is of the utmost importance that all resistors be made up of a predetermined line of standard elements, it is practically always necessary to employ a "cut and try" method before making a commercial application.

Another fact in this connection, which it appears is not generally appreciated, is that the calculation of resistance should be based, not solely on Ohm's law, but should also take into consideration the element of time required for the building up of torque or tractive effort. The tractive effort at any instant is proportional to the product of current and strength of magnetic field in the motors. On the first notch of the controller the current does not immediately reach its maximum value, but lags somewhat because of the counter emf of self-induction.

Furthermore, the motor fields lag somewhat in building up, due to the damping action of the eddy currents produced in the magnetic circuit. Because of this lag of current and field strength the resistance to be used on the first notch should be somewhat less than would be the case if the current and field flux were assumed to reach the final values immediately. Thus the logical procedure in calculating the total external resistance is, first, to find from the motor characteristic curve the value of current required to give the desired tractive effort; second, to calculate the resistance which would give this current according to Ohm's law, and finally to use a total resistance varying from 60 per cent to 90 per cent of this calculated resistance. If the lag in torque, or tractive effort, is not taken into consideration in the calculation of resistors the initial tractive effort may be considerably less than desired.

In addition to the ohmic value an important consideration in the design of resistors is that of capacity. Under the general heading of capacity, two essentials must be considered: first, thermal capacity; second, continuous capacity. As thermal capacity is a function of mass, any attempt to reduce the weight of the active material reduces the capacity for heat absorption, and consequently it is false economy to reduce equipment weights by the use of insufficient capacity.

As the continuous rating of resistors varies with the working temperature and the radiating surface, it is of the utmost importance that the individual elements shall withstand high temperatures and be provided with comparatively large radiating surfaces.

Since the design of railway resistors involves the consideration of numerous variables, it is not at all surprising that we are without simple graphic methods covering the many possible conditions encountered.

KARL A. SIMMON,
Engineer Railway Engineering Department.

NEW YORK STATE RAILWAYS
ROCHESTER, N. Y., Jan. 22, 1915.

To the Editors:

The article by F. Castiglioni, on "Calculations of Starting Resistances for Railway Motors," published in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, 1914, is very interesting. The method described is ingenious and should prove of great value in original design work.

It appears to the writer, however, that it is not a method which would be adopted, to any great extent, by superintendents of equipment in checking up cars which are in service. The first thing to do in solving problems of this kind is to calculate the starting current and its limits of variation. Mr. Castiglioni has very lucidly explained the method of doing this.

The investigation from this point can be made by a series of tests. If the current values have been determined and the voltage is known, a simple application of Ohm's law will show the total amount of starting resistance required. When the total resistance for an existing equipment has been checked and corrected, if it is found necessary to do so, the next step is to determine whether the connections are such as to cut out the proper amount of resistance at each point on the controller so as to provide a smooth and uniform acceleration of the car. In this case the number of resistance steps is fixed by the design of the controller installed in the car. By careful feeding of the controller, the incorrect steps can be determined and corrected so as to eliminate the "jerks." This is a quick method which may be classed as "cut and try."

Incorrect resistances, however, often cause a waste of power. The "cut and try" method may not give the values which would prove most efficient as regards power consumption. In order to make the check complete so as to obtain smooth acceleration and maximum power saving, another practical method presents itself, viz., the use of a graphic ammeter. It is interesting to note, in the letter by John W. Corning published in the issue of your paper for Jan. 9, 1915, a description of the practical application of this instrument in the investigation of resistance problems.

Very often a variation from theoretical values of resistance is made in order to use standard grids and standard combinations. Since current-carrying capacity has to be considered in making up all car resistances, it also affects the combinations so that, in practice, a slight variation from theoretical figures is usually found. The use of the ammeter affords an excellent means of checking current capacity required as well as the proper resistance values.

It is not my intention to criticise the article mentioned in any way, but to point out the difference between the problem as it affects the designer and the operating man. The operating man has the opportunity to solve his problem by practical tests. These tests can be easily and quickly made by him. I believe that in most cases he will prefer to use such methods.

G. M. CAMERON, Master Mechanic.

Baling Waste Paper, Shavings and Excelsior

PITTSBURGH RAILWAYS COMPANY
PITTSBURGH, PA., Jan. 19, 1915.

To the Editors:

The practice of collecting, baling and selling waste paper it seems, from accounts printed in various publications recently, is quite generally recognized as a saving, and many companies are doing it, realizing that, under normal circumstances, it costs less to bale than to burn it, while the proceeds from the sale amount to a considerable sum each year. The fire risk to buildings is considerably reduced; in fact, in most of the larger cities ordinances forbid the burning of paper or anything else within the city limits unless in an incinerator.

It may be of some interest to know that this company has carried the idea a step farther. Our carpenter shops produce a considerable volume of shavings. The practice had been to allow the neighboring grocers, transfer companies and others maintaining stables to come to the shops, load and haul away the daily accumulation free of charge. The shavings are used for horse bedding. It had been impossible for us to handle them in bulk because our stables are at a considerable distance from the shops.

Our balers worked so well with the waste paper that we immediately sought one capable of greater pressure, which is necessary in baling shavings so the bales will withstand repeated handling. We now have a portable baler located conveniently to the planing machine, the shavings being baled and removed from the shops before the end of each day.

The supply is sufficient for bedding all our horses, for which purpose we had previously purchased baled straw at $16 per ton. In addition we sell at the current market price the excess, which nets an amount sufficient to pay for baling the entire output.

We also have a baler on the receiving floor at the general store, which acts as a waste receptacle, where we bale the excelsior that is found in the boxes of material received. This reduces the fire risk. Baled excelsior is saleable at a price per ton somewhat more than the current price for scrap iron.

The wrappings from our bales of waste, soiled wiping cloths, cement sacks too badly torn, etc., are collected, baled and sold also. Without the baler the cost of handling such low-grade salvage would be prohibitive. The total net saving is at least $1,000 per year.

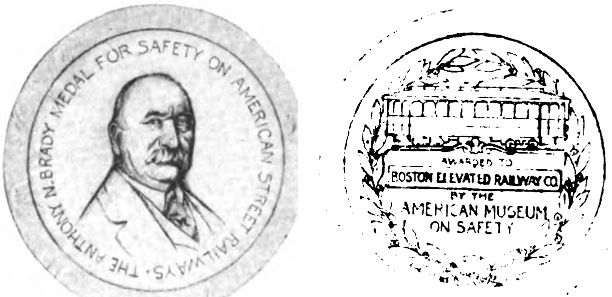
The collection, baling and sale is handled entirely by the stores department, which also handles all scrap copper, iron and other salvage.

B. J. YUNGBLUTH, General Storekeeper.

The Brady Medal Award

At the mid-year meeting of the American Electric Railway Association, Arthur Williams, president of the American Museum of Safety, announced the award of the Anthony N. Brady memorial medals as follows: The gold medal to the Boston Elevated Railway; the replica in silver to Hon. Russell Adams Sears, general attorney of the company, and the replica in bronze to Henry Vinton Neal, a mechanic in the employ of the company. Honorable mention was awarded to the Public Service Railway of New Jersey, and special favorable mention to the Northern Ohio Traction & Light Company.

In connection with the announcement of the awards a special bulletin of the Museum of Safety, giving full information regarding them, was distributed. This contained a brief historical statement of the medals, a copy of the letter transmitting the findings of the award committee, an outline of the terms of the award and the methods used in evaluating the reports, and summaries of the features of the safety work of the three railways affected by the awards.


THE ANTHONY N. BRADY MEDAL FOR SAFETY ON AMERICAN STREET RAILWAYS.
AWARDED TO
BOSTON ELEVATED RAILWAY CO
BY THE
AMERICAN MUSEUM ON SAFETY

THE ANTHONY N. BRADY SAFETY MEDAL

The Anthony N. Brady memorial medals were founded about a year ago by the family of the late Mr. Brady for the purpose of stimulating and promoting interest in safety and health in the electric railway industry. The details of administering the awards have been largely in the hands of the American Electric Railway Association, with the active co-operation of Arthur Williams, general inspector New York Edison Company, and Dr. W. H. Tolman, respectively president and director of the American Museum of Safety. The terms of award were specified by a committee consisting of Arthur W. Brady, president Union Traction Company of Indiana, chairman; Frank Hedley, vice-president and general manager Interborough Rapid Transit Company, and C. S. Sergeant, vice-president Boston Elevated Railway. This committee reported through Chairman Brady at the Atlantic City convention in October, 1914, its work, however, having been completed in the spring. The awards were made by a committee appointed by the American Museum of Safety, comprising Bion J. Arnold, chairman, Board of Supervising Engineers Chicago Traction, chairman; Will J. French, industrial accident commissioner, San Francisco, Cal.; James H. McGraw, president McGraw Publishing Company, Inc.; Frank J. Sprague, consulting engineer, and George F. Swain, professor of civil engineering Harvard University.

American Association News

Meeting of Executive Committee in Washington—Sub-Committees Appointed by Committee on Public Relations—Activity of Various Other Committees—Coming Committee Meeting

AMERICAN ASSOCIATION EXECUTIVE COMMITTEE

The executive committee met in Washington on Jan. 28 with the following in attendance: C. Loomis Allen, Syracuse, N. Y., president; C. L. Henry, Indianapolis, Ind., first vice-president; L. P. Crecelius, Cleveland, Ohio, president Engineering Association; William Tichenor, Indianapolis, Ind., president Claims Association; M. C. Brush, Boston, Mass., president Transportation & Traffic Association; C. S. Sergeant, Boston, Mass., past-president; W. Caryl Ely, Buffalo, N. Y., past-president, and E. B. Burritt, New York, N. Y., secretary.

The secretary reported for the 1915 convention committee, outlining in full the work done up to the present time and stating that an informal conference with such local chairmen of transportation committees as were in Washington would be held the following day, when further plans would be discussed.

The World's Insurance Congress to be held in San Francisco this year was considered and the appointment of a local representative was authorized.

The secretary reported that data sheets calling for information regarding wages had been sent to member companies and that good returns were expected.

The committee voted to increase the circulation of *Aera* among the member companies.

The secretary reported that the following companies had become members since Oct. 1: Berlin & Northern Street Railway Company, Bristol & Plainville Traction Company, Charleston & Dunbar Traction Company, Cleveland & Eastern Traction Company, Port Arthur Traction Company, Slate Belt Street Railway Company, Steubenville & East Liverpool Railway & Light Company, and Steubenville, Wellsburg & Winton Railway Company.

Reports from American Association committees and from the presidents of affiliated associations covering the work of their committees were read. They showed satisfactory progress to date, although in many cases there had not as yet been sufficient time to accomplish much definite work. A large part of the committee work is well under way with sub-committees engaged on their respective assignments. The work of these committees has been covered from week to week on the "Association News" pages of the ELECTRIC RAILWAY JOURNAL.

Among the many activities of the committees but a few typical ones can be mentioned. The committee on valuation is collecting data preliminary to outlining a comprehensive plan. The committee appointed to represent the association at the American Road Congress did so and covered its meetings systematically, reporting the proceedings to President Allen. The committee on taxation will conduct a canvass for data and will include a bibliography with this year's report. The committee on relations with state and sectional associations is collecting data and studying the manner in which other associations have handled the matter. The committee on company sections and individual membership is preparing a booklet for general circulation to increase the membership. Each member will endeavor to interest one company in forming a section. The committee on compensation for carrying United States mail has been active in bringing the attention of the congressional committee to the facts and has, with the co-operation of the bureau of fare research prepared a bill embodying the results of recent studies. The committee on cost of transportation service explained the activities of the above bureau and stated that it will furnish information in convenient form through a series of popular articles. The educational committee explained the operation of the correspondence courses now in actual use with a growing enrollment. The committee on federal relations has kept in touch with the Stevens, Crosser and other bills.

The committees of the Engineering Association have in general assigned detail work to subcommittees which are investigating them. In the case of the committee on equipment this was done by letter, and some subcommittees have already formulated recommendations. The committee on power generation will endeavor to crystallize the work of former committees and writers of papers in the form of recommendations. The committee on standards will study the extent of the use of the association standards and the practice of other associations. The committee on block signals has made considerable progress and is planning a meeting in March to gather together the results of the winter's work.

The Transportation & Traffic Association committee on express and freight traffic is preparing a data sheet covering a wide range of subjects, while that on passenger traffic will also make recommendations on the effect of automobiles on city passenger traffic. The committee on training of transportation employees is studying public service commission rules or city ordinances affecting street railway employment, methods of improving employees' courtesy, and of discipline, and watch inspection methods. The committee on block signals is a joint one with the Engineering Association and is mentioned above.

COMMITTEE ON PUBLIC RELATIONS

A meeting of the committee on public relations of the American Electric Railway Association occurred in New York Jan. 25. It was held at the University Club, where Thomas N. McCarter, chairman of the committee, entertained the members. The members of the committee present, in addition to Mr. McCarter, were C. Loomis Allen, S. M. Curwen, F. R. Ford, James H. McGraw, James D. Mortimer, J. H. Pardee, E. W. Rice, Jr., Guy E. Tripp and T. S. Williams. Others present were J. R. Lilienthal, H. H. Vreeland, T. S. Wheelwright, R. M. Searle, C. C. Peirce, H. C. Clark, H. C. Donecker, E. B. Burritt and H. W. Blake.

Mr. McCarter explained that during the last year the committee had drafted a code of principles which had been indorsed at the October convention and had also suggested a program for publicity, to be conducted by a bureau with a director under the general supervision of the committee on public relations. The program included five general methods of publicity, namely: (1) The dissemination of literature, (2) co-operation with similar committees of other public service associations, (3) lectures on the Chautauqua circuits and elsewhere, (4) preparation of popular articles for publication in magazines and periodicals, and (5) newspaper advertising.

President Allen then said that he had been in consultation with Mr. McCarter on the work which should be taken up during the coming year and they had come to the conclusion that it would be desirable to give attention to the first three methods mentioned above. These could be taken up this year without great expense to the association if railway men themselves would volunteer to do the work. The final two parts of the program could be postponed until later. This plan met the approval of all. President Allen then moved that three committees of three members each should be appointed by the chairman of the committee to undertake these three lines of work. The motion was carried.

Mr. McCarter, after consultation with President Allen. then announced the appointment of the following committees: For the dissemination of literature, Messrs. Tripp, Rice and Williams; for co-operation with other public service associations, Messrs. Pardee, Ford and Vreeland; for the lectures, Messrs. Mortimer, Brady and McGraw. A committee of ways and means was also appointed, consisting of Messrs. McCarter, Rice, Tripp, Brady and Wheelwright. Harlow C. Clark was appointed director of the bureau.

ENGINEERING ASSOCIATION EQUIPMENT COMMITTEE

A meeting of this committee was held in New York on Jan. 27. Those in attendance were: W. G. Gove, Brooklyn, N. Y., chairman; R. H. Dolgleish, Washington, D. C.; F. W. Garrett, Boston, Mass.; R. N. Hemming, Anderson, Ind., and W. E. Johnson, Brooklyn, N. Y. The outline of work of this committee and the personnel of the sub-committees were printed in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, 1914, page 1393. Most of these reported progress on their assignments

In regard to the present specifications for heat-treated axles it was felt that the title should be revised to cover specifically quenched and tempered materials. The sub-committee is to prepare a tentative revision of the specifications for submission to the association this year. The manner of specifying ductility requirements is left to the sub-committee for recommendation. Certain recommendations of the sub-committee relative to improvements in phraseology in the specifications for tensile and cold-bend test and heat treatment were approved. The sub-committee is to collect data preparatory to suggesting recommended practice on proof tests. On the subject of re-treating it was the sense of the committee that the specification should be made to limit re-treating to three times. Further investigation is also to be made as to the practice of leaving rough-forged collars on axles.

Operating data are to be secured from companies on the results obtained from present grades of gearing with a view to preparing tentative specifications, as recommended practice which can be used in obtaining competitive bids.

A design for a deep M. C. B. journal brass that could be used on present type of journal box to replace the present brass was considered. It was considered desirable to have two designs, one for new equipment in which better advantage could be taken of the deep brass principle and another carrying out the principle as far as possible with present equipment.

Members of the committee are to make trials of the tentative air-brake hose specification by purchasing small quantities of hose under them and also obtaining for trial similar hose with oil-resisting inner tubing. The latter is felt to be desirable, and changes in the specifications to include it may be recommended.

The C. E. R. A. limit-of-wear gage was considered and the sub-committee on this subject will consider its adoption as far as the limit is concerned. The turning-gage feature, however, was not included as the committee felt that the turning point is governed largely by local conditions. The matter is to be investigated farther.

The design of steel wheels is to be extended to include sizes down to 21 in. Tentative designs have been prepared and the inclusion of a limit-of-wear groove is under consideration.

COMMITTEE ON POWER GENERATION.

A meeting of the Engineering Association committee on power generation was held on Jan. 22 at the Hotel Statler, Cleveland, Ohio. Those present were J. W. Welsh, Pittsburgh, Pa., chairman; L. P. Crecelius, Cleveland, Ohio, president; E. H. Scofield, Minneapolis, Minn.; G. H. Kelsay, Anderson, Ind.; R. J. S. Piggott, New York, N. Y.; W. H. Roberts, Akron, Ohio; A. B. Stitzer, New York, N. Y., and Fay Woodmansee, Chicago, Ill.

The morning session was taken up with a consideration of the reports from the various sub-committees. As a result of the preliminary study which had been given the subjects originally assigned by the executive committee, a number of changes and additions were agreed upon. The principal task before the committee this year is to crystallize the work of former committees. The aim is to secure definite standards and recommended practices for reference to the committee on standards, with the ultimate purpose of publishing them in the "Engineering Manual." In former years the committee work has consisted largely in the presentation of papers without specific recommendations. The committee proposes this year to bring all of the previous work together in the definite form indicated. The afternoon session was taken up with a discussion by the whole committee of each of the sub-committee subjects and in the preparation of an outline covering the method of treatment and principal subdivisions of each subject.

ENGINEERING ASSOCIATION COMMITTEE ON STANDARDS

This committee has now been completed and the personnel is as follows: H. H. Adams, Chicago, Ill., chairman; C. F. Bedwell, Newark, N. J.; C. H. Clark, Cleveland, Ohio; W. G. Gove, Brooklyn, N. Y.; J. H. Hanna, Washington, D. C.; E. R. Hill, New York, N. Y.; E. B. Katté, New York, N. Y.; C. S. Kimball, Washington, D. C.; F. R. Phillips, Pittsburgh, Pa.; A. S. Richey, Worcester, Mass.; W. H. Sawyer, New York, N. Y.; Martin Schreiber, Newark, N. J., and J. W. Welsh, Pittsburgh, Pa.

AMERICAN ASSOCIATION COMMITTEE ON SUBJECTS

This committee met informally on Jan. 28 in Washington to consider the San Francisco program. Those present were: C. L. Henry, Indianapolis, Ind., chairman; M. C. Brush, Boston, Mass.; H. C. Clark, New York, N. Y.; L. P. Crecelius, Cleveland, Ohio, and William Tichenor, Indianapolis, Ind., of the committee, and E. B. Burritt, New York, N. Y., and J. H. Hanna, Washington, D. C. A tentative outline of the program was made covering four topics of general interest which, however, cannot be announced yet as they are subject to modification.

COMING COMMITTEE MEETING

Feb. 11, New York, 10 a. m., standards committee of the Transportation & Traffic Association, L. H. Palmer, Harrison Williams Company, New York, chairman.

Equipment and Its Maintenance

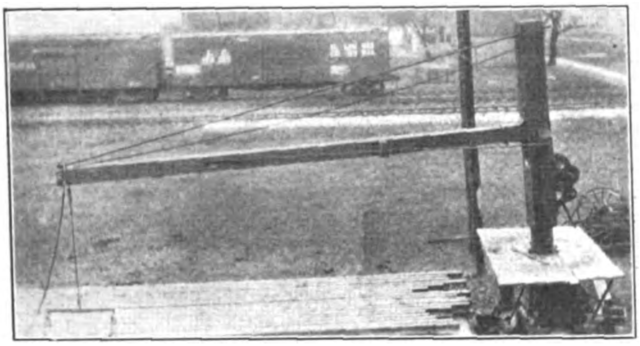
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

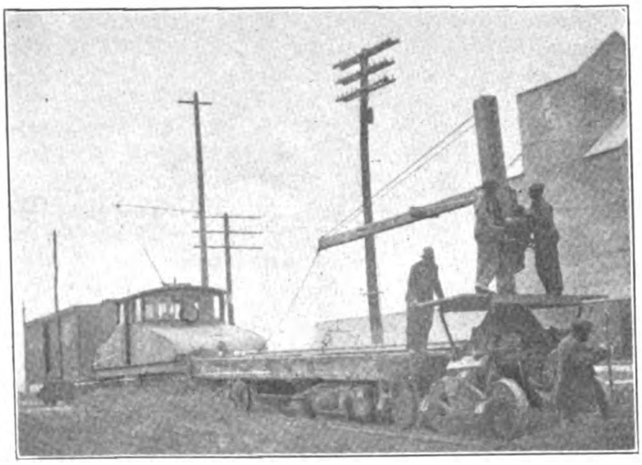
Rail-Laying Outfit on the Kankakee & Urbana Traction Line

BY T. W. SHELTON, GENERAL SUPERINTENDENT KANKAKEE & URBANA TRACTION COMPANY, KANKAKEE, ILL.

A device for laying rails, which has been invented and built by the writer, consists of an ordinary freight-car truck, on which is mounted a movable crane and jib. This jib extends a length of 20 ft., which permits a 33-ft. rail to be lifted out of an ordinary gondola car, to be swung around and to be laid in place on the ties. A brake on the crab attached to the mast of the crane permits the rail to be lowered at will. The device can be used for loading, unloading or relaying rails and, with four men, will unload one rail per minute or about a carload an hour. The rail-handling machine is coupled to the rail car in the ordinary way and is readily moved with it.



SIDE VIEW OF RAIL-HANDLING MACHINE



RAIL-HANDLING MACHINE AND PART OF SUPPLY TRAIN

For laying ½ mile to ¾ mile of track a day two men are required at the crab, two men inside the car, one man to handle the line that swings the jib, two bolters, four spikers, two nippers, four end men for placing rail on ties and one foreman, a total of eighteen men. For laying the same amount of track in the old way forty to fifty men were needed. The machine therefore saves the cost of twenty-five to thirty men.

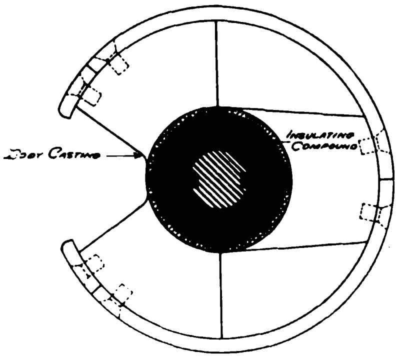
The construction train is composed of the rail-handling device, one loaded rail car, an electric locomotive, a box-car for carrying rail joints, bolts, spikes and all necessary track tools, and one, two or three cars loaded with ties. The accompanying illustrations show the track-laying outfit and part of the train.

The weight of a rail is about 800 lb. which, hanging on the end of a 20-ft. jib, requires a counterweight on the truck of about 5 tons to hold it on the track. This counterweight is obtained by loading the truck with pig iron. The tie-carrying cars are not shown in the views. They are left a short distance back of the train and are unloaded from the cars to wagons, hauled ahead of the track-laying gang and placed on the grade.

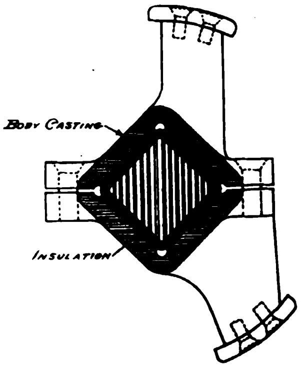
Equipment Defects—Controller Drums, Shafts and Handles—III

BY C. W. SQUIER, E. E.

The general construction of main controller drums consists of body castings of either cast-iron or brass upon which the copper contact segments are fastened with screws. These body castings are insulated from the drum shaft, and the principal differences of drum construction are the result of different methods of insulating these body castings. One of the first constructions used in railway controllers and still generally employed was designed by the General Electric Company and is shown in an accompanying illustration. This makes use of a round shaft with fiber or steel keys, and the body castings are insulated from this by an insulating compound. Bushings of this compound are placed between the shaft and the inside of the body castings, and by applying heat these are softened to form one compact mass.



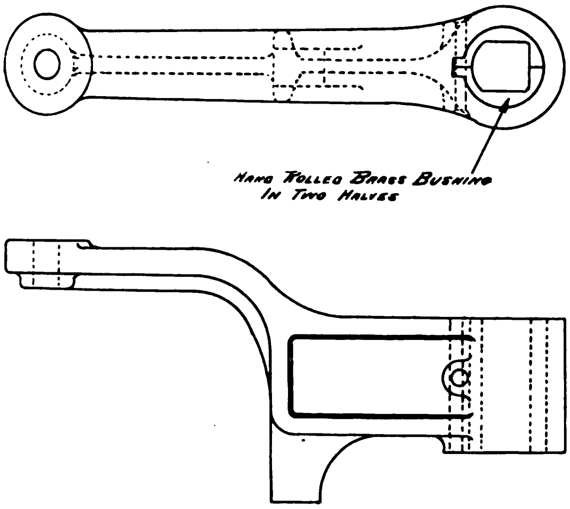
CONTROLLER DRUM WITH BODY CASTINGS INSULATED FROM SHAFT BY INSULATING COMPOUND



CONTROLLER DRUM WITH BODY CASTINGS CLAMPED TO A SQUARE INSULATED SHAFT

The principal trouble experienced with this form of insulation is due to the loosening of the body castings in the compound or the loosening of the compound from the shaft. The first designs employed but one fiber key in the shaft. These were afterward increased to two and the material was changed to steel to try to overcome the troubles due to loosening. The inside of the body castings was also changed from a smooth surface to a corrugated surface, and holes were made to give the compound a firmer grip on the castings. These changes were an improvement over the first construction, but controller drums still require insulation due to loose body castings long before the shafts show excessive wear. Other controller manufacturers have used a square shaft where it passes through the body castings and have made the inside of the body castings square also to give the compound a firmer supporting surface. Hard rubber bushings are also used to insulate the body castings from the shaft, and the bottom of the shaft is provided with a steel clamping nut to secure the bushings in place.

Another form of insulation, which was first brought out by the Westinghouse Electric & Manufacturing Company, is shown in a second illustration. This makes use of a square shaft insulated with mica or pressed asbestos, and on this the body castings are clamped. Some trouble was experienced with this type of construction due to the shrinkage of the insulation as it aged, thus permitting the lengthwise shifting of the body castings on the shaft. This trouble was overcome, however, by using spacing bushings between the different body castings. Another advantage of this type of construction is the ease with which body castings can be replaced without the use of special tools or assembling jigs should they become broken or damaged from burning or short-circuits. The labor required to make repairs with this type of construction is very much reduced, and no trouble arises from loose castings if the clamping screws are carefully tightened and prevented from unscrewing by prick-punching the heads.



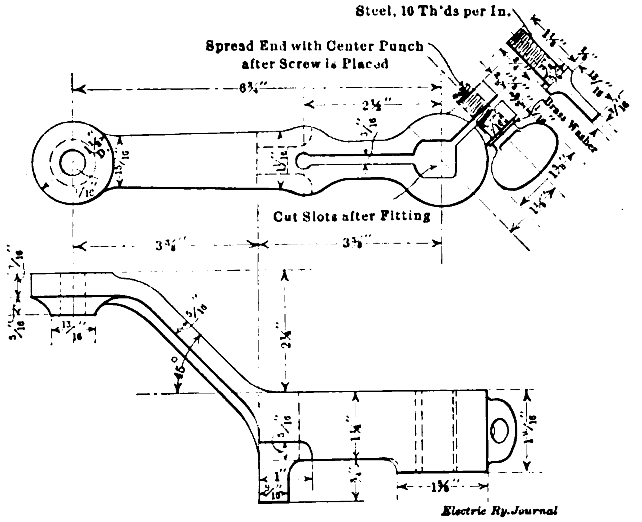
HANDLE FOR K-6 AND K-28 CONTROLLERS WITH RENEWABLE BUSHING

The General Electric Company has also adopted a similar type of insulation in its recent controllers. This consists of a shaft of hexagonal section wrapped with several thicknesses of thin sheet insulation cemented together. The body castings fit over this insulation and are held in place by steel keys which are the width of one of the hexagonal faces. The body castings are prevented from sliding by set screws which pass through bosses in the castings and bear against the steel keys. This construction permits easy renewal of the body castings and also forms a more rigid connection between the shaft and the castings than the molded compound used with other types of controllers.

CONTROLLER SHAFTS AND HANDLES

The principal troubles experienced with shafts and handles are due to wear between these parts. The first designs had no provision for renewal of the wearing surfaces. As a result, it was necessary to scrap the handles and shafts when they had worn too far. The first handles were also made with too short a bearing on the shafts, so that their life was correspondingly short. Operating companies have discovered the need for renewable wearing surfaces, with the result that several types of handles have been developed by different makers. An accompanying illustration shows one method of bushing the standard K-6 and K-28 controller handles. The bushing used consists of either hard-rolled brass or phosphor bronze and is made in two parts. After insertion in the handle the bushing is held in place by a small pin. Other designs of handles have called for a babbitted center instead of a bushing, but of the two types the brass bushing gives the better service.

An effort has also been made to provide for renewal of the wearing surface of the shafts. Steel tubing ⅛-in. thick drawn to the necessary shape for fitting the broached portion of the handles has been developed. This tubing is fitted to the shafts by turning down the worn portion.



K-11 CONTROLLER HANDLE FURNISHED WITH CLAMPING SCREW

Other types of handles have been designed to take up the lost motion caused by worn shafts or wear in the handles themselves. A fourth illustration shows such a handle, for K-11 controllers, which is provided with a clamping screw. The handle is split at the corner of the broached portion, and this can be successfully clamped to a shaft that is quite badly worn. Such a handle is liable to produce excessive wear on the shafts, however, as motormen frequently operate without clamping the handles firmly, and it is the movement of the handle about the shaft that causes wear. This type can be used on shafts that are worn to such an extent that a plain broached handle could not be considered. The principal objection against its use is that if it is not tightly clamped to the shaft nothing is gained, and the fact that the adjustment is left to the motorman permits operation with handles so loose as to be dangerous. There is also no definite means of determining when handles or shafts are worn to such a degree that they should be replaced.

The matter of checking handles and shafts for excessive wear is important but rather difficult to cover satisfactorily. The greatest wear of the handles and shafts occurs at the corners, very little taking place on the sides. Plug or snap gages have not proved satisfactory for condemning handles or excessively worn shafts. The reason is that handles often wear in such a way that they can be turned through a large arc before producing any movement of the controller drum, and yet a gage only a few thousandths of an inch larger than the broached portion cannot be inserted because the wear at the sides is so small. A better way of checking excessive wear is to provide a test board with shafts of standard dimensions for checking the wear of handles by the arc through which they can be moved. If a handle moves to the condemning limits provided it should be taken out of service. A similar method of checking heavily-worn shafts can be used by trying handles of standard dimensions on them and determining the allowable limits of movement.

Location of Trolley Wire on Curves—V

(*Concluded*)

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Distance Between Ears on Curves—In building an overhead trolley wire curve the more ears or points of "pull off" there are, the smoother the curve will be. On the other hand, it will be more expensive for construction and maintenance, and the extra overhead wires will be a greater provocation for adverse criticism from an esthetic point of view.

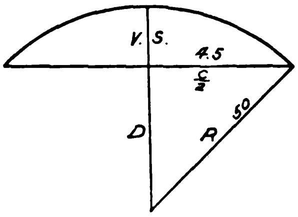


FIG. 8—LOCATING EARS ON CURVES

It is the usual practice to allow about 9 ft. as a good practical distance between ears on a curve of 50-ft. radius, giving an external angle of 5¾ deg. Some engineers go as low as 3½ deg. on this angle, while others give "from 5 deg. to 8 deg." and "not more than 10 deg." From this 9-ft. standard it can readily be determined how to space the ears on curves of other radii so that the scraping of the sides of the trolley wheels against the wire will be the same on all curves of the system as from this standard spacing on the 50-ft. radius curve.

Referring to Fig. 8, which represents an arc of an imaginary circle between two ears of a trolley curve of 50-ft. radius and 9 ft. between the ears, we have

$$V.S. = R - D = R - \sqrt{R^2 - \left(\frac{c}{2}\right)^2} = 0.203 \text{ ft.} = 2.436 \tag{19}$$

inches as the allowable versed sine.

Substituting this 0.203 in the formula

$$V.S. = R - \sqrt{R^2 - \left(\frac{c}{2}\right)^2} \text{ we get}$$

$$0.203 = R - \sqrt{R^2 - \left(\frac{c}{2}\right)^2} \text{ or}$$

c (the distance between ears on curves)

$$= \sqrt{1.624R - 0.1648} \tag{20}$$

The constant quantity under the radical—0.1648—is so small that it can be dropped without affecting the result appreciably and we have

Distance between ears on a trolley wire curve

$$= \sqrt{1.624 \text{ radius}} \tag{21}$$

From this formula the table at the top of the next column has been constructed. Similar tables can be constructed in like manner where from local conditions it seems best to use a different external angle than 5¾ deg.

DISTANCE BETWEEN EARS ON TROLLEY CURVES WHEN USING TROLLEY WHEELS WITH RIGID HARPS (EXTERNAL ANGLE AT EAR 5 DEG. 44 MIN.)

Radius	Distance Apart	Radius	Distance Apart	Curvature	Radius	Distance Apart
35 ft...	7½ ft.	150 ft...	15½ ft.		1000 ft...	40 ft.
40 ft...	8 ft.	160 ft...	16 ft.	5½ deg.	1042 ft...	41 ft.
45 ft...	8½ ft.	180 ft...	17 ft.	5 deg.	1146 ft...	43 ft.
50 ft...	9 ft.	200 ft...	18 ft.	4½ deg.	1274 ft...	45½ ft.
55 ft...	9½ ft.	250 ft...	20 ft.	4 deg.	1433 ft...	48 ft.
60 ft...	10 ft.	300 ft...	22 ft.	3½ deg.	1637 ft...	51½ ft.
70 ft...	10½ ft.	350 ft...	24 ft.	3 deg.	1910 ft...	58 ft.
80 ft...	11½ ft.	400 ft...	25½ ft.	2½ deg.	2292 ft...	61 ft.
90 ft...	12 ft.	500 ft...	28½ ft.	2 deg.	2865 ft...	68 ft.
100 ft...	13 ft.	600 ft...	31 ft.	1½ deg.	3820 ft...	79 ft.
120 ft...	14 ft.	700 ft...	34 ft.	1 deg.	5730 ft...	96½ ft.
140 ft...	15 ft.	800 ft...	36 ft.			

The trolley wire is located exactly at the ears, according to the calculations already explained, and is allowed to depart from exactness of location between successive ears because the trolley wire on curve work as on straight line work is found to wear out faster at the ears than between the ears. Therefore, the wire should be favored as much as possible at the ears.

DEGREE OF CURVATURE

Civil engineers, on steam and interurban track location, use the word "degree" in describing curvatures more often than they do the word "radius" and a few words will show their connection.

The word "degree" as used by locating engineers, means a curvature whose angle subtends a chord of 100 ft. *Example:* A 4-deg. curve is a curve, of which 4 deg. at the center of the circle from which the curve can be imagined to have been struck, will cut out of the circumference of this circle an arc whose chord is exactly 100 ft.

The "radius" can be obtained from the "degrees" by several formulas of varying precision, as follows:

I—Radius $= \frac{5730}{D}$ where D = degrees. This is the simplest but is not quite exact.

Example: Radius of a 4-deg. curve =

$$\frac{5730}{4} = 1432.5 \text{ ft.}$$

II—Radius $= \dfrac{50}{\text{sine}\,\frac{D}{2}}$. This one is more accurate.

Example: Radius of a 4-deg. curve =

$$\frac{50}{\text{sine 2 deg.}} = 1432.664 \text{ ft.}$$

III—Radius $= \dfrac{100 \text{ cosine} \frac{D}{2}}{\text{sine } D}$. This is most accurate.

Example: Radius of a 4-deg. curve =

$$\frac{100 \text{ cosine 2 deg.}}{\text{sine 4 deg.}} = 1432.611 \text{ ft.}$$

NOTE:—The radius of a 4-deg. curve is usually given as 1433 ft.

A few of these "degrees" and corresponding radii are given in following table.

Curvature	Radius	Curvature	Radius
1 deg.	5730.0 ft.	11 deg.	521.7 ft.
2 deg.	2865.0 ft.	12 deg.	478.3 ft.
3 deg.	1910.0 ft.	13 deg.	441.7 ft.
4 deg.	1433.0 ft.	14 deg.	410.3 ft.
5 deg.	1146.0 ft.	15 deg.	383.1 ft.
6 deg.	955.3 ft.	16 deg.	359.3 ft.
7 deg.	819.0 ft.	17 deg.	338.3 ft.
8 deg.	716.8 ft.	18 deg.	319.6 ft.
9 deg.	637.3 ft.	19 deg.	302.9 ft.
10 deg.	573.7 ft.	20 deg.	287.9 ft.

The motorman's gong, mounted as it is under the platform, is not only subject to rust but a perfect catch-all for the soilure of the streets. Under these conditions the sound of the gong soon becomes dull and little better than a click. At the Wolf Street shops of the New York State Railways, Syracuse Lines, such gongs were formerly restored to their original tone only after a good deal of scraping, but it has since been discovered that an ordinary sandblasting outfit is by far the quickest and most effective cleanser.

Handling and Sale of Car Wheels, Rails and Scrap Iron

BY J. P. ALEXANDER

The minimum carload shipments of car wheels, rails and scrap iron on railroads east of the Mississippi River and north of the Ohio River is as follows:

Car wheels (scrap)	44,800 lb.
Rails (old)	56,000 lb.
Mixed railway scrap	44,800 lb.

On the other hand the fully-loaded cars run in the case of scrap:

Car wheels—car loaded is 30 per cent under capacity.
Old rails—car loaded is 10 per cent to 20 per cent under capacity.
Frogs and crossings—car loaded is 40 per cent under capacity.
Mixed railway scrap—car loaded is 30 per cent to 40 per cent under capacity.

Unless a company selling scrap materials has its own scales, it is compelled as a rule to take railroad weights, and it is usually good practice to inquire as to the condition of railroad scales and as to who does the weighing. If possible, have a representative watch the weighing to insure the company against loss through collusion.

The loading of heavy scrap is hard work. Where it is carried on by hand the workmen and foreman should be cautioned and protected against accidents, for the falling of a single heavy piece may produce a permanent cripple for the claim agent to deal with. Overhead or boom cranes or hoists with portable electromagnets should be used if power is available.

Where much loose material is thrown into a car it should go in first, and the heavier material should be placed on top. Then the car is less likely to be robbed in transit, and is more readily unloaded at destination.

It hardly ever pays to sort mixed scrap unless it contains an unusual amount of steel castings or broken parts. Steel axles should always be piled separately, as the advanced price of scrap steel axles would justify their removal from scrap piles, even if the cost ran as high as $1 per ton of scrap moved.

In shipping to concerns of unquestionable standing, a straight bill of lading could be used, and the material regularly billed on reported weights. It is a good practice and much more satisfactory, however, to sell f.o.b. cars shipping point, and ship on order, bill of lading attached to draft, insuring immediate settlement, and saving any controversy over market changes or delays in transit.

At one time the writer had six cars of rails caught in an embargo declared on iron shipments. The railroad company was told not to accept shipments for a certain mill, after a stated date. The cars loaded and on the way were stopped and sidetracked. It took some time to get the material accepted and delivered at a sacrifice and the demurrage waived. Due time should be specified in sale contracts for loading, transit and possible stoppages, in order that such losses as this cannot occur.

When the management backs up the purchasing agent who sells the scrap by giving the help necessary for rapid loading and shipment according to contract, buyers will subsequently offer better prices, knowing that rapid shipments will be made when promised. This point is often overlooked with consequent loss to sellers.

The most common error in shipments is inversion of figures by the clerks who handle the weights. If the difference in weight reported is divisible by 9, the mistake is usually an inversion, and can be looked for in the car weights reported by the railroad and the original scale weights.

Demurrage rules, except for loading, and unloading time which should be doubled, are not objected to by a shipper if the proper notifications are given, for it forces the movement of cars and makes the securing of empties much easier, where cars for loading are desired. Flat-bottomed gondolas of 60,000, 80,000 and 100,000 lb. capacity are best for iron shipments and rails. They should be inspected before acceptance for loading, for if discovered in bad condition after loading, the steam railroad may refuse to reload into another car or accept shipment without charge and delay, and material may have to be sacrificed because the terms of delivery of sale are broken by such delay. Gondolas set in for loading should not have drop bottoms, as poorly-maintained bottoms may drop down and cause a wreck, making the shippers partly, or in whole, liable for damages.

In dealing, order bill of lading attached to draft. When distant parties offer particularly good terms for materials, it is a good plan to have in correspondence in the same locality a second or third possible customer who will take the material if the first party refuses it. It is an old trick of iron brokers and some mills to refuse or condemn incoming shipments and try to buy them at lower figures, knowing that the accumulated freight and demurrage and the cost of returning material to starting point is a dead loss to the shipper. Many traction companies have had experiences of this kind that should cause them to hold such cars in their own railroad yards until the drafts are lifted. This insures a small demurrage, perhaps, but not necessarily more than loading cost and switching charge.

The ruled sheet reproduced has been found by the writer to be useful in keeping track of outgoing shipments.

While rails are bought in short tons of 2000 lb., old rails are usually sold in long tons of 2240 lb., called gross tons, the following being average prices (Chicago, Ill.):

	F. o. b. cars shipping point, per gross ton
Old rails	$11.50
Frogs, switches and guards	9.00
Mixed scrap iron	9.00
Old car wheels	10.25
Cast scrap	10.00
Steel scrap	9.00
Malleable scrap	7.50
Car wheels	10.25

The sales agreement recommended by the writer is of the following general form, subject to the "OK" of the legal adviser of the sellers:

CHICAGO, ILL., Dec. 24, 1914.

(Two copies, original and duplicate)

The undersigned hereby agree that party of the first part, the Blank Traction Company (sellers), will sell to the parties of the second part, A. B. C. & Company (buyers), the approximate gross tonnage stated below, in least minimum carloads of clean material, at the prices, f. o. b. cars shipping points named, with the understanding that the buyer is to have an inspector on hand to watch the satisfactory loading and weighing, shipment of car without protest on his part to constitute acceptance of car at weight and classification given by shipper. All shipments to be order bill of lading attached to draft, and railroad weights to be accepted.

Tonnage	Material	Located at	Price per gross ton	To be shipped to
2000 tons	Old rails	Alton, Ill.	$16.00	Chicago, Ill.
200 tons	Old car wheels	Alton, Ill.	15.00	Chicago, Ill.
1000 tons	Mixed scrap	Alton, Ill.	14.00	Chicago, Ill.

Routeing of cars desired, their capacity and kind, to be given on or before..............1915, by the buyer, and shipments to proceed commencing..............1915, cars to be loaded and shipped in accordance with such instructions from the buyer at the rate of at least two days' loading time per car, all shipments to be completed on or before..............1915. Memorandums of shipments and routing to be sent to buyer immediately on shipment, the sellers not to be liable for delays arising from accidents, wrecks or car shortages beyond their control, and affecting loading. Shipper's liability for rapid delivery of material to cease after delivery of shipment to the railroad company.

All payments made by the shipper in settlement for bill of lading without draft to be in cash or equivalent, a memorandum of exact weight and amount being furnished by the seller. Any further details to be agreed upon in writing by signers.

I agree to the above terms:

.... Buyer.
Date..................

.... Seller.
Date......................

The accompanying record sheet form will be found useful for inserting weights and amounts, while the distribution of the credits on the credit sheet shown brings up the fact that the clause of the contract, "any further details to be agreed upon in writing by signers," takes care of allowances to buyers for dirt or reduction in selling price, delays in shipping, etc., where consequent losses ensue. The writer believes that some of the points mentioned may be of interest to those who intend shortly to move any old rails or other scrap materials.

MEMORANDUM OF CREDITS—SCRAP SALE—1915

Material	Amts	Credits Allowed Buyer	Final Amts.	Credits: Stock Account	Credits: Track No. 2	Credits: Shop No. 32	Credits: Blank St. Recon.	Credits: Main St. Recon.	Totals
Wheels....	$514 99	$45 52	$469 47	$469 47					$469 47
Rails.....	3257 34		3257 34		$318 39 * 913 87		$1120 13	$904 95	3257 34
Frogs.....	1017 30	35 83	981 47		200 00		781 47		981 47
R. R. scrap	1223 95				238 29	985 66			1223 95

* Entire cost of loading.

SCRAP SALE RECORD, CHICAGO, ILL.—1915 SHIPMENTS COMPLETE—6-7-1915.

Cars: Set	Cars: Loaded	Cars: Shipped	Car Initials	Car Numbers	Loaded With	Car Capacity	Car, Light Wt.	Car, Gr. Wt.	Tare	Net Wt.	Gross Tons	Price per Gr. Ton	B. L. Rec'd	Amt.	Totals	Shipping Point	Destination	Consignee
1915 6-1	6-2	6-3	PRR	62323	Wheels	10,000	48,700	110,800	38,700	Reported 6-4 72,100	32 187	$16 00	Rec'd 6-4	$514 99		Switch at "B" Barn	S. Chicago	A. B. C. Steel Co.
6-2	6-3	6-4	C&NW	147196	Rails	8,000	31,000	96,600	30,800	6-8 65,800	29 375	16 00	Rec'd 6-5	470 00		Switch at "C" Barn	S. Chicago	A. B. C. Steel Co.
6-5	6-6	6-7	C&NW	57752	Rails	10,000	46,000	133,540	46,040	6-10 87,500	39 062	16 00	Rec'd 6-7	624 99		Switch at "D" Barn	S. Chicago	A. B. C. Steel Co.

The following credit sheet mentioned above has figures chosen at random for illustration purposes only. The bookkeeping or auditing department should have a proposed form submitted to it, in order that such changes can be made as will give the officials of the department every chance to secure all data they might later desire.

A general conference of department heads should be held at times as to the distribution of credits derived from a sale, and details as to the records to be taken for crediting particular accounts, or jobs, co-operation of the several mechanical departments, and utilization of loading facilities, crews, or cars to attain the lowest cost of handling and shipping scrap.

At such conferences, such questions as the collection, classification and safe storage of all kinds of scrap should be considered and arrangements should be made to prevent the labor cost of rehandling as far as possible in future.

New Cars of the Niagara, St. Catharines & Toronto Railway

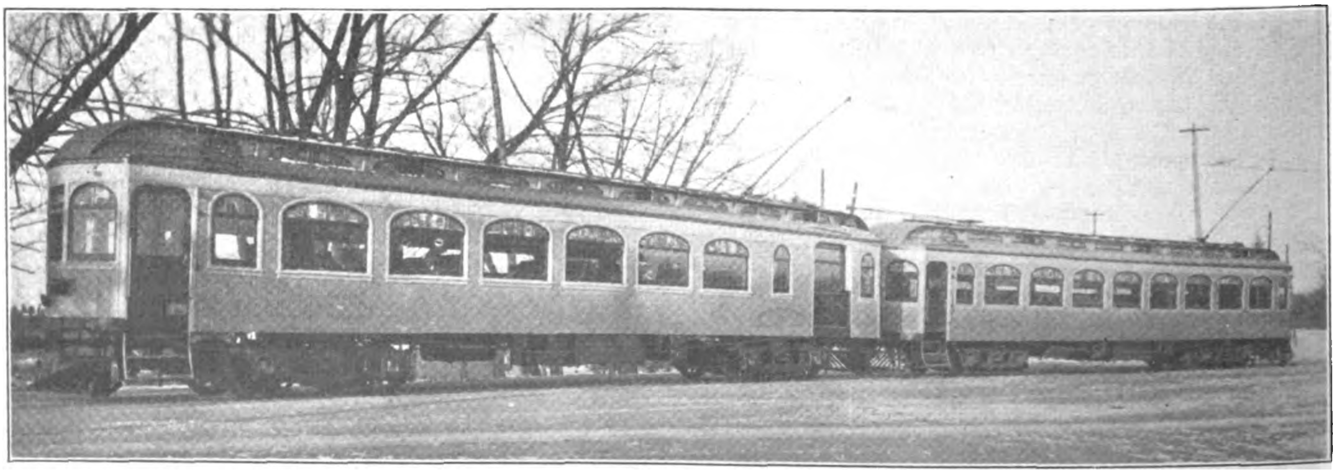
The Niagara, St. Catharines & Toronto Railway has recently purchased six 45-ft. pay-as-you-enter cars for city service and six 55-ft. 6-in. semi-steel and wooden cars for interurban service, all from the Preston Car & Coach Company. The following is a description of the interurban cars:

The cars are 55 ft. 6 in. over all, 13 ft. high from the rail to the top of the car and 10 ft. wide over all. The underframing and sides are of solid steel. The exterior painting consists of two colors of steel gray with black trimming. The interior finish of the car is in mission. The seats are high-backed. In three of the cars the upholstering is leather, while the other three have green plush.

These cars are built for two-car train operation, one car of the train containing a baggage compartment and the other a smoking compartment. The seating capacity per car is sixty-seven. The weight of each of these interurban cars is 75,400 lb.

The electrical equipment per car consists of four GE-219 75-hp motors with multiple unit control for train operation.

The air equipment is A.M.M. Westinghouse. The cars are equipped with electric markers and classification lights and with the latest type of Peter Smith electric heater with forced draft and thermostat control.



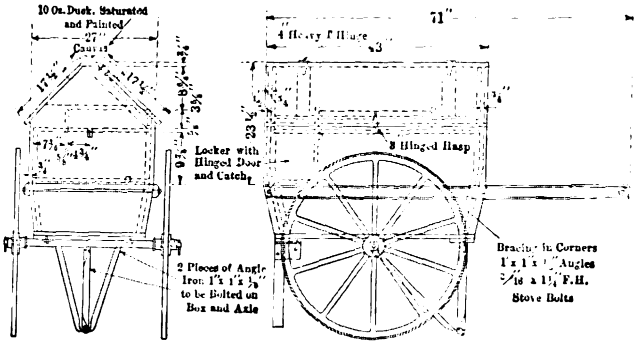
TWO-CAR TRAINS OF SEMI-STEEL, ALL-MOTOR CARS FOR THE NIAGARA, ST. CATHARINES & TORONTO RAILWAY

Syracuse Step Lighting at the Step

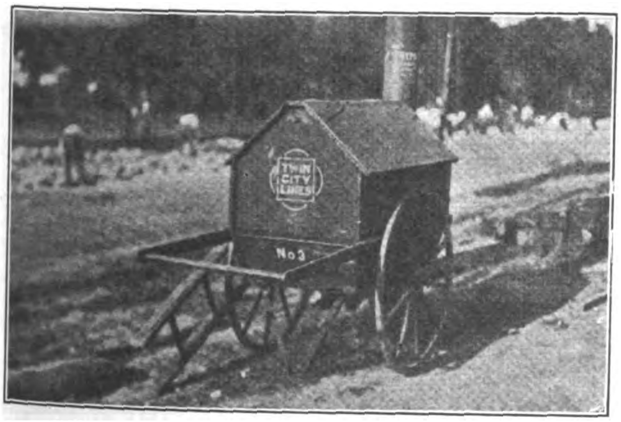
The New York State Railways, Syracuse Lines, has equipped a number of its cars with step lamps at the front exit, the lamp being located to throw the light directly on the step. Other users of step lamps generally have placed the lamp over the doorway, but this can hardly be considered the best position as the lamp is too far from the step. The Syracuse lines have therefore installed the step lamp just where it will do the most good. The favored position is behind the bumper. However, on those cars where no bumper room is available, the lamp is installed behind the step. In either case the light is much closer to the tread and pavement than before.

Cable Splicer's Portable Tool Box Used in the Twin Cities

To facilitate the movement of a cable splicer's tools in his daily travels about the city, a compact, substantially-built portable tool box has been furnished to him by the electrical department of the Twin City Lines, Minneapolis, Minn. This box is arranged with shelves and bins and is large enough to receive a complete kit of cable splicer's tools. In addition to the tools generally used in this class of work, this box is fitted with a Globe kerosene-oil furnace with a reservoir sufficiently large for a two days' run, a Pyrene extinguisher, a bank of lamps, rubber gloves and a first-aid outfit consisting principally of supplies for the treatment of burns. As shown in the accompanying illustrations, the tool box is in the form of a hand push cart. The box was built of ¾-in. hard pine reinforced with 1-in. x 1-in. x ⅛-in. angles and mounted on an axle with 36-in. wheels. The principal dimensions and materials are also shown clearly in one of the accompanying illustrations.


10 Oz. Duck, Saturated and Painted
27"
Canvas
17¼"
17¼"
8⅜"
3⅝"
7⅜"
4¾"
Locker with Hinged Door and Catch
2 Pieces of Angle Iron 1" x 1" x ⅛" to be Bolted on Box and Axle
71"
4 Heavy T Hinge
43
23½"
1¾"
3 Hinged Hasp
Bracing in Corners 1" x 1" x ⅛" Angles 5/16 x 1¼" F.H. Stove Bolts
Electric Ry. Journal

CONSTRUCTION DETAILS OF THE TWIN CITY CABLE SPLICER'S TOOL CART



TWIN CITY CABLE SPLICER'S TOOL CART IN USE

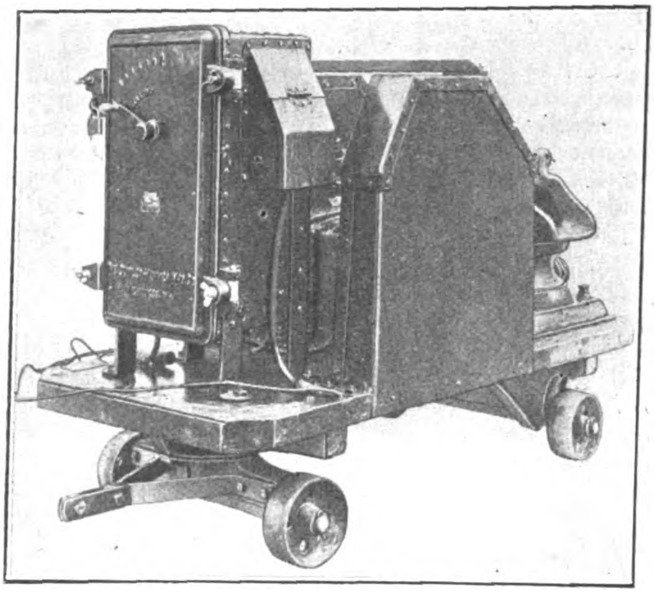
Power-Driven Drainage Pump for Manholes

BY "CONDUIT"

For about a year past the Brooklyn Rapid Transit System has been using a portable motor-driven outfit for draining manholes, which outfit was assembled at the company's shops.

The apparatus, which is mounted under cover as shown in the accompanying illustration, comprises a No. 3 Edson frictionless, non-chokable, side-suction pump, a 550-volt Northern Electric motor and a Cutler-Hammer type "C" water-tight non-reversible, panel type starter.

The pump operates at from forty-five strokes to fifty strokes per minute, and its capacity is 1 gal. per stroke when pumping from a height of 8 ft. above the water in a manhole. This capacity is about five times that of the hand pump formerly used.



POWER-DRIVEN DRAINAGE PUMP MOUNTED FOR TRANSPORT

The maximum current consumption of the pump at 550-volts is about 2 amp. The cost of this outfit was about $200. it requires no special means of conveyance, as it is placed on the small jigger wagon usually employed by the manhole cleaning gang.

Rochester Water-Power Plant

A hydroelectric generating station with very low cost per kilovolt-ampere has recently been put in operation by the Rochester Railway & Light Company. The total cost of the station, the capacity of which is 4500 kva, was $176,000, making a cost per kilovolt-ampere of $39.10.

The total cost included the preliminary investigation reports, cost of building, intake and fore-bay construction, head works, penstock, tailrace, and 3000 ft. of underground lead cable for tying this plant to two other generating stations, as well as the initial and installation cost of the hydraulic and electrical apparatus. This figure, however, does not include any items covering water rights or real estate. During the eight months since the plant was put in service on March 15, 1914, it has generated 12,000,000 kw-hr., operating at a load factor of approximately 46 per cent. The possible winter output is larger on account of the larger amount of water available.

The building, which is located on the Genesee river in the heart of the city, is a one-story structure of reinforced concrete, inside dimensions 38 ft x 96 ft. The generating equipment consists of one 3000-kva Westinghouse waterwheel generator, 11,000 volts, three-phase, twenty-five-cycles, direct connected to a 5000-hp Wellman-Seaver-Morgan horizontal turbine and one 1500-kva, Westinghouse waterwheel generator of the same voltage and frequency, direct-connected to a 2500-hp horizontal turbine furnished by the Camden Waterwheel Works. The station is operated in parallel with a 15,000-kva, twenty-five-cycle steam plant and the hydraulic plant of the Niagara, Lockport & Ontario Power Company at Niagara Falls, 100 miles distant, which supplies energy to the Rochester Railway & Light Company at 60,000 volts.

New General Electric Apparatus

A review of the work in design of electrical apparatus by the General Electric Company during the past year discloses the development of much machinery applicable to electric railway operation. Among other equipment the company has built a 30,000-kw, 6600-volt, twenty-five-cycle horizontal steam turbo-generator set for the New York Edison Company put in operation in November, 1914. This turbine operates at 1500 r.p.m. and normally under 185-lb. steam pressure. The overall dimensions are: length, 57 ft. 4 in.; width, 19 ft. 8 in., and height, 14 ft. 3 in. A number of similar machines ranging in capacity from 20,000 kw to 35,000 kw are on order and several of these have been shipped. The inherent simplicity and relatively compact arrangement of these large turbo-generators has made it possible to effect installation in a remarkably brief time. As an example, a 12,500-kw set was completely installed for the Toledo Railway & Light Company and placed in commercial service within fourteen days after its arrival in Toledo. The company has also recently constructed a number of d.c. generators of exceptional capacity designed for water-wheel drive. At present work is nearing completion on a lot of eleven horizontal-shaft d.c. machines of this type, each having a rated output of 5200 kw, 520-volts at 170 r.p.m. These exceed in size any generators of their type previously built.

Improvements have also been made in gas-engine driven generators. There are now in the Schenectady Works three units of 1390-kva capacity, 2300-volts, sixty cycles, arranged for operation at 116 r.p.m. They will be utilized by the Monongahela Traction Company, Fairmont, W. Va., and are said to be the largest sixty-cycle generators designed for gas-engine drive. Other and larger units, but for twenty-five-cycle operation, have been constructed in prior years for the Bethlehem Steel Company, being of 3125 kva. An equitable basis of guarantee for the parallel operation of both gas-engine and steam-engine driven generators has been developed by the General Electric Company, which should prove of value to the builders of engines and generators and to the operator.

Another piece of apparatus installed during the last year for railway service is a frequency changer set used to inter-connect the Boston Edison and Boston Elevated Systems. This is a horizontal shaft set, the sixty-cycle unit being rated at 9500 kva, 13,800-volts, and the twenty-five-cycle unit rated at 9000 kva, 13,200-volts. The set operates at 300 r.p.m. and is reversible. It is totally inclosed and provided with inlets for an external air supply which discharges into the station. This is the largest frequency changer set produced by the General Electric Company and is said to be the largest machine of this type in service to-day.

Prior to 1914 the largest core type transformers produced by the General Electric Company did not exceed 2000 kva in rated capacity, but during the year the maximum rating was carried up to 7500 kva. Improvements in design have also greatly reduced the interruption to service in transformers as they are now capable of withstanding momentary short-circuits under sustained primary voltage without injury to the coils. This has been accomplished largely through changes in the grouping of the coils and working to higher inherent reactance. A combination transformer, which may be operated either self-cooled or water-cooled, has also been developed during the year. When self-cooled it may be operated safely at 50 per cent of normal load, and when provided with the necessary cooling coils can be used efficiently at 50 per cent above the normal capacity. Improvements in reactances have also been developed for the protection of feeder lines.

The improvements in motors, especially those for higher voltages, have been described in detail in these columns in the past year. Among the most conspicuous are the motors for the Chicago, Milwaukee & St. Paul Railway, those for the locomotives for the Bethlehem & Chile Mines Company, the 2400-volt motors for the Michigan Railway Company and the Canadian Northern Railway, 1500-volt motors for a number of lines, and the GE-247 motor designed for 24-in. wheel, low-floor city cars.

Fiber Bushing for Signal Cord Fixtures

Martin A. Pahler, a carhouse foreman of the Third Avenue Railway System, New York, has recently patented a signal cord bushing which is made preferably of fiber but which can be manufactured of other suitable material. The object of the invention is to reduce the rate of wear of the cords by furnishing smooth rounded surfaces for bearing them, and also to transfer the wear from the bracket openings to the bushings. While the use of bushings for purposes of this kind is not new, the merit of this particular invention lies in the care given to secure non-cutting and non-abrasive surfaces and in the simple means for replacing the bushing when necessary. Mr. Pahler has made arrangements with the Hard Fibre Sales Company, New York, to manufacture the bushings mentioned.

The Tatra 1650-Volt D. C. Railway

The Tatra Railway, located in the central Carpathians of northern Hungary, was built four years ago as a meter-gage, 550-volt d.c. line, chiefly for tourist travel. It has since been lengthened from 8.4 miles to 22.5 miles and supplied with 1650-volt d.c. equipment by the Hungarian Siemens-Schuckert Works.

The overhead line is of simple catenary type with hangers placed about 13 ft. apart for safety against breaks in trolley wire. Energy is supplied from 220-kw motor-generator sets. The a.c. end of a set is a motor taking 3300-volt energy which has been stepped down from 15,000 volts, forty-two cycles; the d.c. end consists of two 825-volt generators permanently connected in series. A storage battery of 794 cells with Pirani equipment is also used.

Part of the rolling stock is made up of converted 550-volt equipment, but this is used only on days of heavy traffic. Each new car carries four 44-kw (60-hp) 750-volt motors of commutating-pole type, each pair being permanently connected in series. The speed of a new car on a 6 per cent grade is 12.4 m.p.h. and on level grades 24.8 m.p.h. The contactors for the control system are operated with current from a motor-generator set. The old cars have only two motors, also of commutating-pole type, and these are operated directly from the ordinary controller.

News of Electric Railways

BROOKLYN CONSTRUCTION PROGRESS

Summary of Work Completed by Brooklyn Rapid Transit Company Under Dual Contracts

The New York Municipal Railway Corporation (Brooklyn Rapid Transit) has issued its progress report on new construction work to the end of December. The work of reconstructing the Lutheran Cemetery line, hitherto involving the operation of elevated trains on the surface from Palmetto Street to Metropolitan Avenue, is practically complete, only the details of station finish and the installation of a few sections of track and third-rail remaining, along with the erection of a temporary connection between the new steel structure and the existing structure at Myrtle Avenue. Jan. 31 has been tentatively fixed as the date of commencement of through operation on the new Lutheran Cemetery line.

Reconstruction on the Sea Beach line is rapidly approaching completion. The excavation has been completed throughout the length of the Sea Beach reconstruction. The erection of steel is 85 per cent completed. During December an additional 2 miles of track was ballasted on the Sea Beach route, 2 miles of third-rail was installed, 30 per cent additional track bonded and about 20 per cent additional conduit installed for station lighting.

The new substation at Sixty-fourth Street on the Sea Beach line and the enlargement of the substation at New Utrecht Avenue are approaching completion, and the installation of additional electrical equipment is under way.

The contract for station buildings on the Sea Beach line has been approved by the Public Service Commission and invitations for bids have been sent out to contractors.

The trucks and bodies of the new subway cars for the New York Municipal Railway have been arriving at intervals at the Thirty-ninth Street shops of the company and are being set up and fitted out with electrical equipment, seating and lighting facilities, etc. Fifty of the new cars are now being assembled in the shops, and, as fast as completed, they are being tested out under actual service conditions on lines adjacent to the Thirty-ninth Street shops. Two hundred of the new cars are contracted for and 600 will ultimately be obtained.

During December the diversion of West End and Culver line trains from the line of construction work was completed, which materially facilitated construction progress.

In the third tracking of the Fulton Street elevated line, in the section where construction work is going on, between Nostrand Avenue and Manhattan Junction, the reinforcing of column foundations has been completed; 560 tons of old structural steel has been withdrawn and replaced with new girders, and steel in excess of 3000 tons has been delivered for use in strengthening the structure to accommodate the third track. The temporary station at Utica Avenue has been completed, and plans and specifications have been prepared for the construction of permanent stations, which plans have been approved by the Public Service Commission and invitations have been sent to contractors to bid upon them.

With respect to the Broadway third tracking, the fabrication of steel, assembling of plant and organization for erection of steel on a section of the Broadway elevated line from Havemeyer Street to Myrtle Avenue have continued satisfactorily; work has commenced on the reinforcing of column foundations, and plans and specifications have been submitted to the Public Service Commission covering the third tracking of the Broadway line between Myrtle Avenue and East New York.

In the Center Street Loop, which will ultimately connect the Broadway and Fulton Street elevated lines, work continued during December on the block signaling and interlocking plants, upon the lighting and ventilation of the tunnel and station and platform lighting.

The Liberty Avenue elevated line at the end of December was within 33 per cent of completion. The contract has been awarded for the erection of stations, and work on the station structures will begin as soon as weather conditions allow. Satisfactory progress has been made in the installation of track and third-rail.

Plans and specifications have been approved by the Public Service Commission for section No. 1 of the Jamaica Avenue line from Crescent Street, the terminus of the present Cypress Hills elevated in the Borough of Brooklyn, to the junction of Myrtle Avenue and Jamaica Avenue in the Borough of Queens.

TORONTO MUNICIPAL RAILWAY EXTENSIONS

On Jan. 1 the ratepayers of Toronto, Ont., approved the extension of the present civic railway system and the acquirement of the Kingston road line of the Toronto & York Radial Railway from Queen Street to the city's limits. Asked as to the policy of the city in regard to the running of this latest branch, Works Commissioner Harris said it had not been settled whether the city or the company was to operate the line. The Kingston road line will not come into the city's hands until the City Council passes the by-law appropriating the necessary $6,021. The ratepayers sanctioned a $425,000 expenditure for the extension of the civic railway system, and as a result a line will be built on Lansdowne Avenue southerly from St. Clair Street to the tracks of the Canadian Pacific Railway. The new North Toronto line will be built as soon as the road through Mount Pleasant Cemetery is completed. The Lansdowne Avenue line will cost $105,000 and the North Toronto line $320,000.

THE INDIANA LEGISLATURE

The Indiana Legislature convened on Jan. 11. The following bills have been introduced in the House: A bill requiring steam and electric roads to install, at all public crossings where the view of approaching trains is obstructed and the obstruction cannot be removed, an automatic gong or bell, or a flagman, to warn the public of an approaching car or train; a bill making it unlawful for any steam or electric road to permit any car or train to remain standing across any street or highway while discharging passengers, except that if the train is longer than the distance between two streets or highways crossing the track, the train may discharge passengers while standing across one only of such highways; a bill providing that in case a city causes any street in which electric street railroad tracks are laid to be paved with any kind of material, the space between the rails and tracks and a certain distance outside the rails shall be paved at the same time and with the same material; a bill making it unlawful to procure copies of pending bills except by permit from the presiding officers of the House and Senate, requiring all persons or corporations to register their attorneys or agents with the Secretary of State, paying a fee therefore, and filing statements of all salaries and expenses paid such agents; a bill giving the boards of public works of cities the right to condemn land, or open or close streets and alleys for railroad purposes; a bill providing that employees in power houses and substations, switchboard operators, attendants controlling or reporting train movements of passenger or freight trains or cars of interurban railroads shall not be permitted or required to work more than nine hours in one day or more than sixty hours in any week; a bill providing penalties for persons tampering with or interfering with any safety device used by any common carrier on its cars, or with any telephone or signal wires or devices; a bill requiring employers to pay within seventy-two hours all wages due any employee who is discharged or who quits service, also giving a letter setting forth correctly the facts relating to the service and cause of termination of same; a bill providing that all common carriers shall afford reasonable and proper facilities for interchange of freight traffic between their respective lines at junction points, a junction point being defined as a point served by two or more railroads, either by main line or switches, an actual physical crossing not being considered necessary to constitute a junction. This act applies to both steam and interurban railroads.

The following bills have been introduced in the Senate:

A bill making it unlawful for any public utility, when an order for examination has been made by the Public Service Commission, to divert or pay out any funds from its treasury for the purpose of concealing its income or assets; a workmen's compensation and employer's liability bill, supported by the State Federation of Labor.

No definite action had been taken on any of the above bills up to Jan. 23.

PRESIDENT LILIENTHAL'S REPLY

He States Attitude of His Company Toward the Municipal Railway

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., has replied specifically to the seven questions put to the company in the resolution passed by the Board of Supervisors calling upon the company to state its policy regarding extensions and improvements. The reply is concluded as follows:

"The United Railroads is financially able to meet all of its obligations to this community and will gladly do so. In fact, notwithstanding the dullness of the times and the constantly increasing competition, the company has seen its way to increase the wages of the employees; to insure their lives for the benefit of their families, irrespective of their physical condition and without cost to them; to establish a system by which any saving of costs by the reduction of accidents will inure to the benefit of the employees; and to make numerous loans to them to take or keep them out of the hands of loan sharks.

"It is certainly not the policy of this company to obstruct in any way the extension of the municipal lines. We believe that the city engineer will bear us out in the statement that we have rendered every assistance in connection with furnishing specifications or information to his office, in connection with the construction of the city lines, both as to track and roadway and rolling stock, and this same policy will be pursued in the future. We have also furnished the city with our shop facilities to make repairs to their equipment and have only charged the city for such services at their actual cost.

"It is the policy of this company to concede to the city every request which it might make of the company, but, just as your Honorable Board are trustees for the public, the directors of the company are trustees for its creditors and stockholders and must obtain for every concession some reasonable equivalent. Approaching every negotiation, as we mean to do, in the right public spirit, it ought to be possible for us to avoid all friction, and we shall certainly co-operate to that end.

"Finally, we beg leave to say that the public is entitled to adequate transportation facilities, and, to the extent that private capital cannot or will not build the necessary extensions, it is not alone the right but the duty of the city to furnish the same, and we would not, if we could, do anything to obstruct the fulfilment of that duty."

PLAN FOR PUBLICATION OF UTILITY COMMISSION DECISIONS

The Utilities Publication Committee of New York has sent to public utility companies in the United States an announcement in regard to the scope and character of the plan for publication of "Public Utilities Reports Annotated." This plan was described in the issue of Dec. 5, 1914. The reports are to be published by the Lawyers' Co-operative Publishing Company of Rochester, N. Y., beginning as of Jan. 1, 1915. The enterprise is indorsed by the American Electric Railway Association, National Electric Light Association and American Gas Institute.

The committee says that the amount of material issued by the public service commissions in the country is so voluminous and a large part of it is necessarily of so temporary a character as to make the publication in its entirety commercially impractical. All material of general interest and permanent value, however, will be contained in the reports. The committee adds: "In order that such a set of reports may be a success it is obvious that the public service companies in the country must very largely subscribe therefor. In order to insure the success of the undertaking assurances have been given the publishers of substantial support from the public service corporations."

In order that these assurances may be carried out, a committee has been formed, of which E. W. Burdett, counsel of the National Electric Light Association, is chairman. The circular is sent in behalf of the committee, the other members of which are as follows: Randal Morgan, United Gas Improvement Company; J. W. Lieb, Jr., New York Edison Company; Anton G. Hodenpyl, Hodenpyl, Hardy & Company; Owen D. Young, counsel General Electric Company; O. B. Willcox, William P. Bonbright & Company, New York; Bernard Flexner, counsel Middle West Utilities Company; Charles F. Mathewson, counsel Consolidated Gas Company of New York; L. D. H. Gilmour, counsel Public Service Corporation of New Jersey, and Z. K. Graham, secretary.

TRANSIT MATTERS IN CINCINNATI

At a meeting of the City Council at Cincinnati, Ohio, on Jan. 19, City Solicitor Walter Schoenle was granted the right to examine the books of the Cincinnati Traction Company and the Cincinnati Street Railway in order to secure data needed in the readjustment of fares in 1916.

Director of Public Service Fosdick has informed Mayor Spiegel that service has been improved by reducing the schedule two minutes on a number of local lines. Additional cars will be put on to meet the Cincinnati, Milford & Loveland cars morning and evening.

At a meeting of the Business Men's Club on Jan. 20 George W. Harris, president of the Sinking Fund Commission, expressed the belief that the Cincinnati Traction Company would be willing to finance the proposed rapid transit belt. W. Kesley Schoepf, president of the Cincinnati Traction Company, refused to comment on the matter until he had given it further thought.

In a talk before the Advertisers' Club at the Hotel Metropole on the same day, John E. Bleekman, vice-president of the Cincinnati Union Depot & Terminal Company, said he believed that an elevated road would be better than the belt line that has been planned for the city. His company will offer either a privately-owned or publicly-owned proposition.

REPORT OF RHODE ISLAND COMMISSION

The Public Utilities Commission of Rhode Island said in part in its third annual report to the Legislature of that State:

"The matter of providing for a suitable inspection of the several utilities was urged in the last report to the Governor. Whatever work of this nature has been done during the year has necessarily been done by the members and employees of the commission at such times as they have had occasion to make use of utilities. Naturally the best result cannot be obtained with this method of supervision, and for that reason the adoption of suitable legislation providing for the employment of inspectors properly qualified to inspect and supervise such utilities, particularly railroads and railways, is suggested.

"In relation to the matter of requiring every public utility to keep and render to the commission uniform accounts of all business transacted, attention was called in the last report to the apparently unintentional repeal of certain sections of chapter 215 of the general laws, one of which provided that annual returns should be made to the railroad commissioner. At the request of the commission the railroad and railway companies have continued to make such returns, but, in the commission's opinion, the law should be amended in such manner as to require all utilities to file such annual return.

"The railroad and railway companies, in common with other business, suffered from the general depression during the year. Whatever the cause of the shrinkage in the net incomes of these companies it is obvious that some time must elapse before the New York, New Haven & Hartford Railroad and the Rhode Island Company, which are the two principal operating companies of these two classes, can obtain the results which might properly be anticipated from the natural increase in business."

CLEVELAND CONSTRUCTION

J. J. Stanley, president of the Cleveland (Ohio) Railway, conferred with the Council of East Cleveland on Jan. 21 in an effort to secure an agreement for an extension of the franchises on Euclid and Hayden Avenues in return for the expenditure of $200,000 for moving the tracks and repaving on Euclid Avenue, where the city expects to build a new sewer the coming summer. The Hayden Avenue franchise expires in 1917 and the Euclid Avenue franchise expires in 1921.

Talk of the establishment of combined steam and interurban railway terminals on a tract of land bounded by Ontario Street, West Third Street and Prospect Avenue has been revived. It is said that the Baltimore & Ohio, Wheeling & Lake Erie and the Erie Railroads have practically agreed to the plan, while the Big Four and Nickel Plate have it under advisement. The Cleveland & Youngstown Railway, which will build an electric railway through Kingsbury Run, will bring in a number of interurban lines, it is said.

Delay in building a sewer in East Thirtieth Street will in all probability postpone the construction of the proposed crosstown line on that thoroughfare until 1916. Plans had been made to complete the work the coming summer, but the company refuses to lay the track until the sewer is built.

NEW CONSTRUCTION IN BUFFALO

Edward G. Connette, president of the International Railway, Buffalo, N. Y., has notified the Public Service Commission of the Second District of New York that the company proposes to spend $1,732,516 on improvements this year and that authorization of a bond issue will be required. The company expects to start constructing its new suburban passenger terminal and office building on the Garden Theater site in Pearl Street this year. The statement to the commission shows the company proposes to spend $808,309 for paving in Buffalo and $250,289 for paving outside of Buffalo. For replacing worn-out tracks and roadbed with new heavy type rails and concrete roadbed, the sum of $373,358 is to be appropriated. For new track extension, $40,876 will be spent. Other improvements the company desires to make this year are grade crossing improvements, $57,310; overhead line work, $29,722; power stations and substations, $144,040; shops, $1,200; bridge and building department, $27,410.

Last year the company spent $1,231,076 for improvements, most of it in laying new roadbed and tracks within the city limits.

THE KANSAS CITY BOARD OF CONTROL

Following the opinion of Judge Hook of the federal court that the board of control of the street railway property in Kansas City, which board was provided for the management of certain features of the service by the franchise not yet operative, should exercise its powers pending compliance with the franchise terms, subject to the receivers, the following statement was issued by Ford F. Harvey, one of the receivers:

"The receivers, desiring fully to meet complaints as to service, have agreed with Mayor Jost that the members of the board of control, as their employees, shall forthwith assume entire control of the routing and scheduling of cars, including the number, character and condition thereof, and the regulation of transfers. As the board is to assume full responsibility, its orders should and will, in the absence of specific personal contrary directions of the receivers, be promptly carried out. It is not the intention to give any such contrary directions unless there arises some radical difference in policy, of which difference the public will be promptly advised.

"To systematize the work and prevent disorganization of a large working force, it is imperative to have the orders go to the general manager, as the head of the system, with instructions to see that they are absolutely and in good faith promptly carried out. There is not and has not been the slightest difference between Mr. Dunham and myself upon the subject; I feel implications to the contrary should be corrected."

SUGGESTED SUBWAY CHANGES

Chief Engineer and Electrical Engineer of New York Commission Make Suggestions Regarding Subway

Alfred Craven, chief engineer of the Public Service Commission for the First District of New York, has reported to the commission in regard to the investigation which he is making of the subway with the view of preventing accidents from short-circuits, fires, etc. While not ready to make final recommendations, he stated that his staff was inquiring into the advisability of complete separation of telephone and emergency alarm cables from all other cables in the subway, and also for an independent outside telephone system; the complete separation of the lighting circuit from all other cables, and an emergency service from the New York Edison Company; the supply of power for ventilating fans from substations, with an independent connection from outside sources; the walling up of all manholes and splicing chambers so there will be no connection with the subway, and an increase in the capacity of the emergency and ventilating chambers.

Clifton W. Wilder, electrical engineer of the commission, has recommended that the Interborough Rapid Transit Company be required to change the storage-battery light system in the subway cars, so that the batteries will be automatically charged and kept at full capacity at all times of normal operation. These batteries supply emergency lighting in case the power is cut off. They were installed by order of the commission, which requires batteries strong enough to operate two lamps of not less than 12 cp. each in every car for at least three hours. The present system makes necessary the removal of the batteries from the cars in order to charge them.

TORONTO RAILWAY MATTERS

The Board of Control of Toronto, Ont., on Jan. 18 gave considerable attention to the transportation problem, and after Mayor Church had elaborated the suggestions made in his inaugural address for solving this question, decided to apply to the Ontario Legislature for powers to compel the Toronto Railway to build extensions and otherwise improve its system. The Mayor contended that under the terms of the agreement of 1891 the railway was obliged to make such extensions as were ordered from time to time by the city, whether such extensions related to streets within the city limits as they existed in 1891 or at the present time, and the application to the Legislature is practically to overrule the decision of the Privy Council that the city's rights regarding improvement apply only to the railway system within the limits of the city as defined in 1891. The board could not agree as to the advisability of applying for power to purchase and operate a system of motor buses, so the matter was sent on to the Council without a recommendation.

Corporation Counsel Geary of Toronto has reported to the Board of Control that John Mackay has no legal claim against the city for services rendered in connection with the valuation of the property of the Toronto Railway and Toronto Electric Light Company. Mr. Geary states that Mr. Mackay did not receive a proper retainer and the city has no legal liability whatever. Mr. Mackay was retained in 1913 by Mayor Hocken. His bill was for $42,545.

TOLEDO CONTEMPT CASES

Judge J. M. Killits of the Federal Court at Toledo, Ohio, announced his decision in the contempt cases against the Toledo *News-Bee* and its editor, Negley D. Cochran, on Jan. 23. The *News-Bee* was fined $7,500 and Mr. Cochran $200. The court held the paper guilty on three counts.

The cases grew out of an injunction against the city of Toledo sought by the Toledo Railways & Light Company to prevent the enforcement of a 3-cent fare ordinance. The newspaper commented upon the decision in a way considered offensive by the court, and Judge Killits cited both the owner of the paper and its editor to appear and explain the purpose of such publication. The defendants contended that the articles were published in what it considered to be the best interests of the public.

Under a resolution introduced in Council on Jan. 25, the various electric railways using the Cherry Street bridge will be charged rental for the tracks, which belong to the city. Director of Public Service Boardman has been directed to furnish an estimate of the cost of the track as a basis for fixing the rentals.

Maine Bill.—A bill has been introduced in the Maine Legislature to make it compulsory for electric railways to install toilets on cars used on lines more than 10 miles in length.

Public Utilities Bill in Utah.—Senator Frank Evans has introduced a bill into the Legislature of Utah creating a public utilities commission. The measure has been referred to the judiciary committee.

Unemployment in Transit.—The committee on unemployment appointed by Mayor Mitchel of New York, has made public its second report. Replies from thirty-one large transportation and public utility companies in the greater city, covering a total of 57,000 persons, show only 1 per cent increased unemployment over that of 1913.

In the Ohio Legislature.—A bill has been introduced in the House to permit trainmen on steam and interurban lines to carry concealed weapons and exercise police powers. Representative Holl has introduced a bill to allow street, suburban and interurban railway companies, using power other than steam, and companies furnishing current for light, heat and power, to appropriate property for use in placing wires and poles.

Steel Car Report.—Clifton W. Wilder, electrical engineer of the Public Service Commission for the First District of New York, has reported to the commission that it was possible to build an all-steel car for service on the elevated railroad which would not weigh any more than the heaviest wooden car now used. In this report George Gibbs, consulting engineer, concurred. The heaviest wooden car body now used on the elevated weighs about 24,000 lb.

Electrical Section of Western Society of Engineers.—At a joint meeting of the Chicago Section of the American Institute of Electrical Engineers and the Electrical Section of the Western Society of Engineers on Jan. 25, the annual election of the executive committee resulted as follows: H. M. Wheeler, Chicago Railways; C. A. Keller, Commonwealth Edison Company; F. J. Postel, consulting engineer; G. T. Seely, Chicago Elevated Railways, and E. W. Allen, General Electric Company.

Additional Tunnels for Baltimore. — The Pennsylvania Railroad has outlined the plans by which it seeks to relieve the congestion of its traffic facilities in Baltimore so as to get a more direct and convenient outlet for the movement of its trains through the city, both north and south. The primary point in the letter is that the company proposes to resort to additional tunnels under the city streets for its relief, paralleling the two existing tunnels, and in this way secure four tracks through the city.

The Richmond Franchise.—The hearing on the proposed new blanket franchise sought by the Virginia Railway & Power Company, Richmond, Va., has been postponed indefinitely by the street committee of the Council. The committee had asked for a compilation of the franchises and grants under which the company now operates. General Counsel Henry W. Anderson says that the company found it impossible to make the compilation in the given time. The franchise was accordingly laid on table.

Removal of Coroner Asked.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., has filed a complaint with Governor Whitman, in which he asked for the removal of Coroner Patrick D. Riordan of New York City. Mr. Shonts based his demand upon the actions of the coroner at the inquest on Jan. 12, when the officials were held for culpable negligence by the coroner's jury in connection with the death of two persons in an accident on the Ninth Avenue elevated railway on Dec. 9.

Philadelphia Electrification Equipment.—Eight cars intended for use on the electrified line of the Pennsylvania Railroad between Philadelphia and Paoli have been received at the West Philadelphia yards of the company. It is announced that work on the rest of the ninety cars to be used on the main-line electrification will be completed by April 1. The work of stringing wires and erecting poles is more than 65 per cent completed, and under favorable conditions it is expected that electric service will be started in June.

Almanac Features Tractions.—The Brooklyn *Daily Eagle* has added to its almanac for 1915 a table covering the electric railways of all the states, giving a statistical record of the growth of the traction industry in each part of the United States and indicating the extent to which the bulk of the nation's people have come to utilize the street railways for transportation. The *Eagle* says that, in studying the figures, the reader should keep in mind the fact that thirty-five years ago "there was no such thing as a traction industry in the United States."

The Stevens Bill.—The Stevens bill to promote the safety of employees and passengers on railroads engaged in interstate and foreign commerce was introduced into the House of Representatives at Washington by Mr. Stevens of New Hampshire on May 27, 1914. It was referred to the committee on interstate and foreign commerce and ordered to be printed. On Dec. 23, 1914, the bill was reported with amendment, referred to the House, and ordered to be printed. In its final form the bill excludes electric street railways and electric interurban railways from its provisions.

Memorandum of Workmen's Compensation Suggestions.—The Workmen's Compensation Department of the National Civic Federation has issued a memorandum of suggestions for uniform State legislation upon workmen's compensation. The report covers the general principles that should be followed in such legislation rather than any details for particular States, and is recommended to legislatures convening in 1915. The compilation was made by a committee whose members were appointed by State industrial accident boards, compensation commissions and governors of States not having compensation laws.

Electrification Suggested.—Suggestions which may lead to the electrification of the Missouri, Oklahoma & Gulf Railroad have been made. The property is now in the hands of a receiver. If the proposed plan is worked out, Joplin, which is now the northern terminus of the line, will become the junction of that system and the electric line northward to Pittsburg, and ultimately a link would be built to connect the lines with those running out of Kansas City. Connections would be made on the south at Denison, Tex., bringing the Dallas-Ft. Worth line into the system.

Franchise Election Question in Cincinnati.—A committee representing the business interests of Cincinnati, Ohio, filed notice with the city auditor on Jan. 21 to the effect that it will circulate petitions for a referendum vote at a special election on the franchise recently granted the Cincinnati, Newport & Covington Street Railway. On the following day an advertisement from the company appeared in the daily papers asking that the petitions being circulated by this committee be signed. The Federated Improvement Association and the People's Power League will circulate petitions for a referendum vote at the regular election this fall.

Chicago Traction Fund Drained Dry.—The Chicago *Examiner* says: "Henry A. Blair, president of the Chicago Railways, made the statement that the city's traction fund of $13,000,000 has been drained dry. He declared that all that remains to represent the $13,000,000 are I. O. U.'s of various city departments. The last $900, he said, was drawn a few days ago to pay city salaries. 'How the money is ever to be forced back into the traction fund,' Mr. Blair told D. H. Morris, a broker, representing 200 of the Chicago Railway Company's participation certificates holders, 'is a matter of speculation.' Mr. Blair said the company was in no position at present to pay dividends because of the hostile attitude of the city toward the company."

Valuation of Omaha Properties.—In connection with the act of the Omaha & Council Bluffs Street Railway, Omaha, Neb., in securing an injunction attacking the ordinance to require it to sell seven tickets for a quarter, District Judge Sears at Omaha has directed the company to furnish a valuation of its property to the court. The company is also required to furnish the court the following additional information: Gross revenue for each of the last three years and the amount of fares received in Omaha for the same period, salaries of all officers and employees for the last three years, receipts and expenses for the same time, amount of bonded indebtedness and interest charges, any other indebtedness and rates of interest, taxes, dividends, sums set aside for reserve and depreciation, if any, and amount of revenue after demands have been met.

Utility Legislation in Michigan.—That Mayor Marx and the city administration in Detroit will contest any attempt on the part of the Michigan Legislature to pass a public utilities bill voiding any of the authority now held by the city was intimated in the Mayor's message to the Common Council at the beginning of his second term. The Mayor frankly stated that he considered the city could look after its own public utility affairs better than a State commission with wide powers. The proposed bill, which is to be prepared by Lawton T. Hemans, chairman of the State Railroad Commission, has not yet been placed in the hands of the Legislature, but Mr. Hemans has intimated that he favors perpetual franchises under the control of the State commission with power to raise or lower rates as circumstances dictate and with ample provision for municipalization.

California Home Rule Bill Up.—Max Thelen, president of the State Railroad Commission of California, has prepared and taken to Sacramento for presentation to the Legislature a bill making effective the constitutional amendment adopted by the people of that State last November giving the Railroad Commission power to regulate public utilities operating within cities. Immediately following the passage of this bill by the Legslature the State Railroad Commission will be invested with the power of making and fixing rates for all public utilities operating within the State. In Los Angeles hereafter the City Council will have no power to fix rates to be charged for gas, electricity, telephones or street railway fares. Water rates will not be affected, for the reason that the water system is publicly owned and the constitutional amendment is applicable only to private corporations, individuals or associations of individuals owning or operating public utilities.

Bills in New York Legislature.—Bills have been introduced in the Legislature of New York to amend the public service commissions law, in relation to conferring on the public service commissions jurisdiction with respect to the number of men constituting crews on trains, and repealing section 54-a of the railroad law, relating to such crews; to amend the railroad law, in relation to grade crossings; to amend the railroad law, in relation to the construction of certain railroads where the property of the company has been sold under foreclosure proceedings; to amend the railroad law, in relation to imposing on railroad corporations the duty of placing upon cars the name of the operating company; to amend the railroad law, in relation to the operation of certain railroads in the city of New York, and providing a penalty for violation; to amend the public service commissions law, in relation to common carriers by water; to amend the railroad law, in relation to grade crossings; to regulate street railway fares in all cities.

Divergent Views of Ohio Valuation.—Speaking before a district meeting of the Ohio Independent Telephone Association at Columbus, Charles E. Marshall, a member of the Ohio Public Utilities Commission, said that the requirement of the new utilities law that makes an appraisement of the 1500 or more service companies in the State necessary will result in an economic waste that is entirely unnecessary and in many cases will be of no benefit to anyone. Some companies that will never have a rate controversy were compelled to pay out large sums of money for appraisements that will be of no value to them. Specific cases could be handled under the old law and those companies not involved in investigations would have saved the money they are compelled to pay out under the new one. E. W. Doty, another member of the commission, said that the appraisements will be valuable in bringing to light conditions that were unknown before. He urged the utility men to make their valuations complete in the itemized form provided by the commission. Mr. Doty complimented the committee of Ohio utility companies which established forms for appraising property, especially the portion pertaining to depreciation, and said that the report disposed of every other theory that had been advanced.

Financial and Corporate

BUSINESS PROSPECTS BRIGHTER

Vice-President Pratt of Stone & Webster Management Association Sees Fairer Day for Business and Financial Institutions

In a recent interview Frederick F. Pratt, vice-president Stone & Webster Management Association, Boston, and chairman of the board of directors of the Puget Sound Traction, Light & Power Company, Seattle, Wash., takes a fairly optimistic view of the future of general business and financial conditions. Mr. Pratt believes that while short-time money will continue to be held at low rates, money which might flow into permanent investments will accumulate in the United States because of the reluctance of investors to engage in new undertakings unless assured of protection. The ultimate effect of the present war will be to make money rates higher. When the war is ended, money may be secured for existing industries and public service corporations, but only at the "going" rates.

In connection with the cause of the present business depression, Mr. Pratt says:

"Notwithstanding last year's wonderful crops and prices, we are in a period of depression and financial disturbance worse than anything which has occurred within the last twenty years or more. This depression cannot be laid to the crops, and it was well under way before the European War broke out. Hence the best thought of this country attributes the present conditions largely to the fettering of business. The attacks on business have made investors fearful of embarking on new enterprises under existing unpropitious conditions. Without a more square deal to business it will be next to impossible to entice capital to make further investments. Such a situation would bring about a most serious condition, with unemployment and decreasing wages, which in time would mean a decrease in purchasing ability. Just now there are very encouraging signs that the general public is beginning to come out of its trance, and it is daily becoming more difficult for self-seeking demagogues and high-minded theorists alike to carry out their program of destruction. The time is fast approaching when a man who pulls down the business structure will lose his following, but he who helps to build up such a structure will be placed in a high position in public confidence. The people are now beginning to see that they, by imposing burdens and restrictions, have been destroying property values, and to realize that the regulation of intricate business affairs must be done with the utmost care and moderation."

DECREASE IN ST. LOUIS EARNINGS

According to a statement issued by Richard McCulloch, vice-president of the United Railways, St. Louis, Mo., the business of the company was fairly good during the first half of 1914. The gross receipts up to July 1 were 1.55 per cent greater than in the corresponding period of 1913. After July 1, however, the receipts of each month kept diminishing. In further describing this situation, Mr. McCulloch said:

"Conditions became so serious that it was necessary to curtail the service to some extent. This has been done, but the diminution in service is not at all proportionate to the diminution in receipts. In curtailing the service we took into account the welfare of the trainmen, as well as the convenience of the public. Although it was necessary in some cases to readjust the runs, no conductor or motorman has been discharged on this account.

"During the last three months of 1914 the passenger receipts were $3,005,336, as compared to $3,248,203 during the last three months of 1913, a decrease of $242,867, or 7.48 per cent. During December, 1914, the number of passengers carried was 29,734,022, as compared to 32,176,129 in December, 1913, a decrease of 2,442,107, or 7.59 per cent. For these two months the total number of car-miles was 3,556,077 as compared to 3,686,340, a decrease in 1914 of 130,263, or 3.53 per cent. The decrease in gross receipts was 9.54 per cent, but the decrease in car-miles was only 3.53 per cent."

ANNUAL REPORT

Massachusetts Electric Companies

The statement of income, profit and loss of the Massachusetts Electric Companies for the year ended Sept. 30, 1914, follows:

Dividends on stocks owned	$1,077,291
Interest on notes and bank balances	77,551
Total income	$1,154,842
Expenses	22,692
Net income	$1,132,150
Interest on coupon notes	155,000
Net divisible income	$977,150
Dividends—4 per cent	968,256
Surplus for the year	$8,894
Surplus, Sept. 30, 1913	2,746,998
Total	$2,755,892
Credit:	
Federal income tax 1910 refunded	881
	$2,756,774
Debit:	
Proportion federal income tax to Sept. 30, 1913	7,191
Surplus Sept. 30, 1914	$2,749,583

The statement of the subsidiary Bay State Street Railway for the year ended June 30, 1914, follows:

Gross income	$9,695,249
Operating expenses	6,363,969
Gross income less operating expenses	$3,331,280
Interest, rentals, taxes, etc	2,006,984
Net divisible income	$1,324,296
Dividends:	
First preferred stock	$164,916
Common stock	1,077,153
Total dividends	$1,242,069
Surplus for the year	$82,227
Surplus, June 30, 1913	212,850
Total	$295,077
Credits:	
Sinking fund—coupon notes	$25,000
Accumulated profit on sales of scrap	3,524
Tickets sold and not used	3,462
Adjustment of accounts	3,391
Total credits	$35,377
	$330,454
Debits:	
Reconstruction	$100,000
Net losses by fire, etc	10,478
Premium on bonds called for redemption	1,865
Settlement with Boston Elevated Railway for certain rental charges covering a number of years	4,579
Total debits	$116,922
Surplus, June 30, 1914	$213,532

The report states that the last year has been one of decreasing business activity in the territory served by the Bay State Street Railway, and has been marked by an increase in expense on most of the transportation companies operating in the New England States. As a result, while the gross income of the company showed an increase of $233,000 (of which $102,625 came from the increase in the freight and express business and only $121,654 from an increase in its passenger income) the net divisible income decreased $113,542.

During the year $290,000 of bonds were issued and sold under the mortgage of the Boston & Northern Street Railway, and $769,000 of bonds under the mortgage of the Old Colony Street Railway. Of this, a total of $619,000 was issued to refund maturing bonds, the balance being issued on account of completed improvements. No new capital stock was issued during the year by either the Massachusetts Electric Companies or the Bay State Street Railway.

The company spent during the year for new property or reconstruction a sum of $1,574,807. New track to the extent of 5.75 miles was constructed; 4.4 miles of track were relined, resurfaced and paved, and 15.71 miles were reconstructed. Fifty semi-convertible cars with four-motor equipments were put into service about Jan. 1, 1914, and seven new express cars and two new service cars were purchased and put into service during the year. Twenty-seven sets of new trucks and 100 new motors were also purchased, besides additional feeder and power equipment.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—At a meeting on Jan. 14 S. J. Dill, New York, was elected a director of the Birmingham Railway, Light & Power Company to succeed D. M. Drennan, deceased.

Carbon Transit Company, Mauch Chunk, Pa.—A. R. Jarrard has been elected a director of the Carbon Transit Company, to succeed John M. Wolff, deceased. H. A. Butler has also been chosen a director, to succeed William Dods, who has been elected president of the company.

Cities Service Company, New York, N. Y.—At a recent meeting of the board of directors the capital stock of the Cities Service Company was reduced by $2,200,000. At the time of the purchase of the common stock of the St. Joseph Railway, Light, Heat & Power Company, the Cities Service Company issued $1,200,000 of preferred and $1,000,000 of common stock to finance this transaction. These securities, however, were not sold, and recently the financing of the balance of the purchase price was accomplished through the sale of $1,118,000 of trust certificates secured by the deposit of the St. Joseph stock, these certificates to be retired from a monthly sinking fund within two and a half years. The Cities Service Company stock issues originally authorized for this financing have now been returned to the treasury, reducing the outstanding preferred stock from $27,368,426 to $26,168,426 and the outstanding common stock from $15,718,380 to $14,718,380.

Holyoke (Mass.) Street Railway.—At the recent annual meeting of the Holyoke Street Railway, L. D. Pellissier was elected president and general manager of the Holyoke Street Railway and president of its leased line, the Mt. Tom Railroad, in each instance to succeed W. S. Loomis. Charles E. Mackintosh was added to the directorate of the street railway and I. E. Sawyer to that of the Mt. Tom Railroad.

Humboldt Transit Company, Eureka, Cal.—The Humboldt Transit Company has filed an application with the California Railroad Commission requesting authority to pledge eighteen of its first mortgage 5 per cent thirty-year gold bonds to the Pacific Coast Casualty Company, as surety in a $7,000 damage case which the company proposes to carry on appeal to the Supreme Court.

Jacksonville (Fla.) Traction Company.—The Jacksonville Traction Company has passed its usual Feb. 1 dividend on its $1,000,000 of common stock. From May, 1911, to November, 1914, 1¾ per cent was paid quarterly. Inasmuch, however, as there was an ample margin over the preferred stock dividend requirements, the directors declared the regular quarterly dividend of 1¾ per cent on the preferred stock payable on Feb. 1. Jacksonville, being essentially a commercial city with a large export business, has felt the business depression and lack of shipping facilities to a greater extent than have other Southern centers. The company made an effort to meet decreased earnings by cutting operating expenses as much as possible and by stopping all new construction except work required by the city. The directors feel confident that with a return to normal business conditions the earnings will show a corresponding improvement.

London (Ont.) Street Railway.—Thirty-five 5 per cent first mortgage bonds of the London Street Railway have been drawn for redemption at par on the maturity date, March 8, at the office of the Canadian Bank of Commerce, Toronto.

New York, New Haven & Hartford Railroad, New Haven, Conn.—Chairman Howard Elliott and General Counsel Buckland of the New York, New Haven & Hartford Railroad have been authorized by the board of directors to seek the legislation necessary in Massachusetts, Rhode Island and Connecticut to allow the placing of a blanket $400,000,000 mortgage on the property. Under this mortgage bonds would be issued from time to time as needed. The railroad on Jan. 20 petitioned the Legislature for a change in its charter which would entitle it to sell, pledge or dispose of any shares of capital stock of steam railroads or street railways now held by it.

New York (N. Y.) Railways.—Judge Lacombe has denied the application of the New York Railways for repayment of judgment recovered by the city of New York against the Broadway & Seventh Avenue Railroad and the Ninth Avenue Railroad for repavement of parts of streets. The lines were leased to the Metropolitan Street Railway, and after the sale of the latter at foreclosure the New York Railways as purchasers assumed the leases. Judge Lacombe says that obligations to repave the street were personal from the lessees to the city, the terms of the leases requiring the lessees to do such work or to respond for failure to do so.

New York State Railways, Rochester, N. Y.—J. P. Morgan & Company have purchased $3,000,000 of first consolidated mortgage 4½ per cent bonds of the New York State Railways. It is reported that Harris, Forbes & Company and other investment houses will be associated with J. P. Morgan & Company in the public offering of these bonds.

North Alabama Traction Company, New Decatur, Ala.—The North Alabama Traction Company has authorized an issue of $75,000 of 6 per cent income bonds to pay its floating debts and to reduce its capital stock to $75,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—An amount of $300,000 of Northern Ohio Traction Company (the predecessor of the Northern Ohio Traction & Light Company) consolidated mortgage 5 per cent bonds held in escrow to retire $300,000 of Akron, Bedford & Cleveland first mortgage 5 per cent bonds due on March 1 has been sold to the Citizens' Saving & Trust Company, Cleveland. This makes the entire $3,000,000 of such bonds outstanding a first mortgage issue.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Oakland, Antioch & Eastern Railway on Jan. 13 filed an application with the California Railroad Commission requesting the approval of two notes amounting to $68,000. These notes are dated Jan. 29, 1913, and Jan. 14, 1913, and extend for a period of three years thereafter.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Redmond & Company, New York, are offering for sale at 96½ and interest, to yield 5.35 per cent, first consolidated and now first mortgage 5 per cent bonds, due 1928, of the Omaha & Council Bluffs Street Railway.

Pacific Gas & Electric Company, San Francisco, Cal.—Announcement is made that the $4,000,000 of Pacific Gas & Electric Company 5 per cent one-year collateral trust notes recently offered at private sale by Bond & Goodwin and William A. Reid & Company, jointly, have all been sold and are now quoted at a premium. The notes were offered at 99¾ and interest. They are dated Dec. 16, 1914, but are subject to prior redemption before Dec. 16, 1915, all or in part (by lot) at 100¼ and interest on fifteen days' notice.

Reading (Pa.) City Passenger Railway.—At the annual meeting of the Reading City Passenger Railway on Jan. 12, George A. Rick was elected a director of the company to succeed William R. McIlvain, deceased.

Rhode Island Company, Providence, R. I.—The trustees of the Rhode Island Company named by the Federal Department of Justice were on Jan. 20 elected directors of the Providence & Danielson Railway, which is leased by the former company. The new directors are Rathbone Gardner, John O. Ames, T. F. Green, J. P. Farnsworth and C. C. Mumford, succeeding D. F. Sherman, J. E. Thielson, C. A. Potter, V. W. Mason and F. A. Smith, Jr. The new directors elected C. C. Mumford president of the company in place of D. F. Sherman.

Riverside, Rialto & Pacific Railroad, Riverside, Cal.—The Crescent City Railway has been incorporated into a stock company under the name of the Riverside, Rialto & Pacific Railroad, commencing business as of Jan. 1, 1915. The Crescent City Railway was under the sole ownership of William C. Henshaw and had no bonds or shares of stock outstanding. Although it was considered a steam railroad and freight was handled by steam, all passenger service was performed by the Pacific Electric Railway under contract. According to a valuation recently completed by the California Railroad Commission, the original cost of the line is not ascertainable, but the reproduction cost, as determined by the commisison, is $457,886, as compared to the carrier's estimate of $538,868. The carrier's estimate of present value as of June 30, 1914, was $491,642, but the commission placed this amount at $430,052.

San Diego (Cal.) Electric Railway.—A notice was recently issued by the California Railroad Commission stating that it intended to conduct on its own initiative an investigation into the property value of the San Diego Electric Railway. A public hearing has been set for Feb. 20.

Seattle (Wash.) Municipal Railway.—The utilities committee of the City Council of Seattle, Wash., on Jan. 19 voted to recommend to the Council the extension of Division "A," of the Seattle Municipal Railway, into Ballard, notwithstanding Mayor Gill's veto. The Division "A" extension bill, which seeks to transfer $80,000 from the street railway bond issue, voted two years ago, to an extension fund to build into Ballard through Fremont and by way of Leary Avenue, was expected to come to the Council for final vote on Jan. 25. If it carries it will go on the ballot at the March general municipal election. The votes necessary to carry the bill over the Mayor's veto are said to be assured.

Shreveport (La.) Traction Company.—Redmond & Company, New York, are offering at a price to yield 5¼ per cent first mortgage 5 per cent serial gold bonds of the Shreveport Traction Company. These bonds mature annually July 1, 1918, to 1944, inclusive.

South Carolina Light, Power & Railway Company, Spartanburg, S. C.—A. B. Leach & Company, New York, are offering at 95 a small block of the 6 per cent cumulative preferred stock of the South Carolina Light, Power & Railway Company. This stock is redeemable at any time at 115 and dividends. Of an authorized amount of $1,500,000, there is now outstanding $700,000, which includes $200,000 recently issued for improvements.

Third Avenue Railway, New York, N. Y.—A semi-annual payment of 2½ per cent has been declared on the $22,536,000 of 5 per cent income bonds of the Third Avenue Railway, payable on April 1, from the earnings for the six months ended Sept. 31, 1914. This is the same payment as was made in October and April, 1914, and October, 1913. In April, 1913, an initial payment of 1¼ per cent was made. Frederick W. Whitridge, president, says that the combined transportation revenues of all the street railway, subway and elevated lines in New York for December sustained a loss of $200,000 on account of business conditions. According to Mr. Whitridge, the special committee appointed to look into the affairs of the Third Avenue Railway has not yet submitted its report. The appointment of this committee was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 21.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio.—The directors of the Toledo, Bowling Green & Southern Traction Company have passed the usual quarterly dividend paid on Feb. 1 on the company's $750,000 of non-cumulative preferred stock. No dividend was disbursed last November, but from August, 1910, to August, 1914, 1¼ per cent was paid quarterly.

Toledo Railways & Light Company, Toledo, Ohio.—At the annual meeting of the Toledo Railways & Light Company on Jan. 22, the membership of the board of directors was reduced from twenty-one to nine. The following men were elected to serve for the ensuing year: Henry L. Doherty, New York, chairman; Frank W. Frueauff, M. R. Bump and C. E. Murray, New York; E. H. Close, S. D. Carr, Thomas H. Tracy, Frank R. Coates and Rathbun Fuller, Toledo.

United Railroads, San Francisco, Cal.—The California Railroad Commission on Jan. 12 sent a reply to a recent letter from Jesse W. Lilienthal, president United Railroads, in regard to the plan which he and creditors of the Solano Irrigated Farms project were considering as a means of rehabilitating this property. Previous reference to this plan was made in the ELECTRIC RAILWAY JOURNAL of Jan. 16. The commission took the stand that additional funds of the United Railroads should not be invested in the Solano enterprise. In its opinion the revenues of the railway should be saved for the purchase of new cars, for the improvement and extension of its service in San Francisco and for the payment of its outstanding obligations.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—J. B. Olmsted, Buffalo, N. Y., chairman of the committee representing bondholders and stockholders of the Buffalo & Susquehanna Railroad, has confirmed a report that the Western New York & Pennsylvania Traction Company has been investigating the abandoned Buffalo & Susquehanna section between Buffalo and Wellsville, with the idea of purchase and electrification. According to Mr. Olmsted, however, the investigation is still in progress and no offer has been received from the traction line.

Youngstown & Southern Railway, Youngstown, Ohio.—In compliance with a petition filed by F. D. Wilkerson, Judge C. M. Wilkins of the Common Pleas Court at Youngstown on Jan. 21 appointed a receiver for the Youngstown & Southern Railway. David Tod, secretary and treasurer of the company, was appointed to execute the trust. The company operates 19 miles of line between Youngstown and Leetonia. There are $948,000 of bonds and $1,520,000 of stock outstanding.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, one-half of 1 per cent, common.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., quarterly, 1½ per cent, common.

Bristol & Plainville Tramway, Bristol, Conn., quarterly, 2 per cent.

Connecticut Railway & Lighting Company, New Haven, Conn., quarterly, 1 per cent., preferred; quarterly, 1 per cent, common.

Cumberland County Power & Light Company, Portland, Maine, quarterly, 1½ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

International Traction Company, Buffalo, N. Y., 2 per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., 2½ per cent, preferred.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; 1¾ per cent, common.

United Power & Transportation Company, Camden, N. J., $1.54.

ELECTRIC RAILWAY MONTHLY EARNINGS

COLUMBUS (GA.) ELECTRIC COMPANY

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$63,274	*828,850	$34,424	$28,781	$5,633
1 " "	'13	58,858	*23,933	34,925	24,957	9,967
12 " "	'14	678,572	*290,177	388,395	320,944	67,451
12 " "	'13	600,009	*296,515	303,494	266,980	†79,226

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$195,389	*$103,121	$92,268	$36,751	$55,517
1 " "	'13	211,612	*122,129	89,483	36,565	52,918
12 " "	'14	2,435,544	*1,323,974	1,111,570	441,464	670,106
12 " "	'13	2,352,895	*1,345,232	1,007,663	418,386	589,277

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$19,590	*$13,901	$5,689	$5,603	$86
1 " "	'13	21,701	*15,261	6,440	5,670	800
12 " "	'14	279,980	*180,484	99,496	67,068	32,428
12 " "	'13	298,441	*180,771	117,670	67,721	49,949

JACKSONVILLE (FLA.) TRACTION COMPANY

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$52,880	*$37,229	$15,651	$13,052	$2,599
1 " "	'13	58,234	*36,226	22,008	13,225	8,783
12 " "	'14	723,598	*477,286	246,312	152,325	93,987
12 " "	'13	663,761	*424,067	239,694	141,608	98,086

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$157,568	*$83,848	$73,720	$26,807	$46,913
1 " "	'13	197,719	*109,037	88,682	24,052	64,630
12 " "	'14	2,093,413	*1,166,265	927,148	312,857	614,291
12 " "	'13	2,118,256	*1,167,127	951,129	287,527	663,602

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$24,838	*$15,044	$9,794	$7,542	$2,252
1 " "	'13	26,659	*16,281	10,378	7,626	2,752
12 " "	'14	303,576	*194,186	109,390	91,438	17,952
12 " "	'13	294,920	*194,093	100,827	89,592	11,235

PENSACOLA (FLA.) ELECTRIC COMPANY

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$18,860	*$12,251	$6,609	$7,353	††$744
1 " "	'13	22,695	*14,560	8,135	7,255	880
12 " "	'14	271,024	*172,204	98,820	86,537	12,283
12 " "	'13	283,303	*181,900	101,403	80,357	21,046

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,	'14	$686,819	*$401,883	$284,936	$177,757	$107,179
1 " "	'13	753,982	*$423,479	329,503	174,419	155,084
12 " "	'14	8,523,730	*5,026,359	3,497,371	2,115,522	1,381,849
12 " "	'13	8,548,934	*4,989,954	3,558,980	2,061,589	1,497,391

*Includes taxes. †Includes other income. ††Deficit.

Traffic and Transportation

THE "JITNEY" BUS

Developments Are Recorded in Connection with the Bus in California and Washington—2375 Buses in Operation in Five Cities

The police department of San Francisco has been issuing licenses to "jitney" bus drivers recently at an average rate of fifteen to twenty per day. The men engaged in this traffic have organized the San Francisco "Jitney" Bus Association, which has promised exposition officials that 2000 automobiles will be put in service to handle crowds expeditiously to and from the exposition gates throughout the season. Books of tickets are to be sold, good on any of the association's buses. These automobiles are expected to handle 20,000 passengers per hour.

Supervisor Vogelsang, of San Francisco, chairman of the public utilities committee, has drafted a recommendation for a municipal "jitney" bus line along Ocean Boulevard, with "jitney" transfers to the Municipal Railway on Geary Street.

On the other hand, at a hearing on Jan. 19 before the State Legislature, presentations were made to show that the "jitney" bus is endangering the street railways. Opposing the "jitneys" at the hearing were Paul Shoup, representing the Pacific Electric Railway, the Stockton Electric Railway, the San José Railway and the Peninsular Railway; C. N. Black, for the United Railroads, San Francisco; R. S. Dilworth, for the San Diego Electric Railway; H. F. Jackson, for the Monterey & Pacific Grove Railway; A. G. Wishon, on behalf of the Bakersfield & Kern Electric Railway; G. K. Weeks, for the Key Route and the Oakland Traction Company; A. Bearce, for the Tidewater & Southern Railway; G. F. Herr, of the Central California Traction Company; F. W. Webster, of the Fresno Traction Company; J. C. McPherson, of the Oakland lines of the Southern Pacific Company; E. L. Lewis, of the Los Angeles Railway Corporation; W. V. Hill, of the Pacific Electric Railway, and James Irvine, of the San Francisco, Napa & Calistoga Railway.

The "jitney" bus associations were represented by W. R. Covington and H. V. MacMeans, San Francisco, and Mr. Higging, Los Angeles. Mr. MacMeans said that the rolling stock of the concerns in San Francisco is worth more than $500,000 and that this would be doubled in a short time. He pointed out that the "jitney" buses are now subject to five different taxes, namely, city license tax, State license tax, chauffeurs' State tax, chauffeurs' city tax and property tax. The associations invited regulation, he said, but were opposed to increased taxation because they were already paying at a higher rate than the corporations.

The San Francisco-Oakland Terminal Railways have been losing $500 per day in passenger fares, according to W. R. Alberger, general manager of the company, on account of the traffic diverted to the auto bus lines now operating in that city. Subsequent to Mr. Alberger's analysis of the situation, the city of Oakland on Jan. 20 passed an ordinance, the salient features of which are that each bus shall be covered by a $10,000 indemnity bond; pay a $60 annual license fee; ply only on routes approved by the City Council; be driven only by drivers who have passed rigid examinations and carry identification papers, and be subject to special police regulation.

San Francisco has under consideration a similar ordinance and a tentative draft of this, given out on Jan. 20, included the following provisions: Each "jitney" owner must have on file with the police commission a $10,000 bond. The police commission will have absolute control of "jitney" buses, which may operate only along the route provided by the commission. The licenses will be, five passengers, $40; more than five and less than eight, $60; more than seven and less than sixteen, $80; more than fifteen, $100. The "jitney" bus men will confer with the members of the public utilities committee to discuss the proposed license fees and other features of the ordinance. The supervisors have explained that they computed the license fees on the basis of 2 per cent of the gross earnings of the "jitney" buses. The bus men claim that the receipts of their cars average $1 per hour and that the cars in operation on the Pacific Coast are as follows: San Francisco, 300; Bay Cities, 450; Los Angeles, 1050; Portland, 75; Seattle, 500. If these figures are correct their total receipts for an eight-hour day in these cities would be $19,000.

The report of the public utilities committee of the Council of Los Angeles, which has been considering the matter of "jitney" bus legislation, says:

"We are convinced that this mode of conveyance is not temporary in character, as some believe, but that it has come to stay as a permanent feature as transportation convenience.

"We hold it as a sound economic principle that every mode of transportation in operation prior to the advent of the motor bus should sustain its appeal to popular favor and profit-making upon its intrinsic merit and not upon protective legislation.

"The motor bus must be received in all fairness and be encouraged to develop along natural lines, leaving the experience of time to demonstrate whether it will develop as an aid to established methods, or whether it will work a complete revolution as an urban passenger common carrier.

"As this development proceeds, certain uniformity of procedure, known as regulation, should be laid down, and while this must be first to the advantage of the passenger public, it must also work to the advantage of the operator and owner."

The committee says that in its judgment an ordinance should be enacted providing that the present license fee remain unchanged for the present; that every operator and owner register his name, description, state number and make of car to be operated and number of driver's license; that licenses be issued only for definite routes, including designated terminals, such routes to be selected by the applicant and not dictated by the city; that non-skid tires be applied to the rear wheels of all buses with tire chains in wet weather; that every operator be required to understand the traffic rules and demonstrate his ability properly to drive his car; that signs be provided which name the route, terminals, license number and fare; that the front seat accommodate not more than one passenger or one passenger with child in arms, and that the supervising power in the city be assigned to the board of public utilities.

The committee of the whole of the Council of Los Angeles has agreed to instruct the city attorney to draft an ordinance incorporating the regulations for "jitney" buses recommended by the utilities committee. The regulations have been approved by the Autobus Owners' and Operators' Association.

In commenting on the regulations suggested by the public utilities committee of the Council of Los Angeles, one of the local papers said that "leading business men were not slow to express their disgust with the City Council's weak-kneed, half-hearted plan of dealing with the serious 'jitney' bus problem."

J. W. M. Pherson, manager of the Glendale & Montrose Railway, Glendale, Cal., issued a statement recently which he concluded as follows:

"I respectfully submit that in view of the serious financial injury caused this company by the operation of the buses in Glendale some action should be taken which will enable both transportation concerns to live, each being compelled to operate in its proper field and in the territory best suited to its respective equipment. In this way the stage line and the railway can work harmoniously and with profit to each and with no loss to the Glendale public or to the inhabitants of the La Crescenta and Monte Vista Valleys. In that event this corporation will gladly continue to co-operate with you in the advancement of the welfare of the city, maintain its present efficient service and constantly try to improve the same. Are not such results better for all parties than to have our present properties deteriorate and again become the butt and ridicule of the community."

About Jan. 1 the first "jitney" bus made its appearance in Seattle. On Jan. 22 not less than 650 buses were operating on the main streets of the city. The City Council, some time ago, passed a bill to regulate those who drive automobiles for hire. Drivers must be twenty-one years of age, or more, must submit to a physical examination to prove their ability to handle a car, must file sworn testimonials of at least two citizens, with the city, before obtaining a license, must submit two photographs of themselves, one to be filed in the comptroller's office and the second to be attached to the license, and must pay a fee of $4 per year for each license to operate, with an additional fee of 50 cents for driver's badge.

State regulation of the "jitney" bus in Washington is proposed in a bill by Senator Wilburn Fairchild and Senator Sutton. This measure provides that bus drivers must give bonds, making themselves responsible for accidents. General regulation of routes and fares is proposed, and a tax on the bus, to assist in the maintenance of streets. I. M. Howell, Secretary of State, is having a bill prepared for regulation of public carrying automobiles, for submission to House members.

Ruling that the Washington State Public Service Commission has the legal right to regulate "jitney" buses, Charles A. Reynolds, chairman of the Public Service Commission, has directed T. E. Phipps, chief engineer for the commission, to instruct his assistants to gather all possible data regarding bus operation. Mr. Reynolds says that the "jitney" bus is a common carrier, under the act creating the commission, and as such falls within the jurisdiction of the commission. The section of the Washington statute defining common carriers follows:

"The term 'common carrier,' when used in this act, includes all railroads, railroad companies, street railroads, street railroad companies, steamboat companies, express companies, car companies, sleeping car companies, freight companies, freight line companies, and every corporation, company, association, joint stock association, partnership and person, their lessees, trustees, or receivers appointed by any court whatsoever, and every city or town owning, operating, managing and controlling any such agency for public use, in the conveyance of persons or property for hire within the State."

The act defines the transportation of persons as follows:

"The term 'transportation of persons,' when used in this act, includes any service in connection with the receiving, carriage and delivery of the person transported and his baggage and all facilities used or necessary to be used in connection with the safety, comfort and convenience of the person transported."

The powers of the commission to regulate the "jitney" buses are outlined in the following section of State law:

"Whenever the commission shall, after a hearing had upon its own motion, or upon complaint, find that additional tracks, switches, terminals, terminal facilities, stations, motive power or any other property, apparatus or equipment, facilities or device for use by any common carrier in or in connection with the transportation of persons, or property, ought reasonably to be provided, in order to secure adequate service or facilities for the transportation of passengers or property, the commission may, after a hearing, either on its own motion, or after complaint, make and serve an order directing such repairs, improvements, changes or additions to be made."

At the present time, there are no "jitney" tariffs on file with the board, and if Mr. Reynolds sustains his ruling, as given out, it is expected that the owners and drivers of buses will flood the commission's office with their tariffs and schedules.

Discussing the matter recently, Mayor H. C. Gill of Seattle said:

"The situation to-day is abnormal. Motor-propelled vehicles are as logically the successors to the electric cars, as the electric cars were the logical successors to the horse-drawn vehicles. Regulations by ordinance, except as provided in the new ordinance requiring registration, is impossible under the present State laws. Any ordinance looking toward general regulation will conflict with State statutes and will be restrictive rather than regulatory. Such a law would be unconstitutional, and would fall before the first test case. Seattle's hope of regulation lies in the passage of a State law covering the operation for hire of all motor-driven vehicles within the State. In the first place, prosecution under a State law always is more effective than under a city ordinance. Buses should not be permitted to be overcrowded; the drivers should be bonded to protect their passengers in case of accident, and the strictest police supervision should be maintained, that human life and property may be protected."

More than 600 owners and drivers of "jitney" buses in Seattle have decided on a permanent organization, to be known as the Seattle Auto Transit Association; its incorporation under State laws, as a non-profitable concern, with a president, vice-president, secretary and treasurer; a business office downtown, and an assessment against every member of $2 per month, to defray the expenses of maintaining the organization.

A. L. Kempster, manager of the Puget Sound Traction, Light & Power Company, advises that the heads of the local corporation have held several conferences for the purpose of discussing the situation, but that it is felt the "jitney" bus has not interfered with their business sufficiently to warrant drastic action being taken at the present time. Other officials of the company intimate that the matter of building and operating a number of buses in direct competition with the privately-owned buses is not improbable. The company has not laid off any men or curtailed its service.

An address in regard to the "jitney" bus in Portland, Ore., was made on Jan. 15 before the Transportation Club in that city by Franklin T. Griffiths, president of the Portland Railway, Light & Power Company. Mr. Griffiths said in conclusion:

"I trust that I have made clear not only the unfair nature of this competition to the existing company, but also that the best interests of the people of Portland would be subserved by placing automobile or auto bus transportation in its proper field as supplementing existing transportation only in those districts where there is or may hereafter exist an inadequacy of street railway service and then subjecting them to a burden for the benefit of the public commensurate with that assumed and discharged by the existing company. Either similar burdens should be imposed upon the new transportation system or the existing company should be relieved of further obligations in the matter of such charges and reimbursed for what it has heretofore expended for the benefit of the public. I trust that in the interests of the public as well as the company a fair and equitable solution of this problem will speedily be found."

The City Council of Portland has taken no steps to regulate or curb the operations of the buses. Commissioner Daly, of the Department of Public Utilities, terms the buses a "fly-by-night" fad. He asserted, however, that should they survive for five or six months they must be made subject to the same regulations as the electric railways and forced to make the long hauls as well as the short.

MASSACHUSETTS BILL TO REGULATE "JITNEY" BUS

As announced briefly in the ELECTRIC RAILWAY JOURNAL of Jan. 23 the Massachusetts Street Railway Association has filed a bill with the Legislature setting forth the conditions under which bus business may be carried on in that State and providing for responsibility in case of damages caused by such bus lines. The bill provides that five or more persons may associate themselves by written agreement with the intention of forming a corporation for the transportation of passengers in automobiles, having a seating capacity for eight or more passengers. The agreement of association is required to be in such form as the Public Service Commission shall require, including the names of the cities and towns in which it is proposed to operate. The capital stock of the corporation is to be not less than $10,000 for each of the total number of passengers capable of accommodation in the largest vehicle operated or proposed for service by the corporation, and is to be fixed at such larger amount and may be increased at the order of the board from time to time, in view of the volume of business, speed of vehicles, danger of injury, or loss of life of passengers or other users of the highways through which such vehicles are operated, and of other conditions deemed pertinent by the board.

The bill provides that the municipal authorities of any city or town named in the agreement of association may issue, after public notice and hearing, a license designating the streets and highways upon which the vehicles are to be operated, the terms and conditions as to rate of speed, compensation for wear and tear of highways and bridges, manner of operating such vehicles, and adoption of proper safeguards under which the business shall be conducted, but no license is to be valid until it has been approved as consistent with the public interests by the Public Service Commission, which may modify any provisions as it deems necessary for the protection and convenience of passengers and the public. If such a license includes any portion of a state highway it is not to be valid until the Massachusetts Highway Commission has determined the amount of annual payment to be made by the corporation to the latter commission to be by it applied in the maintenance of such State highway, and this annual payment, to be made on or before Jan. 1, is to constitute a condition precedent to the right of the corporation to operate its vehicles over the State highway. The amount of the payment can be changed from time to time at the order of the Highway Commission. A fee of $50 must be paid by the corporation for its license. All the provisions of the general electric railroad law (Chap. 463, part 3, Acts of 1906) relative to the issue of securities are to apply to the bus corporation.

The Public Service Commission is to have as full power over fares, service and operation as it exercises over electric railways, and bus corporations are required by the bill to file annual returns with the board. A sworn return of the weight and seating capacity of every motor vehicle seating more than eight passengers and transporting persons for hire is to be made annually to the Highway Commission, duplicates being filed with the Tax and the Public Service Commissioners. No owner, except such corporations, of such a motor vehicle, shall permit its operation for the carriage of passengers until he shall have deposited a bond with the Highway Commission in the amount to be obtained by multiplying $5,000 by the number of persons for whom there is seating capacity in the motor vehicle, to provide security for damages which may be recoverable by any passenger on such motor vehicle, or by any person not a passenger, against the owner or operator of the motor vehicle. Every such individual owner is required by the bill to pay an annual tax to the State at the rate of $10 for every 100 pounds of weight of the vehicle in excess of 4500 lb., the tax to be expended by the Highway Commission as provided by law.

THE "JITNEY" BUS ELSEWHERE

The Real Estate Exchange of Fort Worth, Tex., and other business organizations are protesting against the operation of the "jitney buses," and the exchange has on its own initiative drafted a proposed ordinance covering their operation. This ordinance calls for a higher license on all automobiles operating for hire. It would eliminate the solicitation of passengers on streets over which street cars are run and would provide a regular schedule under which the buses must operate. The ordinance further provides that the "jitney" buses should pay both personal and occupation taxes and carry free all city employees.

Meanwhile the city commissioners of the city of Fort Worth have authorized the police commissioner to approve applications made by "jitney" bus owners and send them to the tax office without the applicants having to wait for the entire commission formally to approve the application. Every applicant is questioned about the condition of his machine, and in some cases the commissioner insists on inspecting the machine before approving the application. The commissioner expressed himself to the effect that he did not intend to have "a lot of 'ratty' and unsafe automobiles running around the city with big loads of people." He has assigned a motorcycle officer to ride around with applicants for "jitney" bus licenses to test their efficiency as chauffeurs. He cautions every driver to whom a license is issued about the traffic regulations and tells him to keep his running board clear and never allow more than one person on the front seat. He has anounced that he will revoke the licenses of all who fail to comply with these instructions. On Jan. 15 there were fifty-four "jitney" automobiles in operation in Fort Worth. It was then figured that more than 100 other cars would be in service by Feb. 1.

David Daly, manager of the Houston Electric Company, is quoted by the Houston *Post* as follows in regard to the "jitney" bus:

"We estimate that the 'jitney bus' lines, if they continue to increase as at present, will decrease the earnings of the Houston Electric Company under those of 1914 by at least $250,000. If such a decrease does come about, it will be absolutely impossible to finance new improvements and go on with the work of double-tracking and the expenditures for paving and other items amounting during the twelve months ended July 1, 1914, to $750,000."

Regarding the menace of the "jitney" bus in Texas L. C. Bradley, manager for Stone & Webster in Texas, is quoted as follows by the Dallas *Times-Herald:*

"If the cities of Texas do not take some steps to put these automobiles under the control of the municipalities in which they operate and have fixed rules of service to all points and see that they pay a permit tax for the streets they use it means a revolution of the street car business of this section. We cannot begin to maintain adequate service if our business is shot to pieces by a business which pays nothing to the city's tax office. We are waiting for the city governments to recognize the situation which faces them and us."

As an immediate means of obtaining motor bus service for the city of Chicago, Mayor Harrison has announced that the field is open for private capital to step in and operate "jitney" buses. In explaining his position the Mayor stated that the thoroughfares were not under park jurisdiction, therefore no franchise was needed to operate bus lines over them. He held that the streets were as free for private motor buses as for any other commercial vehicles.

The operation of about sixty automobiles, including a few adapted trucks, in "jitney" service mornings and evenings, on the streets of Kansas City, has elicited the question by Mayor Jost as to licenses and taxation. The first "jitney" went into service in Kansas City on Jan. 18.

EXPOSITION TRAFFIC

Preparation Being Made for Handling Exposition Crowds at San Francisco

Until recently there has been some apprehension in San Francisco as to the possibility of handling exposition crowds with the transportation facilities now planned, and after a record attendance at the grounds on Jan. 10 a careful compilation of data was made. On that date 45,000 people were admitted to the exposition grounds, this being the last day the grounds were open to the public prior to the official opening on Feb. 20, and although practically all the heavy traffic was handled both ways on a short afternoon, there was no undue delay or inconvenience. Within another month the transportation facilities for handling exposition visitors will, it is estimated, have a total capacity of 52,600 per hour.

A review of transportation facilities to be available by the opening date next month, gave the following results: Municipal Railroads, 18,100 passengers per hour; United Railroads, 16,000; Hyde Street line, 3000; Double-deck buses, 3500; "jitney" buses, 5000; independent buses, 500; Key Route (direct to fair grounds), 5000; Northwestern Pacific, 2000; total, 52,600.

It is estimated by Mr. Mortensen that the average daily attendance will be 40,000 to 50,000. He points out that the 15,000 privately-owned automobiles in the city will convey a large number of people to and from the grounds, and that 40 per cent of the city's population live within walking distance of the exposition gates.

C. N. Black, vice-president and general manager of the United Railroads, said recently:

"The United Railroads wants to make two changes before the opening day. The first of these is under way in Fillmore Street—on the line coming down the hill. We are having cars reconstructed for this line so that they can be emptied and filled much more rapidly than the regular cars. There will be two doors on each side, and when the passengers are going out on one side they will be entering on the other. These cars will be run in trains of two, with a two-minute headway. A new cable is being made and will be put in. I am confident that we can handle 6000 an hour on this line. We shall ask for a temporary permit on Francisco Street between Polk and Van Ness, and if we get it we shall load and unload cars both on this spur and on Polk Street north of Francisco. That will give us double facilities to turn the cars, and with this permit we can run on about a forty-five-second headway on Polk Street. I know that there are estimates that a thirty-second headway can be maintained, and it could were the regular traffic on Polk Street not so heavy, and if the team drivers could be persuaded to keep off the car tracks. These objections will make it impossible to try to run a car more frequently than forty-five seconds. We have the equipment and expect to handle 10,000 people an hour on this line."

ADVICE ABOUT SNOW

Director of Public Service Fosdick of Cincinnati issued the following statement on Jan. 23:

"People riding on street cars will naturally understand that weather conditions of the past few days have greatly contributed to causing delays in the car service.

"The unusual fall of snow and the alternate freezing and thawing tend to more difficult operation of cars. Even with the best attention that can be given to cleaning the streets of snow it is impossible to cover the whole city at once.

"The fact that the electric railway operates its snow plows continuously when the snow comes means that the tracks are clearer of snow than the sides of the streets and that teams and vehicles of all kinds hunt the tracks in preference to the sides of the streets. As the sides are cleaned, however, this condition is materially relieved, and I think it is advisable to request teamsters and drivers of all kinds of vehicles to keep out of the street-car tracks as far as possible so that delays to street cars by fallen horses and broken or stalled wagons will be reduced to a minimum.

"Frequently drivers stay in the car tracks in spite of the ringing of gongs and dragging of the cars behind them. They ought to turn out at once. The street cars are to accommodate so many people that the first consideration should be given to those desiring to get to their destinations in this way. Accidents happening in the car tracks mean the tying up of lines, consequent delays and impairment of the car service. All drivers are earnestly requested to follow the above suggestions."

GRADE CROSSING ACCIDENTS

The report of highway railroad grade crossing accidents for 1914, issued by the National Highways Protective Society, shows that, in New York State, during 1914, 199 persons were killed, as compared with 124 in 1913 and 107 in 1912, not including trespassers. One hundred and thirty-three persons were seriously injured. Of those fatally injured more than 66 per cent were pedestrians. The fatalities in which the victim was an occupant of a motor car decreased from thirty-eight in 1913 to thirty-five in 1914. There were no fatal collisions between trolley cars and trains, but thirty-one occupants of wagons met their deaths by collisions with trains, as compared with thirty in 1913 and forty in 1912. The report holds that the immunity from fatal accidents to trolley passengers at highway railroad grade crossings during 1913 and 1914 is due largely to the law now in force in New York State which compels the motormen of trolley cars to stop their cars at each crossing and assure themselves that the way is clear before proceeding. It is suggested that if a similar law had been enacted to apply to drivers of automobiles and wagons, sixty-six persons would not have been killed last year while attempting to cross a railroad at grade.

CHICAGO TRACTION FUND FOR EMPLOYEES' PENSIONS

Mayor Harrison has suggested to the City Council of Chicago that a portion of the city's traction fund be contributed hereafter to a pension fund for street railway employees. In the letter to the City Council the Mayor asked that the matter be referred to the local transportation committee for investigation and that the corporation counsel be asked to render an opinion as to the legality of an ordinance applying a percentage of the city's future receipts from the street railways to a pension fund. The Mayor sets forth as his reason for making such a suggestion that the working agreement between the employees and the railway companies will expire during the coming summer, and no doubt an increase in wages will be demanded. Since the granting of an increase would reduce the city's share of the net receipts, it might be good policy to inaugurate such a plan as a means of forestalling serious difficulties which, he stated, were sure to arise when negotiations were under way for another working agreement.

EMPLOYEES' MAGAZINE IN ST. LOUIS

The first number of the *United Railways Bulletin*, a monthly published by the United Railways, St. Louis, Mo., in the interests of its employees, has been issued. The front page is devoted to an explanation of the purpose of the *Bulletin*, by Richard McCulloch, vice-president and general manager, who says: "It is intended to be a medium for the interchange of ideas between the men who constitute the brains, the bone and the sinews of the United Railways."

The "leader" in the magazine is an article devoted to the United Railways new pension system. The organization of a building and loan association for employees of the company is told of in an article by Robert J. Richardson. Pope Y. White, formerly with the St. Louis *Times*, is editor of the monthly.

Children's Tickets in St. Louis.—The transportation department of the United Railways, St. Louis, Mo., has inaugurated a new system of handling children's tickets. Heretofore conductors have been required to buy tickets good for children and to keep supplied with a certain number of them. In the future the company will furnish $2 worth of tickets to each conductor each morning, for which he will sign receipt the same as he does for change money, turning in the tickets he has left at night and paying for those he has sold.

Stay Granted in Albany Service Order.—Officials of the United Traction Company, Albany, N. Y., have been granted a temporary stay from the order of the Public Service Commission of the Second District of New York requiring certain improvements to be made in its equipment and service. The application was made before Supreme Court Justice A. V. S. Cochrane at Hudson for a writ of certiorari and a stay to the order of the commission. It is believed that the case will go to the Appellate Division, which will convene in Albany in March and then to the Court of Appeals.

The St. Joseph Fare Case.—On Jan. 22 three United States District judges—John E. Garland, A. S. Van Valkenburgh and D. P. Dyer—heard arguments on the application of the Kansas City, Clay County & St. Joseph Railway for an injunction against the enforcement of the Missouri Public Service Commission's order as to commutation rates. The commission has been allowed thirty days to file a brief. The company will then have five days to make answer, and the hearing then will be by one of the judges. The new rates are suspended by a temporary order pending the hearing of the case on its merits.

Southern Pacific Rate Case Up Again.—The entire peninsula rate case against the Southern Pacific Company and its electric subsidiary, the Peninsula Electric Company, has again been brought up before the State Railroad Commission of California on complaint of San Mateo and Palo Alto people. All rates of the Southern Pacific Company and its electric subsidiary are attacked, including the monthly commutation, trip and regular fares. The peninsula people complain that they are discriminated against by the railroad in favor of Alameda County and trans-bay passengers who are getting lower rates.

Subway Service Order.—On the recommendations of Commissioner Maltbie, the Public Service Commission of the First District of New York has ordered the Interborough Rapid Transit Company to furnish a seat for every passenger in the subway cars between the Atlantic Avenue station, Brooklyn, and Manhattan, during the non-rush hours. The company may obey the order either by operating the maximum of ten-car trains during the hours mentioned, or run a sufficient number of cars to provide seats equal to the number of passengers carried during a period of every twenty minutes.

Steam-Electric Freight Service Discontinued.—The present freight service operated over the Iowa & Illinois Railway from Davenport, Ia., to Clinton, and from that point over the Northwestern steam railroad, will be discontinued after March 15. This means the withdrawal of all steam cars on the Iowa & Illinois Railway. A local electric service in carload lots and less will be continued on both the Iowa & Illinois Railway and the Davenport-Muscatine line. The steam-electric freight service on the Iowa & Illinois Railway was inaugurated on April 1, 1912. It is stated that the service has been unprofitable and that it has interfered with the passenger business.

Traffic Decreases in Buffalo.—The records of the International Railway, Buffalo, N. Y., show that it is carrying fewer passengers now than it did two years ago and that there was a decrease in passenger traffic in 1914 compared with 1913. Edward G. Connette, president of the company, says that the increased number and use of automobiles have injured the business of the company. To obtain concrete information on the subject he had a check made of the number of passengers riding in automobiles on Delaware Avenue, the Fifth Avenue of Buffalo, and from the figures thus obtained it was found that the automobile traffic on that thoroughfare was sufficient to justify a double track railway with cars running on a headway of two and one-half minutes.

New Schedule at Manila.—A new schedule was put into force on Nov. 17 by the Manila Electric Railroad & Light Company, Manila, P. I., because of changed traffic conditions caused largely by the temporary closing of the Bridge of Spain. In answer to some adverse comments in the daily papers on the changes in schedule, C. N. Duffy, vice-president of the company, published a statement on Dec. 3, giving in detail the reasons for the changes in the schedule. He also presented a statement of the revenue passengers carried during the first eleven months of 1914, as compared with 1913. These figures showed an increase of about 2 per cent during the first six months of the year, compared with 1913, but during the last five months of the year there was a decrease of approximately 17 per cent, or a decrease of approximately 7 per cent for the eleven months.

Talks to the Men in Houston.—David Daly, manager of the Houston (Tex.) Electric Company, has begun the publication of *The Organization*. The first issue was dated Jan. 2, 1915. Mr. Daly describes the publication as a pamphlet issued now and then from the manager's office for the promotion of thrift, economy and service. The idea is to make the publication a means by which Mr. Daly can have heart-to-heart talks with his men. His appeal to the men is to read carefully everything that he has to say in the talks and think it over. The talks are not meant for the public. Mr. Daly says that to meet the decreased revenues due to the prevailing dull business and incidentally to the "jitney" lines, the company must decrease its expenses without hurting the service and if possible without reducing the payroll. He desires co-operation towards cutting down waste of materials, of time, money and human life.

Lower Car Steps in New Hampshire.—The order of the Public Service Commission of New Hampshire requiring lower car steps, previously referred to in the ELECTRIC RAILWAY JOURNAL, requires that all cars hereafter placed in service on any of the roads in the State shall be equipped with steps none of which shall be more than 15 in. high. With reference to several of the lines, the commission says that they are small roads and that none of them pay dividends upon their stock or have not done so for the last ten years, except in the case of the Keene and Berlin roads. The steps on the cars on these lines do not vary greatly from the standard fixed by the proposed order, and the commission says that upon these roads the management ought to provide an extra set of steps for the open cars at some reasonably early date. At the present time the commission will make no order as to any reconstruction of existing equipment upon any of this group of roads. The commission states that 93 per cent of the total street railway traffic is upon lines the cars of which now conform, or will by the proposed order be brought to conform, to the standard fixed by the commission.

Personal Mention

Mr. Herbert Clay, counsel of the Atlanta Northern Railway, Atlanta, Ga., has resigned from that company.

Mr. J. H. Hornung has resigned as general manager and purchasing agent of the San Francisco, Napa & Calistoga Railway, Napa, Cal.

Mr. Arthur B. Fuller has been appointed superintendent of equipment of the Union Street Railway, New Bedford, Mass., to succeed the late Richard H. Bennett.

Mr. Samuel Riddle, superintendent of transportation of the Louisville (Ky.) Railway and allied lines, has been elected vice-president of the Louisville Engineers' & Architects' Club.

Mr. Carl D. Jackson, Oshkosh, Wis., former district attorney of Winnebago County, has been appointed a member of the Wisconsin Railroad Commission to succeed Mr. John H. Roemer, resigned.

Mr. P. H. Worman was elected treasurer of the Dayton (Ohio) Street Railway at the recent annual meeting of the company to succeed Mr. E. W. Hanley, who resigned several months ago. Mr. Worman is also secretary of the company.

Mr. Robert E. Williams has resigned as manager of the steam heat department of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to become connected with the Little Rock Railway & Electric Company, Little Rock, Ark.

Mr. Edward M. Graham, who has been connected with the Frank Ridlon Company, Boston, Mass., for the last year, has resigned to resume his former position as assistant to Mr. John R. Graham, president of the Bangor Railway & Electhic Company, Bangor, Maine.

Mr. Frank W. Webster, general manager of the Fresno (Cal.) Traction Company and the Stockton Electric Railroad, has also been appointed general manager of the Central California Traction Company, Stockton, to succeed Mr. C. H. Robertson.

Mr. William S. Hamel has been appointed chief clerk to Mr. C. V. Wood, vice-president of the New England Investment & Security Company, Springfield, Mass., to succeed Mr. Robert E. Cosgrove, whose appointment to the position of passenger and freight agent of the company is referred to elsewhere in this column.

Mr. John Hall Rider is about to join the firm of Preece, Cardew & Snell, London, England. Mr. Rider retires shortly from the position of consulting electrical and mechanical engineer to the Central Mining & Investment Corporation, Ltd., and Rand Mines, Ltd., Johannesburg. Previous to going to South Africa in 1910, Mr. Rider was for nine years electrical engineer to the London County Council Tramways, London, England.

Mr. George M. Cox, vice-president and general manager of the Boston Suburban Electric Companies, Boston, Mass., was presented with a diamond ring and a traveling bag recently by the employees of the company as a token of their esteem and to commemorate his election as vice-president of the company. More than 200 members and guests were present at the annual dinner of the Suburban Railway Club, at which the presentation was made. Included in the gathering were many officers of the towns and cities through which the lines of the company are operated.

Mr. Robert E. Cosgrove, chief clerk to Mr. C. V. Wood, vice-president of the New England Investment & Security Company, Springfield, Mass., has been appointed to the position of passenger and freight agent of the lines operated by the company. He will be in charge of traffic over the Springfield Street Railway, the Worcester Consolidated Street Railway, the Milford, Attleboro & Woonsocket Street Railway, the Interstate Street Railway and the Attleboro Branch Railroad. The new position was created as a separate department, the work having been done previously by Mr. Cosgrove as chief clerk. Mr. Cosgrove is a native of Winchester and entered the service of the company in its Boston office as a stenographer. He was associated there with Mr. Wood, and when the offices were moved to Springfield in 1908 he was appointed to the local office in that city.

Mr. W. H. McGrath, who succeeded Mr. A. W. Leonard recently as manager of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and subsidiary companies on the election of the latter to the position of president, has been connected with public service properties for the last fourteen years. After graduating from Harvard in 1901 with an engineering degree, Mr. McGrath went with Stone & Webster and gained experience in every department of the Boston office work. In 1902 he was appointed electrical engineer for the company at Houghton, Mich., and became superintendent of the Houghton County Electric Light Company about 1903. In 1905 Mr. McGrath was made manager of Houghton County Traction Company and Houghton County Electric Light Company, both Stone & Webster properties. He served in this position until 1909, when he was transferred to Minneapolis as assistant to Mr. A. W. Leonard, at that time vice-president and manager of the Minneapolis General Electric Company. During some of the trying times of this company and until 1912, when Stone & Webster sold the property, which then was very successful, he held the position of assistant general manager at Minneapolis. In June, 1912, Mr. McGrath returned to Boston and took up expert work for Stone & Webster in connection with the examination, analysis and organization of new properties and for other interests, bankers, etc. In November, 1913, he was appointed assistant to the vice-president of the Puget Sound Traction, Light & Power Company, Seattle, which position he held until Mr. Leonard's election to the office of president to succeed the late Jacob Furth.

W. H. M'GRATH

Mr. M. C. Ewing, general manager of the Wausau (Wis.) Street Railroad, was elected president of the Wisconsin Electrical Association at the seventh annual convention of the association, held in Milwaukee on Jan. 22, 1915. Mr. Ewing was born in Cleveland, Ohio, in 1869 and entered public utility service at Wausau in 1906, when he aided in the promotion and construction of the Wausau Street Railroad. In 1908 the electric service and street railway properties in Wausau were merged, and Mr. Ewing was made general manager of the combined properties. He also aided in the promotion and construction of the street railway system in Grand Rapids, Wis. He has been active in the work of the Wisconsin Electrical Association for a number of years. The company at Wausau, of which Mr. Ewing is general manager, operates 9 miles of line and furnishes current for light and power purposes in the cities and towns of Wausau, Schofield and Rothschild.

M. C. EWING

OBITUARY

Harry Glazier, formerly superintendent of the Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., is dead. Mr. Glazier assumed the position of superintendent of the company in 1906 and severed his connection with the company in 1908. He then became associated with the Frankford, Tacony & Holmesburg Street Railway and was connected with that company at the time of his death.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Buffalo, N. Y.—The Council of the city of Buffalo has referred to a committee of nine the Sullivan resolution to permit the Frontier Electric Railway to cross various streets between Kenmore and Main Streets, Buffalo. The Frontier Electric Railway proposes to build between Niagara Falls and Buffalo. [E. R. J., Oct. 12, '14.]

Birmingham, Ala.—The City Commission of Birmingham has been notified that H. J. Milner, president of the Milner Land Company, will apply for a franchise to build an electric railway from the end of the South Highlands line of the Birmingham Railway, Light & Power Company at Twentieth Street and South Fifteenth Avenue to Milner Heights.

Santa Barbara, Cal.—Application has been made to the Council of the city of Santa Barbara for the granting of a franchise to Richard Hamilton Gaud for the construction of a single or double-track street railway upon certain streets of the city of Santa Barbara under the provisions of the general law of the State of California for a period ending March 15, 1957. Competitive bids will be received by the Council until Feb. 18.

Baltimore, Md.—The Pennsylvania Railroad, in a letter to Mayor Preston, has asked that Baltimore grant a franchise to the company to construct two more tunnels under the city, one paralleling the tunnel from Fulton station to the North Avenue Bridge and the other paralleling the line from Greenmount Avenue to Broadway.

Syracuse, N. Y.—The New York State Railways has applied for a franchise for permission to lay a single track in Elm Street, Syracuse, from Shuart Avenue to Burnet Avenue, which will give it a double track on the East Syracuse line within the city limits and enable it to improve its service on that line. By this plan the company proposes to run out-bound cars through Oak, Hawley and Elm, while the in-bound cars will be operated by way of Elm Street and Burnet avenue. At present the East Side cars are operated in both directions by way of Oak, Hawley and Elm.

TRACK AND ROADWAY

Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—Two cars have been received by this company preparatory to establishing service on the company's line in Tuscaloosa on Feb. 1.

Gadsden, Ala.—It is expected that the construction of the proposed interurban electric railway from Gadsden to Center at an estimated cost of $250,000 will be begun in the spring. Louis Hart, Gadsden, is said to have received assurances to this effect. [E. R. J., Nov. 7, '14.]

Fort Smith Light & Traction Company, Fort Smith, Ark.—The Fort Smith-Van Buren Bridge Commission has tabled the offer of the Fort Smith Light & Traction Company for a twenty-year franchise to use the Fort Smith-Van Buren Bridge.

Fraser Valley & Southern Railway, Vancouver, B. C.—An inquiry to this company by the ELECTRIC RAILWAY JOURNAL in regard to the prospect for carrying out the construction of the company's proposed line has resulted in a communication from Frank Harris of the British Columbia Electric Railway, Ltd., Vancouver, to the effect that at the present time no development operations are contemplated by the company.

Los Angeles, Cal.—The Board of Public Works is advertising a hearing by the City Council for Feb. 24 on the granting of a right for a spur track franchise in Los Angeles.

Pacific Electric Railway, Los Angeles, Cal.—So rapid has been the construction of the extension of the line of this company from Harrison Street, Arlington, to Corona that it is announced the line will probably be finished and ready for operation by Feb. 15.

Marion County Electric Railway, Mill Valley, Cal.—This company has filed a supplemental application with the Railroad Commission of California requesting authority to commence construction work upon its Cascade branch in accordance with an offer of the Hicks-Folte Corporation to accept in payment, stock, notes of stock purchases and instalment stock subscriptions. [E. R. J., Dec. 12, 14.]

San Francisco (Cal.) Municipal Railway.—The Board of Supervisors of San Francisco on Jan. 21 adopted a modification of what is known as Plan No. 9 for overcoming the obstacles to extending the municipal railway by a line on Church Street hill. The plan approved provides for a detour through Mission Park and around the Church Street hill from Nineteenth to Twenty-second Streets over a private right-of-way for double track 28 ft. in width, to be purchased by the city. The grade will be between 9 per cent and 10 per cent. The cost of the detour alone will be $200,000, as estimated by the city engineer. Since the amount of funds available for the construction of the Church Street line from Van Ness Avenue to Thirtieth Street is estimated at $450,000, this would leave but $250,000 for the rest of the construction, which is estimated to cost approximately $325,000. The question of financing the new line is yet to be settled.

Ukiah, Cal.—T. J. Weldon, Ukiah, writes that no company has as yet been formed to construct the proposed electric railway from Ukiah to Lake County via Potter Valley. The whole matter is in the preliminary state. [E. R. J., Dec. 26, '14.]

Vallejo-Benicia Electric Railway, Vallejo, Cal.—Estimates made of the cost of construction of this proposed electric railway include the following: Grading, $12,000; ties, poles, etc., $1,500; rails, etc., $2,800; track laying and surfacing, $3,000; pipe, $500; overhead and bonding, $6,000; two cars, $7,000; city construction, $10,000; engineering, $5,000; total, $86,500. Joseph J. Henry, president.

Kankakee, Ill.—Right-of-way for the proposed electric railway between Kankakee and Lafayette has been secured from Lafayette to Rensselaer. Some grading has been done near Lafayette. The proposed line will be 80 miles long and from Lafayette will run through Beaverville, St. Anne, Wichert and Waldron and connect with the Chicago & Southern Interurban Railway at Kankakee. O. J. Brown, general manager.

Union Traction Company, Coffeyville, Kan.—This company has installed service on the Nowata extension of its line. The extension is 23 miles long, and gives the company a continuous line from Nowata, Okla., to Parsons, Kan., by way of Coffeyville, Independent and Cherryvale.

United Railways, St. Louis, Mo.—This company favors the extension of its Fourth Street line through the Lafayette Park district. Richard McCulloch, general manager.

South West Missouri Railroad, Webb City, Mo.—It is stated unofficially that this company contemplates extending its line from Galina to Commerce.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The New York Municipal Railway Corporation, affiliated with the Brooklyn Rapid Transit Company, has advertised for bids for the construction of the elevated railroad from the Cypress Hills terminal of its present elevated lines through Jamaica Avenue to Myrtle Avenue, Richmond Hill, about 2 miles. This is the first section of the line which when complete will extend all the way from Crescent Street, Cypress Hills, to Grand Street, Jamaica. This will be a two-track line with provision for the installation of an additional track in the future. It is expected that the entire line will be completed by July, 1916.

Cleveland, Akron & Canton Terminal Railway, Cleveland, Ohio.—At an organization meeting on Jan. 26, O. C. Barber, Barberton, Ohio, was chosen president of this company, formed to build a subway under East Fifty-fifth Street between the lake front and the upper Cuyahoga Valley. William Greif was chosen vice-president; F. D. Lawrence, treasurer, and E. F. Hutches, secretary. The Osborn Engineering Company has been employed to make the preliminary surveys.

Lake Erie & Youngstown Railroad, Youngstown, Ohio.—This company has filed its first account with the Public

Utilities Commission of Ohio on Jan. 18. It appears, according to this, that more than $200,000 in bonds has been issued to the Caldwell Construction Company. The commission gave the company thirty days in which to decide whether it will proceed with the work of constructing the road or abandon it. [E. R. J., June 27, '14.]

Cleveland (Ohio) Railway.—John J. Stanley, president of the Cleveland Railway, has submitted to the West Madison Avenue Civic Association the plans under which his company would be willing to construct a line on West Madison Avenue, Lakewood, from West 117th Street to Rocky River.

Berks & Lancaster Railway, Lancaster. Pa.—This company has been granted permission to construct its proposed electric railway across the property of the Orphans' Home at Womelsdorf. [E. R. J., Oct. 12, '14.]

Charleston Consolidated Railway & Light Company, Charleston, S. C.—This company has begun the construction of its new interurban lines between Charleston and North Charleston. The work is being done under the direction of L. Y. Dawson, roadmaster of the company.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—Headquarters of the company organized to build an electric railway from Kingsport, via Greenville to Newport, have been established in the Hill & Rankin Building, Depot Street, Greenville, and it is said that construction work will begin in the spring. The power would come from the hydroelectric plant on the Nalachuckey River. [E. R. J., Jan. 2, '15.]

Brenham, Tex.—The construction of the proposed electric railway from Brenham to Independence and Old Washington and points in the Brazos Bottoms has been referred to a committee composed of D. C. Giddings, H. F. Hohlt, president of the First National Bank, Brenham, and F. H. Bosse, president of the Washington County State Bank. [E. R. J., Jan. 23, '15.]

Dallas (Tex.) Electric Company.—L. C. Bradley, assistant district manager for Stone & Webster in Texas, said in a recent interview that the firm was committed to build the Terrell Interurban Railway and that it intended to do so, but as to when the line would be built he could not say.

Northern Texas Traction Company, Fort Worth, Tex.—This company has begun the installation of an automatic block signal system on its line between Fort Worth and Dallas.

Princeton (W. Va.) Power Company.—During 1915 this company plans to build 13 miles of new track.

Morgantown & Wheeling Railway, Wheeling, W. Va.—This company contemplates testing, on one of its local lines, a straight gasoline motor car made by the Roberts Gasoline Engine & Car Company. The inventor of the motor used in the Roberts car is Amos Harold, Marion, Ohio.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company has opened its new depot at El Segundo, Cal. The building is 58 ft. x 38 ft. and consists of an indoor and an out-of-door waiting room, an express office, express and freight rooms, and a platform for freight loading on one side of the station.

United Railroads, San Francisco, Cal.—This company has leased the block bounded by Van Ness Avenue and Polk, Francisco and Bay Streets, and on it will erect a terminal for the use of cars during the Panama-Pacific Exposition. Application has been made to the Board of Works and the Supervisors for permission to put in the necessary track connections.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—This company will move its carhouse and shops from Pen Argyl to Wind Gap in order to be more advantageously situated when the projected line from Wind Gap to Saylor's Lake is completed.

POWER HOUSES AND SUBSTATIONS

Texas Light & Power Company, Dallas, Tex.—The new plant of this company is said to be ready for operation. The Texas Light & Power Company is affiliated with the Texas Traction Company and the Southern Traction Company.

Manufactures and Supplies

ROLLING STOCK

Princeton (W. Va.) Power Company will purchase four interurban cars during 1915.

Arkansas Valley Interurban Railway, Wichita, Kan., will purchase one 40-ft. express trailer during 1915.

Sioux City, Crystal Lake & Homer Electric Railway, Sioux City, Ia., will purchase one open motor or trail car during 1915.

Metropolitan Street Railway, Kansas City, Mo., is receiving bids from car-builders on twenty-five new single-end cars.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has received four 55-ft. suburban cars from the Preston Car & Coach Company. The cars are geared for a maximum speed of 60 m.p.h. The electrical equipment consists of 4 GE-214 motors with type MK simplified control, the master controller having dead man's release handle. The cars are divided into two compartments, the smoker at one end being separated by a partition which allows a passage-way on one side of the car, enabling passengers to go into the other compartment without having to pass through the smoker. The framing is steel with wood lining.

Oklahoma (Okla.) Railway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9, 1915, as having ordered eight double-truck T-post prepayment city cars from the St. Louis Car Company, has specified the following details for this equipment:

Date of delivery	April	Body	semi-steel
Seating capacity	44	Interior trim	bronze
Weight of car-body,		Headlining	Agasote
	17,000 lb.	Roof	arch
Length of body	29 ft.	Underframe	steel
Length over vestibule	40 ft.		

The specialties of old car-bodies and old trucks will be used for the new equipment.

TRADE NOTES

Hugo Burgheim Company, Cincinnati, Ohio, dealer in iron and steel scrap and equipment and specializer in relaying rails, has moved its Cincinnati offices to larger quarters in Suite No. 601, Mercantile Library Building.

David A. Wright, who for several years has been connected with the Yale & Towne Manufacturing Company, New York, as district manager in the West, has opened an office for himself as manufacturers' agent at 140 South Dearborn Street, Chicago, Ill. Mr. Wright is specializing on labor-saving and pneumatic machinery, cranes, hoists and trolley systems.

ADVERTISING LITERATURE

Pittsburgh Transformer Company, Pittsburgh, Pa., has issued a reprint of a paper by D. W. Roper read before the American Institute of Electrical Engineers on May 29, 1914, which presents an analysis of transformer operation for one year on a system having nearly 15,000 transformers installed.

H. M. Byllesby & Company, Chicago and New York, have issued an attractive booklet describing the various securities which they are offering to the public. The securities described have been issued by various electric lighting companies under the engineering and commercial management of the management company.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has organized a bronze department for the production of a general line of brass and bronze castings in addition to certain specialties developed and patented by this company. The department will be under the management of William M. Corse, until recently works manager of the Lumen Bearing Company, Buffalo, N. Y. Hugh R. Corse, who will be located at 912 Ford Building, Detroit, Mich., will be sales representative. This company is specializing in aluminum bronzes. The titanium aluminum bronze has a tensile strength of 70,000 lb. per square inch, elongation 20 per cent, specific gravity 7½.

Dayton Fare Recorder Company, Dayton, Ohio, has issued a catalog which gives particular attention to the new standard D. B. registering fare box which this company is now putting on the market and to its standard types of computing fare recorders for urban and interurban railways. The catalog contains illustrations of the fare box and full-size photographic reproductions of a trip-card record, showing register readings taken from a recorder adjustment used in combination with the fare box. By this system of fare collecting and accounting every fare is classified and indicated as paid, is registered, computed and recorded as indicated and is as effectually checked and verified by the double system of recording as money paid in a bank.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 44004, which forms an ordering catalog devoted to railway line material for direct suspension. This publication covers practically everything in line material for this method of suspension, save poles and wire. The parts are illustrated and each illustration is accompanied by the proper catalog numbers. The prices are not included. The bulletin contains also miscellaneous data relative to construction, overhead material per mile, general data on the use of solid copper wire and copper cable, dimensions of grooved trolley wire sections, etc. Bulletin No. 49901, just issued, describes an oil-testing set, by means of which the dielectric strength of oil can be easily determined. The proper use of this set insures the successful operation of high-tension oil insulated apparatus. The set consists of a 30,000-volt testing transformer with an induction regulator for voltage control and an oil spark gap, all of which are assembled as a unit. The set can be furnished for either twenty-five cycles or sixty cycles. A special portable voltmeter has been built for use with this set.

NEW PUBLICATIONS

Experiments. By Philip E. Edelman; P. E. Edelman, Minneapolis, Minn.; 256 pages; cloth, $1.50; leather, $3.

This book is a comprehensive account of experimental work in science, invention, the industries and the amateur field, containing practical instructions and working directions, and illustrated with tables, plates, engravings and halftones. It comprises two distinct sections, the first of which deal with selected and graded experiments, including some of the most brilliant demonstrations in chemistry, physics, electricity, wireless telegraphy and mechanics. The second part gives a carefully made and interesting classification of the principles of original experimenting, and illustrates these by giving examples of their application in testing and commercial experiments. The book is clear and simple enough for beginners, and it should prove useful to both experienced and inexperienced workers along the lines covered.

Ocean Traffic and Trade. By B. Olney Hough, La Salle Extension University, Chicago; 430 pages; cloth, $3.

This work from the pen of Mr. Hough, editor of *The American Exporter*, is a complete economic study of a subject now occupying a prominent place in the minds of American manufacturers—i.e., exporting and importing. Yet it should not be understood that the work is theoretical in character, for its chief merit, besides its comprehensiveness and authoritativeness, is the practicability of the treatment afforded the discussion of ocean and foreign shipments. The treatise contains a large number of photographs and actual forms portraying the various phases of the subject. Particular stress is laid upon the manner of handling foreign freight, and many practical suggestions are offered as to ways and means of developing export trade. Some of the chapter heads will serve to indicate the range of the book. "Ocean Carriers," "Shipping Agreements," "Ocean Shipping Routes and Service," "Seaports and Terminal Facilities," "Getting Export Trade," "Developing Export Trade," "Foreign Credits and Collections," "Foreign Trade Opportunities," "Marine Insurance and Merchant Marine." A large insert map of trade routes is included.

Why the Dollar Is Shrinking. By Irving Fisher. The Macmillan Company, New York; 223 pages. Cloth, $1.25.

This book states the general principles that fix the scale of prices and shows the manner in which these apply to the high cost of living. The level of prices, according to the author, depends on five definite factors: (1) the volume of money in circulation; (2) its velocity of circulation; (3) the volume of bank deposits subject to check; (4) its velocity; and (5) the volume of trade. These factors have continued to shrink the dollar to about two-thirds of its value in 1896. As for the future, Professor Fisher concludes that 2 per cent is a fairly safe minimum estimate for the average annual expansion of the scale of prices, and that therefore the general trend of world prices for the next two decades will be upward.

Professor Fisher points out in a postscript that the effect of the present European war is most likely to be an acceleration of the rise in commodity prices already in progress. After the war credit will expand faster than trade, which will cause a further rise in prices. This assertion is borne out by charts showing the course of prices during great modern wars. "Why the Dollar Is Shrinking" should be read by every investor and by any one who desires to understand how the value of money enters into commodity prices.

Applied Theory of Accounts. By Paul-Joseph Esquerré. The Ronald Press Company, New York. 400 pages. Cloth, $3; half leather, $3.50.

It is almost axiomatic that the man who has mastered the theory of accounts is the one who is best suited to be trusted with the transactions relating to the finances of a business. This means that the practicing accountant, no matter in what line he may be located, should be conversant with the theory of accounts as it may be applied to all forms of commercial enterprise. To those who wish to gain such a general knowledge, this book by Mr. Esquerré can be recommended. In brief, it presents a comprehensive and not too technical review of accounting theory. Beginning with the fundamental principles of business organizations and the various forms of bookkeeping, the writer progresses by easy stages to the most intricate points of accounting science. At times, it is true, it seems as if he were straining his points in order to present his subject in a slightly different way from that in which preceding accounting writers had treated it. On the whole, however, the book is logical, clear cut and practical. Probably its most valuable sections are those presenting a detailed analysis of all the balance sheet accounts. Every electric railway accountant who follows Mr. Esquerré in his exposition of the theory of such accounts and his constructive description of financial statements that may be used under various conditions, will beyond all doubt have his accounting vision considerably widened.

Concrete Pile Standards. By Hunley Abbott; copyrighted and published by Hunley Abbott, 11 Pine Street, New York, N. Y.; fifty-nine pages; cardboard, fifty cents.

The novel contribution of this treatise to the widely-spreading field of concrete engineering in formulating and presenting for the first time a proposed standard design for reinforced-concrete pile caps renders the suggestions and specifications contained therein of especial value to the engineer and architect. The writer's work during the last six years has included the making of detailed plans for concrete-pile foundations for a large number and variety of structures. It was with the needs of himself and his company, the MacArthur Concrete Pile & Foundation Company, that he first drew up the standards which appear in the book. Having established a unit maximum safe-bearing load per pile from many recommendations based on wide experience, the author proceeds to work out and illustrate, by means of drawings, standard specifications for the dimensions of structures requiring from one to twenty-five piles. The advantages claimed under standardization are stated as follows: (1) Consideration of the economic advantages of concrete piles would not be discounted by an unnecessarily expensive capping design; (2) standardization facilitates the making of concrete-pile plans and reduces the labor and cost of making such plans; (3) standardization lowers the cost to the contractor and owner. Design of wall and column footings along building lines receives special attention. There is a thorough discussion of the advantages of concrete over wooden-pile construction as regards permanence, reliability, shorter time of construction and other advantages which compensate for the greater first cost of construction of concrete piles. At the end of the book is described a method of testing a concrete pile, and also tables on the safe bearing power or various kinds of soils.

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THE NEW ORLEANS MODEL CAR

The new car for New Orleans which is described on another page of this issue stands unique, if such a term can be applied to conservative design, as a combination of practically everything that has fully demonstrated its worth in modern car construction. Naturally, the most prominent feature is the invasion of the South—that stronghold of the wooden car—by an all-steel design. Next in interest is, perhaps, the fact that the weight, 36,100 lb. for a 47-ft. 8-in. car, is one of the lowest that has been recorded. However, that the low weight was not attained by skimping the structure is manifest from the published sizes of the members as well as from the illustrations, which show constructions that remind one almost of steam railroad practice rather than the usages common to city surface cars. One innovation of special importance for electric railways, but which may not be particularly obvious, is the absolute elimination of ornamental painting on the car body—something from which it is well rid. Of course, the painting schemes of recent years have been vastly less objectionable than the "moving van" styles of the earliest days. Yet there has seemed to be no tendency to give up the principle of arraying surface cars in all the colors of the rainbow supplemented with enough perfectly useless information in gilt letters to supply a correspondence school. The start that has been made by New Orleans toward plain, and therefore sensible, painting is most acceptable. In conclusion, the use of end platforms on such a model car may, perhaps, require comment, and it is only fair to the center-entrance principle to say that the "Jim Crow" law of New Orleans practically prohibited its consideration. On the other hand, of course, this is no proof that otherwise the center-entrance would have been used.

AN UNUSUAL "FLYWHEEL EFFECT"

Some years ago when the three-phase locomotive was attracting considerable attention on account of its extensive adoption on the Italian State Railways and elsewhere, quite a little stress was laid upon the way in which stored energy distributes itself in that system. If there are a number of three-phase trains in motion their energy is available to assist the power plant in starting another train. The draft of power by the accelerating train has a tendency to slow down the whole system, reducing the frequency, and for a time the moving trains draw less power and thus relieve the power station. That the same phenomenon appears in the single-phase system and must for the same reason appear also in heavy d.c. systems is indicated by the recent experience of the New Haven road, as described by W. S. Murray. When the heavy extra loads were imposed on the system by the electrification from Stamford to New Haven the peaks of power-plant load which were to be expected in view of the enormous freight trains handled did not materialize. In fact the form of the power-plant load line was improved. This resulted from the lowering of voltage due to heavy draft of current, the voltage dropping suddenly and leaving the operating trains moving at speeds higher than those corresponding to the reduced voltage. Their loads were thus taken off the power station and relieved it to that extent while they were coasting. In this way from different immediate causes, but fundamentally on the same general principle, railway systems employing constant-speed and variable-speed motors act like huge flywheels.

CONFERENCES WITH COMMISSIONS

It is difficult to understand why the Public Service Commission for the First District of New York has been subjected to suspicious criticisms during the last week because Secretary Whitney testified that conferences are often held between the individual commissioners and officers of the public utilities in the district. Perhaps these criticisms can be explained, but not excused, by reference to the dust-covered idea that public service commissions are grand juries to hear testimony against the utilities without permitting them to enter replies. The true function of regulating bodies, as now generally stated, is to act as a mediator between the public and the corporations and not to serve as an *ex parte* tribunal in either direction. It is absurd to suppose that corporation officials have not the same right of presentment of data that is bestowed upon public complainants. Wherein, then, lies the wrong—that the conferences are not public and that some complaints are dropped thereafter? In truth, such objections would betray a most lamentable lack of a proper understanding of commission work—such an understanding as led the engineer of one of the Western commissions recently to say that the informal complaints settled by any commission measure much of the real service being rendered by it. Sixty per cent of the complaints received by this commission are settled by informal conferences with the utilities, and it is stated that the ideal condition would exist if 90 per cent of the work were handled in this way. The saving in time, cost and temper secured by the settling of as many complaints as possible in an informal manner makes the method highly desirable, and the charge or even the suspicion of star-chamber proceedings under this practice betrays ignorance and nothing more.

SPIRIT OF MID-YEAR MEETING

It is but a few days since the American Electric Railway Association met at Washington to count among its speakers two leading members of the House of Representatives, one member of the Senate and the President of the United States; yet, viewed even in the short perspective of a week, it seems clear that this meeting marks a definite step toward a better understanding between regulators and regulated. When the American Electric Railway Association adopted as a body the now-famous Code of Principles it cast off to the last vestige the slough of foolish secrecy with which it had been so long encumbered. It was just as necessary that the chosen representatives of the people should declare themselves with like directness. It was the spirit of publicity and co-operation which prompted the selection of Washington as the meeting place, and it was this spirit which animated the entire convention. It is true that neither the address of the President nor the speeches of Senator Weeks and Congressmen Sherley and Montague bore directly on the specific problems of the electric railway industry. But all of them expressed the spirit of aid instead of enmity, of future co-operation for past antagonism. Each party has cried *Peccavi* and each party has promised hereafter to seek the other's good instead of the other's ill. And what is the panacea? Is it publicity alone, full and frank as that may be? No, the stronger medicine of common honesty, of square dealing, of recognition of mutual obligations is needed as a purge to cleanse both our public and private bodies of the toxins with which they have been too long poisoned. The American Electric Railway Association through its Code of Principles has put itself clearly on record for a clean life in a clean body. May those who have promised to help the business men of the United States show in future a due respect for this declaration by imposing an equally high standard of conduct on the part of the political men of the United States.

NON-UNIONISM A BASIS OF EMPLOYMENT

In clearly establishing the fact that the renunciation of union affiliations may be demanded as a condition of employment, the decision of the United States Supreme Court last week in the Kansas Coercion Statute case has cleared this phase of the labor question in a way that should be of interest to all electric railway officials. The law in question declared that it was unlawful, as a condition for obtaining or continuing employment, to coerce or influence a person to enter into an agreement not to join or remain a member of a labor organization. The downfall of this law now carries with it similar laws in California, Colorado, Connecticut, Indiana, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oklahoma, Oregon, Pennsylvania and Wisconsin. The abolition ot such laws in these states should bring the fact home to all that labor contracts are not wholly one-sided instruments. The trades union theory has always been that the employees had a right to control the acts of the employer but that the employer had no right to place equal or even similar restrictions upon the employees. Justice Pitney declares, however, that just as labor organizations have the inherent and constitutional right to deny membership to any man who will not agree that during such membership he will not accept or retain employment in a company with non-union men, and just as a union man has the constitutional right to decline proffered employment unless the employer will agree not to employ any non-union men, so the employer has the constitutional right to insist that his employees shall refrain from union affiliations during their term of employment. It will undoubtedly come as a surprise to labor advocates that employers have any constitutional rights at all along this line, for they have always been obstinately oblivious of the adage that what is sauce for the goose is sauce for the gander.

FAMILIARITY MAY BREED CONTEMPT

An experienced transportation superintendent recently brought up a point in the matter of discipline which is worth some sober thought by all who are concerned with the direct handling of men. This official found, on taking charge of the platform men on another property, that obedience to orders had become a purely optional affair with them under the late administration. In fact, when the new superintendent demanded obedience as his right, they were astonished. Some very convincing arguments in the form of direct dismissal were required to bring the survivors to their senses. Yet the men themselves had been more sinned against than sinning. The rod of discipline had been wielded so little as to seem a barbarous if not an obsolete instrument.

The trouble was that the previous superintendent had gone too far in fraternizing with the men. He was not content to be with them at an occasional smoker or picnic, but had been "one of the boys" evening after evening at a bowling alley behind a local saloon. Once he had established this intimate acquaintance the men knew his foibles far better than he knew theirs, and when he ventured to issue a disagreeable order he was simply mocked.

We are told that to make Asiatic peoples believe their kings were gods and not mere men, the commonalty were never permitted to see their king eat or drink. The disciplinary officer who wants to keep the respect of his men must also surround himself with just enough mystery to seem more than an ordinary man. The fact that he administers discipline directly makes it undesirable for him to be as familiar as the higher officers may on occasions, as they are not in close daily contact with the men. A reasonable degree of aloofness is not at all incompatible with square dealing. The separate mess for the officers of a ship is not so much a matter of snobbishness as a recognition of the fact that the officers cannot afford to display their frailties before their subordinates. To a certain degree the operating officer of a railway must follow this example, for he, too, is in an organization where implicit obedience means relatively just as much for good service as it does in the army or navy.

THE "BUY IT NOW" MOVEMENT

A prominent steam railroad official, in commenting on the business situation, said recently that if a line was drawn north and south through Chicago for a distance of 200 miles on each side of that city, and each end of the line was then extended west for a distance of 700 miles and the ends of these lines were joined so as to form a parallelogram, it would contain the most prosperous section of the world to-day.

There is no doubt that the farms of the Central West, with a wheat crop of enormous volume and selling at high war-time prices, are in a very strong financial position. This lends interest to the "Buy It Now" movement, launched from Omaha recently through the Associated Press. The campaign has extended to other cities and has attracted very favorable attention from public officials as well as from commercial organizations. The plan is well described by President Wilson, who said in his recent speech at Indianapolis: "I understand that your Chamber of Commerce in Indianapolis is working now upon the motto, 'if you are going to buy it, buy it now.' This is a perfectly safe maxim to act upon. It is just as safe to buy it now as it ever will be, and if you start buying there will be no end to it and you will be a seller as well as a buyer." Governor Capper of Kansas, in referring to the abundant crops in the Central West and the industrial depression in the East, said: "Every dollar wisely spent now tends to enliven business, to start the wheels of idle factories, to give employment to idle men and to feed the hungry. The farmer can not only buy now to better advantage than later, but he can perform a patriotic duty by paying every indebtedness promptly and by purchasing his spring supplies at the earliest possible moment, 'Buy It Now.'" Governor Hammond of Minnesota, another prosperous state, in a recent interview spoke along similar lines.

But the movement is not confined to the agricultural sections of the country. The Baltimore & Ohio Railroad has expressed itself as in full sympathy with such a movement and is showing it by placing an order for 2000 new freight cars, the first order for equipment that has been placed by the company in more than a year. In its official statement it says in part: "We have already purchased $385,000 worth of material in anticipation of our requirements for the next six months and are just about to enter into contracts for $200,000 worth of additional material covering the year's requirements. We suppose this is the most practical way in which we can aid your movement. We are heartily in accord with the work you have in hand."

Each industry and each company must decide for itself how far it can co-operate in a movement of this kind, but if there is to be a revival of industrial activity in this country it will necessarily mean larger gross receipts for the electric railway companies. We realize that each company has many local problems to solve, of which in most cases the best method of increasing fares is the most important, but the old rule should not be forgotten that the best time to make purchases is toward the end of a business depression, because prices are then nearly always lower than can be secured later.

MAKING THE NICKEL GO FARTHER

While the costs of all other elements of railway service have gone up that of electrical energy has gone down. More efficient engines, boilers, generators and distribution systems have effected savings in fuel, floor space, labor and incidentals, off-setting to some extent at least, increases in wages and cost of materials. It has thus been possible to make the cost of the energy for operating a car a small and decreasing proportion of total operating cost, occupying the order of approximately one-seventh of the total. Small as it is, however, it offers one opportunity at present for saving or, as suggested above, for making the nickel go farther in other directions, preferably at present in the line of better dividends.

The unit cost of electrical energy is now about as low as we can reasonably expect to get it, and it is probable that future improvements will take care of increasing unit costs, but not much more. We must then look for further economies in the use of energy rather than in its production. Here is a fertile field as one realizes when he calculates the difference between the energy necessary in overcoming friction in moving a car between two points and that drawn from the trolley. Figures quoted on page 231 of last week's issue showed that rolling friction in freight trains at slow speeds may be as low as 26 watt-hours per ton-mile. On the other hand, an electric street car may often use 150 watt-hours. The difference between these figures is worthy of careful study. It does not all represent waste, however, for a considerable part is incidental to maintaining a reasonable schedule speed with frequent stops.

An energy consumption of 150 watt-hours per ton-mile would occur only in high-speed city service with frequent stops. It might be roughly divided thus: Absorbed by all friction except in brakes and motor losses except resistance, 63 watt-hours, or 42 per cent; absorbed in brakes, 60 watt-hours, or 40 per cent; loss in starting grids, 25 watt-hours, or 16 2/3 per cent, and motor-resistance loss, 2 watt-hours, or 1 1/3 per cent. In heavier service with less frequent stops the energy consumption might be 100 watt-hours per ton-mile, of which friction (including air resistance) might absorb 78 watt-hours; brakes, 15 watt-hours; resistance grids, 5 watt-hours, and motor resistance, 2 watt-hours. These figures, which are approximate only, indicate at a glance the possible lines of improvement. In operation more coasting gives lower speed at brake application and less braking loss, which is roughly proportional to the square of the speed at the instant of application. Quicker acceleration permits the same schedule to be made with more coasting and is thus conducive to saving unless carried to the extreme. This is relatively more important in service with frequent stops. In such service, also, field control of motors is successful in reducing grid losses and permitting more rapid acceleration owing to the strong field used in starting. After all, the most tempting opportunity for saving is probably in the line of weight reduction which produces a cumulative effect. When this opportunity has been exhausted there is still scope for ingenuity in cutting down friction.

In this issue of the ELECTRIC RAILWAY JOURNAL we print an abstract of a paper on energy saving read a few days ago in Chicago by N. W. Storer. In this he gives data which are of great interest in the light of facts such as those outlined above.

IS PLATFORM WORK "SKILLED LABOR"?

In the Bay State Street Railway arbitration of wages now proceeding at Boston, Mass., perhaps the most important point thus far discussed is whether platform work on a car should be considered skilled labor, in the usual sense of the term. Counsel for the employees' union has devoted many hours to the effort to secure admissions from the company's officials that uniformed men in the car service should properly be classed as skilled laborers, but no such admission is likely to be made for the excellent reason that the duties performed by motormen and conductors, while calling for the exercise of proficiency in the handling of equipment and in relations with the public, do not justify the classification advocated by the union.

Granted that the duties of the motorman call for quickness of perception, intelligence, facility in manipulation, the use of judgment, and some degree of mechanical apprehension, it is none the less true that the rudiments of his occupation can be learned within a comparatively few days and that these duties are, while varied as to time combination, essentially repetitive. As experience is gained, most motormen increase in proficiency up to a point which cannot be predicted as yet for the individual, but which is approximated in sliding scales of wages at from roughly five years to ten years of service, generally speaking. Much is made of responsibility by those who contend that motormen should be classed as skilled laborers, but there is no logical connection between responsibility and skill in craftsmanship, except that the latter may be a help in meeting the former. What is true of the motorman applies to the conductor also, to a corresponding degree. The latter improves with practice, but the acquisition of sufficient knowledge and proficiency to take charge of a car is a matter of a very limited time in comparison with the many months required to learn a trade sufficiently well to be of substantial value as an apprentice, and to become a first-class workman is a question of years compared with the time demanded to become an excellent conductor.

None of these comments is intended to belittle a class of men whose faithfulness to duty, forbearance under trying conditions, adaptability to a service which constantly changes in volume if not in form, and whose patient, helpful work meets a need of the world which calls for ability, physical strength and intelligence in all sorts of weathers and in the face of many obstacles. But there is no blinking the fact that the occupation of a uniformed man on a modern street railway is one which can be passably well performed after a period of training which is one of the shortest required of intelligent workers in modern industry; not as well performed, of course, as after extended experience, but still acceptable enough to warrant putting a man on a car in charge of its passengers or its equipment surprisingly soon after his acceptance as an employee. Counsel for such employees are fond of referring to an electric car as a "highly complex locomotive" operated on the public highways, but while the complexity of the equipment may be admitted, the fact that the motorman's relations to it are almost entirely manipulative tells its own story. We may go so far as to grant that the quality of skill may be attained in the work of both motorman and conductor—skill increasing with time—but the officials of the Bay State company are fundamentally right in refusing to class the work of uniformed men with that of cabinet makers, machinists, masons, plumbers, printers, or other wage earners whose duties require for successful performance long and arduous preparation and whose compensation corresponds to the superior degree of skill of mind and hand demanded by their vocations.

CHANGE COLOR AND SAVE MONEY

A prominent superintendent of car equipment recently stated in conversation that if he was permitted to make an unrestricted choice of the shades of color with which his cars were painted he could save $5 per car at each painting without changing the quality of the work. The point is an interesting one. Of course, the economy is somewhat petty, but during the present lean years in electric railway affairs it can hardly be neglected on this score.

As a matter of fact, on any railway it is quite possible that a change in color might even appeal to the taste of the public more than a retention of the old hues. Indeed, it seems off-hand that there is no known color, except perhaps pink, that is not used for the street cars in at least one of the many cities in the country. Greens and reds, of course, predominate, but blues and browns and yellows have many supporters, and if any certain color can be accepted by the people of one city it is hardly reasonable to suppose that those of another community cannot stand a change to the same color.

In general, the selection of the color scheme for electric cars seems to be one of the few duties that railway presidents are absolutely unwilling to transfer to the shoulders of their less gifted subordinates, but when the president has made a decision regarding a color scheme, the time and effort that have been devoted to it are worth, from an artistic standpoint, exactly nothing. Any other color, if well maintained, would impress the riding public just as favorably, and the impression on the public is, so far as we can see, the only reason for painting cars with anything better than the rough but cheerful red made familiar through its universal use on barns and box cars.

Naturally, this should not be construed as an argument in favor of such a grade of paint for street cars. Electric railways owe it to the communities they serve to provide neat-looking equipment, and to this end the so-called "coach colors" are no doubt necessary because of their body and susceptibility to high finish. On the other hand, the railways are not obligated to make their cars look like the proverbial Joseph's coat. Therefore the cheapest and most durable of the coach colors would be the most satisfactory from the railways' standpoint, and it ought to be as uniformly used for street railway service as is box-car red for freight trains or "Pullman color" for sleeping cars. The opportunity for economy is definite enough, because the prices of the numerous coach colors in general use vary through a range of several hundred per cent, and the steps upward from the undefineable greenish-brown that is known as "Pullman color" through the dull yellows, the greens, the blues and the light reds are sufficient to make the latter prohibitively costly in comparison with the former.

It has been said by one of our correspondents that nothing that a manufacturer could do would cause a railroad, either steam or electric, to make a change from its standard color scheme. This would probably be true if the use of a new color could not be made to show an advantage either in lasting quality or in cost, but when a tangible result can be attained the difficulty of overcoming the railroads' conservatism ought not to be insurmountable. What is needed is that the manufacturers' specialists in color-mixing shall be called upon to point the way toward the least expensive combinations and not be told, as they are now, to make quotations upon colors that are arbitrarily selected without regard for cost or durabiilty.

TREND OF ELECTRIC RAILWAY EARNINGS

In our issue of Jan. 23 we published an abstract of the report just given out by the bureau of fare research on the subject of electric railway statistics for June, July, August and September of 1914. The data submitted only serve to confirm the evident fact that the year 1914, with its accumulating gloom of business and financial depression and the European War, was not conducive to electric railway prosperity. That electric carriers did not suffer more than they did was entirely owing to the necessary character of the commodity furnished by such carriers and the careful administration by their officials.

It may be recalled that this paper, in its issue of Nov. 28, page 1217, compiled the earnings of all companies making public reports for September, 1914 and 1913, and that the result showed a total decrease in gross earnings of 1.4 per cent and in net earnings of 2.24 per cent, or, if Western returns were eliminated on account of meagerness, 0.87 per cent for gross earnings and 1.24 per cent for net earnings. These figures were static, in a sense—that is, the month of September in both 1914 and 1913 was lifted away from the remainder of the months and an analysis made as of those two particular months. The data, however, compiled by the bureau of fare research for the four months of 1914 are in running form. They lack the feature of comparison with the preceding year's results, but they are of value in indicating the trend of gross earnings and operating expenses that led up to the condition in September as analyzed by this paper.

With the returns for June, 1914, as a basis, it can be seen from the bureau's figures that the gross earnings, after a slight expansion with the heavy traffic of July, gradually fell until in September they were only 96.24 per cent of the June amount. Similarly, the operating expenses, after a slight rise in July, by September dropped to 95.11 per cent of the June total. A considerable portion of the decreases was undoubtedly caused by the seasonal variations in traffic. Yet if, as the bureau points out, the earnings for June and July from year to year are substantially equal to those of August and September, the two middle months being most affected by these seasonal variations, then it seems that in this section of 1914 certain depressing influences were at work, for the returns of the last two months failed to keep up to the stated standard of the first two months. This is not at all surprising, however, for the increasing tightness of business and finance, the closing down of industrial plants and the cutting off of employee traffic that followed the outbreak of the European War in August may justly be considered to have retarded the seasonal traffic that might logically have been expected in August and September.

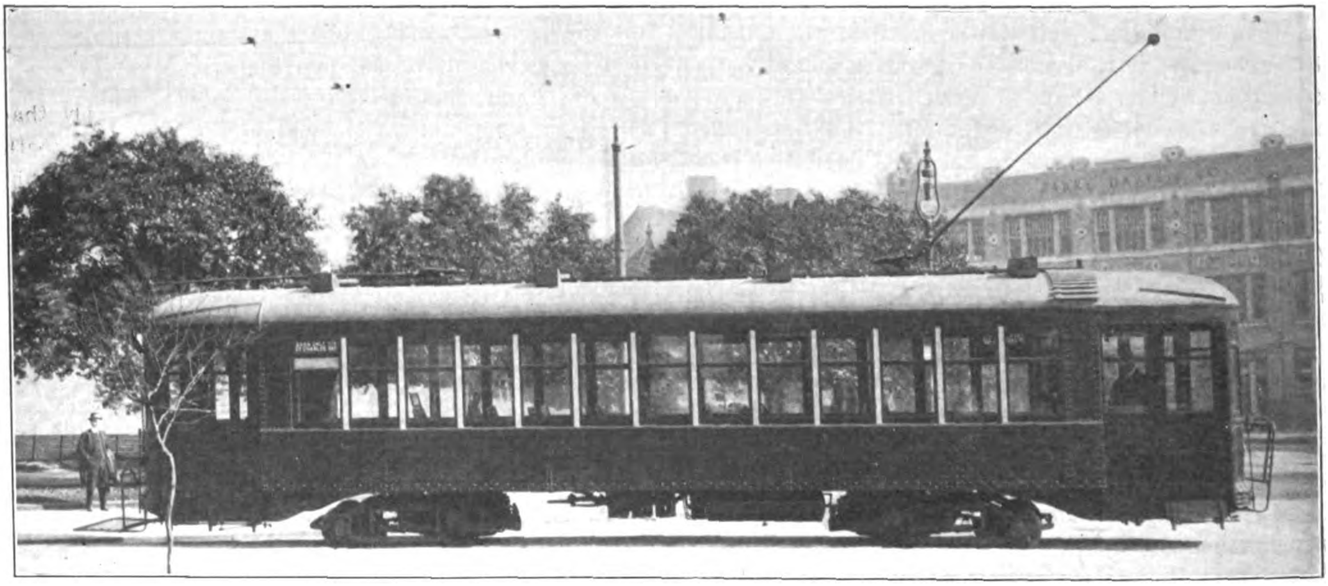
What, then, do the data really show? Simply that the static condition given by this paper for the month of September was mostly a result of influences which, beyond the control of the electric railways, accumulated the decreases in gross and net earnings over a period of at least four but particularly two months. Incidentally, too, it may be remarked that the statistics bring out the effect upon net earnings caused by slight reductions in gross earnings. Under normal conditions an increase in gross earnings is a greater financial advantage than a proportionate decrease in operating expenses. The reason for this is that a large part of the operating cost is fixed and does not fluctuate in accordance with the amount of business done, so that a greater net return is caused by an extension of the revenue-producing power than by a reduction in expenses. It follows, therefore, that a decrease in gross earnings is more detrimental to a carrier than a decrease in operating expenses; for the latter cannot as a rule be decreased to the same extent and may be simply deferred, with the result that the small margin of profit on which the company is operated and its rate of return may be seriously impaired. This state of affairs is mentioned in the bureau's report, but, as before, we find solace in the fact that the causes are external and not likely to be permanent. It will undoubtedly require time for electric railways to be restored to their former basis of prosperity, but individuals in all sections of the country who are keeping their fingers on the pulse of business are predicting a general revival, from which electric railways, of course, will secure their share of benefit.

New Cars for New Orleans

These Cars Combine All of the Most Modern Developments in Design, Having Fully-Inclosed Platforms, Arched Roofs with Ventilators, All-Steel Construction Except for Wooden Sheathing on Roof and Floor, and a Novel Form of Pressed-Steel Carline Which Fits into the Hollow Side Post

The New Orleans Railway & Light Company has just placed in service a lot of fifty cars of a type which may become standard for this property. The new design constitutes a radical departure from the practice that has heretofore been the rule in Southern cities, as the frame construction is all-steel, only the roof sheathing and floor being of wood. In addition, plain-arched roofs equipped with ventilators have been adopted as well as fully-inclosed platforms without bulkheads. Altogether, the design constitutes an excellent example of the most modern developments in surface-car construction.

As shown in the accompanying reproductions of progress photographs, the construction gives the impression of being much more substantial than usual for standard city service. The desire of the designers to reduce maintenance to a minimum is, in fact, manifest throughout, and the utmost simplicity of construction has been made the rule, filler blocks and other parts that form no essential part of the structure having been rigidly eliminated. The desire to reduce maintenance expense has even resulted in the adoption of two-motor equipments with 55-65-hp motors and 30-in. wheels in preference to four of the so-called baby motors with 24-in. wheels, notwithstanding the fact that the advantages of a low floor were fully recognized by the designers. In this case the cost of up-keep for two large motors was considered to be enough less than that for four small ones to offset the saving in weight and floor height effected by using the latter.



NEW ORLEANS CAR—GENERAL VIEW OF CAR, SHOWING ELIMINATION OF ORNAMENTAL PAINTING

The combination of substantial construction and ease of maintenance at which the designers aimed is exemplified by the post and carline design. Both posts and carlines have been made of pressed-steel members, the carlines fitting into the tops of the posts and being rigidly riveted to them. In consequence the posts and carlines form a series of continuous members extending around the superstructure from one side sill to the other, a construction that has heretofore been used only in connection with light, continuous T-bars.

Notwithstanding this substantial construction, however, the elimination of unnecessary parts and the general utilization of the full strength of the various members has resulted in a total weight of only 36,100 lb. This weight does not include heaters which are not needed in the mild climate of New Orleans, and in comparisons with the weights of other cars an allowance should be made for this. Nevertheless, that the car is of large size for the unusually light weight is shown by the following table of general dimensions:

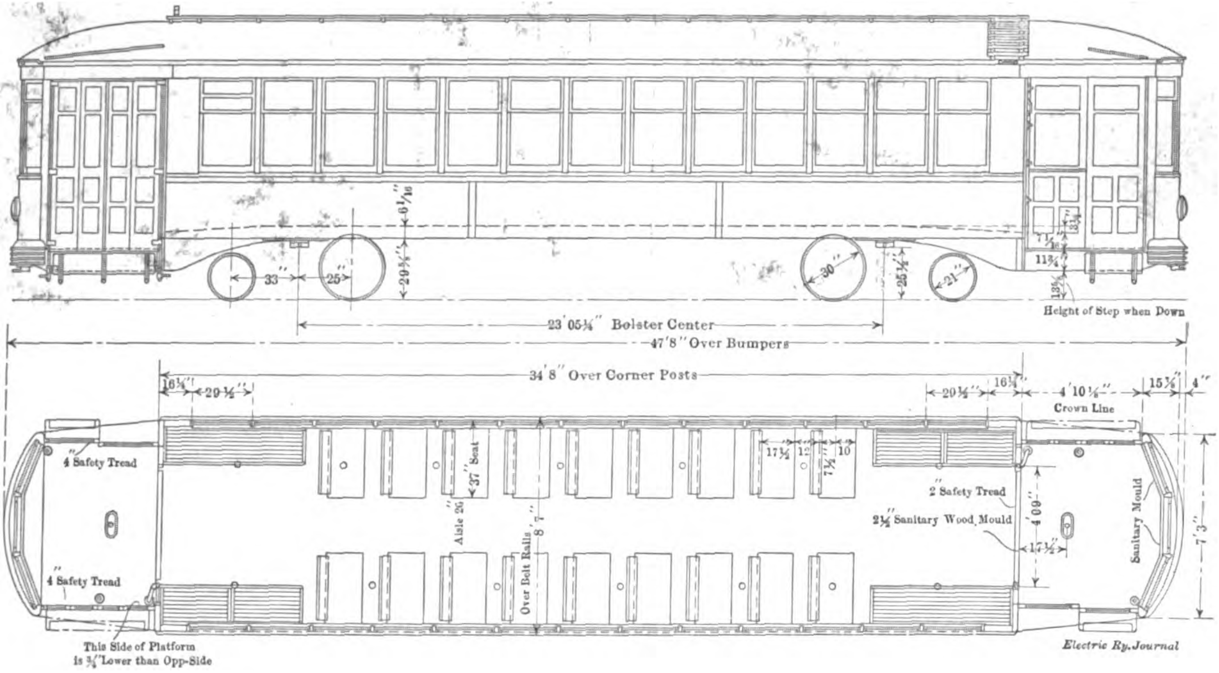
Length over corner posts	34 ft. 8 in.
Length over bumpers	47 ft. 8 in.
Width over all at window rail	8 ft. 7 in.
Width over eave mold	8 ft. 5¾ in.
Height from top of rail to top of trolley board	11 ft. 3⅝ in.
Truck centers	23 ft. 5¼ in.
Wheelbase of truck	4 ft. 10 in.

GENERAL ARRANGEMENT

The car is provided with eighteen cross-seats of the Walkover type, and there are four stationary longitudinal seats at the ends of the car, each holding four seated passengers, giving a total seating capacity of fifty-two.

To provide accessibility the body has been hung as low as possible over the 30-in. wheels. The first step is 13⅝ in. from the rail level and the second step to the level of the platform is 11 in. A 7¾-in. step brings the passenger to the car floor at the end sill, and a ramp of 3¼ in. extends from this point to the bolster, making the total height of the floor 35⅝ in. above the rail, without passenger load.

The inclosed platforms at both ends of the car are 6 ft. 2 in. long from front of vestibule dash to corner posts, and 7 ft. 3 in. wide over vestibule corner posts. No bulkheads are installed, and the longitudinal seats at the ends of the body provide large floor spaces adjoining the platforms. Three seats on each side of each end of the car are fitted with brass sockets in the seat backs for the reception of the race-division, or "Jim Crow," signs. This arrangement gives flexibility and convenience in allotting the space allowed for colored patrons, who are assigned to the rear of the car regardless of its direction. The main aisle is 26 in. wide between seat ends and 29 in. wide between seat backs. The aisle space at the longitudinal seats is 57 in.


6⅝"
29¾"
33"
25"
30"
25¼"
21"
11¾
13¾"
Height of Step when Down
23' 05¼" Bolster Center
47' 8" Over Bumpers
34' 8" Over Corner Posts
16¾"
29½"
20¾"
16¾"
4' 10½"
15⅞"
4"
Crown Line
4" Safety Tread
37" Seat
Aisle 26"
Over Belt Rails 8' 7"
17¾
12
10
7½
2" Safety Tread
2¼" Sanitary Wood Mould
4' 00"
17¾"
Sanitary Mould
7' 3"
4" Safety Tread
This Side of Platform is ¾" Lower than Opp-Side
Electric Ry. Journal

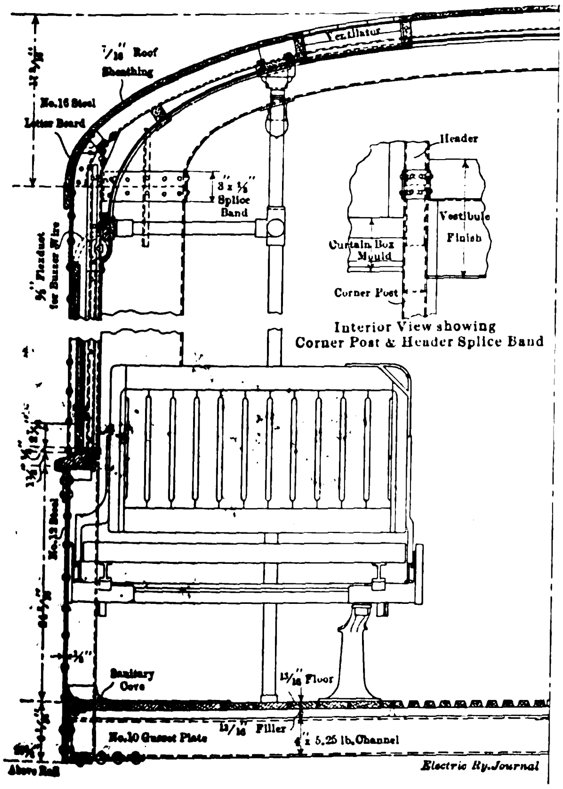
NEW ORLEANS CAR—GENERAL PLAN AND ELEVATION

Each platform is provided with double folding doors on the entrance side and a single sliding door on the exit side. All doors are inter-connected with their respective steps so that upon closure of the door its step is folded simultaneously, Burdette-Rountree mechanisms being used. The entrance or folding doors give a clear opening of 54 in., this opening being divided into entrance and exit portions by the installation of a vertical, white-enameled stanchion approximately in the center of the space. The door operating stand is located on the center line of the car and 11½ in. from the end sill, leaving room for the conductor to stand between it and the end sill. Portable and adjustable seats are furnished for both conductor and motorman.

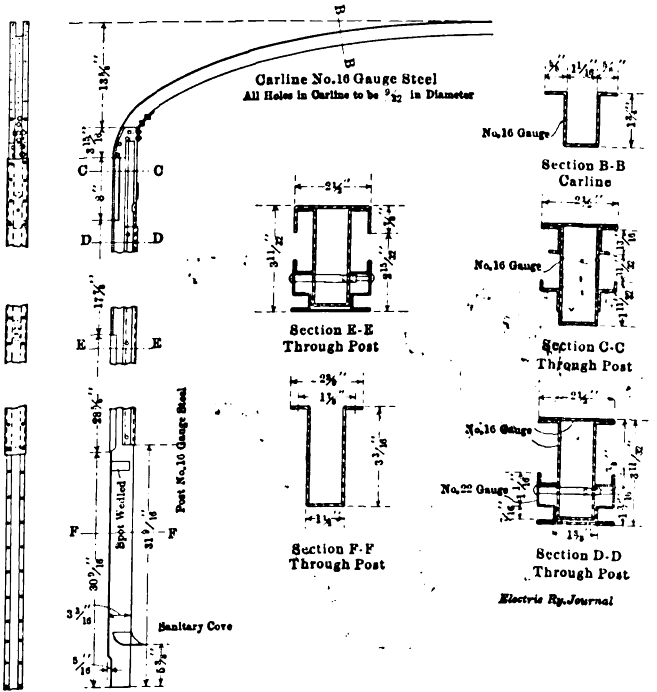
Enameled stanchions are provided at the entrance archway at the usual bulkhead location and also at the entrance and exit doors. The latter stanchions are so placed as to encourage passengers to take the proper hand hold in boarding and in alighting, and thus accidents arising from this source are minimized. Instead of hand straps in the body of the car, white-enameled tubing is arranged over the longitudinal seats in a horizontal position and in a convenient location for hand holds. The enameled hand-holds and stanchions are coated with a glass-hard material that is baked on at high temperature, these having been furnished by the Ellcon Company.

STEEL CONSTRUCTION

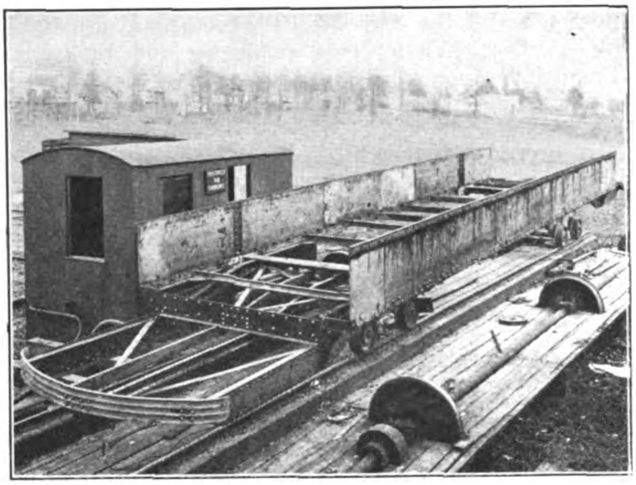
With the exception of floor and roof, the car is built of steel throughout. The underframe consists of two


Ventilator
7/16" Roof Sheathing
No. 16 Steel Letter Board
3 x ⅛" Splice Band
⅝" Flexduct for Buzzer Wire
Header
Vestibule Finish
Curtain Box Mould
Corner Post
Interior View showing Corner Post & Header Splice Band
No. 12 Steel
Sanitary Cove
13/16" Floor
13/16" Filler
No. 10 Gusset Plate
4" x 5.25 lb. Channel
Above Rail
Electric Ry. Journal

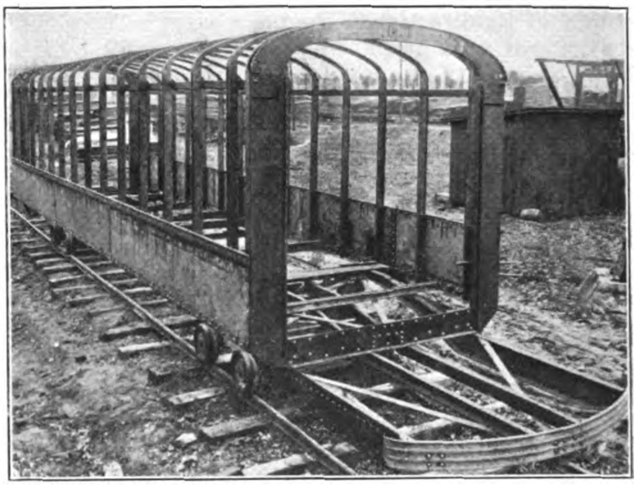
NEW ORLEANS CAR—CROSS-SECTION, SHOWING DETAILS OF SIDE CONSTRUCTION


B
B
Carline No. 16 Gauge Steel
All Holes in Carline to be 9/32 in Diameter
13⅝"
C
C
8"
D
D
17⅞"
E
E
28⅛"
Post No. 10 Gauge Steel
Spot Welded
F
F
31 9/16"
30 9/16"
3 3/16"
Sanitary Cove
5/16"
6⅜"
No. 16 Gauge
Section B-B Carline
2½"
3 11/32"
2 15/32"
Section E-E Through Post
No. 16 Gauge
Section C-C Through Post
2⅜"
1⅛"
3 3/16"
1⅛"
Section F-F Through Post
2½"
No. 16 Gauge
No. 22 Gauge
3 11/32"
1⅛"
Section D-D Through Post
Electric Ry. Journal

NEW ORLEANS CAR—DETAILS OF SIDE POST AND CARLINE CONSTRUCTION



NEW ORLEANS CAR—SIDE GIRDERS AND FLOOR FRAMING BEFORE INSTALLATION OF POSTS



NEW ORLEANS CAR—SUPERSTRUCTURE FRAMING, INCLUDING PANELS AND HEADER AT END OF BODY

side-girders made up of No. 12 gage steel plates, which are 30-in. wide and 34 ft. 8 in. long when assembled. The top member of this girder is a 3½-in. x 1-in. x ⅜-in. dropper bar, and the bottom member is a 4-in. x 3-in. x 5/16-in. angle. Two splice plates are introduced in the length of each girder, and reinforcement against buckling is provided at the bolsters by means of 4-in. x 5-in. x ⅜-in. angle and a 4½-in. x 3-in. x ⅜-in. vertical tee, securely riveted to the girder web. The bottom member at the side of each girder is bent inward at the end sill and the two members meet at the center line of the car, where they are spliced together to form the end sills. In addition, a 3/16-in. x 9½-in. plate is securely riveted to the above-mentioned angles and this is reinforced on the bottom with a 3½-in. x 2½-in. x ¼-in. angle.

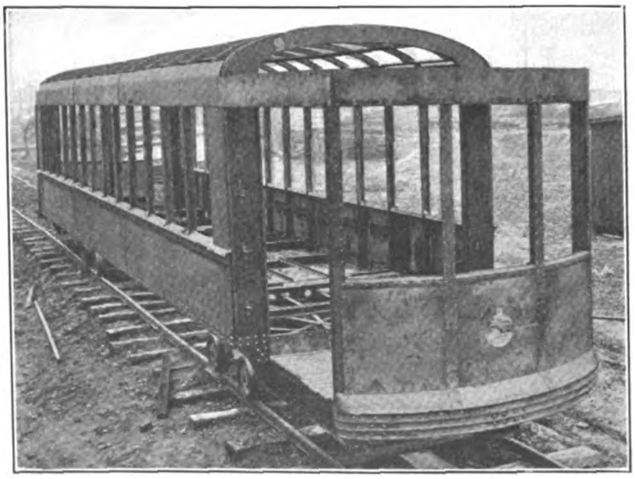
Frequent crossings composed of 4-in., 5.25-lb. channels fasten the two girders together and provide a support for the flooring, and the underframe is further stiffened by the use of diagonal members consisting of 2½-in. x ¼-in. steel bars. Generous gusset plates also are fastened to bottom angle and crossing channels. The top angle of the girder is covered with an oak window rail which also furnishes an arm rest on the inside of car.

The main platform knees are made up of a flat plate of No. 10 gage steel cut in a concave-wedge shape and reinforced on one side by means of 2½-in. x 2½-in. x ¼-in. and 3½-in. x 2½-in. x ¼-in. angles. These platform knees are securely riveted to the end sills and to the cast-steel body bolster, no bolts being used, and the outer ends are riveted to a 7-in. section of channel-shaped Hedley anti-climber which serves in place of the usual crown pieces. The auxiliary platform knees consist of 4-in. channels bent to the proper shape and riveted to the end sill and bolsters.

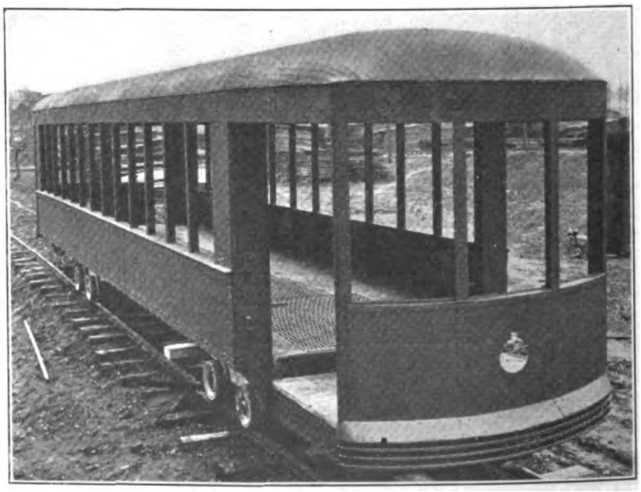
The car posts are unique. They are made of No. 16 gage steel plate which is pressed into a "U"-shape, the flanges of this being securely riveted to the side girder. The outside of each post above the side girder is covered with a No. 16 gage plate that is riveted to the flanges of the "U." The inside of the post is covered with No. 18 gage sheet steel that is molded into proper form to take the rack for the window fasteners and to provide runways for the curtain fixtures. This molding is fastened to the post by means of hollow screws.

The carlines also are composed of pressed "U" shaped sections and they are securely riveted and bolted to the tops of the posts, the carlines fitting inside of the posts and thus forming a practically continuous member extending from one side of the car to the other. The end headers and corner posts consist of pressed steel sections of a deep "U"-shape. These are riveted together at the spring line of the arch of the header and are further riveted to the pier panel which extends between each corner post and nearest side post. The headers are covered with wooden furring strips and the roof boards are through-bolted to these furring strips and to the flanges of the carlines.

The vestibule posts are all of pressed steel, the two



NEW ORLEANS CAR—STEEL FRAMING COMPLETE, INCLUDING LETTERBOARD AND VESTIBULE SHEATHING

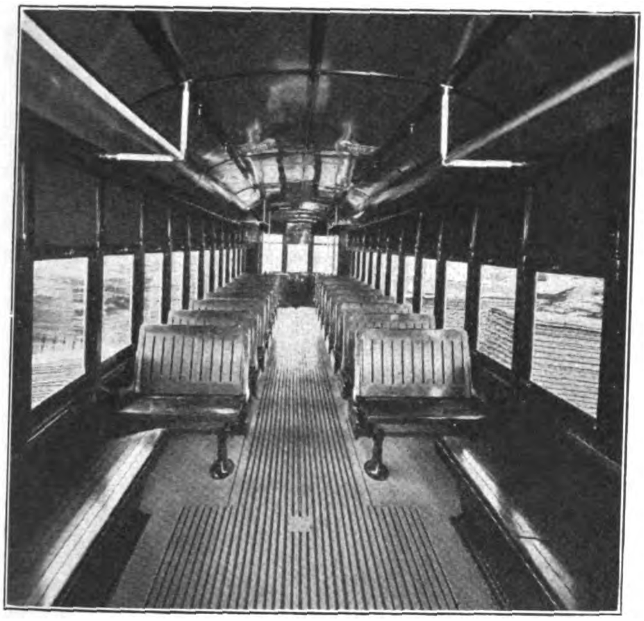


NEW ORLEANS CAR—CAR STRUCTURE COMPLETE WITH FLOOR AND ROOF SHEATHING APPLIED center posts being made in one section of No. 16 gage steel and the corner vestibule posts in two sections of No. 12 gage steel securely riveted together. These posts are bolted to an angle-iron sprung to the proper radius and fastened to the crown piece. The vestibule is made of No. 16 gage sheets bolted to the outside of the vestibule posts, and there is also a lining plate on the inside of the vestibule posts, which provides pockets into which the sash may lower. The outside of the vestibule is provided with the usual bumper shield.

The letterboard is continuous throughout the whole length of the car body, and it is reinforced between posts with a ¾-in. x ¾-in. x ⅛-in. angle. It is 16 in. wide and is not only riveted to the posts but is bent over onto the arch of the roof and riveted to the carlines to stiffen the roof framing transversely. The vestibule top plates consists of a 2½-in. x 1½-in. x ¼-in. angle continuous from body corner post to body corner post.

FINISH AND INTERIOR FITTINGS

The floor consists of tongued-and-grooved yellow pine, laid lengthwise of the car and depressed at the aisle section so that the top of the floor-mat is level with the top of the floor at the side seats. The floor mats consist of narrow strips of maple screwed to the flooring. The roof consists of ½-in. tongued-and-grooved poplar through-bolted to the carlines and covered with No. 8 canvas duck.



NEW ORLEANS CAR—INTERIOR VIEW

The drip rail is made up of wood and bolted to the letterboard. The canvas of the roof comes down over the upper part of this drip rail and is tacked to it with copper tacks, following steam railroad practice. This drip rail is continuous around vestibules. The curtain box is formed of No. 22 gage steel that is divided into sections each covering one curtain and arranged for ready removal for access to curtains and fixtures.

Headlining has been installed notwithstanding the wooden roof sheathing because of the extreme heat of the summer sun in New Orleans. It consists of 3/16-in. agasote separated into convenient sections, the joints being covered with light cherry molding, and this molding matches the molding which carries the lighting wires through the body of the car. The usual space is, of course, allowed for advertising cards. The bottom sash is arranged to raise so as to give a clear opening of 27½ in. but the top sash is stationary and is fastened to the post caps with screws installed from the outside of car.

The interior finish is dark cherry color throughout, but the headlining is painted light green. The interior of the car has been rubbed down to a dull finish after varnishing and it presents a very neat and attractive appearance, the finish of the steel making a very good match with the woodwork of the seats and moldings. The outside of the car is painted a light olive green, and, as will be noticed in the accompanying illustration, all unnecessary ornamentation has been rigidly eliminated. The only striping or lettering appears on the dash, and this consists of the car number and an aluminum stripe around the edge of the dash plates.

Ventilation is provided by means of eight Railway-Utility suction ventilators. The seats are of the standard Hale & Kilburn No. 300 type, fitted with wooden cushions and backs. A Consolidated push-button system is installed for signaling the motorman. The side curtains are of pantasote fitted with Forsyth Rex type rollers and No. 88 ring fixtures. Motorman's curtains are also installed. Keystone signs are located in the center vestibule sash at each and in the rear side window, the boxes for these signs being made of steel in all cases. Crouse-Hinds headlights and Earle trolley catchers are also provided. A double-fare International register is located at one end of the car and this is operated from either end by means of a register rod installed in the center of the car close to the headlining. The bell cord to the motorman's signal bell is run in conduit above the headlining.

The lighting layout provides four circuits of five lights each, giving a total of twenty 23-watt tungsten lamps. A very neat and convenient arrangement for the light switches is provided by the installation of a switch cabinet in the pier panel of the No. 1 end of the car. The door of this cabinet is flush with the interior trim and it contains all the switches except those for the compressor, the latter being located on the dash convenient to the motorman. The compressor switches are wired in parallel so that passengers on the rear platform cannot inadvertently cut off the compressor circuit.

WEIGHTS AND PROPULSION EQUIPMENT

The service conditions under which these cars operate are as follows: Schedule speed 10.8 m.p.h.; average stops per mile, 7.25; average duration of stops, 4.5 seconds; average line potential, 510 volts; rate of accelerating and braking, 1.5 m.p.h.p.s.; average passenger load, 4500 lb. The total weight of the car, fully equipped and ready to run, is 36,100 lb., or 694 lb. per seat. This weight is made up as follows:

Two maximum traction trucks complete with wheels, axles, frame, boxes and brake rigging	10,700 lb.
Electrical equipment on trucks consisting of motors, gears and gear case	5,800 lb.
Electrical equipment on car body, including controllers, cables, circuit breakers, trolley bases, poles, etc	1,400 lb.
Air and hand-brake rigging	1,800 lb.
Car body complete, including all accessories	16,400 lb.

The trucks are of the Brill 39-E, maximum-traction type. They are fitted with 30-in. driving wheels and 21-in. pony wheels, and have a wheelbase of 4 ft. 10 in. The driving axles are heat-treated, association standard, E. B. type, while the trailer axles are of 4-in. diameter and are made in accordance with Pennsylvania Railroad standard. The wheels have the association standard, *B*, tread with ⅝-in. flange and 2½-in. tread. The wheels are of the single plate type and are made of cast iron. The truck bolster is provided with an auxiliary spring placed between it and the elliptical side spring which provides easy riding under conditions of partial load. The journal boxes are of the Brill type and are made of semi-steel.

The car is equipped with two General-Electric 201-I motors of 55-65 hp, the gear ratio being 15-71. The controllers are GE standard K-36-J. All power wiring is carried in conduit. Grade "M" solid gears and pinions are used, the face of gears being 5-in. These are pressed on the axles at approximately 60-tons pressure.

Two electrolytic lightning arresters are provided in connection with the usual kicking coils. Type MR circuit breakers, RG rheostats, U. S. No. 13 trolley bases and GE trolley poles, harps and steel-sided, copper-centered trolley wheels complete the electrical equipment.

The car is fitted with complete straight-air brake equipment consisting of a Westinghouse DIH 16-ft. air compressor, a 16-in. x 60-in. reservoir, a 10-in. x 12-in. brake cylinder and a Type E automatic slack adjuster. The body and truck-brake levers are so arranged as to give a braking pressure of 75 per cent of the load on the pony wheels and 85 per cent of the load on the motor wheels, these pressures being considered to meet the service conditions at New Orleans satisfactorily. Hand brakes arranged with double floating levers and Dayton ratchet-type brake handles are also installed.

DESIGN AND CONSTRUCTION

The general features of the new car's design were planned by a committee composed of B. F. Wood, vice-president and chief engineer, United Gas & Electric Engineering Corporation, engineers for the railway; L. C. Datz of the same company, J. S. Pevear, president New Orleans Railway & Light Company, and M. S. Sloan, general manager. The cars were built by the Southern Car Company at High Point, N. C., under the supervision of Bronson A. Smith, engineer for the United Gas & Electric Engineering Corporation.

Northern White Cedar Association

Twenty firms producing white-cedar lumber and poles were represented at the nineteenth convention of the Northern White Cedar Association held at Minneapolis, Minn., on Jan. 26 and 27. L. A. Page, Jr., president of the association, stated in his official address that general business conditions during the last twelve months had worked a severe strain on the white-cedar industry, and that the stagnation produced by the European war will continue to hold up business in all lines for some time to come. A gradual awakening of business is, however, in sight, but when this comes the short pole and post trades would be affected first. A study of pole stocks now on hand indicates an ample supply to take care of the probable demand.

The committee on publicity, of which H. S. Gilkey is chairman, reported that during the year just closed the association has carried on a campaign to interest and instruct users of white cedar. The practice of making exhibits will be extended during the next year to include conventions and local fairs. The report of the secretary, which followed, referred to extensions of freight rates and exchange of credit information among the association members.

The report of the committee on "war on substitutes" for white cedar suggested means of securing closer cooperation between pole producers, distributers and users. The importance of shipping to customers only first-class stock, thereby establishing a standard of excellence for white-cedar products, was emphasized by several speakers. The railroad committee stated that the matter of increasing the allowance for stakes used on open cars was soon to be brought before the Interstate Commerce Commission for a formal hearing.

At the close of the convention the following officers were elected for 1915: President, L. A. Page, Jr., Minneapolis, Minn.; vice-president, H. F. Partridge, Minneapolis, Minn.; treasurer, H. B. Thomas, Manistique, Mich.; secretary, N. E. Boucher, 743 Lumber Exchange Building, Minneapolis, Minn. Directors: J. E. Gerich, Milwaukee, Wis.; M. J. Bell, Minneapolis, Minn.; William Patch, Menominee, Mich., and L. A. Furlong, Minneapolis, Minn.

German 1500-Volt D.C. Line with Regeneration and Battery

The Wendelstein Railway is a mountain line of Bavaria only 9.3 miles long but notable as Germany's first 1500-volt d.c. railway. Of even greater interest is the circumstance that regeneration was adopted in connection with a storage battery, because the output of available hydroelectric power alone falls below the regular energy requirements.

The plant contains one 184-kw and one 330-kw Pelton turbo-set. The larger unit drives a 100-kw, three-phase machine which generates energy at 5000 volts for industrial purposes; it also drives a 200-kw machine which delivers 1500 volts direct current for traction. The smaller or reserve unit may be used as a motor in emergencies, at which time it is operated from another distribution system to drive a second pair of three-phase and d.c. generators. A Pirani set is also used with the storage batteries to smooth out variations in voltage and assist in returning regenerated energy.

The 721-cell storage battery furnished by the Akkumulatoren Fabrik A.G., Hagen, Germany, is of 100 amp-hr. capacity and is the first in Germany to deliver 1500 volts. This battery is divided in two parts, one section being on the ground floor and the remainder on the floor above. The lower section is grounded in the negative circuit of the railway, which gives it a difference of potential of 750 volts against ground. This voltage is easily cared for by the standard insulation of the accumulators. The cells of the other half, however, are doubly insulated against the floor, the walkways also have double insulation, and a stockade of wooden laths extends all the way around the room to prevent contact with the metal trim of windows and walls.

The rolling stock comprises one locomotive and two trailers, accommodating a total of 100 passengers. The two 750-volt motors on the locomotive are of shunt type to permit regeneration and are connected in series. The drive is arranged for both adhesive and rack rail traction. Special resistances are used to absorb regenerated energy should connection with the overhead line be temporarily interrupted. On each motor shaft is mounted a spring brake which may be manually released from the motorman's cab. Air brakes are also used. A regulator automatically applies the brakes and opens the circuit when the desired maximum speed is exceeded. Lighting is furnished at 110 volts from a motor-generator set.

The overhead line is carried at a height of 13 ft. to 16 ft. 4 in., with duplicate vulcanite and porcelain insulators. The line is not carried from either the ordinary bracket or span construction but from a wooden imitation of bridge construction. In other words, an H is formed by three poles, the horizontal member of which is braced by a diagonal connection with each vertical pole. Feeder capacity is furnished by a second trolley wire. Although no catenary suspension is used, tension take-up devices are installed every 980 ft.

The track is of meter gage and is 9.3 miles long. The train starts at Brannenburg 1548 ft. above sea level, and within one hour climbs to a height of 5650 ft. at a point only 262 ft. below the peak of the Wendelstein. Despite tunnels and retaining walls it was necessary to build part of the rock rail sections on a grade of 23.5 per cent.

The President, the Newspapers and the Association

Mr. Wilson's Address Before the Mid-Year Meeting Treated by the Press as an Important Political Message—Verbatim Report of Address with Comments from Leading Newspapers in Different Parts of the Country

The ELECTRIC RAILWAY JOURNAL for Jan. 30 carried an extended report of the 1915 mid-year meeting of the American Electric Railway Association. However, the fact that the meeting was held on Friday, Jan. 29, made it impracticable to publish in full President Woodrow Wilson's address. It was therefore decided to publish this address verbatim in the succeeding issue of this paper. But the remarkably large amount of comment from the daily newspapers also make it worth while to quote in whole or in part a few of the editorials elicited by the President's statement of administration policy. The editorials received to date include newspapers as far west as St. Louis. However, as the full text of the address was distributed by the Associated Press there is every reason to believe that the same degree of publicity was secured in the Farthest West as in the Nearest East.

THE PRESIDENT'S SPEECH

"Mr. President, Ladies, and Gentlemen: It is a real pleasure for me to be here and to look this company in the face. I know how important the interests that you represent are. I know that they represent some of the chief channels through which the vigor and activity of the nation flow. I am also very glad, indeed, to have you come and look at some portion, at any rate, of the government of the United States. Many things are reported and supposed about that government, and it is thoroughly worth your while to come and see for yourselves.

"I have always maintained that the only way in which men could understand one another was by meeting one another. If I believed all that I read in the newspapers, I would not understand anybody. I have met many men whose horns dropped away the moment I was permitted to examine their characters.

"For, after all, in a vast country like this the most difficult thing is a common understanding. We are constantly forming get-together associations, and I sometimes think that we make the mistake of confining those associations in their membership to those who are interested only in some particular group of the various industries of the country.

"The important thing is for the different enterprises of the country to understand one another, and the most important thing of all is for us to comprehend our life as a nation and understand each other as fellow-citizens.

"It seems to me that I can say with a good deal of confidence that we are upon the eve of a new era of enterprise and of prosperity. Enterprise has been checked in this country for almost twenty years, because men were moving among a maze of interrogation points. They did not know what was going to happen to them. All sorts of regulation were proposed, and it was a matter of uncertainty what sort of regulation was going to be adopted.

"All sorts of charges were made against business, as if business were at default, when most men knew that the great majority of business men were honest, were public-spirited, were intending the right thing, and the many were made afraid because the few did not do what was right.

MUST PULL TOGETHER

"The most necessary thing, therefore, was for us to agree, as we did by slow stages agree, upon the main particulars of what ought not to be done and then to put our laws in such shape as to correspond with that general judgment. That, I say, was a necessary preliminary, not only to a common understanding, but also to a universal co-operation. The great forces of a country like this cannot pull separately; they have got to pull together. And, except upon a basis of common understanding as to the law and as to the proprieties of conduct, it is impossible to pull together.

"I, for one, have never doubted that all America was of one principle. I have never doubted that all America believed in doing what was fair and honorable and of good report.

"But the method of control by law against the small minority, which was recalcitrant against these principles, was a thing that it was difficult to determine upon. And it was a very great burden, let me say, to fall upon a particular administration of this government to have to undertake practically the whole business of final definition. That is what has been attempted by the Congress now about to come to a close. It has attempted the definitions for which the country had been getting ready, or trying to get ready, for nearly half a generation. It will require a period of test to determine whether they have successfully defined them or not, but no one needs to have it proved to him that it was necessary to define them and remove the uncertainties, and that, the uncertainties being removed, common understandings are possible and a universal co-operation.

WHAT HURTS ONE HURTS ALL

"You, gentlemen, representing these arteries of which I have spoken, that serve to release the forces of the communities and serve also to bind community with community, are surely in a better position than the men, perhaps, of any other profession, to understand how communities constitute units—and even a nation constitutes a unit—and what is detrimental and hurtful to a part, you above all men, ought to know is detrimental to all and that you cannot demoralize some of the forces of a community without being in danger of demoralizing all the forces of a community.

"Your interest is not in the congestion of life, but in the release of life. Your interest is not in isolation, but in union—the union of parts of this great country, so that every energy in those parts will flow freely and with full force from county to county throughout the whole nation.

"What I have come to speak of this afternoon is this unity of our interest, and I want to make some—I will not say 'predictions,' but to use a less dangerous, though bigger, word—prognostications. I understand that there is among the medical profession diagnosis and prognosis. I dare say the prognosis is more difficult than the diagnosis, since it has to come first, and not being a physician I have all the greater courage in the prognosis.

"I have noticed all my life that I could speak with the greatest freedom about those things that I did not understand, but there are some things that a man is bound to try to think out, whether he fully comprehends them or not. The thought of no single man can comprehend the life of a great nation like this, and yet men in public life upon whom the burden of a certain degree of guidance is laid must attempt to comprehend as much of it as they can. Their strength will be in taking counsel of as many informed persons as possible in each department with which they have to deal; but some time or other the point will come when they have to make a decision based upon a prognosis.

"We have had to do that in attempting the definitions in law which have been attempted by this Congress, and now it is necessary for us, in order to go forward with the great spirit with which I believe we can go forward, to look ahead and see the things that are likely to happen.

PEERS INTO THE FUTURE

"In the first place, I feel that the mists and miasmic airs of suspicion that have filled the business world have now been blown away. I believe that we have passed the era of suspicion and have come now into the era of confidence. Knowing the elements we have to deal with, we can deal with them; and with that confidence of knowledge we can have confidence of enterprise.

"And that enterprise is going to mean this: Nobody is henceforth going to be afraid of or suspicious of any business merely because it is big. If my judgment is correct nobody has been suspicious of any business merely because it was big, but they have been suspicious whenever they thought that the bigness was being used to take an unfair advantage.

"We shall have to admit that it is easier for a big fellow to take advantage of you than for a little fellow to take advantage of you; therefore, we instinctively watch the big fellow with a little closer scrutiny than we watch the little fellow. But bond having been given for the big fellow, we can sleep o'nights. Bond having been given that he will keep the peace, we do not have to spend our time and waste our energy watching him.

"The conditions of confidence being established, nobody need think that if he is taller than the rest anybody is going to throw a stone at him simply because he is a favorable target—always provided there is fair dealing and real service.

"Because the characteristic of modern business, gentlemen, is this: The number of cases in which men do business on their own individual, private capital is relatively small in our day. Almost all the greater enterprises are done on what is, so far as the managers of that business are concerned, other people's money. That is what a joint-stock company means. It means, 'Won't you lend us your resources to conduct this business and trust us, a little group of managers, to see that you get honest and proper returns for your money?' And no man who manages a joint-stock company can know for many days together, without fresh inquiry, who his partners are, because the stock is constantly changing hands and the partners are seldom the same people for long periods together, which amounts to saying that, inasmuch as you are using the money of everybody who chooses to come in, your responsibility is to everybody who has come in or who may come in.

"That is simply another way of saying that your business is a public business, and you owe it to the public to take them into your confidence in regard to the way in which it is conducted. The era of private business in the sense of business conducted with the money of the partners—I mean of the managing partners—is practically passed, not only in this country but almost everywhere. Therefore, almost all business has this direct responsibility to the public in general. We owe a constant report to the public whose money we are constantly asking for in order to conduct the business itself. Therefore, we have got to trade not only on our efficiency, not only on the service that we render, but on the confidence that we cultivate.

A NEW ATMOSPHERE FOR BUSINESS

"There is a new atmosphere for business. The oxygen that the lungs of modern business takes in is the oxygen of the public confidence, and if you have not got that your business is essentially paralyzed and asphyxiated.

"I take it that we are in a position now to come to a common understanding, knowing that only a common understanding will be the stable basis of business, and that what we want for business hereafter is the same kind of liberty that we want for the individual. The liberty of the individual is limited with the greatest sharpness where his actions come into collision with the interests of the community he lives in.

"My liberty consists in a sort of parole. Society says to me. 'You may do what you please until you do something that is in violation of the common understanding of the public interest; then your parole is forfeited. We will take you into custody. We will limit your activities. We will penalize you if you use this thing that you call your liberty against our interest.'

"Business does not want, and ought not to ask for, more liberty than the individual has; and I have always summed up for myself individual liberty and business liberty and every other kind of liberty in the phrase that is common in the sporting world—'a free field and no favor.'

"There have been times—I will not specify them, but there have been times—when the field looked free, but when there were favors received from the managers of the course, when there were advantages given, inside tracks accorded, practices which block the other runner, rules which would exclude the amateur who wanted to get in. That may be a free field, but there is favor, there is partiality, there is preference, there is covert advantage taken of somebody, and while it looks very well from the grandstand, there are men whom you can find who were not allowed to get into the track and test their powers against the other men who were racing for the honors of the day.

WHAT NEW LIBERTY MEANS

"I think it is a serviceable figure. It means this, that you are not going to be barred from the contest because you are big and strong and you are not going to be penalized because you are big and strong, but you are going to be made to observe the rules of the track, and not get in anybody's way except as you can keep out of his way by having more vigor and skill than he has.

"When we get that understanding, that we are all sports and that we are not going to ask for, not only, but we are not going to condescend to take advantage of anything that does not belong to us, why then the atmosphere will clear so that it will seem as if the sun had never shone as it does that day. It is the spirit of true sportsmanship that ought to get into everything, and men who when they get beaten that way squeal do not deserve our pity.

"Some men are going to get beaten because they have not the brains; they have not the initiative, they have not the skill, they have not the knowledge; they have not the same capacity that other men have. They will have to be employees; they will have to be used where they can be used.

"We do not need to conceal from ourselves that there are varieties of capacity in the world. Some men have heads, but they are not particularly furnished. I overheard two men one day talking about a third man, and one of them referred to his head. 'Head?' the other said, 'head? That isn't a head; that's just a knot. The Almighty put that there to keep him from raveling out.'

"And we have to admit that there are such persons. Now, liberty does not consist in framing laws to put such men at the front and say they have got to be allowed to keep pace with the rest, because that would hold the whole process of civilization back. But it does consist in saying no matter how featherweight the other man is you must not arbitrarily interfere with him; that there must be an absolutely free field and no favor to anybody.

THE RULES OF THE GAME

"There are, therefore, I suppose, certain rules of the game. I will mention what seem to me some of them. I have already mentioned one of them by way of illustration. First of all is the rule of publicity, not doing anything under cover, letting the public know what you are doing and judge of it according as it is. There are a great many businesses in this country that have fallen under suspicion because they were so secretive, when there was nothing to secrete that was dishonorable.

"The minute I keep everything in my pocket and will not show anybody what is there, they conjecture what may be in my pocket; whereas, if I turn my pockets inside out, the conjecture is, at any rate, dissipated. There is no use inviting suspicion by secretiveness. If a business is being honorably done and successfully done, you ought to be pleased to turn it inside out and let the people whom you are inviting to invest in it see exactly how it is done and with what results.

"Publicity, which is required in sport, is required in business. Let us see how you are running the game.

"Then in the second place, there is a full equivalent for money you receive. The full equivalent in service, not trying to skimp in the service in order to increase profits above a reasonable return, but trying to make the profits proportioned to the satisfaction of the people that you serve. There isn't any more solid foundation for business than that.

"If you thoroughly satisfy the people you are serving you are welcome to their money. They are not going to grudge it because they will feel that they are getting a quid pro quo—they are getting something such as was promised them when their money was asked of them.

NEED OF CONSCIENCE

"Then, in the third place, this game requires something more than ordinary sports. It requires a certain kind of conscience in business, a certain feeling that we are, after all, in this world because we are expected to make good according to the standards of the people we live with. That, after all, gentlemen, is the chief compulsion that is laid on all of us.

"I am not aware of being afraid of jail. I do not feel uneasy when I pass a penitentiary, but I would feel extremely uneasy if I knew I had done something which some fine, honorable friend of mine would condemn if I passed before him. I would look carefully at his eyes to see if he suspected anything, and I would feel unhappy until I had made a clean breast of it with him. That is what we are afraid of, and that is what we ought to be afraid of.

"We are sustained by the moral judgment of honorable men, and there isn't anything else in this world that I know of that is worth while. How honors must hurt a man if he feels that they have been achieved dishonorably. They then are an arrow in his heart, not a quickening or tonic to his spirit in any respect. If he feels that he has cheated the people that trusted him then no matter what fortune he piles up, they never can contribute to his peace of mind for a moment. So I say that the conscience in business is the motive spring of the whole thing; the pride of doing the thing as it ought to be done.

"I ask every man in this room who employs other men if he would not pay the best salary he has if he could be assured that the man he employed was of that quality? You know that is the sort of men you want—the men who will take a pride in doing the thing right and have a clean conscience toward you who employ them. Now all of us are employees of the public. It doesn't make any difference what our business is or how small it is, we are, so far as we get money for it, employees of the public, and our clear, clean consciences toward our employers are the basis of our success, and it goes without saying, the basis of our happiness.

THE SPIRIT OF SERVICE

"Then, the fourth rule, as it seems to me, is the rule of having the spirit of service. I know a lot of cant is talked about that, and I get very sick of the cant, as I dare say you do, but when I talk about the spirit of service I am not meaning a sentiment. I am not meaning a state of mind; I am meaning something very concrete—that you want to see to it that the thing that you do for the public and get money for is the best thing of that kind that can be done. That is what I mean by the spirit of service.

"I have known many a man who gave up profit for mental satisfaction. I know men in this city—there are men in the scientific bureaus of this government whom I could cite—who could make very big salaries, but who prefer the satisfaction of doing things that will serve the whole community, and doing them just as well as they possibly can be done.

"I for one am proud of the scientific bureaus of this government. There are men in it of the most self-sacrificing spirit and of the highest scientific efficiency who do things on a petty salary which some other men would not do at all, because if you have to pay a man a salary to produce the best product of his brain, then he scales the product down to the salary. Here are men who scale the product up to the highest standards of scientific ideals.

"They have hitched their wagons to a star, and the star is about to lift their names above the names of the rest of us. So I say that if your earning capacity is the capacity to earn the public confidence, you can go about your business like free men. Nobody is going to molest you and everybody is going to say, 'If you earn big profits; if you have treated the people from whom you are making your profits as they ought to be treated; if you treat the employees whom you use in earning those profits as they ought to be treated; if your methods of competition are clear and above reproach; why, then, you can pile these profits as high as the Rockies and nobody will be jealous of it.' Because you will have earned them in a sense that is the handsomest sense of all.

DEFINITION OF GOVERNMENT

"It is in this spirit that we all ought to regard the laws, that we all ought to criticise the laws, and that all ought to co-operate in the enforcement of the laws. Government, gentlemen, is merely an attempt to express the conscience of everybody, the average conscience of the nation, in the rules that everybody is commanded to obey. That is all they are.

"If the government is going faster than the public conscience, it will presently have to pull up; if it is not going as fast as the public conscience, it will presently have to be whipped up. Because the public conscience is going to say, 'We want our laws to express our character,' and our character must have this kind of solidity underneath it, the moral judgment of right and wrong.

"The only reason we quarrel with reformers sometimes is because they are, or suppose they are, a little more enlightened than the rest of us, and they want us all of a sudden to be just as enlightened as they are, and we cannot stand the pace. That is all that makes us uneasy about reformers. If we could get our second wind, if we could keep up the pace as long as they do, we might be able to run as fast as they do, but we are more heavily weighted with clay than they are. We cannot go as fast. And we like companionship. We want to wait for the rest of them. We do not want to be in a lonely advance climbing some heights of perfection where there is no good inn at which to stop overnight.

"PUT UP, OR SHUT UP"

"That, gentlemen, is the homely and, I dare say, obvious lesson which I have meant to give utterance to this afternoon. I think that I understand what you are after. I hope that you understand what we are after. All I ask is that if anything is being done that ought not to be done, the fault in it be conclusively pointed out and the way to correct the mistake be explicitly shown. There is an old rule that ought to obtain in politics as in everything else and it is aptly expressed in a very homely way. It is the old rule of 'put up or shut up.'

"Some one said, 'If you wish me to consider you witty I must really trouble you to make a joke.' If you wish me to consider you wise I must really trouble you to show the goods: To show how the thing can be done; to show how it can be better done. Because nobody is fool enough to suppose that the way he has determined that the thing ought to be done is necessarily the best way to do it; but it is the best way to do it until you show a better way. That is a perfectly obvious rule. So again I say it is the rule of 'put up or shut up.' And I do not mean that in any sort of disrespect.

"The market for ideas is a highly competitive market and the rules of competition are necessarily fair. There is only one test for an idea and that is 'Is it good?' You may for the time being dress it with such rhetoric that it will look good and the best thing that is characteristic of countries like our own is that every man who has an idea is constantly invited to the platform. And there is nothing better for an idea by way of test than exposure to the atmosphere. If you let enough people hear it stated often enough it will certainly seek its proper level.

"That is the reason I believe in free speech. I have been subjected to free speech myself and it is hard to endure sometimes, because the office of the President seems to be the clearing house for original ideas. I am brought more original ideas per diem, I dare say, than any other person in the country, and, therefore, pay the penalty of freedom of speech.

"Perhaps my mind does not register original ideas readily enough, because some of them do not register at all. I am perfectly willing to admit that that is the fault of the register, not the fault of the idea. All I have to say is that if you have ideas, the register is entirely at your service."

Comments of the Press

Many Shades of Assent and Dissent Apparent in the Editorial Expressions of Leading Newspapers

The following paragraphs are extracts from the newspaper editorials on President Wilson's speech before the American Electric Railway Association from New York papers or forwarded by staff correspondents in time for use in this issue.

Philadelphia Ledger, Jan. 30—President Wilson's address to the members of the American Electric Railway Association in Washington is a reflection of one phase of his personality with which the American public have not heretofore had many opportunities to become familiar. He spoke as a man among men, and he employed the language and the similes of sport to emphasize his thought. In effect, the President told his hearers, and through them the business world, that it was up to them to play the game and play it fairly; that the process of restraint and regulation, to the formulation of which the congress has laboriously devoted itself, has come to an end; that the recent laws have furnished definitions of business ethics which represent the desire of the country, and that it is now up to business men to test those definitions fairly and to enter upon the era of prosperity which we are facing with new confidence and with an honest purpose to enter upon "a free field and no favor." With the spirit of the President's remarks there will be general agreement, but whether there has been that specific definition by law of what ought to be done and what ought not to be done in big business is a trifle doubtful. That a great deal of constructive work has been done no one will deny; the tariff has been revised, the banking system reorganized and new machinery created, and a trades commission provided for. But beyond the definition of "restraint of trade" already given by the courts it cannot be said that the new laws add anything on that point, while the trades commission is yet to begin its activities. It is some comfort to know that business is not going to be molested solely because it may make big profits.

New York Times Annalist, Feb. 1—The responsibility of the managers of a great corporation is to the public at large rather than to the group of individuals who at any given time constitute the body of its stockholders. That is true even of corporations which perform no quasi-public function. . . . The placing of the stock of a corporation upon a public market through listing it on the Stock Exchange or otherwise is in effect an invitation to the public at large to become stockholders. It thus becomes the duty of the corporation to inform regarding its affairs not only the public which has bought, but likewise the public which has not yet bought, but which may.

New York Times, Jan. 31—In his speech to the American Electric Railway Association the President told his audience that: ". . . nobody is henceforth going to be afraid or suspicious of any business merely because it is big." It has not been so during the last twenty years, particularly during the last ten years. Bigness has been a crime, the only crime proved, and the persistent attempts to punish it savagely have disturbed the industrial peace of the country, with disastrous results, in so much that the accruing loss may be fairly compared with the cost of a great war. A few months ago the President discovered that there was a new temper of the people. The new temper meant that the people had got tired of seeing corporations crucified every day, that they had found out that these endless prosecutions were really directed against themselves, that the hurt was theirs, that when business was alarmed and capital made timid they, all the people, were the chief sufferers. It was not a new temper at all, it was a very old state of mind. Now the President calls it a new atmosphere. It is the same thing by another name. If it means anything at all, it means that the politicians have discovered that harassing the corporations is not a profitable business for them.

New York Sun, Jan. 31—In his speech to the American Electric Railway Association at Washington President Wilson said: "It seems to me that I can say with a good deal of confidence that we are upon the eve of a new era of enterprise and of prosperity." The President has been saying this for more than a year. Indeed, he has gone much further; he said that the era of prosperity had arrived and that the blindness to it was purely psychological. Apparently he was mistaken in his former utterances. The President holds that the present regime at Washington has resolved the doubts and removed the checks. It has discovered and formulated the "rules of the business game" which appear to be excellent examples of Delphic wisdom. It has given to business a liberty which "consists in a sort of parole." If business can understand the rules and apply them with exactly the same minds as the government monitors, it is as free as a babe in leading strings. It is its duty and its privilege to grow under the new tutelage, which is the new freedom. The paternal administration is determined to regulate it into the prophesied prosperity. Mr. Wilson ends by imposing in homely phrase a motto upon business, "Put up or shut up." Perhaps business may be inspired to make it reciprocal.

New York World, Jan. 30—The true American attitude toward business was admirably defined by President Wilson in a single paragraph of his speech to the American Electric Railway Association: "You are not going to be barred from the contest because you are big and strong, and you are not going to be penalized because you are big and strong, but you are going to observe the rules of the track and not get in anybody's way, except as you can keep out of his way by having more vigor and skill than he has." This is the sum and substance of the Sherman anti-trust law and of the Clayton amendment. Every business man who has any conscience at all knows whether or not he is following the rules of the game. So far as business is concerned the period of uncertainty is over, as the President has said. The rules of the game have been defined, and these rules are an expression of the general public conscience. For years the managers of big business have insisted that they could adapt themselves to any conditions if they only knew what those conditions were. This was a just complaint, but it has been met. There is no manager of a great industry in the country who does not know in a general way what is expected of him, or who does not know that nothing unjust or unreasonable is expected of him.

Indianapolis Star, Feb. 1—Business has been pilled and potioned, inspected and dissected, expurgated and objurgated, fletcherized and exorcised, drawn and quartered—literally quartered. Now it is lectured. Like an incorrigibly naughty boy it is led by the ear to a front seat where, fidgety and forlorn, it must await the privacy of after-school hours when teacher will inflict a personally conducted course in deportment. For the precepts business must pretend to be thankful and duly exalted. It must receive them with submissive head and not a sign that it has done better by the President's code of morals than he has himself. He exalts the virtue of publicity for business, but business dare not make reply that while it has never sought other than publicity, a Democratic national administration has made secrecy its rule of conduct in caucuses, in legislation, in the violation of civil service, in Mexico, in foreign affairs and everywhere. No historian, not even Woodrow Wilson, records a more striking absence of publicity in government than has existed at Washington since March 4, 1913.

Indianapolis News, Jan. 30—In his address before the American Electric Railway Association the President spoke of what had been done by Congress to clear the business situation, and undoubtedly progress has been made. The trouble had, he thought, been due to the fact that men for the last twenty years had been "moving amongst a maze of interrogation points." They have not, however, as yet got wholly out of the maze, though we believe they are making progress. One interrogation point it is within the power of the President to sweep from the path, and that is an extra session of Congress. That is something which business and the people generally do not want. . . . The temper of the speech is excellent, and there is much in it that can be heartily commended.

St. Louis Globe-Democrat, Jan. 31—Many portions of President Wilson's speech to the convention of the American Electric Railway Association are subject to criticism, but his statement that he has met many men whose horns dropped away the moment he was permitted to examine their character is filled with truth. Most of the prejudices of the world are based on misunderstanding. Knowledge is the greatest dehorner extant. If our people might meet each other oftener in friendly intercourse there would be a better mutual understanding. Railway travel and our mail service have done much to remove sectional prejudices. The meeting of our representatives in Congress has had the same effect. The country has often marveled at how the fiery utterances of Senators have been tempered by a brief association with the men whom they once held up to obloquy and shame.

Buffalo News, Jan. 30—In his speech yesterday before the American Electric Railway Association the President said that henceforth nobody is going to be suspicious of any business just because it is big. It is evident that the President has moved a long way since he came into office, whether his party has done so or not, because the chief aim in life of the party in power for the last two years has seemed to be the prodding of big business.

Louisville Evening Post, Jan. 30—President Wilson yesterday, in a public address, said, among other interesting things, "that since practically all business concerns were no longer private but were owned by a number of people, there should be full publicity about their affairs." We do not know where this theory of universal inquisition into the affairs of other people arose, but whatever its source, it is indefensible, and utterly mischievous. The only businesses which have not this right of privacy are, first, governmental business, which nevertheless is largely conducted in secret by secret devices, full knowledge being kept from the owners of the business; second, the business of common carriers of passengers, freight and intelligence, which business is public business, conducted by corporations which are accepted as substitutes for governmental agencies and are given place on governmental highways, with other governmental powers and privileges; third, public utilities in cities, which are also arms of the government; fourth, banking, insurance and related interests, requiring some form of a government guarantee, based on governmental inspection.

Address of C. Loomis Allen at Mid-Year Dinner

Spirit of Full and Frank Publicity Becoming Universal—New Committee on Public Relations

The toastmaster at the dinner of the American Electric Railway Association and the American Electric Railway Manufacturers' Association was C. Loomis Allen, president of the parent organization. As Mr. Allen's remarks were somewhat broader than those usually given by a toastmaster it has been deemed of interest to print in this issue the more significant passages of his opening statement, as follows:

The meeting of to-day and this dinner of to-night are, I am firmly convinced, typical of the present state of mind of our association, and a bright augury of future prospects. They have their keynote in a frankness which is a reflection of Article X in the code of principles adopted by your association at Atlantic City in October, 1914.

If the association, in behalf of the industry, is to achieve the results at which it aims, the beliefs expressed in this article cannot be too often emphasized. I call it to your particular attention again to-night because I believe that of all the declarations which the code contains it is the most important, as directly reflecting the spirit in which we must proceed in order to secure that which is vitally necessary, if public utilities are to continue in their present form.

"Full and frank publicity should be the policy of all transportation companies, to the end that proper information may be available to the investor and the public." So the article reads.

It will be remembered that although submitted in advance to the member companies for their criticism and emendation, the code of principles was adopted by the convention without a dissenting voice. We can, therefore, safely assume that the full meaning of the several planks was realized by those companies who subscribed by their assent to its far-reaching declarations. Article X means, in consequence, that the electric railways of the country, as represented in this association, are prepared to submit with the greatest frankness their affairs to the scrutiny of patrons.

If in the past there was reason for the policy of secrecy which seemed to envelop corporation matters, that reason has disappeared. Our cards are thrown face upward upon the table, and in the spirit of co-operation and mutual helpfulness we appeal to the people of the communities which we serve in the firm belief that the reason and the justice of our plea will lead to that co-operation which ultimately will give a solution of the problems which have confronted this industry during the last decade.

Publicity, gentlemen, is not a new thing to the electric railway industry. For years we have had publicity thrust upon us unsought. Our sins have been magnified by the lenses of demagogy. Our good deeds have been hid in the shadows cast by the searchlight of the muckraker. No public service company ever has or ever can escape publicity. It is for this association and the industry to say, however, what shall be its character. Shall it be the publicity which comes from *ex parte* investigations inspired by the self-exploiter, seeking political advancement at the expense of our interests? By the fantasies of the half-baked theorist? By the malicious activities of those whose delight it is to attack all prosperity? Or shall it be the publicity that comes from our belief that of all tribunals, the tribunal of a public properly informed, and with a full knowledge of all facts, is in the end the fairest of all?

Business ethics, like all things else in this world, are subject to evolution. The structure of business in the United States to-day is vastly different from that which existed in the days of our fathers. Economic development has been rapid. The individualism which was responsible in the first instance for the development of our resources is, to a large extent, disappearing and a spirit of co-operation in all lines is taking its place.

The $150,000,000 invested in the traction business in 1882 has increased to $4,500,000,000. The 35,000 employees of that year have multiplied until to-day there are more than 300,000, and the 3000 miles of track have expanded until now nearly 41,000 miles of track cover city and country. Not one force at work in this country since 1888, when in the near-by city of Richmond the first complete electric city system was inaugurated, has contributed so much to the prosperity and growth of the cities of the United States as has the electric railway. It has bound together the town and country. It has done away with the necessity of congestion in our large urban communities. It is conserving health, and it has brought prosperity in its wake.

It would indeed be surprising if in the course of this development, if during these full years, when the genius of the inventor, the energy of the executive and the vision of the promotor were all feverishly at work in the creation of the magnificent system of local transportation which exists to-day throughout the country, errors had not occurred, if indeed sins of omission and commission were not an accompaniment, if perfection in method or in practice had been arrived at.

For one I am ready to admit the errors; I am even ready to admit in some degree the sins; and I make no claim for perfection. I do say, however, that the development of the electric railway industry has been accomplished with no greater degree of error, with no greater taint of sin, than the development of any of the other marvelous industries which have made the United States what it is to-day.

I maintain that the good which the industry has done so far overbalances the evils, that we, as its representatives, may appear before the people of this country with our heads erect and with no apology in our speech and ask of the public fair treatment, to the end that the development so splendidly begun shall be carried to its full conclusion, and the people of our urban and rural United States receive the best possible service at the least possible cost.

Under our theory of government it is in the end the people who must decide. In some form or other our case will go to the public for a final decision. It is for us, the organized representatives of this industry, to say in what form that shall be.

On Monday night Jan. 25 your committee on public relations, consisting of representatives from members of your Manufacturers' Association and your Railway Association, held a meeting in New York, at which the machinery for reaching the people with our case was assembled. Three sub-committees were appointed to have charge of various channels by which the sources of public information can be kept in touch with our ideas and our ideals. This is but a beginning, but it is a start in the right direction.

With your assistance and with your co-operation, this committee and its subdivisions can give to the electric railways that which they have for so long looked, and which is so necessary for their welfare, a voice. We have been inarticulate too long. It is time that we had our day in that court of public opinion the attention of which has been far too long monopolized by our enemies. With your assistance we will have it, and I bespeak in behalf of Mr. McCarter and confrères on the committee of public relations, your whole-hearted co-operation and help.

The Brady Medal Award

Below Is Given an Abstract of Parts of the Report of the Committee on Award Outlining Safety Methods of the Companies Honored—Awards Will be Officially Made in New York on Feb. 10

In last week's issue a brief note regarding the award of the Anthony N. Brady medals was printed, with a statement of the fact that copies of the report of the award committee were distributed. Below are given some extracts from the report. Information regarding the individuals honored in the award, including details of their work in the safety movement, together with their portraits, appear elsewhere in this issue. Mr. Sears was a pioneer in safety work and originated much of the activity described below. His campaigns to reduce infant accidents and drunkenness and other nuisances on cars have been effective. His expert knowledge of workmen's compensation acts in general has enabled him to administer the Massachusetts act with extreme fairness and justice. Mr. Neal has been active on the shop committees, combining enthusiasm with ripe experience. He has compiled many instructive briefs, regarding the treatment of common ailments, which are discussed at safety meetings. At present he investigates all accidents which occur at the Albany Street shops of the Boston Elevated Railway. He was for two years chairman of the shop safety committee.

The medals will be officially awarded at the annual meeting of the American Museum of Safety, which occurs on Feb. 10 at the United Engineering Societies' Building in New York.

SOME FACTS REGARDING THE BOSTON ELEVATED RAILWAY SYSTEM

The Boston Elevated Railway controls and operates practically all of the passenger transportation lines in the city of Boston and the surrounding cities of Cambridge, Everett, Malden, Medford, Somerville and the towns of Belmont, Watertown, Brookline and Arlington, and also operates to a more limited extent in the cities of Chelsea and Newton. The municipal area of Boston contains a population of about 700,000, but its true transportation area is made up of a number of separate municipal units containing together in excess of 1,200,000 population. The business district of the city is comprised within a very narrow area, through some part of which practically all of the 1600 cars and the 150,000 daily trips made by these cars pass. The narrowest and most involved streets of the city are within the same area. The longest stretch of straight track in the congested district is 1050 feet, and this is on Washington Street, the principal and most congested street in the city, the width of this street from curb to curb in the widest part being but 31 ft.

Applicants for employment on the rapid transit lines are limited to the positions of gatemen, brakemen on these lines obtaining their positions only after having worked as gatemen, guards only after having worked as brakemen, and motormen only after they have served in all three of the lesser positions. As a result it takes about seven years of service to become a motorman on the rapid transit line. The company is also considering a plan to require physical examination of applicants for positions in the maintenance department. Prospective trainmen are instructed in a special school and later are under the direction of an instructor while in car service. In connection with the matter of examination of prospective employees the company cooperated with Prof. Hugo Münsterberg, head of the department of psychology at Harvard University, in making psychological tests upon trainmen, designed to yield data of use in accident prevention. Every year all motormen and conductors on the surface lines and all motormen, guards and brakemen on the rapid transit lines are required to pass an eyesight test.

During the past year strenuous effort has been made to increase the supervision of car men by inspectors. As the result of the practice of keeping detailed reports of all cases in which inspectors have called matters to the attention of car man or superintendent, there has been an increase of over 100 per cent in the number of reports made in a year. The records of a certain number of employees are reviewed every week, so that the record of every employee in the service is carefully scrutinized at least once in six months. In the effort to impress upon employees the effects of the infraction of rules the legal department maintains a corps of accident clerks. Their duty is to observe the conditions which are conducive to accidents and to point out the ways in which accidents can be averted. Accident charts posted in the carhouses and revised daily have been found useful. Letters regarding the safety problem have also been mailed to the men at their homes and these have been appreciated.

The company not only makes total abstinence from the use of intoxicating liquors a condition of employment, but enforces strictly its rule making intoxication in uniform a reason for discharge, and in many cases has even discharged men who have become intoxicated when not in uniform and off duty.

During the year ending June 30, 1914, the company has succeeded in reducing the number of blue-uniformed men leaving the service from 2362 to 1166 or 50.5 per cent as compared with the year ending March 31, 1912, this being the most recent one for which the figures for comparison were obtainable, and has reduced the number of blue-uniformed men entering the service from 2380 to 1145, or 52 per cent.

The company has conducted a campaign for the prevention of accidents to school children, which was begun in the fall of 1909. In October, 1913, a circular was prepared with the title, "Safety Work with School Children," which has had a very wide circulation. In June, 1914, the Boston Chamber of Commerce was induced to give its sanction and name to a general "safety first" campaign. The first step of this consisted of an active and strenuous circularizing of the schools in metropolitan Boston during the last two weeks before vacation. About 200,000 bulletins over the signature of the Boston Chamber of Commerce, calling attention of fathers and mothers to the seriousness of accidents and inviting their co-operation, were distributed. About 7000 special circulars were sent to the teachers of the schools containing outlines of talks to be given by them to the children before the summer vacation. In this movement the school officials and teachers cooperated heartily.

In the campaign the police and the fire commissioners, the Amalgamated Association of Street and Electric Railway Employees of America, the New York, New Haven & Hartford Railroad and the employees of the company, all co-operated with the Chamber of Commerce.

For the month of July, 1914, in which special account was kept, there was a total reduction of 25.3 per cent in the number of accidents reported as compared with July, 1913, and this in spite of an increase of 9.9 per cent in the number of passengers carried and an increase of 6.8 per cent in the number of trips run.

Safety committees were instituted throughout the entire system on July 1, 1913, the total number of local committees being thirty-seven. These committees represent all grades of work in the company's service, every division of the operating bureau being represented by one or more. The work centers in a general safety committee, composed of executive officers and heads of departments, whose duty it is to take final action upon all recommendations which have not been approved by the head of the bureau. A general secretary, appointed by the general safety committee, devotes his entire time to attending meetings of local committees, making records of suggestions and following the course of suggestions until they are either adopted or rejected. During the first year 371 men served on the various safety committees and 532 suggestions were received.

SOME FACTS REGARDING THE PUBLIC SERVICE RAILWAY AND RAILROAD SYSTEMS OF NEW JERSEY

The Public Service Railway and Public Service Railroad operate over practically the entire State of New Jersey, and serve twenty-one cities and 119 towns and municipalities with a population, according to the 1910 census, of 1,898,559. The greater part of the system is purely urban, but some of the lines operate in rural districts.

Employees are trained in a school of instruction, after passing the physical examination, and are there thoroughly prepared for their future responsibilities. After a day in the school, where they are drilled on instruction cars and instructed in the rules, those who pass the required examinations are put on the road under competent men and receive training under actual road conditions. After a period of from seven to ten days they are recalled to the school and again examined before being placed in charge of their cars. For any infractions of the rules after being placed on a car employees are sent back to the school on their own time to be drilled on those rules which have been infringed. One instructor, specially qualified, drills all students in accident prevention and the method of procedure after an accident has occurred. Lectures, illustrated with lantern slides and moving pictures, are delivered to all conductors, motormen and inspectors at all of the carhouses twice during the year.

During the past year a committee on safety, consisting of the heads of the various departments, with the general claim agent as chairman, was organized. This committee meets monthly and is open to suggestions from all employees regarding conditions of roadway, equipment and operation from a safety standpoint.

For the past three and a half years a welfare plan for the payment of insurance, sick benefits and pensions to employees, their relatives and dependents, has been in operation. The employees receive these benefits without cost. The work, upon which the company expended nearly $54,000 last year, is under the direction of a welfare department.

In alleviating the effect of accidents first aid is applied to all injured persons, and during the past year the services of more than fifty physicians, regularly engaged for the work, were at the command of those needing emergency treatment. All power houses, shops, substations, line wagons, etc., are equipped with first-aid cabinets, and in each carhouse and substation hangs a chart illustrating the Schaefer or prone-pressure method of manual resuscitation, and each employee is required to familiarize himself with it. Employees are also trained by a practical man, who spends much of his time in going from place to place giving lectures and illustrating manual resuscitation.

On Jan. 1, 1914, a filing system was installed in the claim department by which every accident is indexed under six headings, as follows: Car number, conductor's number and name, motorman's number and name, car line and carhouse, nature of accident and place of accident. By means of this system the company is enabled quickly to note repetitions of any kind of accident and to notify the heads of departments immediately so that further repetition may be prevented.

As part of the educational equipment special reels of safety films have been made in co-operation with the Edison Company, and these are now being exhibited throughout the country. The campaign has also been extended to include wagon owners and drivers, who have been reached by visits, lectures and the distribution of large safety posters.

In conclusion it may be noted that, during the past eight years, the percentage of expenditure for accidents in comparison with gross earnings have been reduced from 8.64 per cent to 4.16 per cent by almost exactly equal steps.

SOME FACTS REGARDING THE NORTHERN OHIO TRACTION AND LIGHT COMPANY

The Northern Ohio Traction & Light Company operates interurban railroads from Cleveland to Uhrichsville, Ohio, and from Wadsworth to Ravenna, Ohio, in six different counties. It also operates the Akron, Canton and Massillon city lines. In addition it does a lighting business in Akron and a number of other municipalities. The railway system is the third largest in the State of Ohio.

The safety organization of the company is under the general jurisdiction of the supervisor of safety, who is also general claim agent. There are five safety committees, comprising sixty-five employees, selected from all departments of the organization. The line and shop departments have additional committees. The members of the safety committee are elected by the men of the different divisions by secret ballot. Very good men have thus been secured. There is also a general committee made up of the heads of departments. The local safety committees made weekly reports on the suggestions which have been received, and these are acted upon promptly.

Among the successful plans devised by the supervisor is the sending of an accident letter every two weeks to all employees. This contains suggestions as to how accidents can be eliminated, and calls their attention to the accidents that have occurred just previously and suggests how they could have been prevented.

The general passenger agent of the company publishes a bulletin twice a month. In this a certain amount of space is always given to safety matters. This bulletin is distributed free of charge on the cars of the company.

Quarterly Pamphlet by New York Up-State Commission

The Public Service Commission for the Second District of New York has just issued its regular quarterly pamphlet containing abstracts of the quarterly reports made to it by the operating steam and electric railroads of the State. The current pamphlets contain condensed balance sheets for each company as of Sept. 30, 1914, with corresponding figures for June 30, 1914, and condensed income statements showing revenue and expenses, fixed charges, etc., as reported for the three months ending Sept. 30, 1914. They also contain certain statistical data throwing light on operations during the quarter, such as the amount of freight and the number of passengers carried, ton-miles, passenger-miles, car-miles, etc.

Three-Phase Italian Passenger Locomotives

These Additional Locomotives, Weighing 73 Metric Tons and Carrying Two 1300-hp Motors Each, Are for Passenger Service on the Giovi Subsidiary and Monza-Lecco Lines

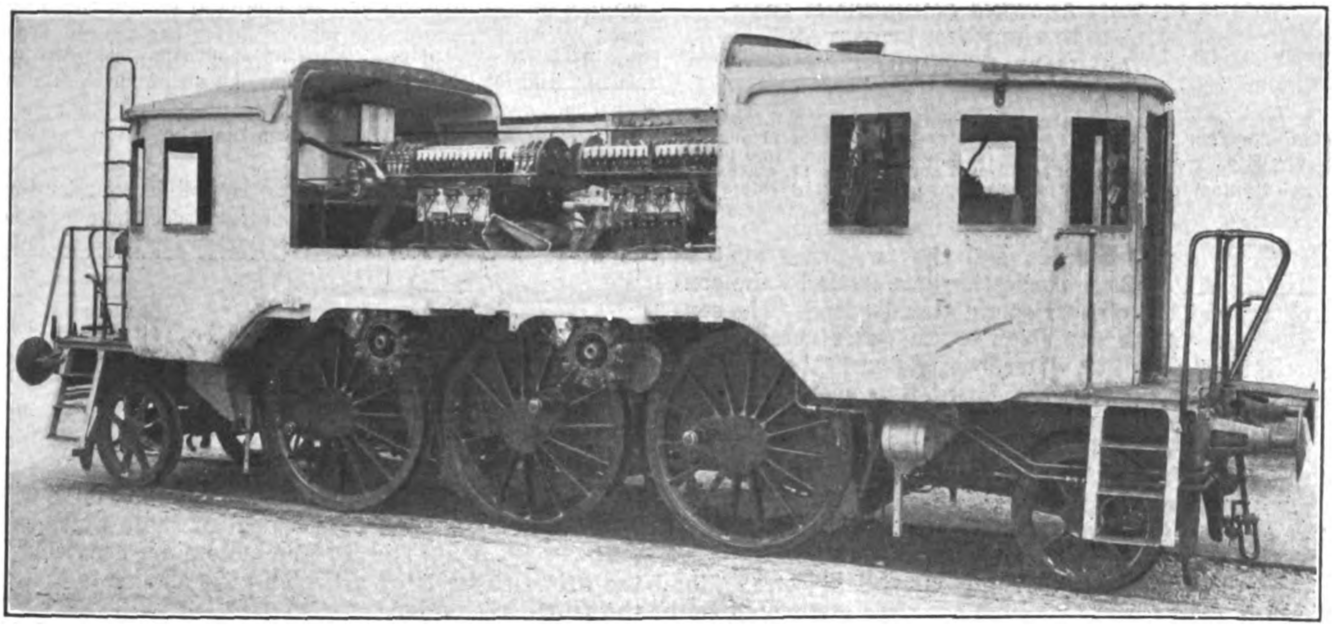
BY G. PONTECORVO, EAST PITTSBURGH, PA.

The Società Italiana Westinghouse is now delivering to the Italian State Railway sixteen three-phase locomotives. These new machines have two 3300-volt, 16.7-cycle induction motors of 1300 hp each, of the slip-ring type. The stator windings are designed so that the coils can be grouped either for two-phase, six poles, or three-phase eight poles. Similarly the rotor has a special winding which can be connected for either two-phase, six poles, or three-phase, eight poles. Only seven slip rings are required. A group of three or a group of four of the seven slip rings can be connected to the stator of the second motor when a three-phase, eight-pole, or two-phase six-pole cascade is required. Otherwise they can be short-circuited through the water rheostat when the motors are connected in parallel to the line. The two motors, of course, are connected mechanically.

By connecting the motors in parallel on the line (connected either for two-phase, six poles, or three-phase, eight poles), or connecting them in cascade, a four-speed combination can be obtained which at 16.7 cycles with a wheel diameter of 1.63 m (= 64.2 in.) gives four running speeds of 23.3, 31, 46.6 and 62 m.p.h. These are fully sufficient for passenger service locomotives, not only on level lines, but also on fairly high grades.

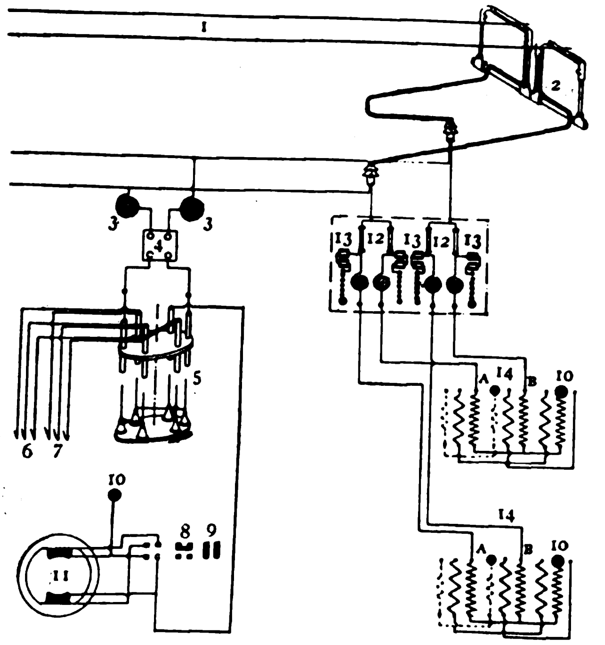
The change of the motor connections from parallel to cascade, and also from six to eight poles, two or three-phase, is made by a drum type controller operated through electropneumatic relays by a master controller. The method of starting the wound-rotor induction motor is by means of a liquid rheostat with an automatic regulation feature which increases or decreases automatically the amount of resistance inserted in the rotor, so as to keep the power absorbed from the line fixed at a predetermined value. It is also supplied with a motor-driven centrifugal pump which is inserted in the line as soon as the rheostat is in operation. This pump throws a jet of water against the resistance plates to prevent concentration of heat at the surface of the water, but all the water assumes an even temperature.

The automatic regulator is designed so as to regulate for constant watts instead of constant current, as was the case in the older type of rheostat. The regulator consists of a laminated core with a two-pole winding connected in series on the ground phase of the motor and constituting the stator, and of a double T-shaped rotor with a winding inserted between the other two phases. The torque exerted between stator and rotor is counterbalanced by a spring, and the tension of this spring can be regulated by the starting controller operated by the motorman so as to predetermine the amount of power to be absorbed from the line by the motors. When the power absorbed by the motor exceeds a predetermined value, the regulator tends to rotate in one direction, thereby increasing the resistance inserted in the rotor which in its turn decreases the power absorbed; vice versa, when the power absorbed tends to decrease, the regulator rotates in the other direction, thus keeping the amount of power taken by the motor at a constant value. Besides the controller and liquid rheostat, the locomotive is equipped with the usual auxiliary apparatus and instruments. There is, however, in addition, a small transformer to change the power supply from three to two-phase.



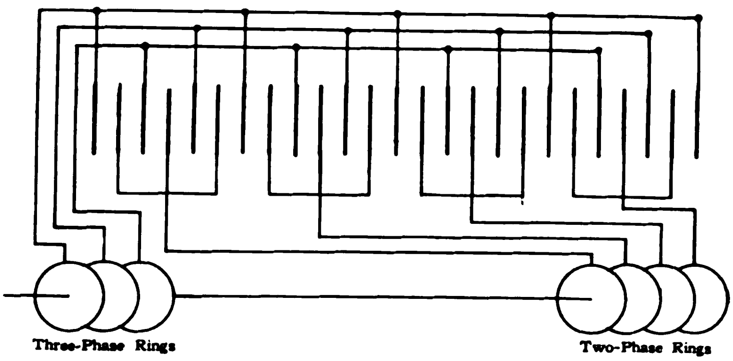
THREE-PHASE ITALIAN PASSENGER LOCOMOTIVES—FIG. 1—THE LOCOMOTIVE WITH PANTOGRAPH SECTION AND DRIVING MECHANISM REMOVED, SHOWING THE RELATIVE LOCATION OF MOTORS AND CONTROLLERS TO THE DRIVERS

Fig. 2 shows the connection between the overhead line and the primary switch through the trolley, impedance coils, and oil switch; also the circuit supplying the auxiliary apparatus with fuses, lightning arresters, and transformers. The three phases consist of two overhead wires and the rails or ground phase. There are, as already mentioned, four connections of windings and motors to obtain the four running speeds. Two connections are shown in Fig. 3; that is, the three-



THREE-PHASE ITALIAN PASSENGER LOCOMOTIVES—FIG. 2—WIRING DIAGRAM SHOWING CONNECTIONS FROM THE TROLLEY TO THE MOTOR SWITCH AND AUXILIARY APPARATUS

1. Contact wires; 2, trolley; 3, inductance coils; 4, automatic circuit breaker; 5, primary switch; 6 and 7, to motor primaries; 8 and 9, connections of automatic regulator for cascade and parallel connection, respectively; 10, ground connections; 11, stationary part of automatic regulator; 12, fuses; 13, lightning arresters; 14, transformers with primary and secondary, *A* and *B*, respectively.



THREE-PHASE ITALIAN PASSENGER LOCOMOTIVES—FIG. 4—LINE DIAGRAM OF LIQUID RHEOSTAT CONNECTIONS FROM THE MOTOR SLIP RINGS

phase, eight-pole cascade and the two-phase six-pole parallel. All of these connections are made by the controllers, which are never operated under load. The connections from the slip rings to the water rheostat are shown in Fig. 4. The water level, rising in the rheostat, fills the space between the plates, thus short-circuiting the rotor windings, which are connected to the plates as shown. The controller, the trolley and the liquid rheostat, are operated by compressed air supplied by a small three-phase motor and compressor, which also supplies the air for the two air brakes (the automatic and straight air brakes).

The motors are well ventilated with air circulation through stator iron and winding. The stator end connections are dipped in an insulating compound and then covered with a brass plate to prevent damage. Experience has shown that this construction has done away with insulation break-downs due to moisture and vibration caused by heavy currents at starting.

This locomotive has five axles, and is of the 2-6-2 type, that is to say, two axles are supporting axles and the other three are driving. The two supporting axles are placed one at each end of the locomotive, and each is connected to the driving axle next to it so as to form a kind of truck. All three driving axles have a transverse play for easy operation on curves. The slip rings are outside the wheelbase and easily accessible.

The weight of the locomotive, complete, is 73 metric tons, of which 45 to 51 tons is adhesive weight. The weight on the drivers can be changed within these figures by an arrangement which shifts the weight from the drivers to the supporting axles. The weight and dimensions of the locomotive are given in Table I.

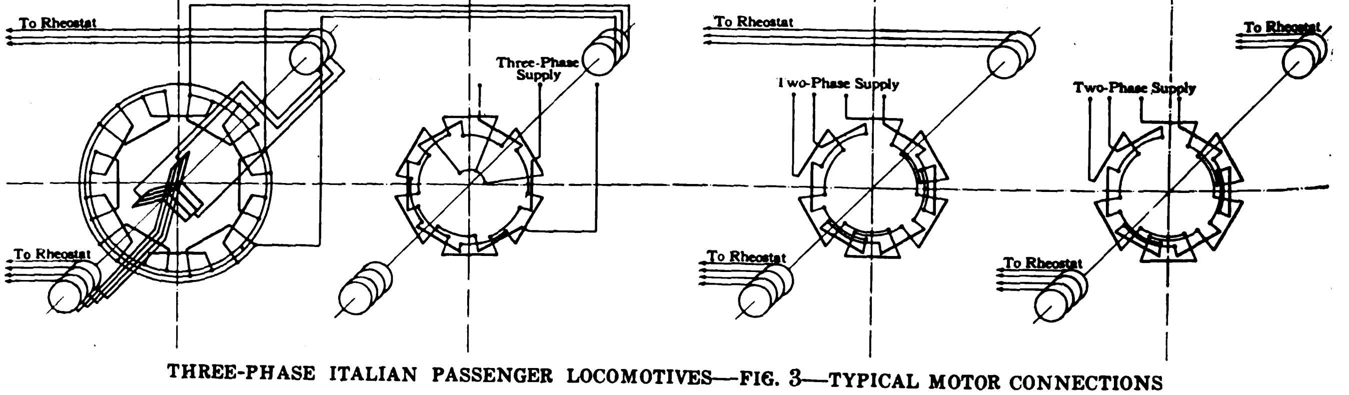
TABLE I—WEIGHTS AND DIMENSIONS

	Weights	
Items	Kg.	Lb.
Mechanical equipment	30,650	67,500
Motor equipment	27,270	60,000
Control equipment	12,700	28,000
Air-brake equipment	2,300	5,050

	Dimensions	
Items	Meters	In.
Maximum width	3.05	120
Maximum length	11.00	434
Diameter of driving wheels	1.63	64
Diameter of pony truck wheels	0.93	37.8

The motors are mounted on the frame in such a way that the air gap of the motor can be kept as small as electrical considerations will permit. This is done by making the bearings which support the rotor rigid with the stator frame, and independent of those which support the revolving shaft. The motors are connected to the driving wheels by a Scotch yoke similar to that of the Giovi locomotive.

These locomotives are designed for the Giovi subsidiary line and for the Monza-Lecco line, which connects Milan to the Lake of Como and the Valtellina lines which were electrified in 1901 with the same system. The Monza line is level single-track, while the Giovi subsidiary is double-track and has fairly high grades, reaching 1.6 per cent in the open and 1.16 in a 5.2-mile tunnel.



THREE-PHASE ITALIAN PASSENGER LOCOMOTIVES—FIG. 3—TYPICAL MOTOR CONNECTIONS

Showing the method of connecting the two motors for three-phase, eight-pole, cascade (left) and for two-phase, six-pole parallel.

OPERATING RESULTS

Some figures regarding the performance and tests of this type of locomotive may be interesting. The normal rating of the two motors is 2600 hp at three-phase, 16 2/3 cycles, 3300 volts and is such that the locomotive can develop for one hour continuously the drawbar pulls given in Table II with a motor temperature rise not exceeding 75 deg. Cent.

TABLE II—RELATIONS BETWEEN DRAWBAR PULL AND SPEED

Drawbar Pull		Speed	
Kg.	Lb.	Km.p.h.	M.p.h.
9,000	19,800	37.5	23.3
9,000	19,800	50	31
9,500	20,900	75	46.6
6,000	13,200	100	62

This locomotive can start a train of 350 tons (exclusive of locomotive) and bring it up to 75 kw p.h. (= 46.6 m.p.h.) speed on a straight line having a grade of 1.2 per cent with an acceleration of 0.15 km (= 0.093 mile) per hour per second; the tractive effort at starting is such as to utilize fully the adhesion between zero and 75 km (= 46.6 miles) per hour speed.

Of these locomotives the Italiana Westinghouse Company has already built sixteen and their operation is very satisfactory. They are run regenerating on the down grades, in this way greatly reducing the operating expenses. Their cost compares favorably with the cost of electric locomotives in the United States; however, the ratio of horse-power to weight, or 2600:73, is considerably higher.

These locomotives are rapidly solving the problems of high speed freight and passenger service on the lines on which they have been installed. Some doubts were expressed some time ago as regards the overhead line having two wires. However, no trouble has been experienced, although the overhead construction, with sliding pantograph construction, would be considered rather light in this country for such service.

Change in Car-Wiring Code Recommended

At the tenth annual convention of the Western Association of Electrical Inspectors held at the Hotel Radisson, Minneapolis, Minn., on Jan. 26-28, the report of the committee on electric traction systems recommended a change in the car wiring and equipment code as now used by the National Board of Fire Underwriters. These recommendations were approved by the association and will be submitted to the electrical committee of the National Fire Protection Association at its next meeting. The existing code appears in the 1913 edition of the National Electrical Code, which contains the rules of the National Board of Fire Underwriters.

Some of the more important amendments to the code include recommendations for self-closing doors in cabinets and for watertight conduit joints with drain holes provided at points where moisture is liable to collect. Also the combustible underside of car bodies should be protected with a fire-resisting material over all electrical apparatus. Rheostats which are at all times energized by trolley current should be surrounded by a grounded No. 8 wire netting guard having a 1-in. mesh. Wires for circuits controlling contactors, unit switches and cut-outs should not be run in the same cable, channel or conduit with power wires. Transformers or compensators should have their cases or shells thoroughly grounded. Arresters, choke coils and their connections should be installed ahead of all other electrical devices and metal conduit.

Included under the topic of electrical heaters were a number of revisions requiring that heaters should have metal inclosures which were thoroughly grounded and which should prevent inflammable material from collecting around or inside of heater casings. Panel heaters should be so mounted that there will be 4 in. between the heating element and any combustible material. Heaters should be so mounted that the heat cannot vent into the area back of the heater. Cross-seat heaters either should be mounted at least 4 in. below the under side of seats, or else the under side of the seat should be protected by not less than 1/4 in. of fire-resisting insulating material. All conductors should have a rubber insulation surrounded by an outer flameproof covering, and all circuits should be in approved metal conduit or molding installed according to rules. Switches meeting with the underwriters' requirements are to be provided and inclosed in a metal cabinet.

In order to put before the association some suggestions regarding changes in the carhouse wiring rules and instructions as included in the underwriters' code, J. S. Mahan, Chicago, chairman of the committee that is investigating this subject, reported a tentative set of revised rules. No action was taken on these suggestions, the committee being at liberty to proceed with the work of revising the rules. It is the plan of this committee to submit copies of the proposed rules to various master mechanics and superintendents of motive power of electric railways throughout the country for their criticisms and suggestions before submitting them to the association in final form. Copies of the proposed carhouse rules may be obtained by addressing F. R. Daniel, chairman of the electric traction system committee, Insurance Exchange Building, Chicago. Like the revised car-wiring rules it is intended to bring the carhouse-wiring rules, as well as the arrangement, up to date, so that they will be more readily available to those interested in using them.

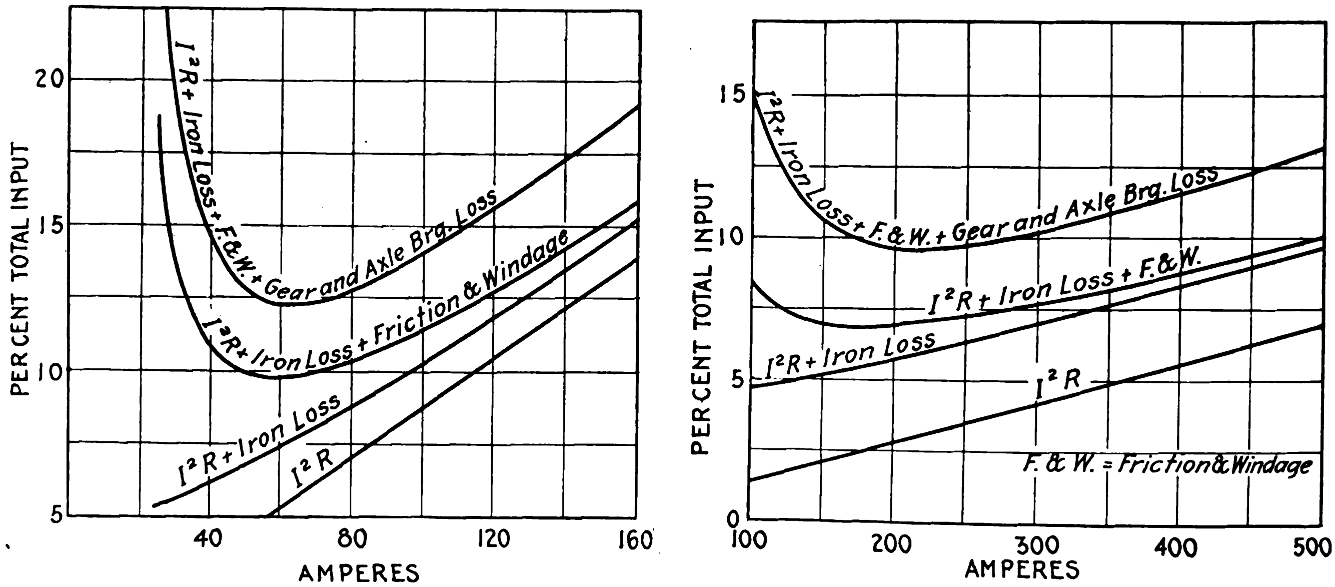
Burton McCollum of the United States bureau of standards presented an exhaustive discussion on the subject of electrolysis. He recommended primarily a proper definition of the responsibilities of both railways and the pipe-owning companies in the prevention of electrolytic damage, but advocated co-operation in all cases. Where rules governing electrolysis mitigation are necessary, they should preferably be erected and administered by state authority, under which the necessary administrative machinery is available. In their absence, however, the cities in which the utilities operate should take the initiative. The federal government, while competent to carry out, as it is now doing, engineering investigations bearing on the problem, should not, and in fact cannot, undertake to prescribe or administer regulations. Where state public utilities commissions are in existence, they are the most logical authority. Such state commissions not only are able to deal with the subject in a more comprehensive way than the majority of local bodies, especially in smaller cities, but their freedom from local political influence will often enable them to deal more wisely with all interests involved.

It is most desirable that regulations be made as few and as simple as possible, to the end that the utilities concerned may enjoy the greatest freedom of action consistent with safety to the underground structures. The present apparent necessity for regulation is due to the lack of co-operation in the past between the railways and the owners of underground utilities. If the interests concerned, particularly the railways, would show a greater disposition to meet the issue squarely, and if, instead of practically ignoring the subject as has been too often done they would treat the matter as one of the engineering problems connected with the operation of street railways, the need for stringent regulation would be largely eliminated. In the absence of such a policy, however, compulsory and perhaps burdensome regulations will be inevitable.

Saving Energy in Car Propulsion

W. N. Storer Analyzed the Possibilities of Energy Saving by Improved Methods of Car Design and Operation at a Joint Engineering Meeting in Chicago on Jan. 25.

On Jan. 25, at a joint meeting of the electrical section of the Western Society of Engineers and the Chicago branch of the A. I. E. E., W. N. Storer, general engineer railway department Westinghouse Electric & Manufacturing Company, delivered a paper under the title "Economy of Power Consumption on Electric Railways." The purpose of the paper was to show how economy in energy consumption can be secured and the limitations imposed in the application of the different methods. He called attention to Samuel Insull's, April, 1912, A. I. E. E. paper, in which the statement was made that not far from 1,000,000 tons of coal would be burned in Chicago in that year to furnish power for electric railways. In Mr. Insull's opinion not less than 40 per cent and possibly 50 per cent of the coal consumption could have been saved by the use of all possible economies. Mr. Storer stated that, since that time, cars have been installed on the Chicago Surface Lines which have cut the power consumption per car-mile to less than 67 per cent of that of older cars of the same capacity.



SAVING ENERGY IN CAR PROPULSION—MOTOR LOSSES—FIG. 1, 500-VOLT, 50-HP MOTOR—FIG. 2, 550-VOLT, 210-HP MOTOR

A large part of the energy now consumed is unnecessarily wasted, but on account of the large investment in existing equipment the waste must continue until the older cars and equipment are worn out. Even in the most modern equipment considerable power is wasted. The waste can be reduced by reduction of weight to be handled and by increase in the efficiency of the equipment used in handling it.

Reduction in weight has been secured by the use of two-motor equipment with maximum traction trucks instead of four-motor equipment, by the reduction in motor capacity made possible by the weight reduction, and by the use of motors weighing less per horse-power. Along with these reductions has gone the lightening of car bodies and trucks.

The energy consumed by electric cars is practically all dissipated in overcoming train resistance, in ascending grades, in motor losses, in gears and motor axle bearings, in rheostats, in auxiliaries and in brakes. Mr. Storer discussed the subject of loss reduction under these heads.

TRAIN RESISTANCE

The train resistance of a street car varies between 10 lb. and 20 lb. per ton, corresponding to about 25 to 50 watt-hours per ton-mile. As the total power consumption usually varies from 120 to 180 watt-hours per ton-mile, probably not more than 25 per cent of the total energy is used in overcoming resistance. The proportion is larger in elevated and subway service, where runs are longer and many curves are encountered, especially where the speed becomes so high as to give a high air resistance.

Train resistance can be reduced in the following ways: Journal friction, which is probably not more than 6 lb. per ton in average service, can be practically eliminated by the use of ball or roller bearings, resulting in an energy saving of from 6 to 15 watt-hours per ton-mile and possibly more. In high-speed railroading air resistance, which at a speed of 60 m.p.h. may amount to 800 lb. or 1000 lb. and may require from 110 kw to 150 kw to overcome it, can be reduced by eliminating projections which cause eddies in the atmosphere. Flange friction can be reduced by eliminating bad curves, by effective tramming of trucks, by removing inequalities in wheel diameter and other causes tending to make the wheels hug one rail.

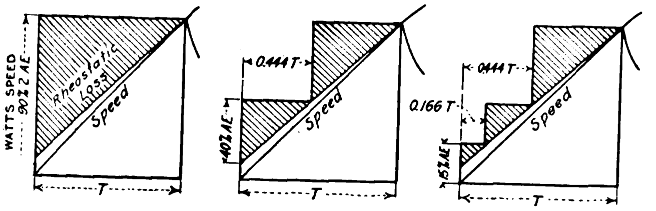
GRADE RESISTANCE AND MOTOR LOSSES

Power required in ascending grades can be decreased only by reducing weight, although it is sometimes possible to use the energy stored in a train in descending one grade to help it up the next. This is seldom done in street car work, but is quite common on lines where long runs are made. Short grades of 1 per cent or 2 per cent on interurban or elevated lines add very little to the power consumption.

The efficiency of a railway motor varies from 80 per cent to 90 per cent, small motors ordinarily used in city service having a maximum efficiency, including gears and axle bearings, of 85 per cent to 86 per cent, while large motors run 2 per cent or 3 per cent higher. The nature of the losses in typical commutating-pole motors is illustrated in Figs. 1 and 2. An increase in efficiency is sure to be accomplished by the production of a heavier and more expensive motor, as, other things being equal, the capacity of a given size of motor is practically dependent on its efficiency. It is, therefore, fairly certain that the efficiency of railroad motors is as high as the state of the art will permit with present commercial conditions.

Mr. Storer took for illustration the losses due to friction and windage, which he translated into terms of train resistance. He stated that a motor of from 40-hp to 50-hp capacity should have approximately 400 watts friction loss with a car speed of 10 m.p.h., corresponding to about a 20-lb. train resistance. With a two-motor car, weighing 20 tons, armature friction and windage amounts to 2 lb. per ton. The axle-bearing losses would probably be about one-half as much. There are few data available from which gear and axle-bearing losses can be determined, but it is hoped that in the near future further tests will be made which will enable the standardization committee of the A. I. E. E. to give more definite figures for the efficiency of axle bearings and gears.

It is possible to use some form of frictionless bearing for armatures, but such bearings as yet have not had sufficient tests under heavy service conditions to justify their adoption, especially as the cost is considerably higher than the ordinary sleeve bearing.



SAVING ENERGY IN CAR PROPULSION—RHEOSTATIC LOSSES DURING ACCELERATION

Fig. 3, parallel control; Fig. 4, series-parallel control; Fig. 5, series, series-parallel, parallel control. Shaded areas show rheostatic losses.

Rheostatic Losses

In the matter of rheostatic losses, it is impossible to avoid such losses altogether, but they can be reduced to a much lower amount than has ordinarily been the practice. Figs. 3, 4 and 5 show the relative rheostatic losses in straight parallel control, standard series-parallel control, and control using full series, series-parallel and full parallel, respectively. In these diagrams the shaded areas represent rheostatic losses. If two motors are assumed to accelerate with a current to give 10 per cent voltage drop in the internal resistance of each motor, then, as shown in Fig. 3, 90 per cent of the voltage will be lost in the rheostat at the instant of starting and an average of 45 per cent during the time the rheostat is in circuit. During the entire time of acceleration, double motor current will be taken from the line. As shown in Fig. 4, with series-parallel control, the rheostatic power loss at starting will be 80 per cent of the line voltage with single motor current, or an average of 40 per cent of the line voltage multiplied by single motor current during the time the car is accelerating in series. The total time will be divided between series and parallel in the ratios of the counter emfs after the resistance is cut out. In this case it will be in the ratio of 40 to 90, or 44.4 per cent of the time will be spent in series and 55.6 per cent in parallel up to the time the motor curve is reached. When the motors are connected in parallel the voltage applied to the motor terminals is only 50 per cent of the line voltage, consequently the remainder of the line voltage, or 50 per cent, is lost in the rheostat. The average drop in the rheostat will be 24 per cent for 55.6 per cent of the time. If A is the current for one motor, T the time to reach the motor curve and E the line voltage, then, in rheostatic control, the loss is

$$W = 2\,A \times 0.45\,E \times T = 0.9\,A\,E\,T$$

The total energy taken from the line during this acceleration is $2\,A\,E\,T$, and 45 per cent is lost in the rheostat.

In series-parallel control the rheostatic loss is

$$W = A \times 0.4\,E \times 0.444\,T + 2\,A \times 0.25\,E \times 0.556\,T = 0.456\,A\,E\,T$$

The total energy from the line in this case is

$$W = A\,E \times 0.444\,T + 2\,A\,E \times 0.556\,T = 1.556\,A\,E\,T$$

The rheostatic loss is thus cut almost in half by using series-parallel control instead of parallel control, and the total energy during acceleration on resistance is reduced more than 22 per cent.

The use of four-motor equipment makes it possible to go still further, as is illustrated in Fig. 5. The rheostatic loss in this case is the same as in the case shown in Fig. 4, except for the area of the rectangle cut out by full series operation, the area of which is $0.083\,A\,E\,T$. The total rheostatic loss is thus

$$W = (0.456 - 0.083)\,A\,E\,T = 0.373\,A\,E\,T,$$

a decrease of 18.3 per cent below that of series-parallel control. The energy taken from the line during the time on rheostat is $(1.556 - 0.083)\,A\,E = 1.473\,A\,E\,T$, a reduction of 53 per cent. Since the rheostatic loss in ordinary city service is only 12 per cent to 20 per cent of the total energy used, the saving resulting from starting with four motors in series can scarcely exceed 1 per cent of the total, unless there is a great deal of operation at extremely low speeds.

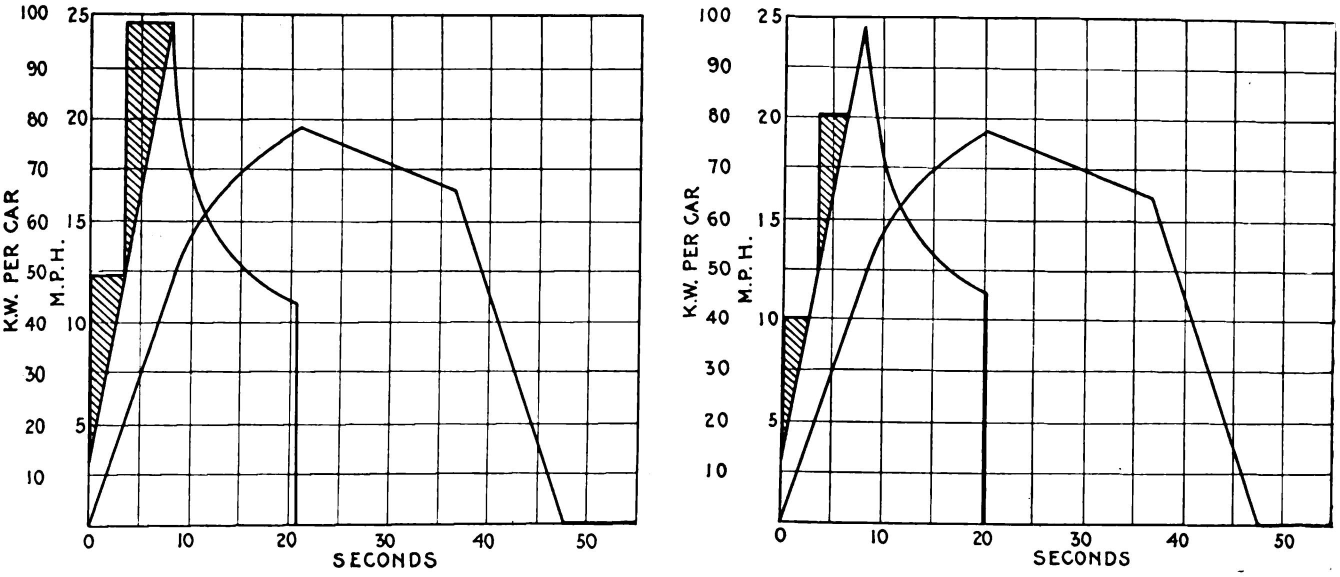
A recently exploited system combines the operation of four motors connected successively in series, series parallel, and parallel, with intermediate steps using three motors and a limited amount of rheostatic operation. A portion of the rheostatic losses is eliminated through unequal loading of the motors, due to doubling the voltage on one motor at a time, thus heavily overloading it without a serious surge in the acceleration. A saving of from 8 per cent to 10 per cent in power is effected.

Other things being equal, the rheostatic loss varies as the square of the speed at which the motor curve is reached in acceleration. The characteristics of the motor and the rate of acceleration have, therefore, a great deal to do with the rheostatic loss. For example, a motor with a steep speed characteristic, geared for a certain schedule speed, will reach the motor curve at a lower speed than one with a flat speed curve which is geared to the same speed, and will thus have less rheostatic loss. A higher rate of acceleration will enable the motor curve to be reached at a lower speed, especially with a non-saturated motor. The rheostatic losses are thus reduced in the same way.

The shape of the speed curve has been too often left out of consideration because the unsaturated motor, the one with the steep speed curve, is usually slightly heavier than the saturated motor of the same rating and armature speed.

Field Control

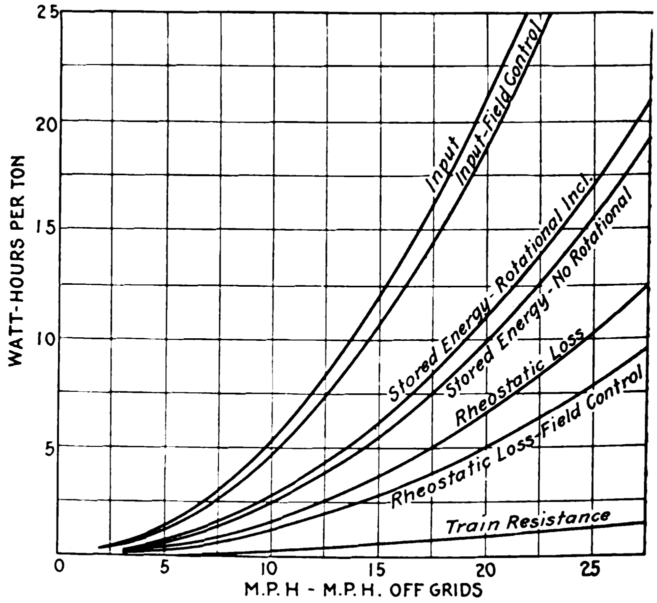
After the series-parallel control and the single reduction motor were introduced, the control of the field as a means of affecting economical speed variation and reduction of rheostatic losses was dropped because of the trouble from poor commutation and overloading of motors. The use of the commutating-pole motor and a better understanding of the application of railway motors to given service have led to a revival of field control which is now used in all classes of service, usually effecting a saving of from 10 per cent to 20 per cent in power consumption. To get the best results the motor should be geared to give the highest speed desired with a short or permanent field. The full-field speed curve should be 20 per cent to 25 per cent or more if possible, lower than this short field speed curve at the accelerating tractive effort. Referring to Fig. 4 and assuming that the full speed of the motor at the accelerating tractive effort is 20 per cent below that of the short field and, as the same rate of acceleration is maintained, a field control equipment would perform the same service with approximately one-half the rheostatic loss. Where the balancing speed on short field is higher than that of the non-field controlling equipment, a still further saving in power consumption results on account of the more rapid acceleration on the motor curve, permitting a longer coasting period and consequently a lower speed at the time the brakes are applied and less loss in that period. Where stops are frequent the use of field control effects a very substantial saving. Typical speed-time graphs are shown side by side in Figs. 6 and 7, Fig. 6 showing a typical run with standard motors without field control and Fig. 7 the same run under identical conditions of load and speed, but with field control. The difference in rheostatic losses is shown by the shaded areas.



SAVING ENERGY IN CAR PROPULSION—RHEOSTATIC LOSSES—FIG. 6, SERIES-PARALLEL CONTROL; FIG. 7, SAME WITH FIELD CONTROL. SHADED AREAS SHOW RHEOSTATIC LOSSES

Data: Weight of loaded car, 20 tons; two 50-hp, 500-volt motors; 33-in. wheels, gear ratio, 16:68 (Fig. 6), 15.69 (Fig. 7); rate of acceleration and braking, 1½ m.p.h.p.s.; stops per mile, 6; duration of stop, 7 sec.; schedule speed, 11 m.p.h.; watt-hours per ton-mile, (Fig. 6) 112.8, (Fig. 7) 103.8.

Fig. 8 shows a set of general curves which may be applied to almost any condition of acceleration. They are intended primarily to exhibit the rheostatic losses entailed in accelerating 1 ton under certain conditions of motor efficiency, train resistance and rate of acceleration, with and without field control. With these curves are included others showing watt-hour input, rheostatic losses with and without field control, and energy losses in overcoming train resistance, all plotted in terms of speed at which the motor curve is reached.



SAVING ENERGY IN CAR PROPULSION—FIG. 8—ANALYSIS OF POWER CONSUMPTION IN STRAIGHT-LINE ACCELERATION

Data: Weight, 1 ton; acceleration, 1.7 m.p.h.p.s.; acceleration force, 185 lb.; control, series-parallel, with and without field control; motor efficiency at full voltage, 85 per cent.

To show how these curves may be used, take the speed-time curve shown in Fig. 6. The energy stored in the train at the time the brakes were applied is all lost either in the brakes or in overcoming train resistance during braking. In this case the brakes were applied at 16.3 m.p.h., and reference to the stored energy curves shows that at this speed 7½ watt-hours per ton are stored. Part of this (4 watt-hours) is stored while accelerating on resistance at an efficiency of approximately 56 per cent; the remainder (3½ watt-hours) with motors accelerating on the motor curve at an efficiency of about 83 per cent. The first portion, 4 watt-hours at 56 per cent efficiency, takes 7.15 watt-hours from the line; the section portion, 3½ watt-hours at 83 per cent efficiency, takes 4.22 watt-hours from the line, a total of 11.37 watt-hours for each stop or 68.22 watt-hours per ton-mile. A train resistance of 20 lb. per ton would normally require, with an average efficiency of 80 per cent, 50 watt-hours per ton-mile, but since the braking period has already been included, a deficit of 13.5 per cent must be deducted, leaving 43¼ watt-hours. The total per ton-mile is then 111.47 watt-hours. This compares with 112.8 watt-hours, as given in the figures.

The ratio of the sum of the curves of stored energy and friction to the curve of input is the efficiency of the equipment during acceleration to the motor curve. With the conditions of motor efficiency, train resistance, etc., assumed, this efficiency is found to be approximately 56 per cent. It will hold approximately constant regardless of the time of acceleration or whether on level or grade. The rheostatic loss with a given tractive effort is inversely proportional to the rate of acceleration; in other words, if the car were starting on a grade that would cut the rate of acceleration in half, the time on the rheostat would be doubled and the rheostatic loss double that shown on the curve. This curve is a good check on the speed-time curve.

OTHER POSSIBLE MEANS FOR SAVING ENERGY

Among the other means for saving rheostatic losses there is notably one in which the voltage on the motors is varied by means of a motor-generator set. Such a system is in operation in Paris and is reported to be giving very economical results. It is understood that this equipment is also operated to vary the voltage applied to the motor during the braking period so as to regenerate the stored energy of the train and return it to the line. Such a system must require a relatively large capacity of motor-generator set on the car and the cost of this set and the extra cost of motors and control would be considerable, while the additional weight to be carried around and the losses in the motor-generator set would go a long way toward absorbing any savings that might be made.

In conclusion, Mr. Storer discussed the possibilities of regenerative systems of control and prophesied that some plan will be developed to prevent the present enormous destruction of energy, which costs a great deal simply to destroy. He considered the proposition of elevating station tracks above those between stations for the purpose of changing the kinetic energy of the moving train into the potential energy of the train on an elevation. Theoretically, this is the most efficient method, but as a matter of fact the elevation which it would be necessary to climb is so great that its use would greatly increase the cost of any construction, the elevated railway stations would be so high as to require elevators to take passengers to and from the streets, and it could be used only with very short trains. Induction motors lend themselves to regenerative control readily and in many of the cases where it has been applied the saving in wear and tear on the brakes and the reduction in danger of accidents are more important than the savings.

With direct current motors regeneration has been accomplished by the use of shunt motors, but these have been used only to a very limited extent.[*] In Mr. Storer's opinion the essential of an equipment for regenerative braking with d.c. motors is the use of the standard series-wound motor with a control equipment that will add but little weight and complication to that used without regeneration, since every bit of additional weight and complication would mean additional first cost, additional cost of maintenance, and additional power to carry it around. The point would soon be reached where the extra cost balances the saving.

Mr. Storer called attention to the fact that he had said nothing directly concerning the importance of correct gear ratio, or the correct operation of equipment so as to take advantage of the benefits of rapid acceleration, long coasting, quick braking and short stops. He did not touch upon the saving resulting from the use of high efficiency lamps and the best distribution of light, nor of the use of the latest methods of car heating. He did not discuss line loss and its relation to the reduction in peak load by means of field control and proper gear ratio. He stated that these points have all been fully discussed. The reduction of dead weight per passenger, the adoption of frictionless bearings and the widest use of field control with motors of steep speed characteristics, and efficient handling of cars will alone be sufficient to save more than 40 per cent of the power now used on a great many roads. Any saving that can be accomplished by the development of a successful scheme for regenerating the power now lost in brakes would be so much clear gain.

DISCUSSION

Mr. Storer's paper was discussed by H. H. Adams, Chicago Surface Lines, who stated that 33 1/3 per cent reduction in current consumption had been obtained on this road, on the cars equipped with field control motors. This reduction in energy consumption had made possible a reduction from 4 kw-hr. to 2½ kw-hr. per ton-mile. H. A. Johnson, of the Chicago Elevated Railways, suggested that many interurban railways could profitably undertake a careful study of their equipment with a view to eliminating useless weight. He believed that a large percentage of light-weight cars could be used in interurban service without entailing operating difficulties or reducing the comfort to passengers. Wray Thorn, equipment engineer of the Board of Supervising Engineers, Chicago Traction, called attention to the fact that the savings made possible by improved motor designs would represent a 25 per cent increase in the net earnings per car per year when the gross was assumed as 30 cents. In obtaining this result Mr. Thorn assumed that the total expense of operation per car-mile was 26 cents, of which 3½ cents per car-mile was chargeable for power. Power cost represents about 13.5 per cent of the total cost of operation, and the purchase of new equipment had permitted a 4 per cent reduction of this item. E. J. Blair, of the Chicago Elevated Railways, and W. B. Jackson also took part in the discussion.

I. C. C. Report on Steam Railroads in 1913

The division of statistics of the Interstate Commerce Commission has issued the preliminary abstract of its twenty-sixth annual report, covering steam railroads for the fiscal year ended June 30, 1913. During this year the mileage of single track operated increased 1.67 per cent, whereas the total mileage of all tracks operated increased 2.39 per cent. The total of railroad capital on June 30, 1913, was $19,796,125,712, the increase over last year being divided $131,723,168 for funded debt and $116,763,035 for stock. The average receipts per passenger per mile were 2.008 cents, the corresponding figures for the previous year being 1.985 cents, an increase of 0.023 cent. The average receipts per ton per mile for the year were 0.729 cent, which was smaller than the corresponding average for 1912 and 1911. The rail operating revenues increased $298,177,432 during the year and the operating expenses $210,874,266, giving an increase in net operating revenue of $87,303,166. The total revenue, including that from outside operations, increased $88,290,224. Taxes during the year increased nearly 8 per cent. Dividends declared from surplus were $85,706,629, as compared to $100,435,589 for the preceding year.

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[*] [NOTE—An account of a recent installation of this type, that of the Wendelstein Railway in Bavaria, is given on page 274 of this issue.—EDS.]

COMMUNICATIONS

The President's Address

INTERBOROUGH RAPID TRANSIT COMPANY
NEW YORK, Feb. 5, 1915.

To the Editors:

While I was not able to reach the Washington meeting of the Railway Association in time to hear President Wilson's address, as a railway operator I appreciate the importance and significance of the occasion. The association is to be congratulated upon the fact that the President took this opportunity to express through the association to the country his ideas on some fundamental business questions.

I agree with the President that nothing is so helpful to a better understanding among people as to meet and discuss their problems together. He set an example of this last week at the meeting of our association, an example which was followed by other prominent representatives of the federal government at the meeting and the banquet. This plan could well be followed not only at formal gatherings of railway men but whenever, during the year, differences of opinion arise or seem to arise in regard to the conduct of electric railway matters. Indeed, this is an advantage of commission regulation, that the public utility interests and the public, as represented by the authorities, can meet face to face to consider their mutual problems, and in this way each side can learn the attitude and opinions of the other.

THEODORE P. SHONTS, President.

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., Feb. 2, 1915.

To the Editors:

In response to your inquiry regarding my impression of President Wilson's Washington speech I would say that it was full of good ideas and was hopeful in tone. I should have liked it better if it had amplified the necessity on the part of the government, in its dealings with corporations and in its own administration accounting, of recognizing and following the same high standard of honesty and fair dealing which it seeks to establish in private and corporate business.

T. S. WILLIAMS, President.

ELEVATED RAILROADS OF CHICAGO
CHICAGO, ILL., Feb. 4, 1915.

To the Editors:

From President Wilson's address, the impression was gained that he is of the opinion that the large business interests of the country could now look forward with confidence to a period of prosperity, and that business properly and lawfully conducted need not fear attacks indiscriminately by various governmental bodies, as has been the practice for several years past. The President evidently realizes that the business of the country is in need of encouragement, and it is welcome to hear this note sounded by the Chief Executive of the nation.

If a spirit of friendly co-operation with the business interests of the country permeated the national, state and municipal governments, there would be no lack of capital and few unemployed men in the United States. However, for business men to believe that governmental bodies will cease to harass business is expecting too much at the present time. The era of restored confidence which President Wilson believes is now upon us, will not come until the people fully realize what serious injury is being done, and has been done, to their interests for years, by self-seeking politicians and irresponsible reformers. Indications, however, point to a change not far distant, when the public will comprehend the true relation between their own welfare and properly conducted business, and the arguments and wiles of the politician and reformer will not meet with the easy conquests they have in the past.

When the people elect to public office men who will aid legitimate business, whether big or little, in every possible way, and work for the commercial supremacy of the United States, then and then only, will prosperity be assured. In England and Germany business is not only fostered but is also successfully governed, and the business man is honored and his counsel sought. In our country it has been quite the reverse.

The American Electric Railway Association is working along the right line in its endeavors to bring about a better understanding on the part of the public. The publicity program and high ideals set forth by Mr. Kingsbury in his able paper, will bring results not only desirable in the railway industry but equally applicable to the various business interests of the country.

BRITTON I. BUDD, President.

GENERAL ELECTRIC COMPANY
NEW YORK, Feb. 5, 1915.

To the Editors:

I want to express my thorough appreciation of the address delivered by President Wilson before the American Electric Railway Association on Jan. 29, and especially of the latter portion thereof in which he invites those connected with the electric railway industry, and others, to present their ideas on important public questions.

Seemingly our association could make no more fitting response to this invitation than to transmit to the President our recently adopted Code of Principles, which can hardly fail to receive his full endorsement.

WILLIAM J. CLARK.

MCGUIRE-CUMMINGS MANUFACTURING COMPANY
CHICAGO, ILL., Feb. 2, 1915.

To the Editors:

The impressive statements made in President Wilson's talk last Friday before the American Electric Railway Association, lead us all to hope for better business. His administration came into existence pledged to accomplish the correction of abuses in business life and to a constructive work which would build to a greater and sounder prosperity.

Some of the abuses he was pledged to correct have been corrected. I believe he has a comprehensive appreciation of commercial conditions as they exist to-day, and is going to do all he can, in a constructive way, to bring to us all, large and small, a revised code of business principles, and to do his best, notwithstanding adverse world conditions to bring us material prosperity.

JOHN J. CUMMINGS.

Terminology for Steel Construction

THE AMERICAN RAILWAYS COMPANY
PHILADELPHIA, PA., Feb. 1, 1915.

To the Editors:

In the article on the Cleveland Railway's new repair shops in your issue of Jan. 23, we notice that these buildings are described as being entirely fireproof. We notice, however, that in the interior view, the steelwork is shown as being entirely exposed. This condition would not, therefore, be considered by us as entirely fireproof but as non-inflammable. It has been our practice and it appears to be the practice of the Cleveland Railway to use the money that would be needed to protect the steel work completely for the installation of a sprinkling system. This would give protection not only to the building but to its contents.

While we are on the question of descriptive terminology we might call your attention to a recent statement in your JOURNAL that cars which have steel underframes, steel sides and steel posts should be considered to be "all-steel." This may be slightly misleading, as we are building cars of this general description having outside steel sheathing up to the window sill and steel posts, and carlines are one continuous piece but having the trim, floors, roof, sash and doors of wood. We have been considering these cars as semi-steel and think this is the general practice.

C. G. KEEN, Engineer Way and Structures.

[NOTE—Our correspondent's first point is undoubtedly well taken. It is well known that exposed steelwork, in general, has less ability to resist the damaging effect of fire than wooden beams so that the buildings in question should have been classed as non-inflammable rather than fireproof.

The definition for all-steel cars to which our correspondent refers was developed arbitrarily to avoid confusion in our statistics as published Jan. 2. Under it, cars with the continuous post-and-carline construction would be classed as all-steel only if they had steel letterboards. Also, cars with all-steel framing and agasote roof sheathing would be classed as all-steel, the point being that the material used for roof sheathing is largely incidental. Of course, since this definition (like every other definition that could be used) is arbitrary, it is subject to difference of opinion, and we would be glad to receive other communications which might aid in the establishment of a definite and universally used terminology for the different types of car construction.—EDS.]

Stress Analysis of the Chicago Steel Car

CORNELL UNIVERSITY
ITHACA, N. Y., Jan. 4, 1915.

To the Editors:

We have been very much interested in the article entitled "Analysis of Stresses in the Chicago Elevated Steel Car" published in your issue of Dec. 12, 1914, page 1299. It occurred to us that it would be interesting to see how the "principle of least work" applied to an analysis of the stresses in this car would result. In consequence, we have worked out the problem as shown below and have obtained results which differ somewhat from those obtained by Mr. Johnson. The construction, as outlined by him, is undoubtedly entirely safe, but the application of the principle of least work seems to us to give a somewhat more exact, or at any rate, more logical method of analysis than the method employed by him.

As the truss form described is an indeterminate one, it could not, of course, be solved by the ordinary methods. The method employed by us also takes care of the forces in the truss due to the loads outside the bolsters which were probably also considered by Mr. Johnson, although the published solution does not indicate the way in which this was done.

The following is our solution of the problem: The lower part of the car frame, consisting of the channel, belt rail and sheeting, forms a plate girder of which the sheeting is the web and the window posts are stiffeners. This girder is 36.5 in. high. Let F equal the total sectional area of plate girder, or 7.30 sq. in.; y equal the coordinate of the center of gravity from top, or 19.75 in.; and I equal the moment of inertia of section with respect to its gravity axis, or 1352 in.^{4}

Consider the left half of the truss. This includes the central door post, corner post and four window posts. Since the four window posts are slender and easily bent, their stress effect upon the upper chord cannot be much more than 200 lb. If required, their action could be considered, as is indicated later in this discussion. For simplicity, however, we will for the present neglect them, and represent the frame as shown in Fig. 3.

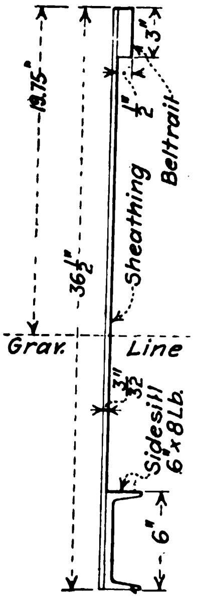
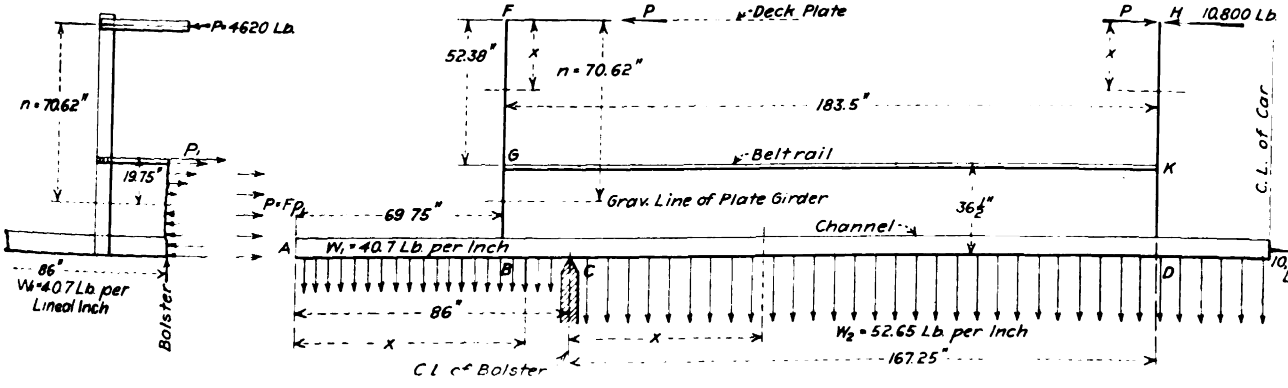


FIG. 1—SECTION OF SIDE GIRDER

Here GF, FH, and HK are the center lines of the corner post, upper chord and door posts respectively. The lower part GD is to be considered as a plate girder. The required dimensions, as far as they could be obtained, are given in the figure. With the loading uniformly distributed, the load outside the bolsters comes to 40.7 lb. per linear inch, while inside the bolsters it is 52.65 lb. per linear inch. The reaction of the bolster equals 14,150 lb. Also let I equal the moment of inertia of plate girder, or 1352 in.^{4}; I_1 equal the moment of inertia of end post FG, or 169 in.^{4}; I_2 equal moment of inertia of center post HK, or 327 in.^{4}; F equal the area of section of plate girder, or 7.30 sq. in.; F_2 equal the area of section of deck plate, or 1.44 sq. in.

It is evident that Fig. 3 is an illustration of an indeterminate truss. The unknown stress in the upper chord is represented by P. The problem now is to find the value of P. This cannot be found by simple statics, but by using integral calculus the "Principle of Least Work" can be applied.

According to the principle of least work, of all the values that P might have, only that one is admissible which will make the total internal work done by the members a minimum. Let W represent the total internal work; then the true value of P that will make W a minimum is found by writing $\frac{dW}{dP} = O$. The ex-



STRESS ANALYSIS—FIG. 2, STRESS IN SECTION OVER BOLSTER; FIG. 3, DIAGRAM SHOWING FORCES THAT ACT ON CAR FRAMING pression for W consists of a number of terms. Since we differentiate with respect to P we need to consider only those terms that will involve P. Any term that does not contain P will drop out in the differentiated expression. The work of shear need not be considered since the shear in the plate girder is not a function of P. This gives the following equation:

$$\frac{dW}{dP} = \int_B^C M \frac{dM}{dP} \bullet \frac{ds}{EI} + \int_C^D M \frac{dM}{dP} \bullet \frac{ds}{EI} + \int_F^G M \frac{dM}{dP} \bullet \frac{ds}{EI_1} + \int_H^K M \frac{dM}{dP} \bullet \frac{ds}{EI_2} + \frac{Pl}{EF_3} + \frac{Pl}{EF} = 0$$

The first term gives the internal work done between B and C due to the bending of the girder, and, omitting the details of integration, this equals $\frac{105,400 + 60P}{E}$. The second term is the work done between C and D due to bending of girder, and this equals $\frac{617P - 4,332,000}{E}$. The third term is work due to bending of end post FG, equalling $\frac{283.5P}{E}$. The fourth term is work due to bending of door post HK, and this equals $\frac{-1,583,000 + 146.5P}{E}$. The fifth term is work due to compression in member FH, or $\frac{127.5P}{E}$ and the sixth term is work due to tension in girder, or $\frac{25.2P}{E}$.

If these values are substituted in the equation and this equation is simplified, we will obtain, since the factor E divides out, $1259.7P = 5,809,600$, or $P = 4620$ lb.

The value is considerably larger than that given by Mr. Johnson. As stated above, the influence of the window posts was neglected, since this influence is small. If this influence is considered it will increase the value of P a little. If desirable, the effect of the window posts can be included. In that case we will have five unknowns, and can obtain five equations similar to the equation above, and involving these five unknowns. The solution of these equations gives us the required five quantities. This involves considerable labor and it seems hardly necessary.

It may be of interest to determine the stresses in a section over the bolster. To do so, pass a section through the truss over the bolster and represent the forces as shown in Fig. 2. The forces acting on the girder consist of a shear (not represented), a system of forces forming a couple, M, equal to $\frac{p_2 I}{19.75}$ (where p_2 equals stress in outer fiber due to bending), and a uniformly distributed force, $P_1 = p_1 F$. If now moments are taken about the neutral axis of the girder $\frac{p_2 I}{19.75} = 4620 \times 70.62 + W_1 86^2/2 = 477,800$ in. lb. and $p_2 = 6980$ lb. per square inch. Also $p_1 = \frac{4620}{7.30} = 633$ lb. per square inch.

The total unit stress in outer fiber then equals $p_1 + p_2 = 7513$ lb. per square inch. The belt rail has a sectional area of 1.5 sq. in. The approximate stress in the belt rail then is $1.5 \times 7513 = 11,250$ lb.

It is not intended by this article to question the sizes of members in Mr. Johnson's design, but merely to show how the stresses might be found by another method. One advantage is that it can be used even if there is more than one redundant member in the truss, such as the deck plate in this case. The above calculations are based on a live load uniformly distributed over the whole car. If we had assumed the platforms empty, the stress in the upper chord would have been about 4000 lb., according to Mr. Johnson's method, and about 30 per cent higher according to the method here given.

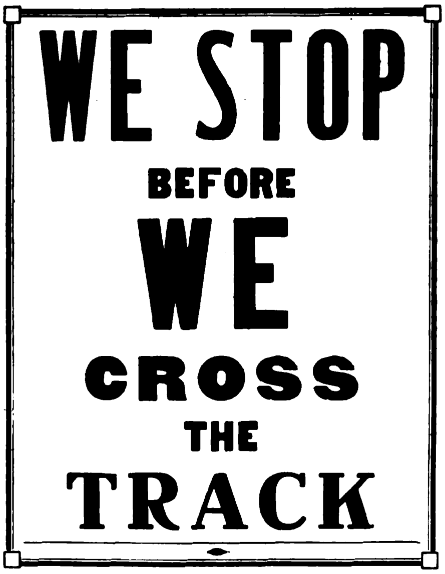
E. W. RETTGER and S. G. GEORGE,
Assistant Professors Applied Mechanics.

The "WE" Slogan Sign

KENTUCKY TRACTION & TERMINAL COMPANY
LEXINGTON, KY., Jan. 27, 1915.

To the Editors:

I think that you may be interested in our "WE" slogan sign, which I am forwarding you. These signs we have been giving to the truckmen, merchants, conveyances of any and all character, and automobiles, with the request that they be carried on the conveyance and in this manner enlist them in the campaign. This sign, as you will note particularly, is not directory but implies that the initiative is being taken by the truckmen and is not fostered by the railroad interest.



"WE" SLOGAN SIGN

Stop to consider the number of accidents, steam and electric, which have come under your direct attention, and probably many of which may be acquaintances, and you will realize the value of this slogan, which we feel is the most forcible thing we have brought forward in our "safety first" campaign.

F. W. BACON, Vice-President.

Commission Report on Electric Interurban Lines of Iowa

According to the thirty-sixth annual report of the Board of Railroad Commissioners of Iowa, for the year ended Dec. 1, 1913, the gross earnings from operation for the electric interurban lines of the State amounted to $2,330,385, as compared with $1,823,191 for the year previous. The operating expenses increased from $1,272,340 in 1912 to $1,453,624 in 1913, while the net earnings from operation increased from $550,851 in 1912 to $876,761 in 1913. The net earnings per mile in 1912 were $1,607 and in 1913 $2,224. The interurban mileage (single track) increased from 342.74 miles in 1912 to 394.23 miles in 1913. The outstanding capitalization per mile in 1913 was $39,832 for stock and $38,333 for bonds, as compared to $40,443 and $33,356 in 1912, respectively.

American Association News

Committee Activities Continue as Middle of Association Year Approaches—Claims Association Selects Subjects for Convention Program—Block Signal Committee Especially Busy

JOINT COMMITTEE ON BLOCK SIGNALS

Meetings of sub-committees on block signal details were held at association headquarters on Jan. 26 and 27. Members of the committee in attendance were: J. M. Waldron, New York; J. W. Brown, Newark, N. J., and G. N. Brown, Syracuse, N. Y. Others in attendance by invitation were C. L. Cadle, Rochester, N. Y.; R. V. Collins, United States Signal Company; S. N. Day, General Railway Signal Company, and H. W. Griffin, Union Switch & Signal Company, who gives the committee valuable suggestions. The important matter taken up on Tuesday was the preparation of a form of statistical blank for the recording of signal maintenance cost reports. This will be submitted to the convention next October. A suggested list of requirements for trolley-contact signal operation was presented by Mr. Collins and this was discussed in detail, being accepted for further consideration by the committee.

At the meeting on Wednesday the discussion on the data sheet was continued, and, as an aid to simplifying this and providing for uniformity in the replies, a complete classification of signal operations was prepared. This provided tentative plans for expressing signal efficiency which would serve as a basis for comparing the data that would be obtained through the use of the proposed data-sheet. A proposed outline of information that should be supplied when requesting quotations upon new signal installations for interurban lines was also discussed, and changes were made in the standard clearance diagram for semaphore signals that had been submitted at the 1914 convention and referred back to the committee.

CLAIMS ASSOCIATION EXECUTIVE COMMITTEE

A meeting of the executive committee of the Claims association was held in Washington on Jan. 29. Those present were: W. Tichenor, Indianapolis, Ind., president; R. E. MacDougall, Rochester, N. Y., vice-president; S. B. Hare, Altoona, Pa., vice-president; B. B. Davis, Columbus, Ohio, secretary-treasurer; P. C. Nickel, New York, N. Y., and Wallace Muir, Lexington, Ky. A list of subjects for the 1915 meeting was prepared as follows: A card index and what it means; safety and its relation to conservation; motor vehicles (details to be announced); standard classification of accidents. The committee on the last-named subject consists of Messrs. Nickel, H. K. Bennett and H. V. Drown, of whom Mr. Drown is a recent addition. The authors of papers are to be selected by the president and the secretary.

POWER DISTRIBUTION

The sub-committee of the committee on power distribution, to which had been assigned the preparation of standard specifications for overhead line material, met in New York on Jan. 28. There were present C. R. Harte, New Haven, chairman; C. L. Cadle, Rochester; C. F. Woods, Boston, and G. W. Palmer, Boston. The sub-committee discussed in detail the possible schemes for grouping the different specifications for various parts of overhead construction so that they might be most easily available for use in permanent form, and a schedule covering the scope of the work was prepared. Tentative general specifications for material had been prepared by Mr. Harte and these were considered in detail by the sub-committee as a whole and approved with certain modifications. Detailed specifications for wrought iron and steel were then taken up, together with requirements for such parts of the usual types of overhead construction as are made wholly of these materials and which, in consequence, fall naturally under this general heading. This subject was extended into an evening session without being completed and it was decided to hold another meeting of the sub-committee on Feb. 25, the meeting to be carried over to the following day if necessary.

COMMITTEE ON STANDARD CLASSIFICATION OF ACCOUNTS

A meeting of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association was held in Washington on Jan. 27 and 28. Those in attendance were: H. L. Wilson, Boston; W. F. Ham, Washington, D. C.; R. N. Wallis, Fitchburg, Mass., and W. H. Forse, Jr., Anderson, Ind., representing the Accountants' Association, and F. W. Sweeney and George Geekie, representing the Interstate Commerce Commission. These gentlemen spent two days in preparing the manuscript of a case book, based on the new classification. This book will publish all of the questions in the old case book and will apply them to the new classification. There will also be some two hundred additional questions in regard to the classification of accounts, which will be answered according to the basis of the new classifications. The case book will carry a complete index both of subjects and case numbers. The manuscript of this book was completed at the meeting of the committee in Washington and it will be issued by the government as soon as it can be printed at the Government Printing Office.

DENVER TRAMWAY SECTION

The January meeting of the Denver Tramway Company Section was held on Jan. 28, having been postponed from Jan. 21, the regular meeting date. The subject for the meeting was "Snow Work and Equipment," the principal paper being presented by W. H. McAloney, superintendent of rolling stock. This was discussed by J. M. Tierney, W. L. Whitlock, A. M. Evans, J. J. Foster, A. J. Krick and R. L. Baker. Mr. McAloney used a large number of lantern slides to illustrate his talk, in which the audience of 200 was intensely interested. Preceding the formal part of the program the Central Tramway Glee Club gave a brief entertainment.

COMING COMMITTEE MEETINGS

Feb. 11, New York, 10 a. m., standards committee of the Transportation & Traffic Association, L. H. Palmer, Harrison Williams Company, New York, chairman.

Feb. 11, New York, 10 a. m., rules committee of the Transportation & Traffic Association, W. H. Collins, general manager Johnstown & Gloversville Railroad Company, Gloversville, N. Y., chairman.

A meeting of the committee on way matters of the Engineering Association, C. S. Kimball, engineer maintenance of way Washington Railway & Electric Company, Washington, D. C., chairman, will probably be held in New York before the end of February.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Electrolysis Develops Defects in But Three Out of 1500 Concrete Poles

BY H. G. THROOP, SUPERINTENDENT LINE AND BUILDINGS NEW YORK STATE RAILWAYS, UTICA-SYRACUSE LINES

Several articles have been published dealing with the effect of stray electric current upon concrete poles. A recital of our experiences in this line may be of some benefit to users of this type of pole.

Out of a total installation of some 1500 reinforced concrete poles placed during the last five years, three poles have developed defects, which, upon investigation, proved to be directly traceable to the flow of current through the reinforcing rods to the ground.

The first case was indicated by a vertical crack extending from the top of the pole to the ground line, from one of the corner reinforcing rods to the surface of the concrete. This pole was one of the first built and was installed in the spring of 1911 and removed in December, 1914. Evidently there had been a leakage of current into this pole for some time, due to a defective strain insulator in the span wire, the current flowing from the eyebolt into one of the corner reinforcing rods, thence to ground. When the concrete was removed from the reinforcement of this pole, the rod in contact with the eyebolt was badly oxidized, and below the ground line some 2 ft. of this rod was entirely eaten away. Within the portion of the pole which was buried in the ground the current had communicated through the damp concrete to the other rods, which were all badly oxidized. The concrete above the ground line had been so loosened from the oxidized rod that this concrete would in time have fallen away from the rod.

The second case was that of an extra heavy 8-in. top corner pole, into which there had been a gradual leakage of current. This leakage resulted in the spalling of the concrete below the ground line to such an extent that the grip of the concrete on the reinforcement was badly weakened. Due to its weakened condition this pole had been pulled 1 ft. out of line by the trolley pole of a passing car catching into the attached curve.

The third case showed spalling of the concrete below the ground line, but had not resulted in failure when the pole was removed for other reasons.

CONCLUSIONS

All of the foregoing cases of failure were due to leakage of 600-volt trolley current through defective hangers and strain insulators.

The evident remedy for the conditions cited is to insulate the pole completely by placing in the spans the proper strain insulators. Poles removed for other causes than defects have been knocked to pieces and all of their rods have been found to be in perfect condition.

In favor of this type of pole it may be stated that in all of the foregoing cases ample warning was given by the gradual spalling and cracking of the concrete, and all of the poles mentioned would have supported their load in safety for some time after the defects were detected.

Case-Hardened Collar and Welding Reclaim Worn Button-End Axles

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY SYSTEM, NEW YORK

Some two or three years ago the Third Avenue Railway System had much trouble from broken check plates on the No. 22-E trucks used on lines in the outlying districts. This trouble was entirely overcome by substituting a check plate made of manganese bronze, but it was then found that the hard wearing qualities of that material caused much wear in the check plate grooves on the axles. In fact, a number of them wore to a knife edge, as shown in No. 1 of the accompanying half-tone, Fig. 1.

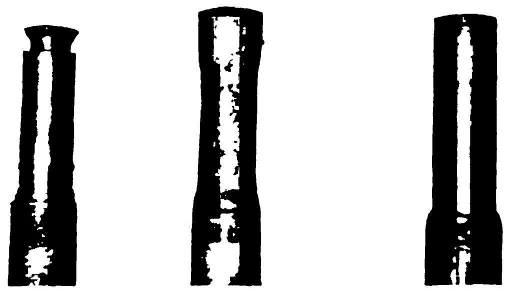

No. 1 No. 2 No. 3

FIG. 1—WORN, WELDED AND FINISHED AXLES OF THIRD AVENUE RAILWAY SYSTEM

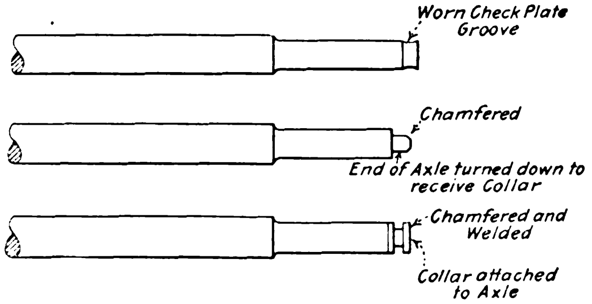


FIG. 2—STEPS IN APPLICATION OF CASE-HARDENED COLLAR TO A WELD-REPAIRED AXLE

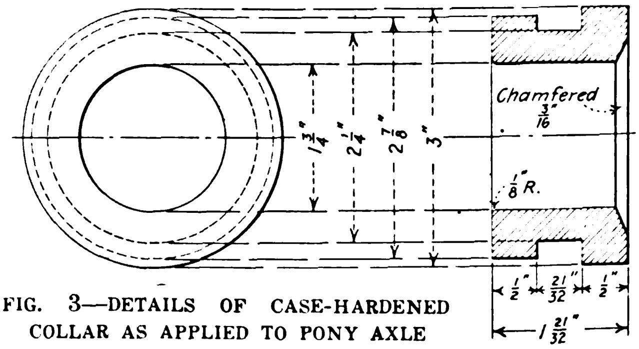


FIG. 3—DETAILS OF CASE-HARDENED COLLAR AS APPLIED TO PONY AXLE

To save the axles from the scrap pile we used our electric welding plant to fill in the grooves, as indicated by No. 2 of Fig. 1, and then turned the axles down, as shown by No. 3 of Fig. 1. While this treatment added to the life of the axles, the welded material also wore off in time. The question of reclaiming these axles, therefore, came up a second time with the result that we decided to try the scheme of attaching a case-hardened collar on the end of the axles, as shown in Figs. 2 and 3. This collar consists of a piece of steel which is case-hardened to a depth of 1/16 in. in the grooved part only. The axle is turned down at the end for a distance of $1\frac{21}{32}$ in. and chamfered for 3/16 in. at the extreme end. The collar is arranged for a driving fit. The outer end of the collar, as shown in Fig. 3, is also chamfered to permit filling in the welding material to insure rigidity and to prevent the collar from turning on the axle.

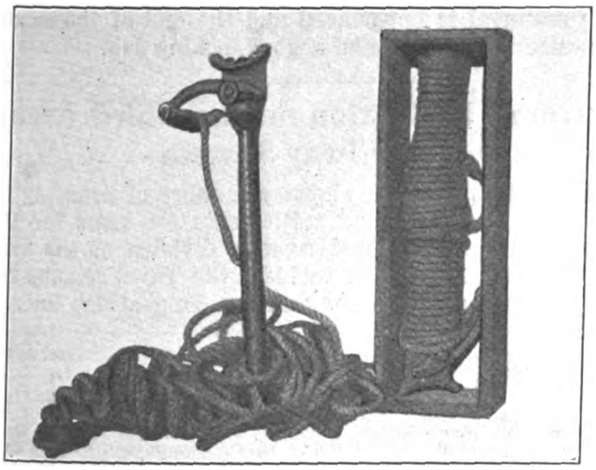
Up to the present time the practice described has been in an experimental stage, but the results so far obtained have proved very satisfactory. One car on which this collar was applied to the axle had made more than 3000 miles in hard service up to Feb. 1 of the current year and still showed no sign of wear or other possible defects.

Trolley Wire Pick-Up

BY HARRY BRANSON, SUPERINTENDENT OF EQUIPMENT LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

All cars of the Lehigh Valley Transit Company are now being equipped with trolley wire pick-ups designed to handle dropped trolley wires without danger. The accompanying halftone shows this device in its case on the right, while on the left it is shown ready for use in an emergency.

The instrument consists of a well-seasoned staff of ash about 18 in. long and 1½ in. thick with a casting mounted on one end to which a lever is pivoted, as shown. On the long end of this lever is fastened about 50 ft. of ⅜-in. rope which passes through a slanting hole in the center of the rod. The top of the casting, which is made with a corrugated curved groove, is inserted under the wire. A pull on the rope will then exert through the lever a firm grip on the wire. The loose end of the rope is thrown over the limb of a tree or other support, the wire is drawn up from the ground and the rope fastened. The car may then continue its run without waiting for repairs to be made to the overhead line.



TROLLEY WIRE PICK-UP READY FOR USE AND PACKED IN BOX FOR INSTALLATION IN CAR

The pick-up is stored in a pine box fitted with a glass cover. This box is mounted either under a seat in the car or near the roof in one of the vestibules. The glass must be broken to get hold of the pick-up just as in the case of axes for emergency use.

Pine Ties Reused by Street Railway After Twenty-One Years' Service

BY R. C. CRAM, ASSISTANT ENGINEER WAY AND STRUCTURE BROOKLYN RAPID TRANSIT SYSTEM

The average life of the several kinds of untreated ties generally used in steam railroad track structures is now quite well determined. On the other hand, information concerning the life of ties in electric railway service in paved streets is somewhat meager. The conditions governing the two forms of service differ so much that those obtaining in steam railroad service cannot be taken as a guide for electric railway service in streets, and even, to some extent, in private right-of-way.

The ties in steam railroad service are constantly exposed to alternate variable wet and dry conditions; they are subject to very heavy stresses due to the great weight of the steam railroad equipment; they are subject to mechanical injury from more or less constant tamping. On the other hand, those in the street railway service are usually in a comparatively uniform state with respect to variation in moisture content, owing to the protection from evaporation afforded by the paving; they are subject to much lighter loads, and are seldom retamped after their installation. It is conceded that the life of tie timber is greatly increased under the latter conditions.

The character of the soils in streets may affect the life of the ties to a considerable extent, but the increasing use of concrete in the track structure undoubtedly helps to preserve ties against decay, providing fungi or fermentation are not present at the time of installation, and should offset variable soil action and add materially to the ultimate life obtained.

Fred G. Simmons, then superintendent of construction, The Milwaukee Electric Railway & Light Company, stated at the 1906 convention of the American Street & Interurban Railway Engineering Association that he had taken up tracks laid with red-cedar ties which were from sixteen to eighteen years old and that he was putting back between 40 per cent and 60 per cent of them into the tracks, surrounding them with concrete.

TIE LIFE IN BROOKLYN

The reconstruction of surface tracks carried out in Brooklyn during the past season afforded an opportunity to investigate this subject. Observation was made covering nine different streets in widely separated territory involving altogether about 15 miles of single track.

The tracks removed were constructed almost uniformly with 9-in. tram girder rail, having a base 5½ in. wide, spiked to 6 in. x 8 in. x 7 ft. sawed long-leaf yellow pine ties spaced 2 ft. 6 in. on centers, with brace tieplates spaced from 6 ft. to 8 ft. apart. In every case the tracks were paved and had been since construction, mostly with 8-in. deep granite blocks laid on sand, with sand joints. In three of the streets the original pavement had been replaced within the last six or seven years with an improved type, involving the use of the same blocks laid with grouted joints on cinder concrete.

No attempt was made to count the old ties removed, but careful check was made on the average spacing. The estimated number of ties removed was found to be about 33,000. Upon arrival at the storage yard the ties were counted and selected for use as second-hand stock, being later reissued and used, in some cases, in rehabilitated tracks where old rails were left in place and new grouted pavement was being installed.

The count at the yard showed that there was an average loss of about 24 per cent of the estimated number of ties between the street and the yard. In one or two instances the losses were so high that, considering the neighborhoods, they could only be accounted for as being due to their being appropriated for firewood. It is also patent that a fair number were destroyed in removal and went direct to dumps in the clean-up.

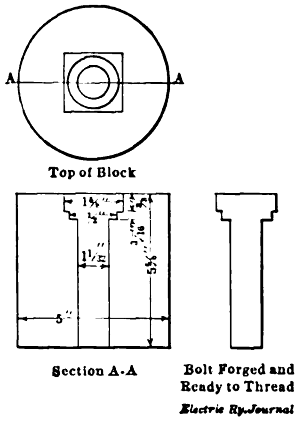
However, the interesting features are that the average age of the ties taken into stock was 18.6 years; that 72 per cent of the ties which were sorted were taken into stock, representing 54 per cent of the estimated total number removed from the street; that the ages ranged from sixteen to twenty-one years; and that in one case 94 per cent of ties sixteen years old which were sorted went into stock, or 82 per cent of the estimated original number in that street.

When all the features are considered it seems reasonably safe to assume that at least 60 per cent of the total number of ties would have been fit for stock if all of them could have been recovered. It was also observed that as a rule there was comparatively little damage to the ties due to rail cutting, especially when the 5½-in. base and old tie spacing are borne in mind.

Handy Forming Blocks for GE-57 Motors

BY J. N. GRAHAM, MASTER MECHANIC ROCKFORD & INTERURBAN RAILWAY, ROCKFORD, ILL.

During the cold weather we have had much trouble from the breakage of steel motor bolts. Such failures allow the motor case to drop and, worse than that, the armature occasionally will fall on the pole pieces. To overcome this we had lately been making these bolts from 1⅝-in. square Swedish or Farnley iron, both of which brands are very costly. Further, with the usual methods of operation much material was lost in turning these bolts from the square iron and much time was required, thus making the bolts very expensive.



Top of Block

Section A-A

Bolt Forged and Ready to Thread

Electric Ry. Journal

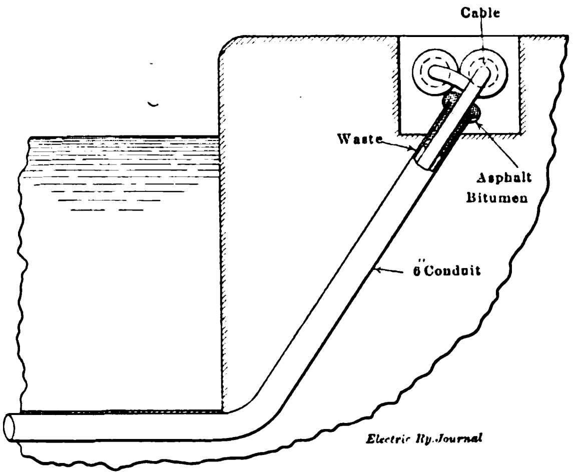
FORMING BLOCK FOR GE-57 MOTOR BOLTS

To make such bolts at a lower cost we now use a block made from a piece of an old steel axle in which the bolts can be forged from round bars of the tough steels named at a big saving in material and time. The block, as illustrated, is easily made as follows: First cut off a piece of an old axle a little longer than the length of the bolt over the head, then face off both ends in a lathe to the exact length of the bolt over the head. Next allow the block to remain in the lathe for a 1 1/32-in. drilling of its full length. After drilling the block counterbore for the round shoulder on the head of the bolt. Then take the block from the lathe and chisel it out to receive the square part of the bolt head. The block is then ready for use. Place it on an anvil or forming block, heat one end of the 1-in. round iron of which the bolt is to be made, drop it in the block with the cool end down, sledge the hot end down to form the head of the bolt, drive the bolt out of the block as soon as it is formed and allow it to cool slowly. Never cool in water. When cool the bolt is ready for threading.

Preventing Condensation in Under-Water Conduit

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES, SAULT STE. MARIE, MICH.

The accompanying illustration shows a 6-in. cast-iron power cable conduit which is laid under a canal. It was found that a large amount of water had accumulated in this conduit from the condensation of entering air. This water does no damage so long as the lead covering of the cable stays in good shape, but if the lead sheathing is damaged a little, as when the cable is pulled through the conduit, water becomes very troublesome.



UNDER-WATER CONDUIT SEALED WITH ASPHALT-BITUMEN TO AVOID CONDENSATION

To stop condensation we now seal the conduit ends with asphalt-bitumen. About 12 in. from the end of the conduit we insert a piece of clean waste to keep the bitumen from running too far down the conduit. The material is hot-poured and the end of the conduit is sealed neatly to make a good-looking job.

Accident Reduction on the Third Avenue Railway System

The following table shows a number of boarding and alighting accidents and settlements for same for 1913 and 1914 for the Third Avenue division of the Third Avenue Railway. This includes the Third Avenue road proper, 125th Street line and the Kingsbridge line.

TABLE SHOWING ACCIDENTS AND SETTLEMENTS ON THIRD AVENUE DIVISION

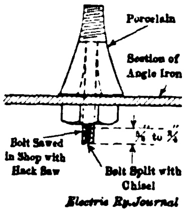
	1913. Old Style Cars				1914. New Type Cars			
	Boarding		Alighting		Boarding		Alighting	
	Accidents	Settlements	Accidents	Settlements	Accidents	Settlements	Accidents	Settlements
Sept.	70	$1,245	33	$892	14	$235	30	$360
Oct.	100	1,790	34	1,335	14	75	41	375
Nov.	72	2,412	47	1,300	17	80	31	235
Dec.	97	1,370	48	2,140	19	61	38	140
Totals	339	$6,817	162	$5,667	64	$451	140	$1,110
Increase					...	....	...	....
Decrease					275	$6,366	22	$4,557

The division mentioned was equipped throughout with the folding door and step device of the Prepayment Car Sales Company in August, 1914, and the railway company attributes the reduction in the number and serious character of the boarding and alighting accidents entirely to this improvement. It will be noticed the number of boarding accidents decreased 275 and the alighting accidents 22, the whole reduction in settlements being $10,923, or about 88 per cent.

Experience with Malleable Iron Cross-Arms on Wooden Poles

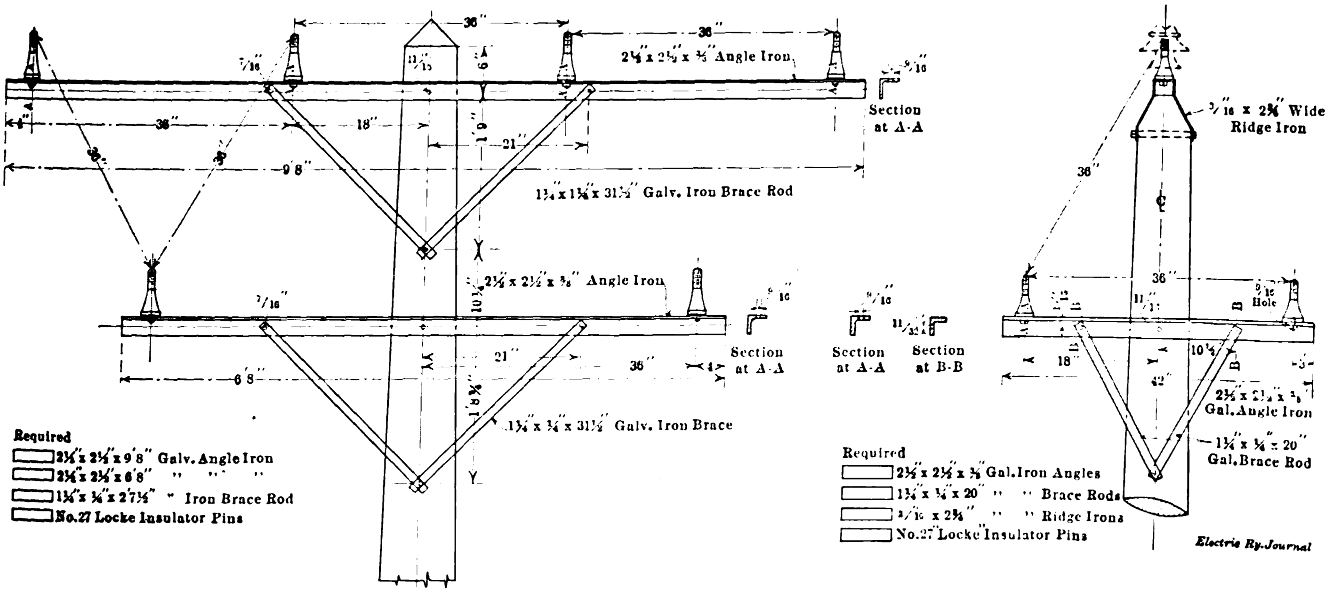
Late in the year 1908 the New York State Railways-Rochester Lines, on what was then known as the Rochester & Sodus Bay Railway, superseded the long-leaf yellow pine cross-arms with steel-iron arms. The first installations were made on lines up to 13,000 volts, but since then the same construction has been applied to transmission lines as high as 20,000 volts. In all cases the lines are carried on cedar, chestnut or concrete poles.

The wooden cross-arms cost only 35 cents each, but as their life did not extend beyond five years it was necessary to replace them at a cost of $1 per arm for labor alone. To eliminate this maintenance cost for good, C. L. Cadle, electrical engineer of the company, decided to try steel-iron cross-arms. While these arms cost 76 cents each as compared with 35 cents for wood, they are far cheaper in the end because they will last as long as the pole. Thus, for a pole life of fifteen years the cost of wooden arms is $4.05 and that of steel $1.76. These angle-iron arms are purchased under a specification which calls for hot galvanizing after the holes have been drilled, thus avoiding the possibility of rust. The company buys the arms in the open market, but quite a portion of those now in service came from the Archbold-Brady Company, Syracuse, N. Y. Two constructions of this character, one for single-line 13,000-volt and one for double-line 20,000-volt service, are shown in accompanying drawings. It should be understood that the braces and other fittings used with the steel arms do not differ to any degree in character or price from those which were used with wooden arms.


Porcelain
Section of Angle Iron
5/8 to 3/4"
Bolt Sawed in Shop with Hack Saw
Bolt Split with Chisel
Electric Ry.Journal

SAWED AND SPLIT BOLT

The only point of importance which came up after the first change-overs were made was how to prevent the nuts from working off of the pins. First, the company tried a spring washer at the bottom of the nut, but the nut would back off from the washer. Next a cotter key was tried, but in this construction the nut eventually wore the key in two. Finally, about three years ago, the following scheme, which has cured the trouble entirely, was devised:

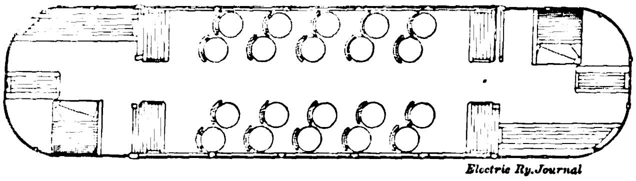

36"
36"
2½" x 2½" x 3/8" Angle Iron
7/16"
11/16
6"
4"
36"
18"
1'6"
21"
9'8"
Section at A-A
1¼" x 1¼" x 31½" Galv. Iron Brace Rod
2½" x 2½" x 3/8" Angle Iron
7/16"
9/16
10"
21"
36"
4
Section at A-A
6'8"
1'8⅜"
1¼" x ¼" x 31½" Galv. Iron Brace
Required
2½" x 2½" x 9'8" Galv. Angle Iron
2½" x 2½" x 6'8" " " "
1¼" x ¼" x 2'7½" " Iron Brace Rod
No.27 Locke Insulator Pins
9/16
11/32
Section at A-A
Section at B-B
3/16" x 2⅜" Wide Ridge Iron
36"
36"
11/16
9/16 Hole
18"
10¼"
42"
3
2½" x 2½" x 3/8" Gal. Angle Iron
1¼" x ¼" x 20" Gal. Brace Rod
Required
2½" x 2½" x 3/8" Gal. Iron Angles
1¼" x ¼" x 20" " " Brace Rods
3/16 x 2⅜" " " Ridge Irons
No.27 Locke Insulator Pins
Electric Ry.Journal

STANDARD FIXTURE LAYOUTS FOR DOUBLE LINES UP TO 20,000 VOLTS AND FOR SINGLE LINES UP TO 13,000 VOLTS

Before the bolts are taken to the field, they are hacksawed for 5/8 in. to 3/4 in. on that portion which will come below the nut. Then after the nuts have been applied on the job the sawed portion is split with a cold chisel just enough to prevent the bolt from losing its spring while assuring enough expansion to give the effect of a locknut. In fact, while the nut cannot work off of its own accord, it can readily be unscrewed by the lineman for use somewhere else, and of course there is no other part to remove first, as would be necessary in cotter-key fastenings.

Front Exit Glasgow Double-Deck Car With Folding Step

The Glasgow Corporation Tramways has recently added to its rolling stock a double-deck car, the chief features of which are a front exit for inside passengers and a new design and arrangement of the upper-deck seats. The car body and platform are built to the standard design adopted by the tramways committee many years ago. The length of the car body is 17 ft. and the length of each platform is 6 ft.

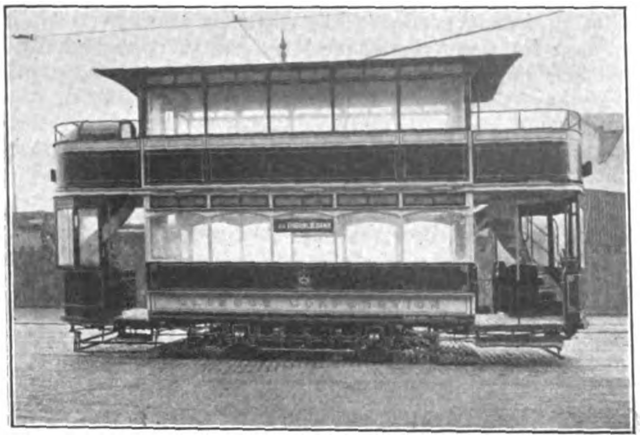

Electric Ry.Journal

PLAN OF UPPER DECK OF CAR, SHOWING REVOLVING SEATS

In the original design the top of the stair is fitted hard against the car body, leaving accommodation at the foot of the stair for placing the controller close up to the dashboard. In the new design, the stair is moved away from the body of the car, in order to provide the necessary headroom between itself and the car body, free access being obtained at the foot of the stair by moving the controller about 20 in. away from the dashboard. The hand-brake staff is placed at the extreme end of the platform, and a vertical wheel with suitable bevel gearing and folding handle has been introduced in place of the ordinary spindle brake.

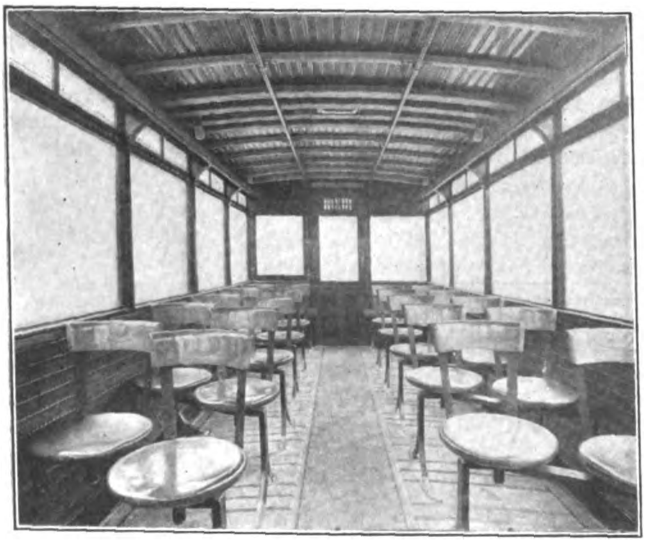
The hinged exit gate is geared to the folding step in such a manner that when the gate is open the step is lowered, and when the gate is closed the step is raised.

The arrangement of the top seats, as shown on the plan, was introduced in order to increase the passageway up the center of the car and at the same time to provide a more comfortable seat. By this arrangement, each passenger is provided with an independent chair, with a back rest, mounted on a pivot, so that the chairs can be turned to suit the direction in which the car is traveling. Each pair of seats is set at such an angle that the shoulder of one passenger overlaps the shoulder of the passenger occupying the next seat.



GLASGOW DOUBLE-DECK CAR WITH HINGED EXIT GATE AND FOLDING STEP

On account of the new position of the stair, it was necessary to increase the length of the upper dashboard or wind screen, the effect of which has been to increase the seating capacity under the canopy at each end of the car by one passenger. The seating capacity of the original type of car is sixty-two and in the new car sixty-four.

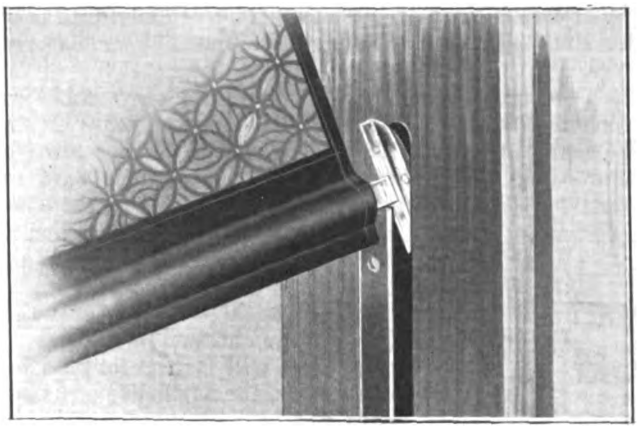


PAIRS OF PIVOTED SEATS ON UPPER DECK OF GLASGOW CAR; NOTE ALSO ABSENCE OF HEADLINING

Local and interurban railways in Cleveland found operation difficult on Feb. 1, because of sleet on the trolley wires and tracks and numerous broken wires. Reports from Toledo indicate that similar difficulty was encountered on Feb. 1 and 2. Because of broken trolley wires power was shut off at the plant of the Lake Shore Electric Railway at Fremont and for a time operation of cars between that point and Toledo was suspended.

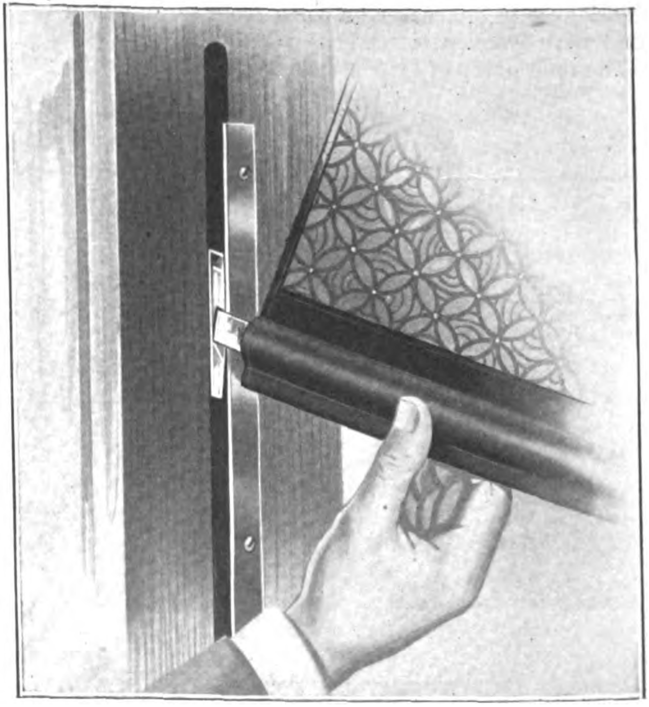
Curtain Fixtures Without Pinch Handles

The Dayton Manufacturing Company, Dayton, Ohio, has recently brought out an improved car curtain fixture in which friction shoes bearing in the curtain grooves hold the curtain absolutely at any position. These shoes are pivoted at the ends of spring-pressed plungers, and they will not bind in the curtain grooves, even if the lower edge of the curtain is slanted at an unusual angle. The bottom rod may be grasped at any point with either hand and the curtain raised or lowered smoothly and easily. No pinch handles are necessary.



SHOE EASILY REMOVED FROM GROOVE WHEN NECESSARY

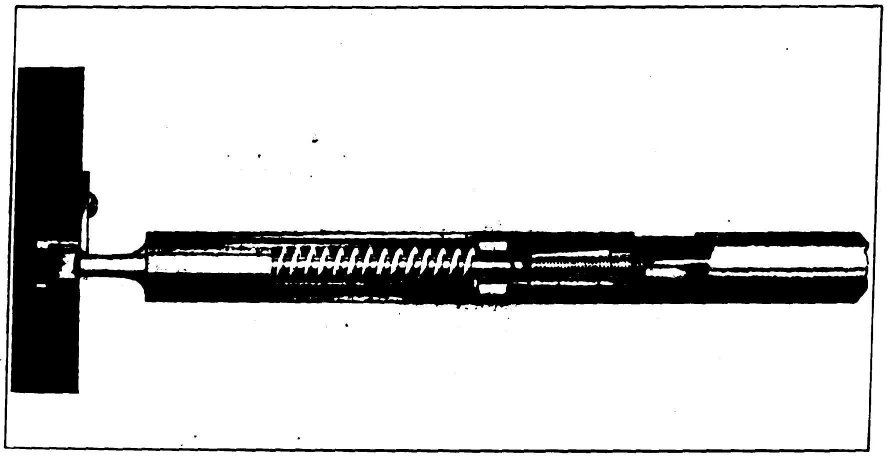
It is asserted that no matter how rapidly or how roughly the curtain may be operated, the tips cannot be jerked from the grooves, as a metal retaining strip, fastened to the window casing along the edge of each groove, effectually prevents the accidental displacement of the shoes. The tendency of the tips of other types of curtain to leave the grooves if the finger pieces are pressed too strongly, or if the curtain is raised or lowered too rapidly, is a source of much annoyance to passengers and what is more apparent, of considerable damage to the curtain and the finish of the window casing.



RETAINING STRIP PREVENTS ACCIDENTAL MISPLACEMENT

The retaining strips, while keeping the shoes in the grooves under all conditions of operation, do not interfere with the ready removal of the curtain when necessary. Each strip terminates 1¼ in. below the upper end of its groove and the friction shoe may be tilted and withdrawn through this opening. However, the shoe is nearly twice as long as this opening and it will not slide out under use. The removal of the curtain must be intentional, in which case it is easily and quickly effected.

The simplicity of this curtain fixture is apparent from the accompanying sectional view. The lower edge of the curtain is formed by a steel tube, in either end of which slides a brass plunger with its shoe. Adjustment of the spring tension and for different widths of window is obtained by screwing this plunger in or out as required, the threaded end of the plunger engaging a long bronze nut, as shown. As the shoes do not extend far below the lower edge of the tube, a long apron is not required and this feature adds greatly to the durability of the fabric.



DETAILS OF CURTAIN FIXTURE EXPOSED IN PART

The "Dayton" fixture does not require a special size of groove as it will operate equally well in the standard size groove, as also in the deeper, wider grooves required by certain other types. This is of importance when fixtures are being specified for the remodeling of old cars.

The retaining strips may be enameled to suit the color of the woodwork or they may be finished to match the other bronze trimmings of the car.

This company's curtains will be regularly made from "Fabrikoid," a durable curtain material, which can be supplied in all shades, and in a wide variety of patterns, or to match any curtain material now in use. All curtains are fitted with metal rollers.

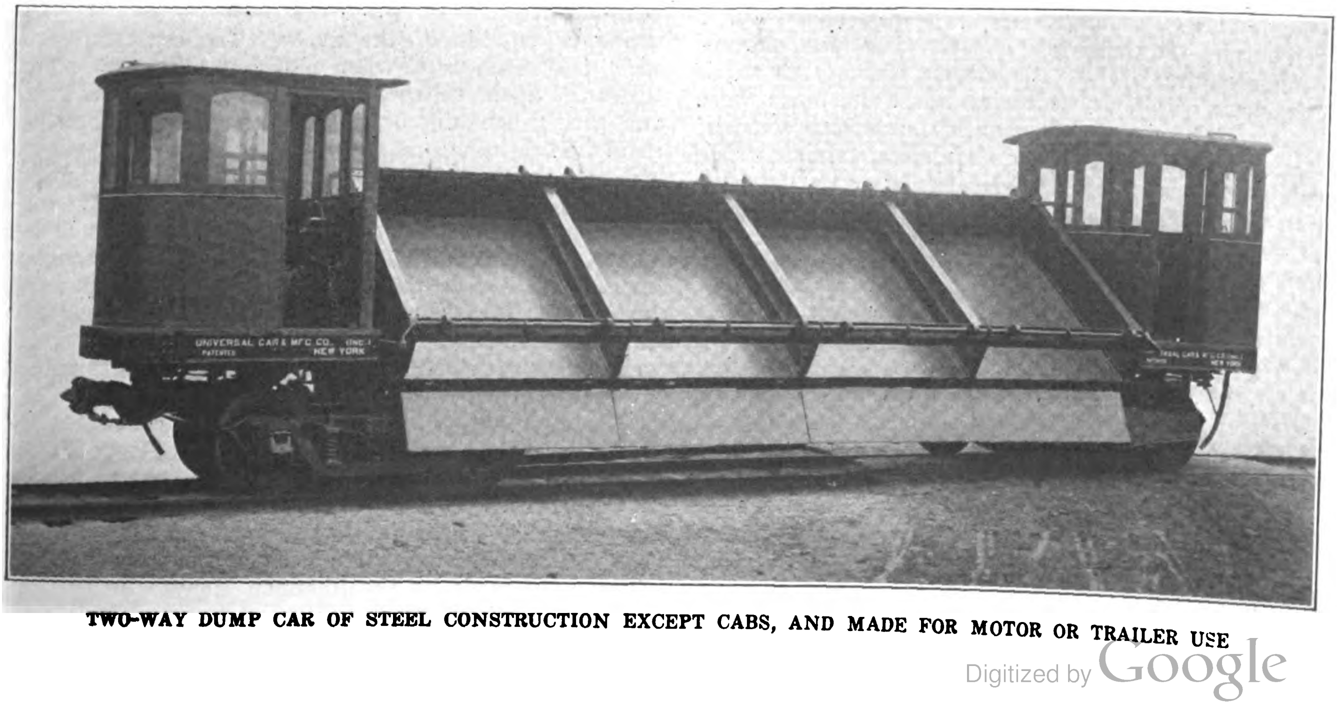
Two-Way Dump Cars

The "Universal" is the name of the modern two-way dump car built by the Universal Car & Manufacturing Company (Inc.), New York. With the exception of the cabs this car is constructed of rolled-steel sections and plates throughout, and it may be used either as a motor car or as a trailer. In trailer cars the cabs are usually omitted. The car dumps to either side and is operated entirely by hand power. As it is mounted on the underframe by means of cast-steel rockers the car comes to its full angle with little or no shock, and it is easily righted when the load is discharged. The entire dumping and righting operation is performed within two minutes.

The doors open automatically when the car is dumping and, as illustrated, form an apron for the lading to pass over, thus throwing the load entirely free of the track. A spreader is also attached to the rear truck as a further aid in pushing the material away from the track. The car may be dumped in an empty position and then loaded by hand and righted. This is a decided advantage as the lift from the roadway to the top side of the car is only 4 ft., which is easy for men using shovels.

The car has four compartments, each of which may be dumped separately if so desired. The car may also be dumped in normal running position without tilting the body. When partitions are not wanted the company substitutes a diaphragm only 4 in. high, thus allowing long material to be hauled. Any type of couplers may be used and, if desired, air brakes may be added. The body may also be mounted on the railway's standard trucks.

Cars of this type are used on several of the largest electric railways in the United States, such as the Connecticut Company, the Boston Elevated Railway, Cleve-



TWO-WAY DUMP CAR OF STEEL CONSTRUCTION EXCEPT CABS, AND MADE FOR MOTOR OR TRAILER USE land Railway, Bangor Railway & Electric Company and the Public Service Railway. Charles H. Clark, engineer maintenance of way Cleveland Railway, estimates the earning power of one of these cars to his company as $100 a day. Since this car requires only the motorman and conductor for unloading, its superiority to the old-time hand-loaded flat car is manifest. For example, it costs one Eastern system about $2 to unload one flat car.

The principal data on a typical two-way dump car follow:

Cubic capacity level full	15 cu. yd.
Length over end sills	50 ft.
Length inside box	25 ft.
Width inside	8 ft.
Height from top of rail to top of floor	5 ft. ⅝ in.
Height from top of rail to top of side	6 ft. 1⅜ in.
Truck centers	25 ft. 6½ in.
Height inside	25 in.
Weight (without electrical equipment)	33,000 lb.

Sand-Spreading Wagon for Slippery Pavement

Officials of the Louisville, Ky., Railway have been watching the efforts of the Board of Public Works to improve the condition of the streets in the business section by means of a sand-spreading wagon. This wagon, which is made by the Havass Company, New York, N. Y., feeds sand through a revolving disk under the wagon bed. It can be adjusted to throw sand at any desired rate. It has been put to work on wood block and certain asphalted streets, the surface of which has been made very slippery by the continued cold weather.

In the sections where this wagon has been put into service the railway has double tracks, which, of course, are affected by the same conditions that make the streets slippery. If the sand distributed by the city is of the right quality, dry and sharp, it will lessen the railway's own requirements for sand; if it is a low grade of sand, the railway's "slick rail" troubles probably would be increased. However, the city is now using a sharp, clear river sand similar to that used by the railway, if for no other reason than that clayey, wet sand would not run through the new machine.

Direct-Current Generator Capacity

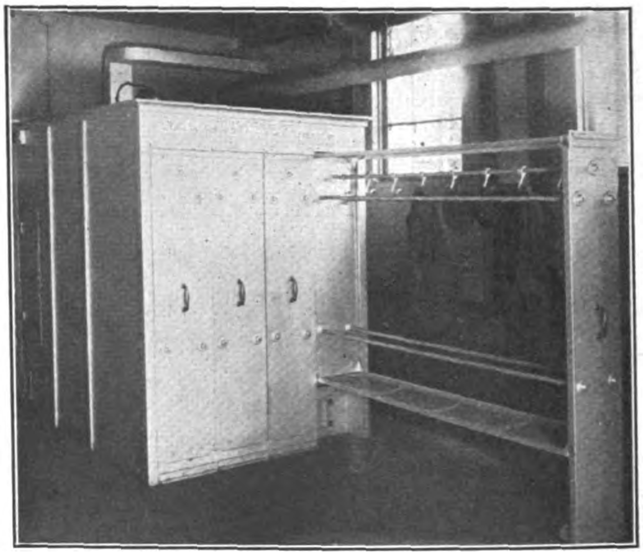
In an article in the *Electric Journal*, B. G. Lamme, chief engineer Westinghouse Electric & Manufacturing Company, commented on direct-current generators as follows: The engine-type machine in its prime was a magnificent piece of apparatus. On account of its low speed, it was of comparatively large dimensions for a given output. In the largest capacity, low-speed engine-type generators, over-all dimensions of from 25 ft. to 27 ft. were attained. However, these machines were midgets, both in size and capacity, alongside some of the a.c. engine-type generators at their maximum. The latter were constructed up to capacities of from 5000 kw to 6000 kw compared with 3000 kw for direct current, while the engine-type alternators attained over-all diameters as high as 42 ft. Incidentally, as regards capacity alone, the race between alternators and d.c. machines has been very much one-sided, almost since the polyphase system became thoroughly commercial. The earliest Niagara generators (constructed in 1893), of 3750 kw were practically of as large capacity as the largest d.c. machine ever built; while in later polyphase work, generators of the usual multipolar construction have been built up to 17,000 kw and turbo-generators up to 30,000 and 35,000 kw. Obviously, as regards maximum capacity, the d.c. generator makes but a poor comparison, but this should in no way detract from the appreciation of this machine as an energizing accomplishment.

Electric Garment Dryer Conserves Health and Schedules

For many years the Brooklyn Rapid Transit System has provided employees' clubrooms in which, among other conveniences, lockers and shower baths are installed. Through its benefit association and medical inspection service, however, the company found that these facilities were insufficient to ward off the illnesses that follow when men stay in wet clothing after coming in from a storm. Very few platform men would be likely to keep an extra suit of clothing at the clubrooms, nor is it convenient for them to go home between runs for that purpose.

To better this condition the company tried out nearly two years ago, an electric garment dryer of the style shown in the accompanying illustration. This device thoroughly dries wet clothing in the time that a man requires for a bath. The results in keeping men from becoming ill and so missing their runs, to say nothing of the comfort afforded, were so satisfactory that seven more dryers have now been installed by the company at different stations.

The dryers are made to fit any desired location. Their racks pull out individually, traveling on the floor, either inside or outside of the dryer. The construction is such, that each rack when pulled out its full length, closes the aperture, retaining the heat within the dryer and giving constant drying efficiency to the garments inside, while other racks are being loaded or removed.



ELECTRIC GARMENT DRYER IN SERVICE, ONE RACK DRAWN OUT TO SHOW HANGER

While the dryers are ordinarily 7 ft. long and about 7 ft. 6 in. high, their dimensions may be varied to contain the necessary numbers of racks for the sizes of the crews, etc. Each rack is 16¼ in. wide, with a hanging capacity of five complete suits of underwear, linen and uniforms. The dryers have a double casing, insulated to prevent radiation of heat. In addition to the natural ventilation provided, added drying efficiency is obtained by forced draft circulation from a fan motor.

The first use of these dryers in the connection described is to be credited to the Brooklyn Rapid Transit System, although different types have been in use for some years in various municipal fire and police department houses. They are available as conditions demand for heating by electricity, coal, gas or steam. These dryers are made by the Shannon Manufacturing Company, New York, N. Y.

LONDON LETTER

P. A. Y. E. Cars Successful in Aberdeen—Last of London Horse Tramways to Give Way to Electrified Lines

(From Our Regular Correspondent)

The annual return regarding tramways and light railways and trackless trolley undertakings issued by the Local Government Board shows that since 1878 the route length of tramways and light railways on public roads open for traffic in the United Kingdom has increased from 269 to 2703 miles, the capital expenditure from £4,207,350 to £80,977,838, the number of passengers carried from 146,000,000 to 3,426,000,000, and the net receipts from £230,956 to £5,628,321. Of the total of 1848 miles of line owned by local authorities, 1640 miles are worked by those authorities themselves, or, in a few cases, by other local authorities leasing from them, and the remaining 208 miles by leasing companies. Last year the route mileage worked by electric traction was 2546 miles out of a total of 2662. This year it is 2595 miles out of 2703. Of the 279 undertakings, 171 belong to local authorities and 108 to companies or other parties. The net receipts of local authorities who work tramway undertakings belonging to them, or leased from other local authorities, amounted to £4,071,610. On the year's traffic £1,218,299 was required to pay interest or dividends on capital, and £120,039 for rent of leased lines. The sum of £1,371,263 was applied towards the reduction of tramway debt, and £589,886 for relief of rates, while £711,217 was carried to reserve and renewal funds. As regards the length of line open for public traffic, the London County Council system comes first with 146 1/6 miles, then Glasgow with 103¾ (including depot connections), while Manchester is credited with 78¾ and Liverpool with 64½. Among company undertakings the London United heads the list with 53¾ miles.

The Halifax Town Council has decided to promote a bill in Parliament giving it power to spend about £120,000 on new tramway works. It is proposed to extend the tramways from Brighouse to the Huddersfield border via Rastrick, from Halifax and Elland, from West Vale to Stainland, and from Triangle to Ripponden; to run trolley vehicles and motor buses and to secure extension of the periods during which the corporation will have possession of the tramways it has constructed in the areas of other local authorities. The Halifax Corporation is also seeking powers to run trail cars and to deal with road maintenance in connection with the running of motor buses. The clause regarding the buses follows what has now become standard practice, namely, the corporation will pay to the road authority during the first three years ⅝d. per car-mile run by the buses in the outside area. After three years, and at the end of every subsequent three years, the extra cost of road maintenance caused by the running of the buses is to be ascertained, of which the corporation will pay half, but in no case will this contribution exceed ⅝d. per car-mile run. Any grant made by the Imperial Exchequer is to be taken into account.

Mr. Pilcher, the manager of the Aberdeen Corporation Tramways, has issued a report to the members of the tramways committee to refute the criticisms on P. A. Y. E. cars. He states that the cars have been in operation on the Woodside route for twenty months, Beach route ten months, Torry route seven months, and Mannofield route four months—practically half the system now being operated. Generally speaking, he found that there was a considerable amount of criticism at first. From an administrative and operating point of view they have been an unqualified success. The number of accidents to persons attempting to board or alight from the ordinary cars while in motion, for twelve months ended Dec. 1, 1914, was 87, all of which platform accidents would either have been prevented or greatly minimized on P. A. Y. E. cars. Most of these occurred while the conductor was engaged inside or on top collecting fares. It very rarely happens that a serious platform accident occurs on a P. A. Y. E. car, as the conductor is always present to prevent it. It is interesting to note also that nearly all the conductors and motormen are in favor of the P. A. Y. E. cars.

For a considerable period the London County Council and the Stepney Borough Council have been at variance over the system on which the tramway between South Hackney and the Docks (by way of Grove Road and Burdett Road) should be electrified. The County Council wanted to install the overhead system; the Stepney Council insisted upon the conduit. The result has been that the old horse cars have ceased to run, and this important route is now without trams, though not without motor buses. Recently the need for reconstructing the tramway became urgent, and the County Council undertook to reconstruct the existing tramways for horse traction, but in such a way that they would be suitable for electrification at some future date, on the overhead trolley system. Against this the Stepney Council entered a protest. Now it has been asked by the Board of Trade if it has any further observations to offer on the plans furnished by the London County Council. At the same time, the board states that it is not prepared to withhold consent from the proposals of the County Council on the ground that that authority does not propose to renew the lines in such a way as to facilitate their equipment for electric traction on the overhead trolley system. The board transmitted copy of a communication from the Poplar Borough Council, showing that the Borough Councils of Poplar, Bethnal Green and Hackney have agreed to the overhead system and are anxious that the Stepney Council should withdraw its opposition. The works committee of the Stepney Borough Council has now replied to the Board of Trade that it has no further observations to offer except that it is doubtful whether any appurtenances purely germane to the overhead trolley system can be provided by the London County Council in the absence of the consent of the Borough Council. In other words, the deadlock continues.

The last of the horse tramways in London are shortly to be removed as the London County Council has sanctioned the expenditure of £22,000 for the widening of certain roads preparatory to electrifying the horse tramway at present running from Tower Bridge Road to Rotherhithe. The total cost of electrifying this route, which is about 27 miles in length, will be £74,700, apart from the cost of street widenings, the track work alone costing £62,500. The new tramways will be constructed on the conduit system, thus enabling through service in connection with the other routes linking up with both ends of this branch. The reconstruction of this route has been before the London County Council and the Bermondsey Borough Council for several years, the difficulty being that the London County Council favored the overhead system, while the Bermondsey authority refused to consider any other than the conduit system. After several interviews between representatives of the two bodies concerned, the London County Council yielded.

London is to have a second bill promoted in Parliament at the next session with a view to supplying electrical energy in an area comprising the Administrative County of London and adjacent areas. It will be in substitution for the London County Council bill, a few particulars of which were published last month. This second bill is promoted by a few of the London electric lighting companies, and the preamble states that electrical energy is now supplied to the County of London by a number of companies and local authorities, and that the existing conditions are unfavorable for the best economy. It states also that electrical energy can be supplied more effectively and economically from one combined undertaking, and that the existing undertakings in the area should be consolidated. The bill, therefore, proposes to incorporate a company with a share capital of £6,000,000 and a loan capital of £2,000,000 "for the purpose of consolidating, unifying and improving the generation and distribution of electrical energy for all purposes in the area of supply as defined by the act, and of utilizing to the best economical advantage all existing means of generation and distribution of electrical energy within the area, with a view to the ultimate provision within the area of one system of supply of electrical energy with concentrated generation and standardized distribution." The companies proposed to be transferred to the new statutory company are the Charing Cross, West End & City Electricity Supply Company, Ltd., the Brompton & Kensington Electricity Supply Company, Ltd., the Central Electric Supply Company, Ltd., the Chelsea Electricity Supply Company, Ltd., the Kensington & Knightsbridge Electric Lighting Company, Ltd., the London Electric Supply Corporation, Ltd., the Metropolitan Electric Supply Company, Ltd., the Notting Hill Electric Lighting Company, Ltd., the St. James & Pall Mall Electric Company, Ltd., and the Westminster Electric Supply Corporation, Ltd.

A. C. S.

News of Electric Railways

BUFFALO-NIAGARA FALLS LINE

Project Involving Expenditure of Several Million Dollars Approved by Commission

The Public Service Commission of the Second District of New York has granted the International Railway permission to build its proposed high-speed electric line between Buffalo and Niagara Falls over private right-of-way, and has authorized an issue of the company's 3 per cent fifty-year refunding and improvement mortgage bonds to the amount of $2,395,000, to be sold at not less than 87, netting a little more than $2,000,000 to pay for the new line.

The new line will start on Main Street, Buffalo, at the intersection with the Buffalo & Lockport line of the International Railway, and run northwesterly out of Buffalo to Tonawanda, through Tonawanda over the old Buffalo, Thousand Islands & Portland Railroad line, through North Tonawanda, the town of Wheatfield, village of La Salle and into the city of Niagara Falls to Portage Road and over Portage Road to Niagara Street.

Included in the cost of the new line is provision for the purchase of sixteen new 52-ft. steel underframe interurban cars, substations at Payne Avenue and Niagara Falls, a carhouse at Niagara Falls, stations at La Salle, Division Street and Tonawanda, waiting rooms at Main and Erie Streets and at Payne Avenue, and a shelter house at Ward's Road. It is provided that the new line shall cross the New York Central tracks by an overhead bridge, and bridges are provided for over Mill Creek, Ellicott Creek, State Ditch, Tonawanda Creek, Cayuga Creek, Gill Creek and the Gratwick Trestle.

The right-of-way and real estate are to cost $800,000, as detailed in the report of H. F. Riesinger; bridges and culverts, $240,500; substation equipment, $78,700; buildings, $109,850; rolling stock, $160,000; track line and grading, etc., $127,837.

PUBLIC SERVICE COMMISSION INQUIRY

New York Legislative Committee Begins Inquiry into Practices of First District Commission—Secretary Whitney Testifies

The taking of testimony by the legislative committee appointed to inquire into the workings of the Public Service Commissions of New York was begun in New York City on Jan. 30. Travis H. Whitney, secretary of the commission for the first district since its creation in 1907, explained the routine of the organization. Starting with 403 employees with salaries of $724,216 in 1907, the commission last year had 2097 employees, with salaries of $2,903,321 and expenses of $2,971,000. The increase was attributed to the building of the new subway system. The commission had twelve lawyers on its staff, but spent $57,825 for special counsel since 1907. Some of the questions were directed toward ascertaining the qualification for office of Joseph Johnson, head of the transit inspection bureau of the commission, former fire commissioner of New York and campaign manager for Judge McCall, chairman of the commission, when the latter ran for Mayor.

The history of the now famous wheel-guard case in connection with which William R. Willcox, former chairman of the commission, was held in contempt of court, was reviewed. Mr. Whitney said that the policy of the commission in regard to pressing suits to require compliance with its orders had been influenced very largely by the outcome of several of the early actions brought by the commission. In one of them the commission was awarded only $1 damages and it did not appeal, while in another action by the commission to compel respect for its orders the judge dismissed the complaint.

At the hearing on Feb. 1 it was brought out that correspondence in regard to informal complaints amounted to some twenty or thirty letters a day and that this was cared for by Mr. Whitney and George S. Daggett, the chief clerk. The complaints addressed to individual members of the commission went to such members. In the case of informal complaints no hearings were held and no orders issued. Citizens who made complaints usually wished to have them treated as informal ones, in order to obviate the necessity of having to testify at public hearings. Asked what supervision the commission exerted over this correspondence, Mr. Whitney said that Commissioner Woods, since taking office, had been applying to him for copies of complaints. Mr. Whitney said that it was the regular practice to hold conferences between the individual commissioners and officers of the public service corporations, but denied that informal complaints were often modified after such conferences.

Mr. Daggett, who followed Mr. Whitney on the stand, was asked if some of the commissioners had not been displeased with his letters to some of the public service companies, and if such displeasure had not been shown after the commissioners had consulted with officials of the companies. He replied that it might have been. Required by Mr. Haywood, counsel of the committee, to answer specifically, Mr. Daggett said, "On one or two occasions, yes."

Mr. Haywood expressed himself on Feb. 2 as being well satisfied with the progress so far made in connection with the investigation. He said, however, that if the committee was to conclude its labors by Feb. 17 it would not be possible to go thoroughly into all phases of the commission's work. Up to Feb. 2 no plans had been made for the investigation of the commission for the second district.

BRITISH TRAMWAYS AND THE WAR

General Managers of Manchester and Glasgow Companies Report Effect of War Upon Finances and Number of Employees

Mr. McElroy, the general manager of the Manchester Corporation Tramways, has submitted a report as to the effect of the war upon the finances of the department. Since the first four months of the war there has been a large decrease in the receipts, as compared with the previous year, and it is anticipated that at the end of the financial year the income will be £900,000, or £50,000 below the estimate. Notwithstanding the increased expenditure owing to allowances to the men who have joined the colors, and the engaging and training of a new staff, and the reduced revenue, Mr. McElroy considers that the tramways committee will, at the end of the year, be in a position to pay £100,000 in relief of the rates and place £50,000 to renewals, etc., fund, instead of the estimated £102,000. The report continues:

"The number of men from the tramways department who up to this date have joined the colors is about one in 200, and the amount now allowed to them or their dependents is at the rate of £44,876 per annum. Our men are still leaving us daily to enlist. In addition to supplying so many men from our own department, we have assisted in the general recruiting campaign in Manchester by displaying striking posters in the tramcars, which, we are told, have had a good effect. The department has made an energetic effort to raise funds by means of collections in the tramcars. The weekly collections since the commencement have amounted to £5,827. The various bills and posters which have been placed in the cars in connection with these collections have cost the department up to the present about £150, which equals 2½ per cent on the amount collected. Free riding on the tramcars has been granted to those recruits who have joined the city battalions and are not housed at the places where their training is taking place, and have therefore to travel daily to and from their homes. The free traveling facilities are provided by granting supplies of tokens to the commanding officers, who undertake to distribute the tokens and to see that the privilege is not abused. The value of the tokens distributed up to the present has been £2,057, which equals nearly 500,000 1d. fares."

A communication to the ELECTRIC RAILWAY JOURNAL from James Dalrymple, general manager Glasgow Corporation Tramways, states that the company is at the present time recruiting an additional 300 men as a reserve company for the tramway battalion, and later will probably be asked to procure another 300. The men of the "First Glasgow" H. L. I., comfortably housed at Gailes, are now equipped and almost ready for the front. The company has prepared leaflets describing its troops and is having its female staff distribute these in the cars.

As to the new conductors, Mr. Dalrymple says that, although practically all new men with but very little training, they are doing quite well. The revenues of the company are showing a slight increase over last year. The fiscal year does not end until May 31, but if conditions continue as at present, the revenues should about equal those of last year.

RAPID TRANSIT IN CINCINNATI

Representatives of a number of civic organizations attended the meeting of the Rapid Transit Commission of Cincinnati at the Business Men's Club on Jan. 29. President Edwards of the commission explained the four plans presented by the engineers recently and then said that if the east and west sides of the loop in scheme No. 4 were built, all the interurban lines with one exception would have entrance to the business section of the city. He said that this line could be brought in over one of the surface tracks until the remainder of the loop is completed. The cost of constructing the two sections would be about $3,000,000 less than for the entire loop. A suggestion from another speaker that only one side of the loop be constructed at first met with disfavor.

The east side of the loop extends from the business district to Forest, while the west side extends to Crawford. The third side connects these two points and passes through Mitchell, St. Bernard, Paddock and Montgomery. Rapid transit service could not be furnished these places until the city is able to build the third section, if the plans suggested are carried out, but it was said at the meeting that they do not form a portion of the city and there is no obligation to furnish their residents with the new service at once.

W. W. Freeman, president of the Union Gas & Electric Company, sent a communication to the commission in which he stated that his company would do everything possible to aid in the improvement and that power might be furnished from its plants for the operation of the road on a more economical basis than if generated in stations built by the city. The commission promised to give this matter serious consideration.

Walter M. Schoenle, city solicitor, told the commission that he had prepared a bill for introduction in the Legislature that would, if passed, result in relinquishing the city from paying a rental of $32,000 a year for the use of the canal bed for the rapid transit line. The commission delayed any expression of opinion on the matter until the bill has received careful consideration.

INDIANA LEGISLATURE

The following bills have been introduced in the Indiana House: A bill providing that incorporated towns of 500 or more inhabitants may by order of the Town Board compel the stationing of flagmen or installation of signal systems at dangerous railroad or interurban crossings within the towns; a bill amending the tax laws to place the power of evaluating all public utilities in the hands of the State board of tax commissioners; a bill amending the old railroad commission act (now thrown under the Public Service Commission) providing that the commission shall have six months instead of thirty days to take action on railroad tariffs; a bill amending the present 2-cent fare law, and fixing the maximum fare at 2½ cents a mile.

In introducing the last measure, Mr. Waltz called the attention of the General Assembly to the fact that the Interstate Commerce Commission has recommended a 2½-cent rate in interstate business and that the various states enact laws to make such a rate legal within the confines of the several states.

The "anti-lobby" bill has passed the Indiana House, and has been amended and passed by the Senate. One of the Senate amendments provides that if any newspaper receives compensation for printing any article advocating or opposing any measure before the Legislature, it shall print the amount of the compensation received for such article and at whose instance it was printed. The amended bill has been approved and passed by the House, and will probably be signed by the Governor.

The nine-hour day bill, covering substation or switchboard operators who control or report train movements of electric railways, has been killed in the House.

SECURITY SELLING COMPANY UNDER INVESTIGATION

At the instance of the Interborough-Metropolitan Company, New York, N. Y., District Attorney Perkins has under investigation the Interborough-Metropolitan Investing & Security Company, which has recently been selling to Italian subway laborers for $24 a share Interborough-Metropolitan Company common stock quoted at $11 and $12 a share. The security selling company, which of course has no connection with the railway, induced the Italians to purchase these shares through advertising in Italian newspapers. The advertisement featured the great "opportunity" that accompanied the sale of the stock at $24, but carefully refrained from making any direct promises or statements that might give grounds to action for fraud. The railway has notified August Belmont & Company, transfer agents, not to transfer any of the stock to the Italian buyers and altogether about 300 shares of stock have been refused for transfer. It is reported that suit will be brought against the Interborough-Metropolitan Company by one of the New York Stock Exchange brokerage houses that have been dragged into the affair, to recover damages for the holding up of its stock transfers. The railway, however, in order to protect its Italian workers, is willing to allow the courts to decide the legality of its stand. The security selling company, which is said to be headed by Roberto Parodi, was formed to deal only in Interborough-Metropolitan stock and has been in existence for little more than two weeks. According to latest advices, Mr. Parodi has been arrested on the charge of grand larceny in the second degree.

BAY STATE ARBITRATION HEARINGS

Hearings by the Bay State Street Railway wages arbitration board were suspended during the week ended Jan. 30 on account of other engagements of counsel. At the later sessions various division superintendents located at important points north and south of Boston testified that the policy of the company was one of leniency toward mistakes of an unintentional character and that there was no difficulty in securing a plentiful supply of new men at the prevailing rate of wages. Representatives of the union admitted that in conferences last fall the company had offered to put into effect a daily guarantee of five hours' pay for all transportation employees, but that the offer was refused by the union, which desired a seven-hour guarantee. P. F. Sullivan, president of the company, also offered to increase the wages of blue uniformed men 0.5 cent an hour for two successive years, pointing out at the conferences that the company's finances would not justify a further advance. Extended testimony was offered by employees to the effect that the cost of living has risen materially in the last five years and that the present maximum of 28 cents an hour should be increased to 35 cents. The employees' union contends that new men should be paid 30 cents an hour and that at the end of the first year the maximum should be attained. The company's side of the case has not yet been presented. Prof. Irving Fisher of Yale University testified on behalf of the employees' union that the cost of living has risen about 50 per cent in the last eighteen years. The rise in prices is the resultant of five different factors: amount of money in circulation, amount of deposits subject to check, the velocity of circulation, activity of bank accounts and the volume of trade. Professor Fisher contended that $16 a week is the minimum wage upon which a family of five can subsist.

COUNCIL MEETINGS IN CLEVELAND

The plan to have the Cleveland (Ohio) Railway purchase the North Randall line at $146,000 was defeated at a meeting of the City Council on Feb. 1, although Peter Witt, street railway commissioner, favored the idea.

The street railway committee has presented an adverse report on Councilman Gahn's proposed ordinance requiring the Cleveland Railway to furnish derailer operators at all grade crossings.

In reply to an inquiry from Councilman Dittrick, on

Feb. 1, Mr. Witt said that the $2,500,000 which the company had agreed to expend in extensions and betterments under the Tayler agreement has been exhausted. Proposals for the expenditure of funds for this purpose must now be made by the company. Council has a right to veto the plans, however. The money has been used for the construction of division carhouses and buildings, track and rolling stock.

Virgil J. Terrill has undertaken to relieve certain cities of the necessity of seeking consents from the owners of property abutting on proposed street railway lines by introducing a bill in the Legislature making this unnecessary in cities that operate under a charter adopted in accordance with the State constitution. This is meant to apply to Cleveland and especially to open the way to building tracks on Euclid Avenue between East Twenty-second and Fortieth Streets, otherwise known as "Millionaires' Row." The city wants this section of road built the coming spring and summer.

The Council asked the company to operate its motor buses on East Thirtieth Street to test the need for a crosstown line at that point. The income from the bus operated on Noble Road at a 5-cent fare, for December, 1914, was 6.03 cents per car-mile, while the cost of operation was in excess of 20 cents, it is said. During the same month the bus on Pearl Road earned only 4.68 cents per car-mile, with the cost of operation about the same. These routes are outside the city limits.

TRACKLESS TROLLEY BILL IN PENNSYLVANIA

Representative Gans of Philadelphia has introduced a bill in the Legislature at Harrisburg that would overcome the objections of the Public Service Commission to granting charters to "trackless trolley" companies. Recently application was made to the commission for a certificate of public convenience by the Perkiomen Electric Transit Company, which proposed to run a trackless trolley through the Perkiomen Valley. The commission refused the application on the ground that under the general corporation act of 1874 no provision was made for the granting of charters for such a company, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 16. The bill of Mr. Gans amends the act of 1874 governing the incorporation of motorbus and omnibus lines by providing regulations for corporations drawing power from overhead wires. It is understood that the Perkiomen company, should the bill become a law, will apply again to the commission for a charter.

DETROIT PURCHASE NEGOTIATIONS

James Couzens, president of the Detroit street railway commission, announced in an interview in Detroit newspapers that negotiations for the purchase of the property of the Detroit United Railway within the one-fare zone would be undertaken shortly by the commission on the basis of the appraisal of $21,000,000 made for the commission by Prof. E. W. Bemis. He intimated that the city had a club to force a reasonable price in the 3-cent fare ordinance which was dropped at the time the day-to-day agreement establishing seven-for-a-quarter tickets was reached. He also stated that if the people rejected the price as agreed upon by the commission and the company the commission would then know whether the electors wanted municipal ownership and what plan to follow thereafter. Professor Bemis, in his supplementary report to the commission, fixed the franchise values of the Detroit city lines at approximately $2,500,000, making the total appraisal about $21,000,000 up to July 1, 1914. Prof. David Friday, of the University of Michigan, who appraised the franchises for the company, set the value at $7,500,000.

CLEVELAND FARE MATTER

Members of the Council of Cleveland, Ohio, are threatening the Cleveland Railway with an invasion of auto bus service. Interviews with Councilman William Stolte have appeared in the local papers suggesting bus operation. Councilmen W. J. Reynolds and J. J. McGinty, however, have seconded his ideas to a large extent. They will try to have the company operate its three auto buses on East Thirtieth Street, where the next crosstown line is to be built, and test the extent to which a bus service can compete with the electric railway. These vehicles are now in operation on Noble Road.

Councilman Dittrick in an interview on Jan. 28 stated that the amount paid out in accident claims will never be less so long as the cars are speeded up and the present schedules are maintained. He believes that people will have to be satisfied with a few minutes added to the running time of the cars if they wish to retain the low fare.

Several councilmen favor the plan of J. J. Stanley, president of the company, extending the Prospect Avenue line from Fortieth Street to Fifty-fifth Street and linking up one of the West Side lines with it, in order to relieve the congestion at the Public Square by running cars through. Within a short time it is thought that the Euclid line will run through on Euclid and not around on Prospect, as at present.

Bill in Kansas Legislature.—A bill has been introduced in the Kansas Senate providing that at all railway crossings in Kansas where a hedge fence approaches the crossing the fence must be kept cut down to a height not exceeding 5 ft. for a distance of eight rods from the highway.

Local Control of Milwaukee Utilities.—By a vote of twenty-five to eleven, the Common Council of Milwaukee on Jan. 18 approved a bill to be presented to the State Legislature asking that the Wisconsin Railroad Commission be relieved of all jurisdiction over the public utilities in Milwaukee, and that the control of these utilities be placed within the jurisdiction of the Council.

Legislation on Working Conditions.—A bill has been introduced in the Ohio House which will require that street and interurban railways have motormen and conductors instructed in their work for fifteen days prior to taking charge of cars; that nine hours shall constitute a work day, which is to be completed within eleven hours, and that motormen and conductors shall have thirteen consecutive hours of rest.

Saskatoon Railway Results.—The City Council of Saskatoon, Sask., on Jan. 7, in passing the street railway estimates for this year, desired to have the commissioners bring in a detailed report on the public utilities, of which the municipal railway shows a loss. A telegraphic dispatch from Saskatoon states that notice of a motion has been given for an early meeting of the Council, to consider the sale of the municipal railway.

Report on Montreal Franchises.—The Board of Control of Montreal, Que., on Jan. 4, in accordance with a resolution passed on Dec. 30, began a systematic study of the Montreal Tramway's twenty-three separate franchises, granted by the various municipalities now forming the city of Montreal, and the numerous engineering and statistical reports on the system. At the discussion on Jan. 9, the city attorney was asked for an opinion as to the various franchises, the rights comprised in them, etc.

Passaic Gas Rate Case Reopened.—The New Jersey Court of Errors and Appeals on Jan. 27 granted a rehearing of the Passaic 90-cent gas rate case. This court, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 19, page 1331, reversed the decision of the Public Utilities Commission reducing the gas rate to 90 cents, on the ground that the franchise values of the gas subsidiary of the Public Service Corporation of New Jersey had not been considered in determining the basis for a fair return. No date has yet been set for the rehearing.

Brooklyn Rapid Transit Assessment Lowered.—The assessments made by the State Tax Commissioners against the Brooklyn Rapid Transit System for the 1915 special franchise tax have been lowered $3,000,000. In 1913 the component companies were assessed at sums aggregating $47,130,835, this amount being voluntarily cut by the State Board of Equalization in 1914 to $34,356,263. Corporation Counsel Polk has protested against the cut on the ground that the cost of pavement should be included in the cost of reproducing the tangible property in the streets.

Legislation in Tennessee.—Three measures of much importance to the electric railways of Tennessee have just been introduced in the State Legislature. One would give city railways the right to acquire and operate interurban lines. Another would make it unlawful for passengers to sell or give away transfers and provide penalties for violation of the law, while the third would require that all damage suits to persons or property be tried in counties where the accidents out of which they grew occurred, except when service of process may not be had in such counties.

Delay on New York Subway.—Drippings of water and collections of dust from an opening near the Seventy-second Street station of the New York subway caused a short-circuit on the third-rail on one of the uptown express tracks near that point on the morning of Feb. 2. The matter would have been remedied in about ten minutes by the switching of the uptown express trains to the uptown local tracks and the removal of the defective insulator by a repair gang, but someone rang a fire alarm signal and the fire department insisted upon stopping all traffic and making the passengers leave all trains while it investigated the trouble. The result was a delay of an hour or more during the height of the rush-hour traffic.

Ontario Hydro-Electric Railways.—The question of building an electric railway from the Niagara frontier, via Hamilton, to the Georgian Bay, is under consideration of the Hydro-Electric Power Commission of Ontario. Comptroller Morris, Hamilton, stated on Jan. 4 that F. A. Gaby, chief engineer of the commission, had shown him plans for a line from Queenston and Dunnville, through Hamilton, to Georgian Bay, and that the surveys had been completed for this and connecting lines from Dunnville to Beamsville, from Queenston to Beamsville, and from Guelph to Toronto; that preliminary surveys had been made on other sections of the district to be served, and that the surveys would be resumed almost immediately. The construction of the line would depend entirely on the action Hamilton was prepared to take.

Bills Introduced into the New York Legislature.—The following measures have recently been introduced into the Legislature of New York: To amend the public service commission law, in relation to the free transportation of chiefs of police of the municipalities of the State; to amend the code of criminal procedure, in relation to the payment of expenses and prosecution of crimes committed on railway trains; to amend the railroad law, in relation to the names of railroad stations; to make an appropriation for the elimination of certain grade crossings; to validate the consolidation of the Susquehanna Valley Electric Traction Company as a New York State corporation, with the Waverly, Sayre & Athens Electric Traction Company, a Pennsylvania corporation, by which the Waverly, Sayre & Athens Traction Company was formed; to amend the workmen's compensation law in relation to abolishing self-insurance.

Disposition of Chicago's Traction Fund Explained.—Mayor Harrison of Chicago has issued a statement in reply to numerous criticisms regarding the loose handling of the $14,000,000 traction fund. More than $2,500,000 of the fund is kept in Chicago banks. The records of authorization for distributing the remainder, filed in the city comptroller's office, show that the city has been taking out cash for the last four years by substituting tax anticipation warrants. These warrants are said to be a first lien against the city's taxes, being retired as rapidly as taxes are received. They are permitted to be issued in an amount equal to only 75 per cent of the total of the city's share in the taxes. For the amount loaned the city has been paying the banking rate of 3 per cent. The City Council has taken no action on the Mayor's proposal to contribute a portion of the fund to a pension fund for railway employees. It was assailed by the employees' association as a subterfuge for securing votes.

Merger Measure in Washington.—Ben Johnson, chairman of the district committee of the House, has referred to the District Commissioners the Page bill, which would authorize connecting or intersecting street railways of the District of Columbia to be operated under joint management. The district committee will take no action on the bill until the commissioners have handed in their recommendations. The Page bill, in short, authorizes any street railway in the District to acquire, by lease or purchase, connecting or intersecting lines, provided the holders of a majority of the stock of the two lines vote for consolidation or joint management. It is stipulated, however, that lines which so consolidate shall charge only a single fare for a continuous ride within the District over all of the lines affected by the consolidation. It is also stipulated that the aggregate capital stock of the purchasing company shall not exceed the combined capital stocks of the contracting companies.

Massachusetts Legislation.—Among the measures introduced into the Massachusetts Legislature is a bill providing that the rate of fare on street railways transporting passengers from one town to another shall not exceed 5 cents where the distance involved is not more than 5 miles. The bill is particularly aimed at the 6-cent fare unit established on the Middlesex & Boston Street Railway by recent decision of the Public Service Commission and also seeks to restrict interurban fares to the 1-cent per mile basis indicated above, within the 5-mile limit. A bill has been introduced into the House establishing a 2.5-cent fare by rebate check for passengers unable to obtain seats on street cars, and another bill provides that all street railways shall equip their cars with steps not more than 8 in. above the ground and with a maximum rise of 7 in. on steps leading to the car platform from the lowest tread. A bill is also before the House requiring all street railways to meet the expense of oiling sections of the public highways covered by their franchises, where the rest of the traveled way has already been oiled by the local authorities.

Suits Against Chicago Railways for Ordinance Violations.—In accordance with the general policy recently adopted by the Chicago city administration of entering suits against railways for violation of city ordinances, more than 100 suits have been begun in the Municipal Court on account of the failure to post copies of the traction ordinances in the cars. Another suit involves the right of passengers to demand and receive transfers at all intersecting points, some of which were specifically excluded by provisions in the 1913 merger ordinance. Still other suits charge the Chicago City Railway with posting only one copy of transfer regulations in the cars instead of two, as required by the ordinance. Action on suits previously brought has resulted in the fact that the Surface Lines have been fined in the Municipal Court for violating the ordinances requiring signs on cars clearly to designate both the route and destination. The company was fined $25 in each of sixty cases. Twenty-one more sign cases have just been submitted to the court and a fine of $50 each was assessed for violating the city ordinance.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Railway Association

The program for the annual meeting of the Central Electric Railway Association, to be held at the Hotel Severn, Indianapolis, Ind., on Feb. 25 and 26, will include addresses by Samuel Ralston, Governor of Indiana; Judge Thomas Duncan, chairman of the Indiana Public Service Commission; C. Loomis Allen, president of the American Electric Railway Association, and C. E. Peirce, vice-president of the Manufacturers' Association.

A. I. E. E. Mid-Winter Convention

The third New York mid-winter convention of the American Institute of Electrical Engineers will be held at institute headquarters, in New York, on Feb. 17, 18 and 19. The program will be of a general nature. Two sessions will be under the auspices of the transmission committee; one of these will be devoted to the discussion of impact testing of high-tension insulators; the other to miscellaneous subjects connected with high tension work. Another session will be devoted to papers provided by the electrophysics, electric lighting and mining committees. The last technical session of the convention will be devoted to the subject of application of electric motors, and a number of prepared discussions will be presented giving the characteristics of each type of motor which govern its application to various kinds of work. The session on the evening of Feb. 17 will include addresses by a number of prominent engineers on the general subject of the status of the engineer. On the evening of Feb. 18 a dinner-dance will be held at the Hotel Astor. The afternoon of Feb. 19 will be devoted to inspection trips to points of engineering interest.

Financial and Corporate

BANK HOLDINGS OF PUBLIC UTILITY BONDS

According to the report of the Comptroller of the Currency for the year ended June 30, 1914, the holdings of public utility bonds by the 26,765 banks of all kinds in the United States on that date were less by $137,500,000 than on the corresponding date in 1913. At the same time holdings of railroad bonds by these banks increased $145,100,000.

This decrease in public utility holdings and increase in holdings of railroad bonds were caused by changes in the investments of trust companies and savings banks. The national banks took the opposite course in increasing their holdings of public utility bonds and decreasing their holdings of railroad bonds.

The holdings of these classes of bonds over a three-year period are as follows:

PUBLIC UTILITY BONDS

	1914	1913	1912
National banks	$218,200,000	$197,400,000	$195,700,000
Trust companies	224,700,000	334,300,000	208,700,000
State banks	50,800,000	52,900,000	53,600,000
Savings banks	88,500,000	135,300,000	143,500,000
	$583,900,000	$721,400,000	$603,500,000

RAILROAD BONDS

	1914	1913	1912
National banks	$341,700,000	$345,200,000	$384,300,000
Trust companies	395,300,000	297,200,000	380,200,000
State banks	76,600,000	65,500,000	71,500,000
Savings banks	859,600,000	821,500,000	794,100,000
	$1,675,300,000	$1,530,200,000	$1,631,600,000

The 7525 national banks reporting, increased their holdings of public utility bonds $20,800,000 in the period from June, 1913, to July, 1914, while at the same time their investments in railroad bonds decreased $3,500,000. The 1564 trust companies in this period increased their investments in railroad bonds by $98,100,000 and decreased their holdings of public utility bonds by $109,600,000. The 14,512 state banks decreased their public utility holdings by $2,100,000 and increased their investment in railroad bonds by $11,100,000. The 2100 mutual and stock savings banks increased their investments in railroad bonds by $38,100,000 and decreased their public utility bond holdings by $46,800,000.

The aggregate amount of holdings by all banks on June 30, 1914, was $5,584,900,000, of which 10.43 per cent was in public utility bonds. The proportion of public utility bonds to the total holdings by each class of banks was as follows: State banks, 13.70 per cent; mutual savings banks, 4.50 per cent; stock savings banks, 0.427 per cent; private banks, 10.43 per cent; trust companies, 17.82 per cent; national banks, 11.40 per cent.

CAPITALIZATION REPORT OF NEW YORK COMMISSION

The division of capitalization of the Public Service Commission for the Second District of New York reports that the net amount of new securities authorized during the calendar year 1914 was $178,722,277. Since 1907 the commission has authorized nearly a billion dollars' worth of securities. A large part of the increase in 1914 was probably due to refunding operations and a number of purchases where securities were merely exchanged. During the year only ninety-four applications were made for authority to issue new securities, as compared to 126 in 1913 and 111 in 1912. For the first time since it was created, the division began the new year with practically a clean slate. Commenting on the acquisition of one property by another, H. C. Hopson, chief of the division, says that in many cases the purchasing corporation is obliged to pay a price in excess of the original cost of the physical property acquired. The commission allows the increased purchase price but insists upon its amortization over a reasonable number of years. This practice results in a conservative statement of the property accounts of the acquiring company, and at the same time makes it possible to put into effect immediately the savings resulting from the cutting down of competition and the instituting of centralized management. Mr. Hopson also emphasizes the fact that corporations should take better care of the filing of their vouchers and also make better explanations for entries in their capital accounts.

ANNUAL REPORT

Lehigh Valley Transit Company

The statement of income, profit and loss of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Nov. 30, 1914, follows:

Operating revenues:	
Revenue from transportation:	
Passenger revenue	$1,446,694
Other transportation revenue	78,075
Total	$1,524,769
Revenue from other railway operations: Power sales, etc.	344,236
Total operating revenue	$1,869,005
Operating expenses	1,052,693
Net operating revenue	$816,312
Taxes	97,961
Operating income	$718,351
Non-operating income:	
Dividend income	$107,963
Interest on notes, bank balances, etc	14,985
Total	$122,948
Gross income	$841,299
Deductions from gross income:	
Interest on funded debt	$530,894
Rent for leased roads	53,341
Interest on unfunded debt	17,915
Amortization of discount on funded debt	20,432
Miscellaneous debits: Legal expenses, etc	10,596
Total	$633,178
Net income	$208,121

In spite of the widespread business depression and the unusually severe winter, the gross earnings of the company increased slightly more than 1 per cent during the year. The report states that the company maintained its property at its usual standard and also continued to carry out its original program of improvements. An amount of 22 per cent of the gross earnings was allowed for maintenance and depreciation. The company now operates 167 miles of railway, of which 146.38 miles are owned and 20.62 miles are leased. Its rolling stock consists of 113 closed cars, forty-one open cars, eleven freight cars and thirty service cars, making a total of 195 cars.

During the year the company acquired all the outstanding stock of the Easton Consolidated Electric Company. This company, in addition to the ownership of the Edison Illuminating Company of Easton, owns and controls 54 miles of railway from Easton to the Bethlehem district. It is stated that the through service established between Easton and Allentown has produced a large increase in the receipts of this line over the previous year, to the profit of both companies. The surplus earnings of the controlled company for the year ended Dec. 31, 1914 (December estimated), were stated to be $87,163. The interest charges on the collateral trust bonds now outstanding amount to $55,446, thus leaving a profit of $51,717 for the Lehigh Valley Transit Company on its investment.

In regard to its freight and express service, the report says that an efficient service of this character is operated from all points on the Lehigh Valley Transit Company to Philadelphia in connection with the freight department of the Philadelphia Rapid Transit Company. Arrangements were completed to include the Lansdale-Morristown territory on Jan. 2, 1915. The company rents a portion of the new transfer station erected by the Philadelphia Rapid Transit Company at Chestnut Hill, the transfer point. During the year the surplus from the freight department increased 25 per cent in the face of the prevailing adverse business conditions. Moreover, the surplus from the Adams Express Company business was 80 per cent more than during the previous year.

In summarizing the year's work, special attention was called to new track in Allentown, on the Bethlehem Pike, and in New Jersey; the installation of automatic signals on the Slatington Division; the removal of dangerous curves and steep grades; the building of new equipment in the company's shops; the purchase of nine new prepayment cars and the increased patronage of the company's high-speed limited service.

AMERICAN CITIES COMPANY PROSPECTS

Member of Visiting Board of Directors Describes Conditions Existing in Company's Subsidiaries

The board of directors of the American Cities Company, New York, recently made a week's tour of the properties of the constituent companies at Houston, Tex.; Little Rock, Ark.; Memphis, Tenn.; Knoxville, Tenn., and Birmingham, Ala. One of the directors, Frank B. Hayne, New Orleans, in describing the unanimous conclusions of the board, states that a thorough inspection was made of all the properties, including power houses, car shops, trackage and gas works, and the physical property of each subsidiary was found to be modern, up to date and competently handled. The properties are fully rounded out to serve each community adequately, and the existing facilities are in advance of requirements. The important question now is to develop fully the available business for which the systems have been so adequately equipped.

Continuing, Mr. Hayne says:

"A most gratifying spirit of co-operation on the part of the citizens was exhibited toward the public utilities in each city visited. It was very pleasing to hear one Mayor refer to the American Cities Company as the greatest factor in helping to build up his city. In each city we were met by representative men who spent the full day not only in going around the properties with us, but also in explaining the advantages and constant development of their cities. It was most encouraging to note the progressive development of these communities, and to know of the enthusiasm of each with respect to its future growth.

"Of equal weight with this spirit of co-operation was the outspoken recognition on the part of the leading citizens that the encouragement of outside capital was of the highest importance, that the most successful way to draw additional outside capital to their cities was through a broad distribution of the local company's securities, placed in the hands of satisfied investors, and that to attack outside capital invested in their cities was the most certain way to deprive their communities of additional outside funds. This attitude toward the investment of capital in public utility companies is most encouraging."

THIRD AVENUE DIVIDEND RECOMMENDED

After Investigation, Stockholders' Committee Asks for Quarterly Dividend of 1 Per Cent

The committee of stockholders of the Third Avenue Railway, New York, N. Y., appointed by President Frederick W. Whitridge at the last annual meeting to investigate the affairs of the company, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1914, submitted a report on Feb. 1, in which it recommended that a quarterly dividend of 1 per cent be declared shortly after the beginning of the next fiscal year, to be paid not later than Oct. 1, 1915. The committee stated that with dividends paid at such a rate, there was no reason why the assets of the company should not continue to increase, why the conservative management of the company should suffer interference, or why the company should not be able to keep up its budget requirements besides adding to its surplus.

In reaching its conclusions, the committee said: "The special reserve for depreciation and contingencies from the statement ended June 30, 1914, has reached a total amount of $1,152,750. This amount was clearly a part of the net earnings of the property and should be considered as a part of the surplus earned since the company's organization, Jan. 1, 1912, which would increase the net income from $2,050,173 to $3,202,923. In 1914 the surplus earnings were $626,306 plus the reserve created for depreciation and contingencies, or $511,250—total, $1,137,556. These figures show that the net earnings of the company for 1914 were the equivalent of approximately 8 per cent on the stock, exclusive of the high maintenance charges, which were themselves a very liberal offset against depreciation."

The report gave the present management a clean bill of health and found that the physical property of the company is in commendable condition. In regard to the control exercised by the board of directors, however, the committee reported as follows:

"The records show that the company's directors, collectively, have at no time owned more than 113 shares of the total outstanding stock. The directorate is justly criticised as representing the bondholders and not the stockholders. A more general representation of the latter's interests is desirable as a matter of propriety as well as public policy."

The committee also stated that the annual report of the company should be in the hands of stockholders thirty days before the annual meeting. In a letter to the board of directors, President Whitridge agrees to this recommendation, but he states that the committee is in error in considering the depreciation reserve as earnings. Regarding the representative character of the board, he says:

"The committee is mistaken in supposing that the present board represents only 113 shares of stock. One director is the representative of a company which has 6025 shares of stock in its name, and two directors are members of firms which at the time of the stockholders' meeting held 2722 shares and 2015 shares, respectively. Besides this, I believe that the present directors represent many thousands of shares in addition."

British Columbia Electric Railway, Ltd., Vancouver, B. C.—It is announced that a dividend of 5 per cent per year has been declared on the preferred ordinary stock of the British Columbia Electric Railway for the half year, payable on Feb. 1. Last year a dividend of 6 per cent was paid.

Brooklyn (N. Y.) Rapid Transit Company.—In regard to the gross and net earnings of the Brooklyn Rapid Transit Company, which are published in this issue in the Table of Monthly Earnings, the company says that the abnormal gain in the operating revenue over the six months in 1913, $972,225, or 7.69 per cent, was caused by the operation this year of a part of the system of lines of the Coney Island & Brooklyn Railroad. The large increase in operating expenses, $801,834, was caused by the same factor. The decrease in fixed charges, $117,567, was brought about by the conversion of refunding 4 per cent bonds into preferred stock. At the recent annual meeting of the company, Eugene N. Foss, Boston, was added to the board of directors to fill the vacancy caused by the resignation of George F. Porter. At the present time the company has 8406 stockholders, compared to 6319 on June 9, 1914, and 3709 on June 9, 1913.

Chicago City & Connecting Railways, Chicago, Ill.—The financial statement of the Chicago City & Connecting Railways, formed as a collateral trust in 1910 to hold securities of the Chicago City Railway and various connecting railways serving outlying districts, shows that the gross income for the year ended Dec. 31, 1914, was $2,052,026, consisting of $1,964,771 from dividends and $87,255 from interest. Disbursements during the year required the following sums: Bond interest, $1,100,000; general expense, $45,081, and interest on bills payable, $16,033, a total of $1,161,114. The net income, therefore, was $890,912, which after a deduction of $875,000 for dividends on participation shares gave a surplus of $15,912.

Cleveland, Youngstown & Eastern Railway, Cleveland, Ohio.—On Jan. 30 Judge Pearson of the Cuyahoga County Common Pleas Court gave the Citizens' Savings & Trust Company, trustee for the bondholders, a judgment for $53,560 against the Cleveland, Youngstown & Eastern Railway on mortgages covering the portion of its line in Geauga and Portage Counties. Receiver Robert Beatty, whose appointment was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, was ordered to sell that portion of the property within ten days, unless the mortgage is satisfied within the period. Bondholders charge that the line has been allowed to deteriorate.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The stockholders of the Columbus Railway, Power & Light Company on Jan. 26 approved the proposition to purchase the Columbus Light, Heat & Power Company. Previous references to this purchase were made in the ELECTRIC RAILWAY JOURNAL of Nov. 7, Nov. 14, and Nov. 28, 1914, and Jan. 9 and Jan. 23, 1915.

Electric Bond & Share Company, New York, N. Y.—The directors of the Electric Bond & Share Company have called a special meeting of stockholders on Feb. 17 after the regular annual meeting for the purpose of authorizing an increase in the company's capitalization from $10,000,000 to $16,000,000 through adding $3,000,000 of 6 per cent preferred stock and $3,000,000 of common stock.

Gary & Interurban Railroad, Gary, Ind.—It has just been announced that the payment of coupons due on Sept. 1, 1914, on the $350,000 of 6 per cent convertible notes of the Gary & Interurban Railroad, which payment was for a time deferred, was made on Nov. 29, 1914.

Long Island Railroad, New York, N. Y.—Dick Brothers & Company, New York, are asking for proxies to be used at the annual meeting of the Long Island Railroad on April 13. It is asserted by the bankers that during the fourteen years when the Pennsylvania Railroad has operated this property the debts have increased more than $50,000,000, and the net earnings have been reduced from a substantial surplus to a deficit in 1915 of almost $1,000,000. According to a statement issued by President Ralph Peters, the Pennsylvania Railroad acquired its interest in the stock of the Long Island Railroad in 1901. At that time the Long Island Railroad was not paying dividends and had not paid any for five years. The property needed rehabilitation to eliminate grade crossings and electrify its road. This work, which is approaching completion, has involved an outlay of about $50,000,000, and has been accomplished largely through the co-operation of the Pennsylvania Railroad and by the use of that company's credit, without any assistance from the other stockholders. Mr. Peters mentioned several improvements which have been to the advantage of the Long Island Railroad, but which have been paid for by the Pennsylvania Railroad. In his opinion the charges made for the use of the Pennsylvania Terminal and the East River Tunnels are moderate, and the result through their aid has been a large increase in passenger traffic.

Mexico Tramways, Mexico City, Mexico.—It is reported that the Mexico Tramways has deferred the interest due on Jan. 1 on $6,083,333 of 6 per cent mortgage second issue bonds. The company has interest due on March 1 on $10,298,000 of first consolidated bonds, and it is probable this will also be defaulted, as conditions in Mexico are not improving.

Michigan Railway, Kalamazoo, Mich.—E. W. Clark & Company, Philadelphia, are offering to yield about 6.5 per cent the unsold portion of an issue of $5,000,000 of first lien 6 per cent five-year gold notes of the Michigan Railway. The notes are dated June 1, 1914, and mature on June 1, 1919. The payment of principal and interest is guaranteed by the controlling company, the Commonwealth Power, Railway & Light Company. A full description of this issue was given in the ELECTRIC RAILWAY JOURNAL of June 27, 1914, in connection with the original offer of the notes.

Monterey & Pacific Grove Railway, Monterey, Cal.—At a recent meeting of the bondholders of the Monterey & Pacific Grove Railway, a protective committee, consisting of Carver Pomeroy, W. F. Williamson and R. H. Cross, was appointed. The interest default on the first mortgage 6 per cent bonds of this company was noted in the ELECTRIC RAILWAY JOURNAL of Jan 23. "Jitney" bus competition was stated to be the cause of the default. This company is controlled by the Coast Valleys Gas & Electric Company, a subsidiary of the California Railway & Power Company.

New England Investment & Security Company, Springfield, Mass—The *Boston News Bureau* of Jan. 27 says: "On April 1 the $13,709,000 of New England Investment & Security Company debentures would, under their indenture, be entitled to a 2 per cent interest payment, or one-half of 1 per cent more than the semi-annual rate during the first five years of their fifteen-year term. According to the last New Haven report, these debentures were owned by the New England Navigation Company and carried by it at a book value of almost par, although appraised at only $9,000,000 as collateral behind the $20,000,000 of short-term notes of the New England Navigation Company. An understanding has recently been reached with the New Haven interests by which the latter will on April 1 receive but 1 per cent on these notes and be afterwards allotted the full interest rate only if earned. Without such a reduction in charges, the income of the New England Investment Company for the last six months would have been considerably short of the 2 per cent semi-annual disbursement made on Jan. 1 on its 40,000 preferred shares. Holders of about 34,000 shares of preferred stock who last autumn contributed $10 per share toward the purchase of the company's 1000 shares of common stock, are likely to receive back from the protective committee which has closed that transaction not far from $1.75 per share. This means that Sanderson & Porter received about $275,000 for the common stock, as compared to the $200,000 which they paid for it."

New York State Railways, Rochester, N. Y.—Harris, Forbes & Company, New York; N. W. Harris & Company, Inc., Boston, and the Harris Trust & Savings Bank, Chicago, are offering for sale fifty-year first consolidated mortgage 4½ per cent gold bonds of the New York State Railways. These bonds are dated 1912 and due Nov. 1, 1962, but are callable at 105 and interest on any interest date. The purchase of these bonds through J. P. Morgan & Company for a banking syndicate was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 30. An amount of $6,925,000 of this issue is already listed on the New York Stock Exchange, and application will be made to list the remainder.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The committee appointed on Dec. 11 by the security holders of the Oakland, Antioch & Eastern Railway to look into the affairs of the company, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 19, has reported unfavorably upon the plan of the management for the financing of the company during the next three years. The main finding of the committee is that the plan is unfair to the bondholders, in that it would increase the liabilities of the company by creating new debts through the issuance of new notes and the pledging of new bonds. After the report was submitted the security holders authorized the appointment of a new committee of seven members, three to be appointed by the security holders, three by the directors and the seventh member by the two foregoing groups. It is reported that the time for the payment of the assessment of $1.50 per share on the stock of this company and of $3 per share on the stock of the Oakland & Antioch Railway, called for Jan. 15, has been extended to Feb. 13.

Ohio Traction Company, Cincinnati, Ohio.—On Jan. 25 the Ohio Public Utilities Commission authorized the Ohio Traction Company to issue $1,500,000 of 6 per cent gold coupon notes to be sold for the highest price obtainable but for not less than 95. These notes mature as follows: Sept. 1, 1916, $200,000; Sept. 1, 1917, and Sept. 1, 1918, $300,000, and Sept. 1, 1919, and Sept. 1, 1920, $350,000. This issue has been authorized to take the place of $750,000 of 5 per cent preferred stock authorized in 1912 to be sold at 90, and $300,000 authorized in 1913, which the company has been unable to market on the terms prescribed by the commission. The proceeds from this note issue, just as in the original authorization of the stock, are to be used to reimburse the company for expenditures made on capital account.

Quebec Railway, Light, Heat & Power Company, Quebec, Can.—The Quebec-Jacques Cartier Electric Company, a subsidiary of the Quebec Railway, Light, Heat & Power Company, has defaulted interest on its first mortgage 5 per cent bonds due on Dec. 1, 1914, and a protective committee has been formed with the Bankers Trust Company, New York, as depository. It is reported that the subsidiary is simply taking advantage of the ninety-day period of grace allowed by the indenture and that arrangements will be made by March 1, when foreclosure proceedings would be possible, to pay the interest.

Republic Railway & Light Company, New York, N. Y.—White, Weld & Company and Montgomery, Clothier & Tyler, both of New York, are offering for sale at 98¾ and interest, to yield 6¼ per cent, 5 per cent secured gold notes of the Republic Railway & Light Company, dated April 1, 1912, and due on Jan. 1, 1916. These notes are redeemable at 100 and interest at thirty days' notice. They are secured by deposit with the trustee of 98.5 per cent of the stock of the Mahoning & Shenango Railway & Light Company, and are also a first lien, through deposit of first mortgage bonds, on new power house and other physical property costing more than $1,720,000.

San Francisco-Oakland Terminal Railways, San Francisco, Cal.—The California Railroad Commission has issued a notice to the effect that it will conduct on its own initiative an investigation as to the value of the property of the San Francisco-Oakland Terminal Railways. A public hearing in the matter has been set for Feb. 23 in San Francisco before Commissioner Phelen.

Twin City Rapid Transit Company, Minneapolis, Minn.—Donald Goodrich, who is a son of C. G. Goodrich, president Twin City Rapid Transit Company, has been elected a director to succeed Sir Henry M. Pellatt. It is reported that a proposition to reduce the membership of the board from twelve to eleven will be taken under consideration at a later date.

United Light & Railways Company, Grand Rapids, Mich.—N. W. Halsey & Company, New York, are placing on a 6¾ per cent basis $1,500,000 of 6 per cent gold coupon notes of the United Light & Railways Company. These notes are dated Jan. 1, 1915, and are due Jan. 1, 1918, and Jan. 1, 1920, but are callable, all or in part, upon four weeks' notice at 100 and interest and 101 and interest, respectively. The proceeds of these notes will be used to complete payments on property heretofore acquired and to reimburse the treasury for improvements to subsidiary properties. The notes will be secured by deposit with the New York Trust Company, as trustee, of $2,000,000 of first and refunding mortgage 5 per cent bonds, due in 1932. The authorized note issue is $3,000,000, but in addition to the present $1,500,000, more notes may be issued only as additional bonds are pledged and only in an amount not to exceed 75 per cent of their par value.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Illinois Traction System, Peoria, Ill., quarterly, 3 per cent, common.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Dec., '14	$467,973	......	......	......	......
1 " " '13	462,149	......	......	......	......
6 " " '14	2,866,770	......	......	......	......
6 " " '13	2,872,839	......	......	......	......
ATLANTIC SHORE RAILWAY, SANFORD, MAINE					
1m., Dec., '14	$23,722	*$22,873	$849	......	......
1 " " '13	24,608	*21,377	3,231	......	......
BROOKLYN (N. Y.) RAPID TRANSIT COMPANY					
6m., Dec.,'14	$13,607,760	$7,521,934	$6,085,826	$2,350,593	†$3,096,993
6 " " '13	12,635,535	6,720,100	5,915,435	2,733,794	†2,733,793
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO.					
1m., Dec., '14	$96,900	$62,470	$34,430	$30,791	$3,639
1 " " '13	105,365	62,807	42,557	33,087	9,470
12 " " '14	1,255,283	757,020	498,262	386,725	111,537
12 " " '13	1,255,235	759,387	495,848	381,930	133,918
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., Dec., '14	$3,000,365	$1,365,197	$1,635,168	$913,036	‡$776,416
1 " " '13	3,035,729	1,332,748	1,702,981	913,149	‡843,904
6 " " '14	16,270,705	7,404,178	8,866,527	7,209,819	‡3,689,954
6 " " '13	15,999,453	8,866,527	7,132,926	7,209,819	‡3,272,574
MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.					
12m., Dec., '14	$968,389	$415,724	$552,665	$308,642	$244,023
12 " " '13	960,262	346,712	613,549	298,048	315,501
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY					
1m., Dec., '14	$2,074,523	$1,202,654	$871,869	$807,016	$64,853
1 " " '13	2,141,522	1,248,860	892,662	808,663	83,999
6 " " '14	11,945,123	6,898,721	5,046,402	4,847,955	198,447
6 " " '13	12,239,537	7,136,034	5,103,503	4,796,161	307,342

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*Includes taxes. †Includes adjustments. ‡Includes other income.

Traffic and Transportation

THE "JITNEY" BUS

Thirty-nine Cities Have at the Present Time Been Invaded by the Fare Snipers

Among the cities in which "jitney" bus services have been installed are Los Angeles, Oakland, Pasadena, Fresno, San Diego, San Francisco, Portland, Seattle, Tacoma, Vancouver, El Paso, Houston, Galveston, Ft. Worth, Dallas, Austin, San Antonio, Beaumont, Wichita, Lawrence, Topeka, Emporia, Kansas City, Joplin, St. Joseph, St. Louis, Ogden, Birmingham, Des Moines, Fort Smith, Oklahoma City, Tulsa, Denver, Baltimore, Sterling, Ill.; Pittsburg, Kan.; Omaha, New Orleans and Detroit.

"Jitney" owners in Kansas City have been besieging the casualty companies for liability insurance, but without success. A slight accident, when a small car, heavily loaded, overturned at a curve, injuring three persons, has brought to the attention of the drivers and owners the question of responsibility for damages. One insurance agent said: "We are very careful in writing liability on automobiles, and it is unlikely that any cars in the service have previously been covered. The car must be paid for or be backed by substantial assets before we write it. Such cars are not going into the 'jitney' business."

No action has been taken at Kansas City so far to cancel liability insurance on automobiles that are put into "jitney" service, but such procedure was intimated. Liability companies seem uncertain as to whether the usual double indemnity for injury while riding in a public conveyance would be collectible by the holder of a personal accident policy.

The Kansas City *Times* is carrying a column headed "Kansas City's 'Jitney' Service," under which the bus routes so far established are enumerated and number of cars and leaving times given wherever possible, and also the name of the person operating the route.

So significant does the San Antonio *Express* consider the bus situation that in its issue of Jan. 20 it reproduced under a heading from San Diego, Cal., the entire letter of William Clayton, managing director of the San Diego Electric Railway, addressed to the Common Council of that city. This communication had been published in abstract in the ELECTRIC RAILWAY JOURNAL.

The chief engineer of the Public Service Commission of the State of Washington has reported to Chairman Charles Reynolds of the commission in regard to the operation of the "jitney" buses in Seattle. He recommends that immediate action be taken to remedy the situation. According to the engineer the Seattle Electric Company is losing $2,450 in revenues daily, while the bus drivers are making an average net profit or wage of $2.33 a day. The report says that the 518 buses in that city are carrying 49,000 passengers daily who formerly rode on the electric street railways.

Councilman Allen Dale, of Seattle, is fathering a bill to compel bus owners to come under identical regulation with the street railways in the matter of handling passengers, gross earning tax, construction of bridges and maintenance of paved streets. Councilman Hesketh seeks to have the capacity of every vehicle operated for hire limited to its seating capacity. A third ordinance is in course of preparation to settle definite routes of travel through the downtown streets for buses. "Jitney" bus drivers will, however, come under the provisions of the ordinance recently passed by the City Council requiring all drivers of motor vehicles for hire to pass not only a medical examination but one as to proficiency in handling cars on crowded thoroughfares. This ordinance becomes effective on Feb. 7.

Objection to the operation of buses has taken a new turn at North Yakima, Wash. In that city the Electrical Workers' Union has gone on record as being opposed to the buses on the ground that they are jeopardizing the street railway service with the result that many street railway men, among them electrical workers, will be thrown out of employment.

The "jitney" bus has made its appearance in Detroit, one car operating on Woodward Avenue the early part of the week ended Jan. 30. Newspaper announcements state that others are to be placed in service. It has also been announced that a company is to be organized to run the buses along systematic lines.

Interviewed by the Oklahoma *News* in regard to the "jitney" bus, George W. Knox, general manager of the Oklahoma Railway, said in part:

"I am not at all downhearted about the little pest that has, I am sure it will prove, temporarily infested itself upon us. It is only another example of one of the characteristic spasms of the American people to try something new, and the scheme will have to run its course, regardless of the economic features involved; that is, duplicating an already adequate service means someone is squandering or losing resources and the fiddler will have to be paid finally, and it is inevitable that the public will have to foot the bill.

"Anyone who owns an automobile, if he will take just a few moments of his time and will be honest with himself, will be able to demonstrate that by this system it is not possible to transport passengers for 5 cents, even short distances, at a profit. Taking a few concrete examples, here is a case where under most favorable conditions the 'jitney' service has been applied with the following results:

Average hours per day of cars in service	15
Average speed in miles, per hour	14
Average earnings per car, per hour, in cents	70
Average earning per car, per mile, in cents	5
Operating costs, in cents:	
Oil and gasoline, per mile	1
Tires and tubes, per mile	1
Maintenance, per mile	1½
Depreciation, per mile	1
Wages of operators, per mile	2
Total cost of operation per mile	6½

"The cars used in the above mentioned instance were the best type of light efficient machines made. If larger capacity cars are used, the cost of operation will be nearly doubled. As further evidence of the failure of the plan, it is known that a well-organized and equipped auto bus concern on the Pacific coast has had to go into the hands of a receiver and has quit business.

"I have always found the people of Oklahoma fair, and in fact, the great strides made in its wonderful development are due to the spirit of fairness manifested, one business toward the other, so it will be in this matter, further than this—ish ka bibble."

The State Board of Equalization of California, in its report, says:

"The Pacific Electric Railway, which has made careful observation of automobile competition with its lines, reports to this board that the company alone is losing $20,000 a month or $240,000 per annum from this cause. The State tax on that alone would have been $11,400. One company alone carried 122,686 passengers in a period of thirteen days with an estimated revenue of nearly $24,000. It is probable the State loss from this source is at least $200,000 per annum.

"In addition to the big double-deck buses and other large motors that ply over more or less regular routes and on a more or less definite time schedule, there are many smaller vehicles plying for hire on less regular schedules, all doing the same kind of business which comes under the purview of the State tax system. It would appear that the State tax system ought to be extended to cover these carriers, both to protect the State revenues and in justice to the taxed transportation companies."

The Denver Tramway Company has issued a modern fable, entitled "The Landlord," written by John A. Beeler, vice-president and general manager. In this fable the municipality represents the landlord; and the premises, the city streets. The moral is that the taxes and sums paid for city improvements by the tramway are of more importance to the landlord than the insignificant license fees paid by "jitney" bus operators. In addition to the franchise and general tax aggregating more than $200,000 per year, the tramway company pays interest on about $2,000,000 of bonds that have been issued for street paving, grading and other public improvements, which at 6 per cent amounts to about $120,000 per year. Repairs to paving and the removal of snow and ice average about $50,000 per year. These items total $370,000, all of which goes to the public good. On the contrary, however, if the proposed sixty-six "jitney" buses were permitted to operate under the ordinary $25 annual motor license, as they desire to do, they would pay $1,650 yearly, and their operation would undoubtedly involve the city in tremendous police expense for handling the traffic.

It is said that nearly 85 per cent of the expenditures of the tramway company for combined construction and operation are made locally for home products, materials, fuel and wages. Exactly the opposite, however, is true of the "jitney" buses, for fully 85 per cent of their expenditures are made abroad for autos, tires, gasoline and repair parts. As regards accidents, too, the "jitney" buses are reported to be leaving behind them a trail of killed, maimed and injured in the Pacific coast cities, and the congestion in the streets there has become dangerous and alarming. In summing up the case, Mr. Beeler states that the success of the "jitney" bus depends upon their escaping the responsibility of paying for franchise rentals, street paving, grading, viaducts and other public burdens that have fallen upon the street car companies, and upon their stealing the cream of the transportation business. If such buses want to compete with electric railways, they should be required to do so on equal terms and under equal conditions.

THE COPPER ZONE SYSTEM

New Fare Collection System of Union Traction Company of Indiana Working Satisfactorily

Officials of the Union Traction Company of Indiana, which on Jan. 1 adopted the copper zone system for passenger fares, approved by the Public Service Commission of Indiana, state that the new system is working out very satisfactorily. With the introduction of the new zone plan a system of cash fare receipts was inaugurated to take the place of the recording fare registers which have been in use on the interurban cars of the company, and the fare registers have been removed from the cars. The fare receipts are in duplicate, passenger's fare receipt and auditor's stub, numbered consecutively and bound in pads. At the end of each run the conductor turns in the duplicate receipts in an envelope, and each day the stubs in the conductor's book and the cash fares for the day are audited at the principal offices of the company at Anderson.

The management of the company believes that the new system of fare receipts is proving most satisfactory in obtaining an accurate accounting of all fares collected from passengers on the cars. Since the new copper zone system went into effect an increase has been shown in the number of passengers who purchase tickets before boarding the cars. In fact, it is estimated that more than 85 per cent of the passengers are now purchasing tickets at the stations. Under the new copper zone system the company filed tariffs which put into effect on its lines in Indiana rates which approximated 2 cents a mile for the actual distance traveled, with a minimum of 5 cents. Commutation tickets are sold in books of twenty round trips at the rate of 1¼ cents a mile, and the sale of round-trip tickets at an amount less than two full one-way fares was discontinued. Many inequalities in the old nickel zone system have been eliminated by the adoption of the new system.

TICKET SALES AT BOOTHS IN KANSAS CITY

The middle of January the Metropolitan Street Railway, Kansas City, Mo., built a booth at the corner curb line where passengers for and from the new union station are handled. General agents of the company, as they are called, occupy this booth from the first regular car in the morning until midnight, chiefly to answer questions as to destinations and routes, and to look after the running of the cars. Incidentally, tickets are sold at 5 cents each—no reduction for quantities—at the booth. There was some doubt as to how extensively the opportunity to buy single-ride tickets would be taken advantage of, but the feature has proved very popular. Half-fare tickets are also sold at the booth. Heretofore the full-fare tickets have been purchased at the company's offices, chiefly by firms which provide their employees with transportation. Conductors sell half-fare tickets only.

No Reduction in Traffic in Washington.—The Washington Railway & Electric Company has been informed by the Public Utilities Commission of the District of Columbia that observations made by its inspectors show that the service now in force is demanded by traffic conditions and must be continued.

Chicago to Issue Official Booklet of Traffic Facts.—It was decided at a recent meeting of the committee on local transportation of the City Council of Chicago, Ill., to authorize R. F. Kelker, Jr., traction supervisor, to prepare a booklet of facts not generally known to the public regarding street railway service in the city.

Brooklyn Inquiry Concluded.—The inquiry being conducted by the Public Service Commission of the First District of New York into the adequacy of the service of the surface lines of the Brooklyn Rapid Transit Company was concluded on Feb. 1. The principal witness was Slaughter W. Huff, vice-president of the company.

Louisville-Indianapolis Hearing.—The Louisville Board of Trade has received notification of indefinite postponement of the hearing before the Interstate Commerce Commission in connection with the reopened case against the Indianapolis, Columbus & Southern Traction Company and other lines connecting with Indianapolis. The hearing was to have been held on Jan. 29.

New Freight Rates.—The Mahoning & Shenango Railway & Light Company has filed a revision of its freight rates with the Interstate Commerce Commission and the Ohio and Pennsylvania commissions, to become effective on Feb. 15. The new tariff provides for through rates over all lines of the system based on the distance freight is carried. A small increase is made in the rates for milk.

New Indianapolis Traffic Ordinance.—The City Council of Indianapolis recently passed an ordinance, which is now being put into effect, requiring that all cars shall stop on signal on the far side as well as the near side of certain street intersections in the downtown district, where the distance over the crossing is very considerable on account of the intersection of wide north and south streets with diagonal avenues.

Decision in Atlanta Service Case.—In its decision upon the petition of the Georgia Railway & Power Company, Atlanta, Ga., to curtail its service on fourteen lines in Atlanta, the State Railroad Commission has granted in full the prayer of the company for curtailments on two routes and granted in part or conditionally the company's petition regarding five other lines. The other seven lines were not allowed to be changed.

New Street Rule in Detroit.—A new stopping ordinance has been passed recently in Detroit, Mich., which permits the driver of a vehicle to pass between the running board or lower step of a car headed in the same direction, when stopping to discharge or take on passengers, provided there is a 6-ft. clearance between the car step and the vehicle. If it is not possible to allow this clearance the vehicle is required to stop at least 6 ft. from the rear end of the car.

Change in Zone System Denied.—The Public Service Commission of Maryland has rendered a decision in the case of F. L. Hawley versus the City & Suburban Railway, Washington, D. C. The question at issue was the division of the line for the boundary of the District of Columbia to Laurel into five zones with a cash fare of 5 cents for each. The complainant desired four zones with the same fare, but the commission decided that the Interstate Commerce Commission under the Shreveport decision had the final authority in the matter, and it, in establishing six zones between Laurel and Washington, had already provided five between Laurel and the district boundary.

Fares in Edmonton.—The following fares were put into effect on the Edmonton (Alta.) Municipal Electric Railway on Dec. 15: Regular fare, 5 cents cash; tickets (lilac), five for 25 cents, good at all hours; tickets (brown), six for 25 cents, good from 6 a. m. to 8 a. m., 12 noon to 2 p. m., 5 p. m. to 7 p. m., not good on Sundays or public holidays; children's tickets (green) from five to fourteen years, ten for 25 cents. Two children are permitted to travel on 5 cents cash or one regular ticket. A double fare is charged after midnight, payable in cash or tickets. Tickets intended for use by persons on city's business are sold at the rate of twenty-five for $1.

Answer to Albany Suit.—Ledyard P. Hale, counsel to the Public Service Commission for the Second District of New York, has filed an answer to the writ of certiorari obtained by the United Traction Company, Albany, for a review of the commission's order requiring better service from the company in Albany. In the answer Mr. Hale denies that the commission's order is illegal or erroneous and states that a hearing is the proper method of offering any additional facts by the company and that a rehearing of the case is not necessary. The papers in the case will be printed immediately and an argument had before the Appellate Division in the first week of the term beginning March 2.

Traffic Survey in New Orleans.—D. D. Curran, president of the New Orleans Railway & Light Company, New Orleans, La., has presented to the Mayor of that city a summary of a traffic survey of most of the lines of the company for the period from Dec. 7 to Dec. 12, inclusive. In its communication to the Mayor the company says that since making the check it has added twenty-one cars to the various lines of its system and at the present time is operating a total of 443 cars daily, as compared with 422 for the same period of last year. In addition to this, the company has replaced fourteen large cars seating fifty-two persons each on the St. Charles and the Tulane Belt lines for fourteen smaller cars with a seating capacity of twenty-eight each. A traffic bureau has been organized to check traffic on all the lines of its system.

Highway Accidents in New York and New Jersey.—One-third fewer deaths in January in the streets of New York than a year ago are reported by the National Highways Protective Society, which estimates that the traffic on the streets has fallen off 30 per cent, 10 per cent of which is commercial traffic. During January, 1915, sixteen children lost their lives, fourteen being killed by automobiles, one by electric railway and one by wagon. The total number of persons killed was thirty-one, of which number automobiles killed twenty-three, electric railways four and wagons four. The number of persons killed on the streets and highways of New York State, outside of New York City, during the past month was eleven. Automobiles caused the death of seven and electric railways four, as compared with five by automobiles, five by electric railways and one by wagon in January, 1914. In New Jersey thirteen persons were killed by automobiles, as compared with eight during the month of January, 1914. Nine persons were killed at railroad grade crossings in New York and six in New Jersey during January.

Fare Order Respite.—Under the stipulation reached recently by the officers and patrons of the Seattle-Everett Interurban Railway the order of the State Public Service Commission of Washington of Dec. 24, reducing the rate charged by the company from 3 cents to 2 cents per mile has been deferred for a period of six months. The stipulation will ask the commission to validate the old schedule of rates, except that the company will issue a twenty-five ride book from the city limits to Seattle, as follows: To Lake Ballinger and intermediate points at the rate of 2 cents a mile; to Esperance, at the rate of 2.1 cents a mile; to Seattle Heights, at the rate of 2.2 cents a mile; to Cedar Valley substation, at the rate of 2.3 cents a mile; to Alderwood Manor, at the rate of 2.4 cents a mile; from the city limits of Everett to Silver Lake and intermediate points, at the rate of 2 cents a mile; the minimum fare in the case of a twenty-five ride ticket book to be 5 cents, the coupons to be good for transportation when presented with the book. The twenty-five ride ticket book, if continued beyond the term of six months' trial period, is to be good for one year from the date of sale. Pending a six months' trial of this experiment, no action will be taken upon the commission's order or the company's petition for rehearing.

Personal Mention

Mr. C. W. Colvin has been appointed transmission engineer of the British Columbia Electric Railway, Vancouver, B. C.

Mr. C. A. Hoag, who has been the assistant secretary and assistant treasurer of the Hagerstown & Frederick Railway, Hagerstown, Md., has resigned.

Mr. Alexander Armstrong, Jr., was elected assistant treasurer of the Hagerstown & Frederick Railway, Frederick, Md., to succeed Mr. C. A. Hoag, resigned.

Mr. J. L. Baird, heretofore assistant secretary and treasurer of the Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont., has been appointed auditor.

Mr. Carl D. Jackson, Oshkosh, has been confirmed by the Wisconsin Senate as the successor to Mr. John H. Roemer on the Railroad Commission of that State.

Mr. C. Loop, who has been acting roadmaster of the Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont., for the last year, has been appointed roadmaster.

Mr. A. R. Keele, heretofore assistant dispatcher of the Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont., has been appointed chief dispatcher of the company.

Mr. C. D. Flanigan, vice-president and general manager of the Athens Railway & Electric Company, Athens, Ga., has been elected president of the Athens Chamber of Commerce.

Mr. George Bullock has been elected chairman of the board of directors of the United Gas & Electric Engineering Corporation, New York, N. Y. He was formerly president of that company.

Mr. W. L. Palmer has resigned as claim agent for the Illinois Northern Utilities Company, at Dixon, Ill., to become claim agent for the Terra Haute division of the Terra Haute, Indianapolis & Eastern Traction Company.

Mr. A. Baltzer, heretofore shop foreman of the Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont., has been appointed master mechanic of the company in charge of shops and all work in connection therewith.

Mr. S. J. Dill, vice-president of the United Gas & Electric Engineering Corporation, New York, N. Y., has been placed in charge of the work of that company in the South, with headquarters at 201 Baronne Street, New Orleans, La.

Mr. Charles C. Mumford, one of the trustees of the Rhode Island Company, Providence, R. I., appointed by the Federal Department of Justice, has been elected president of the leased Providence & Danielson Railway to succeed Mr. D. F. Sherman.

Mr. C. P. Cooper has been appointed superintendent of the Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont., in charge of general operation. He has been with the company in various capacities from its construction days, and has been chief dispatcher for four years.

Mr. S. H. Bennett, general auditor Hagerstown & Frederick Railway, Frederick, Md., was elected assistant secretary of the company at the recent annual meeting, to succeed Mr. C. A. Hoag, resigned. Mr. Bennett will, in addition to this office, continue to hold that of general auditor.

Mr. J. S. Pevear, formerly president of the New Orleans Railway & Light Company, New Orleans, La., has been elected president of the United Gas & Electric Engineering Corporation, New York, N. Y., to succeed Mr. George Bullock, who has been elected chairman of the board of directors.

Mr. F. Howard Warfield, trust officer of the Fidelity Trust Company, Baltimore, Md., was elected vice-president of the Hagerstown & Frederick Railway, Frederick, Md., at the recent annual meeting of the railway. This office is a new one in addition to the vice-presidency held by Mr. Henry Holzapfel, who was re-elected.

Mr. F. S. Barnard, Victoria, B. C., who has been appointed Lieutenant-Governor of British Columbia, was born at Toronto, Ont., on May 16, 1856, and has been associated with the British Columbia Electric Railway for many years, acting recently as local adviser to the directors, most of whom reside in London, England.

Mr. Beecher W. Waltermire, an attorney of Findlay, has been appointed by Governor Willis to succeed Mr. E. W. Doty as a member of the Ohio Public Utilities Commission. Mr. Doty's term expired on Feb. 1. Mr. Waltermire was a candidate for lieutenant-governor in 1912 and has been successful on the lecture platform. He took part in the campaign for Governor Willis.

Mr. Pope Y. White, who has been appointed editor of the United Railways *Bulletin*, published in the interest of the employees of the United Railways, St. Louis, Mo., was engaged in daily newspaper work for fourteen years, advancing from reporter to telegraph editor, make-up editor, news editor and finally city editor, which place on the St. Louis *Times* he resigned to become connected with the United Railways.

Mr. Walter Alexander, Milwaukee, has been nominated as a member of the Railroad Commission of Wisconsin to succeed Mr. David Harlowe. For the last five years Mr. Alexander has been district master mechanic for the Chicago, Milwaukee & St. Paul Railway with headquarters at Milwaukee. Previous to this time he served on the faculties of the University of Wisconsin, Armour Institute and the University of Missouri.

Mr. Hugh McCloskey has resigned as chairman of the board of directors of the New Orleans Railway & Light Company, New Orleans, La. Mr. McCloskey was elected chairman of the board of the company and president of the American Cities Company in October, 1913. He first became identified with railway work in New Orleans as a member of the board of directors of one of the subsidiary companies under the New Orleans Railway & Light Company.

R. A. SEARS

Mr. Russell A. Sears, to whom was awarded the silver replica of the Anthony N. Brady safety medal, was born in New York in 1869, but was educated in the Boston public schools. He was admitted to the Massachusetts Bar in 1890 and for fifteen years was associated in law practice with Samuel L. Powers. He resides at Quincy, Mass., of which he was Mayor in 1898 and city solicitor in 1900 and 1901. He had early association with various street railways now comprising the Middlesex & Boston Street Railway before its consolidation with some of the street railways now included in the Bay State Street Railway. He has been associated with the Boston Elevated Railway as general attorney since October, 1902. In addition to his Boston Elevated activities, Mr. Sears is a director of the Massachusetts Employees' Insurance Association, the Granite Trust Company and the Citizens' Gas Light Company. Mr. Sears was nominated by his company to receive the safety award because he has taken a leading part in accident reduction. In addition to the activities mentioned elsewhere in this issue he has developed the machinery of his department to promote safe operation. For example, the department diligently prosecutes in the criminal courts all persons who make traveling upon the cars unpleasant and dangerous. Again, in connection with the department, accident clerks are appointed to spend their time in carhouses and lobbies instructing employees on safety matters. Mr. Sears supervises the work of the general secretary of safety committees. He has also organized a number of public campaigns, among them being one against the stealing of rides and the jumping on and off cars. Another was one to stimulate the writing of safety verses in the schools by means of a prize contest. A special campaign against drunkenness upon street cars gave excellent results.

Mr. William W. Chisholm, who has been appointed electrical engineer of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., was born at Caradoc, Ont., on Oct. 17, 1876. He entered railway service in June, 1896, and to April, 1897, was switchman on the Michigan Central Railroad, St. Thomas, Ont. From April, 1897, to March, 1898, he was yard conductor and assistant yardmaster of the Toronto, Hamilton & Buffalo Railway, Hamilton, Ont. From March, 1898, to June, 1903, he was brakeman of the Michigan Central Railroad, St. Thomas, Ont. In May, 1905, he became assistant chief engineer of the city pumping station at St. Thomas, Ont., and since November, 1907, he has been chief engineer of the power plant of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.

Mr. Henry V. Neal, to whom was recently awarded the bronze replica of the Anthony N. Brady medal, is sixty-six years of age. He has been in the employ of the Boston Elevated Railway for twenty-one years and is at present a mechanic in the Albany Street shops. Before coming to the Boston Elevated Railway, he was in the employ of the Hinckley Locomotive Works for thirteen years and the Boston & Albany Railroad for nine years, and was actively interested in the emergency work of the latter company. Mr. Neal for many years has been deeply interested in medical matters. In the early eighties, while with the Hinckley Company he took a course of emergency lectures, and later helped to organize an emergency class while with the Boston & Albany Railroad. In connection with this work he acted as assistant demonstrator during another lecture course. All of this preparation has well fitted Mr. Neal to take up his present activities, which are mentioned in connection with the digest of the Brady medal committee report elsewhere in this issue.

H. V. NEAL

OBITUARY

James D. Parker, one of the promoters of the Sandusky, Milan & Norwalk Electric Railway, now included in the system of the Lake Shore Electric Railway, Cleveland, Ohio, is dead.

John C. Brewster, superintendent of construction during the building of the Muskegon (Mich.) Street Railway, now included in the system of the Muskegon Traction & Light Company, is dead. Mr. Brewster was born on June 5, 1829, in New York. He located in Muskegon in 1869 as a civil engineer. He was interested in the construction of the Chicago & Michigan Railroad and the Grarnd Rapids & Indiana Railway.

John Wesley Richardson, general superintendent of the Kansas City-Western Railway, Kansas City, Kan., is dead. Mr. Richardson was born at Freeman, Mo., on March 25, 1867. When seventeen years old he entered the employ of Holmes Brothers with the local railway lines in Kansas City. Later he became superintendent of one of the divisions of the Metropolitan Street Railway in Kansas City, and in June, 1905, was made general superintendent of the Kansas City-Western Railway.

John M. Mack, financier and contractor, who took a prominent part in the organization of the Philadelphia (Pa.) Rapid Transit Company, is dead. Mr. Mack was born in Philadelphia on Aug. 15, 1852. He was educated in the public schools there and in 1872 began business as a contractor. He was largely responsible for organizing the Asphalt Company of America. He was formerly president and a director of the Barber Asphalt Paving Company, the General Asphalt Company, the Mack Paving & Construction Company, the Norwich Compressed-Air Power Company, the Hamburg Vitrified Brick Company, the Railways Company General, and was president of the Manhattan Trap Rock Company. Mr. Mack retired some time ago from active business.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***McConnellsburg & Fort London Railway, McConnellsburg, Pa.**—Application for a charter has been made by this company in Pennsylvania to build an electric railway between McConnellsburg, Pa., and Fort London in Peters Township, Pa. Incorporators: Edward J. Post, D. H. Patterson, Herbert A. Duffy, George A. Harris and B. C. Lamberson.

Portland, Vancouver & Northern Railway, Vancouver, Wash.—Chartered in Washington to build an electric railway between Portland, Ore., and Vancouver, Wash. Capital stock, $300,000. Henry Crass, 511 United States Bank Building, Vancouver, Wash., president, and G. W. Ford, Vancouver, secretary. [E. R. J., Jan. 19, '15.]

FRANCHISES

Fresno, Cal.—The Fresno Interurban Railway has asked the Council for a franchise over certain streets in Fresno.

Los Angeles, Cal.—Upon being informed that the Los Angeles Railway corporation is desirous of removing certain tracks on Thirty-ninth Street, which is to form an entrance to Exposition Park, the Park Commission has approved new plans for the street approach to the park in question.

Riverside, Cal.—Floyd Brown and associates have asked the Board of Supervisors for a fifty-year franchise to build an electric railway along the county highway in Riverside, and by motion it was decided to advertise for bids on the franchise to be opened March 3.

***Santa Barbara, Cal.**—Application has been made to the City Council by Richard Hamilton Gaud for a franchise granting the right to construct an electric railway upon certain streets in Santa Barbara until March 15, 1957. The Council will receive sealed bids up to Feb. 18 for the franchise.

Murphysboro, Ill.—The Murphysboro & Southern Illinois Railway will ask the Mayor and City Council for a franchise in Murphysboro on Feb. 9.

Albany, N. Y.—The International Railway has received permission by the Public Service Commission in Albany to construct its high-speed electric line between Buffalo and Niagara Falls. Permission was also given the railway to issue 3 per cent fifty-year refunding and improvement mortgage bonds for $2,395,000 to be sold at not less than 87. The new line is to start in Buffalo at the intersection of the Buffalo & Lockport line and run out Main Street through Tonawanda over the old Buffalo, Thousand Islands & Portland Railroad line, through North Tonawanda, Wheatfield, La Salle into Niagara Falls.

Buffalo, N. Y.—The Frontier Electric Railway has received a franchise to extend its lines across Kenmore Avenue, Main Street and intervening streets in Buffalo.

Buffalo, N. Y.—The International Railway has accepted the franchise recently granted it by the Tonawanda Common Council giving it the right to build a double-track line from Buffalo to Niagara Falls. In the acceptance, the company placed a clause giving it the right to cancel the grant at any time before the building of the new line is begun. The company will also accept the North Tonawanda franchise on the same condition.

***Clymer, N. Y.**—The Columbus & Mayville Railroad has asked the Council for a franchise in Clymer. This is part of a plan to build an electric railway between Jamestown and Clymer.

New Rochelle, N. Y.—The trolley committee of the City Club of New Rochelle has asked the Council to grant the Westchester Electric Railway a franchise to build a new electric line from Mount Vernon through Winyah Avenue, to connect the end of the line in North Pelham with North Avenue, and to extend these cars to Hudson Park and double-track Franklin Avenue.

East Linden, Ohio.—On Jan. 27 the commissioners of Franklin County granted the East Linden Electric Railway a franchise for a line between the Leonard Avenue viaduct in Columbus and East Linden. Work must be begun within two years and the fare is to be 5 cents until the net income exceeds 6 per cent on the investment, when it is to be reduced to the rate of six tickets for 25 cents. Further decrease of the fare is provided as the income increases.

Toronto, Ont.—The City Council has authorized the issue of debentures to the amount of $455,961 for civic lines in Toronto. The City Council authorized the issue of debentures, amounting to $66,418, for acquiring the portion of the Scarboro division of the Toronto & York Radial Railway within the city limits.

McConnellsburg, Pa.—The McConnellsburg & Fort London Railway has received a fifty-year franchise from the Council in McConnellsburg. This is part of a plan to build an electric line between McConnellsburg and Fort London.

***Knoxville, Tenn.**—M. K. Bell has asked the County Court for a franchise for an electric interurban railway from Knoxville to Bristol and Newport.

Seattle, Wash.—The City Council of Seattle has voted to submit at the March election the ordinance of Councilman Erickson to extend Division A of the municipal electric railway into Ballard.

TRACK AND ROADWAY

Gadsden, Ala.—Application for a charter will soon be made by Louis Hart to build an electric railway from Gadsden to Centre. It is expected the capital stock will be at least $250,000, although the preliminary organization of the company may be effected on a smaller amount. Property holders of Centre are greatly interested in the project and will give material assistance. Power will be purchased from the Alabama Power Company. [E. R. J., Jan. 30, '15.]

Mobile Light & Railroad Company, Mobile, Ala.—This company has in contemplation extensive improvements of its lines provided the franchise rights are secured. The company has been considering these improvements for some time, and it is expected that if the proper negotiations are completed the work will begin in the near future.

Tramways Company, Ltd., Edmonton, Alta.—The agreement between the Edmonton City Council and this company has been ratified by the ratepayers. The directors are: A. E. Farncomb, president; H. Stutchbury, S. D. Hogan, G. G. Reedwell, S. Carson, W. Golley and S. H. Smith. It is reported that the company has already graded several miles from the city limits and has bought right-of-way from the landholders along the side of the road allowance.

San Jose & Almaden Railway, San Jose, Cal.—The project to build a 12-mile electric line between Almaden, San Jose and Hacienda has been abandoned. [E. R. J., Sept. 28, '12.]

Jacksonville, Fla.—The new interurban electric railway from Jacksonville to Middleburg, on which construction was recently begun, in addition to being in shape to go ahead with its building for the first 10 miles, has the co-operation of every land owner along the line. These have contracted to give time, labor and ties, in addition to offering to take stock in the company as soon as the organization is completed.

Miami (Fla.) Traction Company.—Work has been resumed by this company on its line in Miami. It is planned to have 2 miles of track laid by March 1. B. B. Tatum, Miami, president. [E. R. J., Nov. 21, '14.]

Tarpon Springs, Fla.—Plans to build an interurban railway from Tarpon Springs to St. Petersburg are under consideration. The line will be 12 miles long and will be operated with gasoline motive power. M. L. Waggoner, Third Avenue, South, St. Petersburg, is interested. [E. R. J., April 25, '14.]

Macon Railway & Light Company, Macon, Ga.—The work of relocating the track on College Street, removing it from the lower edge of Tattnall Square and placing it in the center of the street, will be begun at once by this company.

Union Traction Company, Coffeyville, Kan.—This company has placed in operation its extension to Nowata. Other extensions are contemplated.

Manhattan, Kan.—Municipal bonds to the amount of $20,000, voted in 1910 as a bonus to the Manhattan City & Interurban Railway when it should complete a line to Fort Riley, were turned over to the traction company on Jan. 23, the line having been placed in operation three months ago.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being considered to build soon the extension to Hutchinson. Extensions to Great Bend, Larned and other western towns are also being considered and plans are also contemplated for extensions northward, probably to McPherson and Salina.

Kentucky Traction & Terminal Company, Lexington, Ky.—Orders have been placed by this company with the Hardwick Lumber Company, Winchester, for 30,000 crossties, which are for use in the reconstruction of the railway.

Louisville & Interurban Railway, Louisville, Ky.—Plans are being made by this company for a 7-mile extension from Fern Creek to Mount Washington.

Louisville (Ky.) Railway.—There will be no extension of the Walnut Street line in Louisville from the present terminal in Parkland to the State Fair grounds at the present time. The board of directors of the company so decided at their regular January meeting recently.

Southwestern Traction & Power Company, New Iberia, La.—Plans are being made for the construction of an electric railroad from New Iberia, La., to St. Martinville, a distance of 10.5 miles, also from Jeanerette, La., through Franklin, Baldwin and Patterson, to Berwich, a distance of 50 miles. No contracts have been let, but it is expected that work will soon be begun. W. S. Henning, New Iberia, La., is chief engineer.

***New Orleans, La.**—Plans are being made to build a double-track electric railway for the section of the city below Canal Street. Among those interested are: Charles Torreogrossa and Joseph F. Ebert, New Orleans.

Orleans-Kenner Electric Railway, New Orleans, La.—Work has been begun by this company on the construction of the Metairie Ridge loop line in New Orleans. [E. R. J., Jan. 9, '15.]

Shreveport (La.) Traction Company.—Plans are being made to build an extension from Waverly to South Highlands, about 1½ miles, in Shreveport.

Asbury Park, N. J.—Harry W. Smock, retiring president of the Chamber of Commerce, is reported as stating that the recently talked of Trenton to Asbury Park electric railway is now assured. He announces that the line will run through Allentown, Lakewood, Farmingdale and Hamilton and thus into Asbury Park with a spur from Lakewood to Point Pleasant. The project will go through, he assured chamber members, without local financial aid.

Trenton & Mercer County Traction Company, Trenton, N. J.—Wilbur residents are agitating the extension of the Hamilton Avenue line into East Trenton. The present terminus of this branch is Olden Avenue and State Street. The plan is to have the tracks extended to the corner of Clinton Avenue and Olden Avenue.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—This company has been asked to buy the Buffalo-Susquehanna Railway extending between Buffalo and Wellsville. The proposition is to electrify the Buffalo-Susquehanna Railway which would provide an outlet into Buffalo. It is understood the Chamber of Commerce of Olean and the towns of Friendship, Franklinville, Wellsville and others would aid such an undertaking.

Goldsboro, N. C.—The House of Representatives at Raleigh, N. C., has passed on third reading the bill authorizing the city of Goldsboro to issue bonds for municipal street railway purposes.

Pictou County Electric Company, Ltd., Stellarton, N. S.—This company has under consideration the construction of an extension from Potiers Bridge to Pardale, N. S., ½ mile. L. T. Flaherty, New Glasgow, N. S., manager.

Youngstown & Southern Railway, Youngstown, Ohio.—David Tod, receiver for this railway, has announced that the line will be double tracked from Youngstown to Southern Park, where the racetrack is located. He will soon ask the Council for a franchise for this work.

Toronto (Ont.) Eastern Railway.—This company has an application before the Dominion Parliament asking for an extension of time for completing the line authorized to be built from Toronto easterly to Cobourg, Ont., with branches as follows: From Cobourg or Port Hope northerly to Peterborough; from Scarborough to Markham, Stouffville or Uxbridge; from Oshawa northerly via Lake Scugog to Lindsay; from Oshawa southerly to Lake Ontario.

Niagara, Welland & Lake Erie Railway, Welland, Ont.—This company has an application before the Ontario Legislature for the confirmation of an agreement granting the right to the company to operate a railway in Welland, and the confirmation of a second agreement fixing the assessment of the company's property there at specific sums for five-year periods, terminating in 1934.

Portland & Oregon City Railway, Portland, Ore.—This railway will be completed and in operation to Baker's Bridge, 16 miles from Portland end, early this spring,

Lancaster & Berks Electric Railway, Lancaster, Pa.—Plans are being contemplated by this company to change its route to Womelsdorf for the proposed spur line that was to have been laid from Kleinfeltersville to Womelsdorf. It has been stated that the line will now be constructed along an altogether different route, passing through Reistville, Richland and Stricklerstown. It is said that the reason for abandoning the original project is that the right-of-way could not be secured at a nominal cost. The new spur would connect with the Ephrata & Lebanon lines.

Montreal (Que.) Tramways Company.—The Quebec Legislature is being asked by the town of Mount Royal for an extension of time within which it may make arrangements with this company and the Montreal Public Service Corporation for the building of electric railways, etc.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—In advance of the paving of Elmwood Avenue by the city, this company will lay a new track down Elmwood Avenue and erect concrete poles. The company will soon replace the wooden poles on Lady Street with iron poles.

Brenham, Tex.—Washington will join in the project to build an interurban electric railway from Brenham via William Penn and Independence, thence through the Brazos section. This will add 6 miles more to the route already surveyed. Outside capital is very much interested in the construction of this interurban line. L. M. Hewitt, Bryan, is interested. [E. R. J., Jan. 30, '15.]

El Paso Electric Belt Line, El Paso, Tex.—No definite plans have yet been formulated by this company for the construction of its proposed electric railway from the center of El Paso through suburbs to Woodlawn addition, east of El Paso. Thomas P. Ruddy, Kansas City, is interested. [E. R. J., Nov. 14, '14.]

San Angelo (Tex.) Street Railway.—Plans are being considered by this company to extend its lines in San Angelo to Austin, a distance of about 75 miles.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company contemplates the construction of an extension to Madison Heights over the proposed viaduct from Seventh Street and Commerce Street across the James River in Lynchburg.

***Radford, Va.**—Plans for the construction of an electric railway from Willis, in Floyd County, to Radford, Va., 28 miles, are being considered by residents of that county and the Radford Board of Trade. It is understood that Floyd County people will subscribe about $100,000 to the stock of a company which may be formed to build the railway, and that they will pay for it in crossties and labor. A. J. McClung, secretary of the Radford Board of Trade, may be able to give further information.

Tacoma (Wash.) Municipal Railway.—The first line of this railway has been placed in operation in Tacoma. It will be known as the Tide Flats line and will operate from Pacific Avenue and Eleventh Street to the shops of the Chicago, Milwaukee & St. Paul Railway. The line will be operated under lease by the Stone & Webster Corporation.

West Virginia Traction & Electric Company, Wheeling, W. Va.—It has been officially stated that this company is contemplating many improvements of its lines in Wheeling during 1915.

SHOPS AND BUILDINGS

Kankakee & Urbana Traction Company, Urbana, Ill.—T. W. Shelton, superintendent of this company, has just completed the plans for a new station for the company at Rantoul. It will be on the site of the present structure. Work will be begun as soon as the weather will permit. The new structure will be of brick, 20 ft. x 50 ft., and so arranged that 100 ft. more can be added to it when necessary. The front will be used as a waiting room for passengers, and in the center will be the ticket office. The rear part will be used as a freight room, switches being run to it to make loading and unloading easy.

Berkshire Street Railway, Pittsfield, Mass.—This company has opened a new passenger station in Pittsfield.

Piedmont & Northern Railway, Charlotte, N. C.—The offices of this company have been moved from the former place on Main Street to the new office on Washington Street over the new depot.

Cleveland (Ohio) Railway.—Plans are being made by this company to ask the City Council for permission to purchase 19 acres of land near the Big Four Railroad at Denison Avenue and Ridge Avenue in Cleveland on which the company plans to build new carhouses. The land will cost $60,000.

Texas Traction Company, Dallas, Tex.—Negotiations are now being conducted between the Southern Traction Company and Texas Traction Company, of Dallas, and the Dallas Interurban Terminal Association for the right of the cars of the lines mentioned to use the shed and station privileges of the new interurban terminal station which the association will erect. This is one of the most important details of the erection of the new interurban terminal station by the Stone & Webster interests. It was the former purpose of the Strickland-Goodwin Managerial Association, controlling the operation of the Texas and Southern Traction companies, to build a station of their own out of the present Santa Fé depot at Commerce and Murphy Streets. They bought control of this property some months ago. If the new contract is made, their plans will probably be changed. The Southern Traction and Texas Traction Companies hold franchises on Commerce Street at the present time, so that no changes would have to be made in order to reach the new stations. The franchise on the streets entering the station itself is a blanket franchise, issued to the association, covering all lines.

POWER HOUSES AND SUBSTATIONS

United Railroads of San Francisco, San Francisco, Cal.—Work will shortly be begun by this company on the construction of a new substation on Eighth Avenue, near Geary Street, in San Francisco. This substation is designed to handle all cars operated in the Richmond district. The ultimate capacity of the new substation will be 6000-kw, equivalent to approximately 10,000 hp.

Rockingham Light & Power Company, Portsmouth, N. H.—The electric machinery, formerly in use at the power house of the Portsmouth & Exeter Street Railway, now abandoned, at Stratham, is being moved by the Rockingham Light & Power Company to Portsmouth, where it will be installed at the Daniel Street plant and connected up with the power lines. The lot includes a rotary converter, transformers, switchboards and other equipment.

Toronto (Ont.) Suburban Street Railway.—Contracts have been awarded by this company for three substations on its Toronto to Guelph line, at Islington, Georgetown and Guelph, Ont. The latter will have 1000-kw. capacity, in two 500-kw units, while each of the other two will have a single 500-kw unit, with provisions for the addition of a similar unit in the future. Power will be received at 25,000 volts, alternating current, three-phase, twenty-five-cycle, and will be stepped down and passed through 500-kw rotary converters, which will deliver to the line at 1500 volts direct current. The Georgetown and Guelph stations will contain waiting, baggage and express rooms and dispatching offices, providing railway station facilities.

San Angelo (Tex.) Street Railway.—Plans are being considered by this company to build a new power house in San Angelo.

Manufactures and Supplies

ROLLING STOCK

Reading (Pa.) Transit & Light Company is contemplating the purchase of a few cars.

Iowa Railway & Light Company, Boone, Ia., is reported as expecting to buy four cars.

International Railway, Buffalo, N. Y., is reported as figuring on buying twenty-five cars.

Sioux City (Ia.) Service Company is reported as expecting possibly to rebuild five city cars.

Oakwood Street Railway, Dayton, Ohio, is reported as expecting to rebuild cars in its own shops.

Columbia (S. C.) Railway, Gas & Electric Company is reported as expecting to purchase new cars.

Dayton & Troy Electric Railway, Dayton, Ohio, is reported as expecting to buy three interurban cars.

Birmingham & Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., during 1915 will purchase four passenger cars.

Somerset Traction Company, Skowhegan, Me., expects to purchase one semi-convertible combination passenger and baggage car.

Columbus Railway & Light Company, Columbus, Ohio, is rumored as considering the possible purchase of twenty-five or fifteen city cars.

Hagerstown & Frederick Electric Railway, Frederick, Md., has ordered two electric freight locomotives of 25 tons each from the General Electric Company.

Arkansas Valley Interurban Railway, Wichita, Kan., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1915, as expecting to purchase one car, has ordered this equipment from the Cincinnati Car Company.

Tampa & Gulf Coast Railway, Tampa, Fla., contemplates either electric storage-battery or gasoline motor car operation on its recently completed line between Tampa and St. Petersburg, Fla. Other cars will be purchased for similar service between Tarpon Springs and Port Richey.

Union Electric Company, Dubuque, Ia., which operates all the electric utilities in that city, placed in service during 1914 two electric buses which run on a twenty-minute schedule between Dubuque, Ia., and East Dubuque, Ill. This service, which could not be furnished in any other manner, has proved so popular that an order has recently been placed with the General Vehicle Company, Long Island City, N. Y., for a third bus.

Shore Line Electric Railway, Norwich, Conn., has specified the following details for the ten semi-convertible cars recently ordered from the Wason Manufacturing Company:

Date of delivery,	during May
Seating capacity	52
Weight of car body,	20,000 lb.
Bolster centers	24 ft.
Length of body over corner posts	36 ft.
Length over vestibule,	45 ft. 5 in.
Height, rail to floor	40½ in.
Height, floor to trolley board,	8 ft. 4½ in.
Width over sills	8 ft. 2 in.
Width over all	8 ft. 4 in.
Body	metal
Interior trim	mahogany
Headlining	Agasote
Roof	arch
Underframe	metal
Air brakes	West. S. M. E.
Control	West. H. L.
Couplers	West C-I
Curtain fixtures	National
Curtain material	Pantasote
Gongs	Dedenda
Hand brakes,	Peacock, no staff
Heaters	Consol.
Headlights	Golden Glow
Motors	four, inside hung
Registers	No. 5 Sterling
Sanders	Sterling
Sash fixtures	Brill
Seating material	rattan
Springs	Brill
Steps	Stanwood
Trolley Catchers	Earll No. 7
Trolley base	U. S. No. 15
Trucks	Brill No. 27 MCB 1
Ventilators	Brill
Wheels	Midvale, 34 in.

Metropolitan Street Railway Company, Kansas City, Mo., has advised through the board of control that it will let a contract on Feb. 8 for fifty new cars to be delivered April 15. Specifications call for single-end, double-truck cars with an inclosed rear door and folding step with motorman's red light signal for starting the car. White enamel decorating is to be used and 50 per cent more heaters will be provided than have been in use on the Metropolitan's cars. The wheel height is to be reduced from 33 in. to 30 in. in order to save space and facilitate boarding and alighting.

TRADE NOTES

Lorain Steel Company, Johnstown, Pa., has just received an order from the International Railway, Buffalo, N. Y., for 5300 tons of 9-in. girder rail, No. 124—432.

Electric Controller & Manufacturing Company, Cleveland, Ohio, announces that the O. H. Davidson Equipment Company, Ideal Building, Denver, Colo., will act as its representative in Colorado, Utah, Montana, Wyoming, South Dakota, New Mexico and Arizona.

H. Bortin, formerly engineer in charge of valuation department of Union Pacific Railroad for four years, and member of its valuation committee; lately assistant to general secretary of Presidents' Conference Committee on Federal Valuation of the Railroads, announces his entry into private practice as consulting valuation engineer, with office at 149 Broadway, New York City.

Guy E. Marion, secretary-treasurer of the Special Libraries Association, has resigned from Arthur D. Little, Inc., chemists, engineers and managers, 93 Broad Street, Boston, Mass., where he has been located for the last five years in charge of its information department. Mr. Marion will devote himself to the organization and development of special libraries, or information departments, in business houses, industrial plants, etc.

American Manufacturing Company, Chattanooga, Tenn., of which J. B. Robinson is president, manufacturer of hardware specialties, such as electrically welded wire oven racks, etc., has recently purchased the plant and equipment of the Owensboro Shovel & Tool Company, Owensboro, Ky., of which J. W. McCulloch was president. The equipment has been installed in the Chattanooga manufacturer's plant and will be ready for operation in a few weeks.

Edison Storage Battery Company, Orange, N. J., has appointed Charles E. Poyer as assistant general sales manager. Mr. Poyer has been with the Edison interests for about four years, having served first on the personal engineering staff of Mr. Edison in the development of special application of the alkaline battery, and later as assistant advertising manager. For the past two years he has been manager of the house lighting department.

British Westinghouse Eectric & Manufacturing Company, Ltd., Manchester, England, will purchase the Société Anonyme Westinghouse, Havre, France, and the Societa Italiana Westinghouse, Genoa, Italy. The English company, it is reported, will take over the Continental companies purely as a matter of business policy, and not as an expedient under which to furnish war materials for the Allies. The American company, by virtue of its stock control of the English company, will still control the English company, and through it the French and Italian concerns. The plants in France and Italy will continue to be run separately.

E. P. Roberts, who, since 1912, has been Commissioner of Smoke Abatement at Cleveland, has reopened his office as consulting engineer at Cleveland with temporary headquarters at 2053 East Ninety-sixth Street. Mr. Roberts has had an extended experience as consulting engineer for public service and industrial properties. In the circular which accompanies the announcement in regard to the opening of his office, it is stated that the total amount involved in properties for which Mr. Roberts has been engineer, or for which he has prepared reports, is approximately $175,000,000; the properties for which he has been engineer cost from a few thousand dollars up to $3,500,000, and the properties existing or proposed which he investigated or reported on would cost from a few thousand dollars up to $8,500,000.

ADVERTISING LITERATURE

Eclipse Railway Supply Company, Cleveland, Ohio, has issued a folder describing its trolley retriever.

Ohmer Fare Register Company, Dayton, Ohio, has issued a card which reproduces an editorial which appeared in the Dayton *Daily News* of Dec. 23, 1914, commenting upon the proper relationship between manager and conductor.

Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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THE PASSING OF THE SNOW MENACE

Elsewhere in this issue is described a new form of snow-sweeper that has just been successfully tried out by the New York Railways. Its principle is simple, involving merely the use of an out-board broom to clear a passageway beside the rails for the wagons and trucks which otherwise could not be forced off the tracks during snow storms. Notwithstanding the almost obvious nature of the underlying idea, its importance to the industry is much more likely to be under- than over-estimated. In fact, the surface railways have become so inured to the losses occasioned by snow storms that these have come to be accepted as a regular risk of the business, and great reductions in gross earnings for periods of two weeks or more, such as were reported in New York City last winter, are looked upon with calmness if not with equanimity. Manifestly, the major part of the loss from snow is traceable directly to reduced car movement. No one cares to pay even a nickel for a ride when walking is quicker and much more reliable, and just as long as the street-railway track offers the only pathway through a snow-covered street the speed of the cars will be measured by that of the slowest wagon upon it. Of course, it is easy to say that the municipality ought to clear the streets promptly, but on the other hand, practical experience shows that this is not going to be done. There remains only the alternative for the street railways to do the work. But if they do it themselves, the hypothesis that a snow storm in a large city means an immediate reduction in schedule speed to 3 m.p.h. need no longer be accepted.

THE EMPLOYER'S OPPORTUNITY

The educational committee of the American Electric Railway Association has announced the inauguration of the correspondence courses for employees engaged in construction, maintenance and operating work. For this purpose arrangements were made with a well-known correspondence school. Students are enrolling, and a number have already passed sections of the courses very creditably. The committee, of course, had the sanction of the association in adopting these arrangements, which were made only after the former had demonstrated to the satisfaction of all interested persons that it was impracticable to conduct correspondence courses by the association itself. While cooperation with a commercial concern is not entirely without precedent in the association, such an alliance must be guarded most carefully if the results are to be permanently satisfactory. The correspondence schools are responsible for the results of their work, but as they have authority to approach member companies with the backing of the association, the very considerable influence of the latter will cause many persons to enroll as students who would not otherwise have done so. The association must see to it that these especially, but also all others who follow the courses conscientiously, are not disappointed. To this end it is the manifest duty of every employer to take an active interest in the work of students in his employ and promptly to notify the association officers of any weaknesses or defects which are discovered in the courses. The use of special correspondence courses by large industrial concerns is on the increase, and the officers take a lively interest in the progress of their young men. In the association courses the same principle applies, but the industry is so enormous that greater effort must be made to keep track of this movement which, in its inception, will properly be inconspicuous.

STARTING RESISTANCES FOR RAILWAY MOTORS

In the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26 we printed and commented upon an interesting article on this subject by Mr. Castiglioni. As a result of this publication J. W. Corning of the Boston Elevated Railway sent us an account of an experience of that company which bore testimony to the importance of the subject, and this was printed last week. Since then Prof. A. M. Buck has contributed the article printed elsewhere in this issue. We are pleased to print these articles for their reference value and because they contain information not readily accessible. Calculating resistances is a mathematical rather than a controversial problem. There can be only one correct result of the application of different methods of solution. The interest seems to us, therefore, to center in the method rather than in the result. Mr. Corning puts an ammeter on the car and records the current and thus obtains data for the readjustment of resistance steps. Mr. Castiglioni, by methods necessarily laborious, works out sets of curves which when completed are applicable to all cases and for all time. Professor Buck replots the torque-current curve of the motor in terms of current and torque per ampere, and by applying to it a simple geometrical device makes it possible to calculate the starting resistances for a given equipment very quickly. For a manufacturer who has to make these calculations by wholesale Mr. Castiglioni's method appears to possess advantages as a time saver. For purposes of instruction, which naturally impelled the development of Professor Buck's plan, it is probable that his method is better in impressing fundamental principles more graphically.

ABOLITION OF SELF-INSURANCE

A pending bill in the New York Assembly contains a serious threat at one of the good features of the workman's compensation law passed at the last session. Whether it was inspired by the casualty companies or by one of those persons who actually believe that the government can do everything better than the individual or private corporation, we do not know, but its purpose is to remove the provision permitting employers, upon deposit of proper security with the compensation commission, to carry their own risks for compensation to injured workmen. The fact that all of the large electric railway companies in New York City early adopted the self-insurance plan after the law went into effect last July shows to what an extent electric railways would be affected by such a prohibition.

The alacrity with which these companies took advantage of the self-insurance provision is ample evidence of the fact that this method of insurance is considered by railways with large organizations and extensive resources better than insurance in the State fund or with casualty companies. Not only can these railways follow the mandates of the workman's compensation law most easily and cheaply in this way, but the self-insurance method more fully safeguards the interests of the employees. For years the large electric railways in the State had been paying compensation to their employees, even where no legal liability existed, as part of their systems of welfare work, and in the necessary investigation of passenger injuries and claims they had developed departments that were able with the utmost facility to handle the clerical and medical work necessitated under the new law. Thus, not only did the existing departments make it possible to adopt the self-insurance method without the piling-up of high administrative costs and overhead charges, but there was also an absence of the "loading" charges so inseparable from State fund and casualty insurance operations. In other words, each company was not compelled to make contributions to any general fund, made up by averaging good and bad risks, whereby the more stable companies have to pay the losses incurred by bad risks. Lastly, under this method, each self-insuring company was made more than ever the guardian of its own workmen, for aside from humanitarian reasons the fact that it alone had to meet all its compensation expenses gave it the most powerful incentive to minimize injuries by improving the physical conditions of its plant and providing safety appliances for operation.

The adoption of the self-insurance method, however, meant no lack of protection to the employees, for the self-insuring companies were required to prove to the compensation commission that they were financially responsible and had to file with the commission, to insure the faithful discharge of their duties, high-class securities in an amount equal to the semi-annual premium in the State fund, less 10 per cent. This latter amount had to be deposited in cash with the commission for use in the case of any immediate call for compensation payments. In the event of any death resulting in compensation payments, the self-insurers were required to deposit immediately the full amount estimated to be necessary to cover the risk involved to its full maturity.

In the light of these facts, it is difficult to see wherein lies the justice or economy of abolishing self-insurance. Insurance experts are at loggerheads on the question of whether or not the State fund is operating successfully. Governor Whitman in a special message on the subject expresses his sincere hope that the compensation commission may be so reorganized as to reduce its expenses and states that the results so far indicate that "the attempt by the State to do the business of its citizens must inevitably cause enormous expense to the Government, besides the inconvenience and disorganization of private business and injury to private interests, whether of capital or labor." He accordingly desires the work of the commission to be relieved somewhat by making the commission a supervisory party in compensation settlements between employers and employees instead of the settling party itself. If the cutting of expenses is so much needed, why abolish the very method of insurance that large electric railways have chosen for its cheapness and ease of administration? Small companies of all sorts must find strength in union through the State fund, casualty companies or mutual associations, but the expenses resulting therefrom and the cost of insurance to self-insurers need not be increased under cover of politics and the delusion that state operation is necessary for compensation insurance success.

THE RAINBOW-CHASING JITNEY

The more we learn about the cost of operation of the motor-bus in city transportation the more apparent it becomes that this "menace" is likely to take care of itself by the simple process of self-elimination. In many large cities there may be special circumstances in particular localities which will enable a bus line over a short route to exist on a 5-cent fare. But that the bus can be extensively profitable and in a large sense therefore a serious menace to the surface car, is not at all apparent. Several companies and many individuals have rushed into motor-bus operation to their sorrow. They knew nothing about cost of operation and maintenance, and there was little or nothing that could be found out about these costs had the information been sought. On paper the jitney-bus is a gold mine. At the end of a few months the cost of tires, repairs, accidents and operation of almost empty buses for five or six hours a day usually changes the golden glow to a dark blue.

Even when second-hand automobiles of the five-passenger touring-car type are used instead of the bus the same condition will obtain, whether these cars are operated by a number of individual owners or by a single company. A second-hand touring car represents, of course, a much smaller investment than an automobile bus, but its carrying capacity is proportionately less and the per cent of maintenance on its cost should certainly be no less. The rate of depreciation obviously is higher.

There is no more reason for believing that a fleet of second-hand passenger automobiles can be operated at a lower rate per passenger than the automobile bus than that the same number of second-hand carriages, when horses were used as motive power, could compete in cheapness per passenger with a regular horse-drawn bus. The jitney-bus competition which has been felt so keenly on the Pacific Coast and elsewhere in this country as described in recent issues of this paper has been largely from cars of this nondescript character, that is to say, while there have been a few buses, most of the competing vehicles have been old automobiles of practically every type, make and condition.

While there are many owners of private automobiles who can testify as to the cost of operation and maintenance of their own cars there are comparatively few reliable data on the cost of motor bus operation. The London figures, for reasons which have already been published in these pages, are not of very great assistance because the transportation conditions in that city differ so greatly from those prevailing in American cities. The latest and almost the only reliable information we have is that of the Fifth Avenue Coach Company in New York, and we present in this issue a discussion of these figures by the president of the company, supplemented by other data, including a very clear analysis of the situation in San Francisco by Charles N. Black.

The Fifth Avenue Coach Company gets a 10-cent fare and gives 10-cent service, both as to quality and quantity. Few cities can or will pay for such a service, but in the comparatively rare occasions where buses can be operated the electric railway company might well consider motor-bus operation as a supplement to its own service, if there is a genuine demand for it, rather than to leave it to others. But in support of the claim that for general city transportation the automobile can compete on at all equal terms with the electric car, not one scintilla of evidence can be adduced.

In addition to the information we now have in regard to New York and San Francisco, there may be cited the experience of Wilkes-Barre and Pittsburgh, Pa., and Washington, D. C. In the Pennsylvania cities bus operation has not been a financial success, and in Pittsburgh it has been abandoned. In Washington the bus company has a 3-mile route through the heart of the best residence district, reaching the business and shopping centers, the theaters and several government departments, yet the six-for-a-quarter fare barely earns operating expenses, and in the two years of its life the company has been unable to charge off a dollar for depreciation. It has carried a large number of passengers per bus mile run, but the expense of upkeep has absorbed the revenue as fast as it came, or faster. Any railway man who has been losing sleep over the inroads of the motor-bus, and those who are contemplating the operation of these vehicles as a short road to wealth, should study Washington's experience. The railway man will save his sleep and the other man will save his money.

There still remains the question of the best way in which the electric railways can protect their short haul business in large cities from jitney competition. So long as second-hand automobiles can be purchased at a low price there will remain the temptation for individual chauffers and perhaps garage owners to operate one or more of these cars, when these cars cannot make more money elsewhere and until they break down, in a 5-cent fare service along certain profitable routes. This is a matter where the municipality can fairly interfere, as indeed it has been done in a number of western cities. Mr. Black has shown that under parallel conditions an electric railway can transport passengers more cheaply than they can be carried in an automobile, and if the company should abandon its long unprofitable lines or charge a higher fare on them it could carry passengers on the more profitable lines for less than 5 cents.

However, the interests of the public as a whole have always been felt to lie in the American system of a uniform fare. This was what the authorities in both New York and Chicago fought for and obtained in the recent negotiations with their transportation lines. The railways of the country have been willing to haul some passengers long distances for 5 cents because they also had the short haul business, but they would be unwilling to take the unprofitable business without the part which shows a profit.

But the financial side is not the only one to consider, as Mr. Black clearly points out. There is the increased danger on the streets to pedestrians from an added number of automobiles, driven in most cases by irresponsible drivers, as well as the physical limitations of space on the streets. Then again, there is the question of taxes, street paving and other contributions to the welfare of the city in which the electric railway takes a large part. The income derived by the city from the electric railway companies from these sources is considerable, and it is only by the neglect of equivalent obligations that the jitney can thrive even temporarily. All in all, there is every reason why the city should favor the electric railway rather than the automobile pirate. Regulation can be and, in many cases, has been applied, and from any standard of equity it should be applied. There should be no difficulty in getting communities to pass such measures. But in so doing it would be well for them to realize that, if they do not reserve the right to control the routes of the jitneys, and the railways lose business on their only profitable lines, it is inevitable that all of the existing lines that now run at a loss will have to be abandoned. This may be a serious matter for many cities.

It may be that some vehicle more economical of operation than those now available will be developed. Until then the electric car can easily undersell the motor-bus and give better as well as cheaper service. The mobility (it may almost be regarded as gregariousness) of the motor-bus is an undeniable advantage, but this will usually mean merely that it can run where there is not enough traffic to support electric car lines, and it can therefore take proportionately little from the electric railway company's revenue.

A Solution for the Snow Problem

The New York Railways Company Has Tested Successfully a New Form of Snow Sweeper with An Out-Board Broom Which Clears a 12-Ft. Path Beside the Rails, Thus Eliminating Restriction of the Service During Snow Storms Through Vehicular Congestion on the Tracks

For every really large city in the United States east of the Rockies and north of the thirty-eighth parallel a heavy snow-storm constitutes a disaster that is quite comparable to a cyclone in its costliness. The spectacular features of the cyclone, of course, are lacking, but should the snow be allowed to lie where it fell the orderly course of the city's domestic economy would be rudely interrupted. The alternative is snow removal, and this involves an expense which may reach a figure, as it has in New York, of more than $2,000,000 per annum. Only an extraordinary visitation of nature in a malignant mood could inflict damage to this extent.

Ethically speaking, the responsibilities of the electric railways in such emergencies are limited to keeping their tracks sufficiently clear of snow so that cars can move, and to that end, elaborately equipped organizations have been developed for the sole purpose of fighting snow. Yet, thus far, these have generally failed in the complete accomplishment of their purpose for the very reason that, when the railway tracks are clean and the rest of the street is piled with snow, every truck and wagon gravitates naturally to the pathway thus afforded, and the electric cars are almost as effectively blocked as if the tracks had not been swept at all.

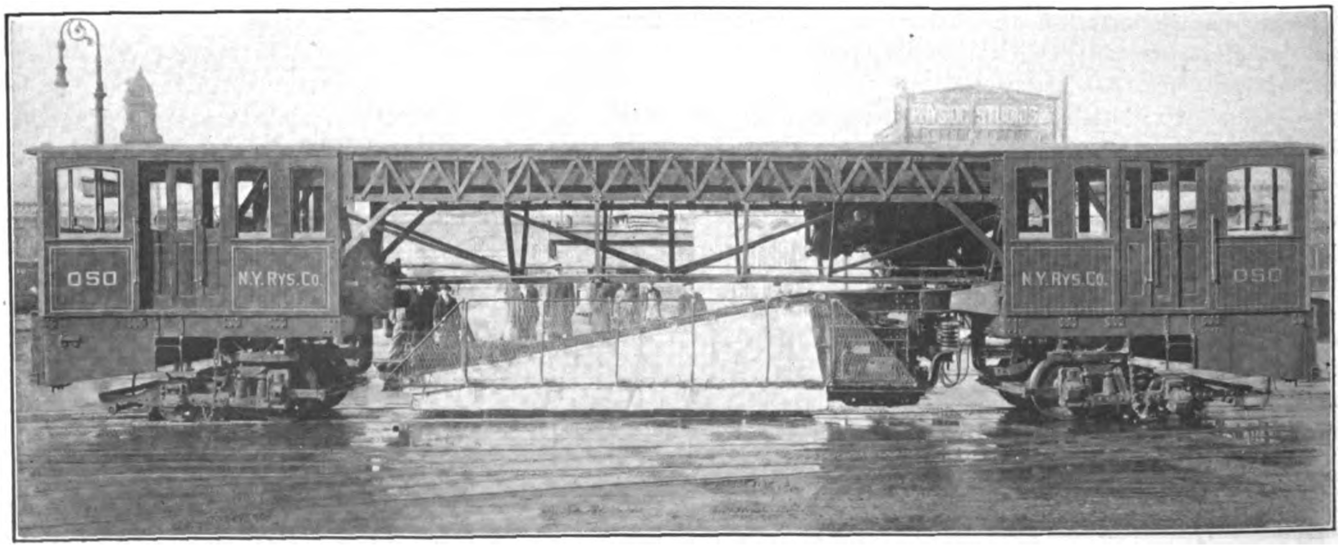
From the practical standpoint this condition is unavoidable. The economic life of the city demands continuous movement for goods as well as for persons, and an interruption of the facilities for communication means almost immediate privation and even danger to the citizens. Regardless of orders or ordinances, trucks, fire-engines and ambulances are bound to use the tracks if these provide the only passage through a snow-covevered street, and, obviously, the one method of keeping them off is the provision of a clear space outside the rails which may be occupied by the irregularly-moving vehicles.

Operating Results with New Sweepers

It is this phase of the snow problem that has been attacked, with apparently complete success, by the New York Railways. A new form of sweeper with a 16-ft. out-board rotary broom has been developed by J. S. Doyle, superintendent of equipment, and the equipment engineering department of that company, under the direction of Frank Hedley, general manager, and during last week's storm in New York City this sweeper was operated with most satisfactory results. The machine is designed to clear a path 12 ft. wide alongside of the track, and the actual experiences in its first test under the most severe conditions showed that it was fully capable of doing this work.

The results were found to be largely dependent upon the relative peripheral speed of the broom as compared with its forward movement. When the sweeper-car moved slowly, the moderately rapid rotation of 300 r.p.m. for the broom was sufficient to clear even packed snow from a paving surface composed either of wood or granite block. When the car was stationary sleet or freezing rain could be removed. This is ascribed partly to the heat of friction developed at the line of contact between the broom and the pavement and partly to the minute chipping action of each of the numerous rattan stems forming the broom filling. On asphalt, however, presumably on account of the smoothness and greater heat-absorbing ability, the broom failed to remove packed snow except when the sweeper-car was practically stationary.

It is, of course, of the utmost importance (if it really is a physical possibility to remove sleet as well as packed snow) that the sweeper should be able to clean the street surface on asphalt as well as on wood pavement because there is much of the former in use in New York and because a sleet storm is quite as effective as a fall of snow in sending trucks upon the car tracks. Consequently, the designers plan to increase the broom speed from 300 r.p.m. (as it is at present) to 800 r.p.m., with the expectation that the increased speed will permit the complete cleaning of all kinds of pavement. If necessary to enable the sweeper to maintain the normal speed of the passenger cars, and still clean sleet from the pavement, the broom will be direct-connected to its motor and run at 1300 r.p.m.



NEW YORK SNOW-SWEEPER—VIEW SHOWING BROOM SWUNG IN-BOARD INTO CLEAR POSITION AND WITH FENDER RAISED

One of the most remarkable features of the test in last week's storm of freezing rain followed by snow was the fact that when the relative speeds of broom and car were properly adjusted the pavement was left not only clear of sleet but actually dry. What this means from a humanitarian standpoint, as well as in the saving of expense and loss of time for the owners of horse-drawn vehicles, is obvious.

Another feature of the test on the new machine was the discovery that even with light snow there was a proper speed of car for every broom speed. When the sweeper-car moved faster than the speed to which it should have been limited by the broom speed, the snow was invariably left across the broom's path in a series of windrows instead of being swept completely out beyond the end of the broom.

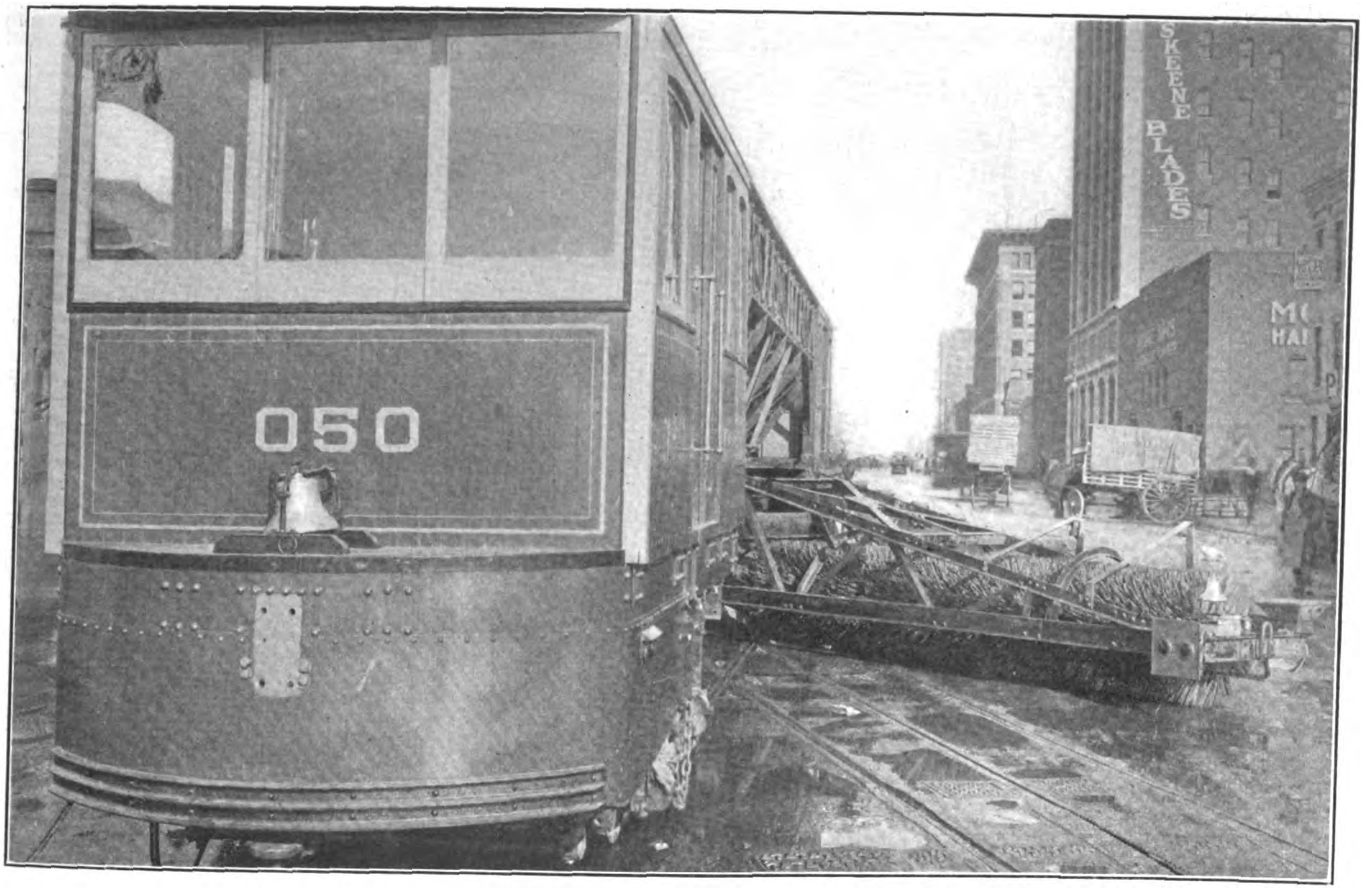
PLAN OF OPERATION

The custom followed by the New York Railways in snow-fighting at the present time with standard sweepers is to put out all equipment as rapidly as possible whenever threatening snow begins to fall. Sweepers are sandwiched in between the regular equipment in service, at intervals averaging roughly ten cars. The sweepers are kept continuously at work on the line until the snow stops, and as the best of electrical equipments is used for the snow-fighting facilities, the company's lines have not been actually tied up on account of snow for several years past, although the speed is so much reduced by vehicular congestion that for several days after a severe storm receipts fall off very materially.

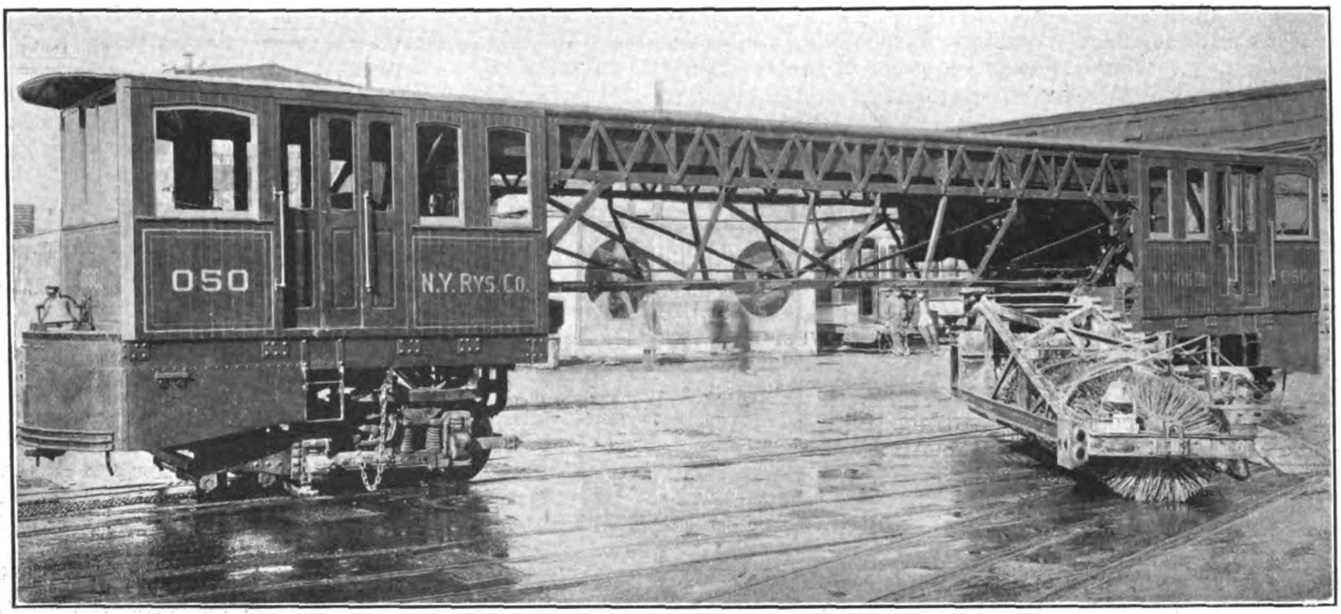
The new type of sweeper is designed for a similar scheme of operation, and consequently, as it will have to be used during hours when vehicular traffic is heavy, provision has been made whereby the out-board broom can be swung at will inside of the tracks to clear vehicles that pass or are passed by the sweeper as it moves forward. Arrangement has also been made so that the direction of movement of the sweeper car can be reversed and the broom can be extended on either side and at any angle. This has involved the use of two cabs, one at each end of the sweeper body, between which is a bridge structure which carries the broom and which permits it to be swung out-board on either side.

The broom is rotated by an independent motor mounted on the broom carriage and another motor provides power for swinging the carriage out board at the desired angle. In operation, these two motors are controlled by a man stationed in the forward cab who swings the broom in-board whenever a vehicle is passed and who also varies the broom speed and pressure to suit conditions. The motorman who runs the sweeper car is, of course, located in the front cab and his duties are confined to this work alone. A mechanic is also carried in accordance with the standard practice of the New York Railways, to care for the sweeper mechanism. At switch backs or at the stub ends of lines the broom is swung to the opposite side of the sweeper-car and the broom carriage is moved to the opposite end of the open structure between the cabs so that the in-board end of the broom is in advance of the out-board end. This operation has been made possible by mounting the supporting mechanism of the broom carriage on what is called a mast-carriage, or trolley, that runs on an overhead track supported by the open structure between cabs, a small motor being provided to move the mast-carriage as desired.

As the plan of operation involves the sandwiching of sweepers in between the passenger cars, frequent sweepings will be the rule. A snow fall, therefore, will not be permitted to pile up, and no sweeper will be called upon to handle snow that has a depth greater than say ¼ in. This scheme of eliminating the necessity



NEW YORK SNOW-SWEEPER—REAR VIEW SHOWING ARRANGEMENT OF WARNING LIGHTS AND BELL AT END OF BROOM



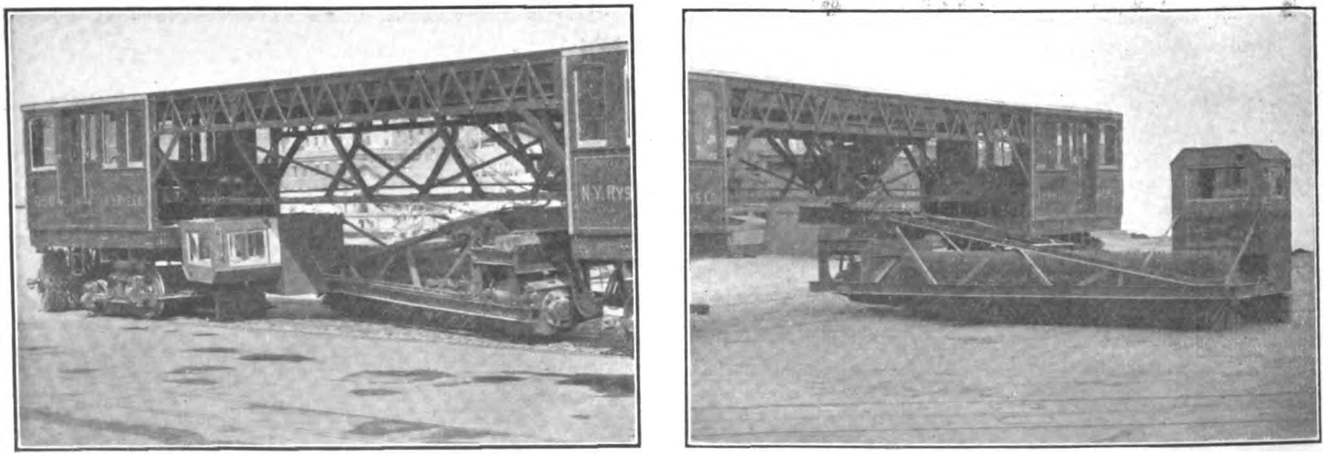
NEW YORK SNOW-SWEEPER—VIEW SHOWING BROOM SWUNG OUT-BOARD READY FOR OPERATION

for "plowing" snow is to some extent a new one, and, naturally, it provides against strangulation, even for short periods, of the electric car service because of teams on the tracks. The anticipated result will be to permit practically normal schedule speed for cars even during snow storms. As the speed under present snow-storm conditions is sometimes reduced to the vicinity of 3 m. p. h., and as the effectiveness of the present sweepers is reduced in proportion to their speed, it is believed that a sweeper of the new type will do about twice as much work as one of the old ones because of its higher speed. On the New York Railways the present snow-fighting equipment, which is known to be ample, consists of one sweeper for every 2 miles of single track, so that the capacity of one of the new machines under New York conditions is estimated roughly at 4 track miles. The cost of the new machines, it may be said, is roughly estimated at 50 per cent more than that of a standard double truck sweeper so that, considering the increased capacity, equipment of the new type will really cost less than the old. However, as expressed by Mr. Doyle, the cost is almost immaterial if equipment can be provided to prevent the recurrence of such conditions as existed in New York last winter, when two heavy falls of snow in close succession practically paralyzed transportation for more than a week, resulted in great privation, cut heavily into railway receipts, and even left the city open to disastrous conflagration through the inability of the fire department to respond promptly to calls.

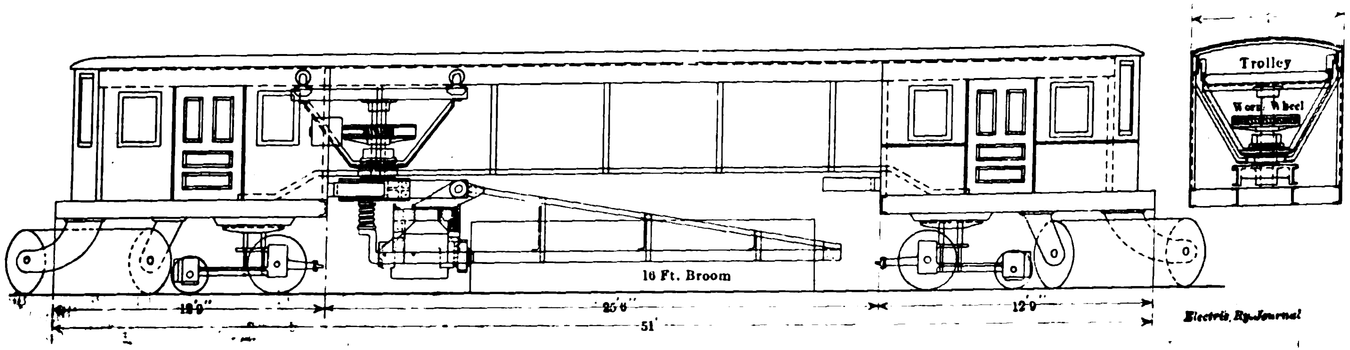
DETAILS OF CONSTRUCTION

As shown in the accompanying illustrations, the new sweeper-car consists of two cabs mounted on standard trucks and connected by an open bridging. Close under the roof of this central portion are a pair of rails that carry the mast-carriage, which may be moved from one end of the bridging to the other by means of a small motor geared to the wheels. In bearings at the center of the mast-carriage a 7-in. shaft, or mast, is carried, and upon this shaft between the upper and lower bearing in the dropped-frame of the carriage is keyed a heavy worm-wheel, 48 in. in diameter. The worm that meshes with the wheel is driven by a 5-hp motor mounted on the carriage frame so that as the motor is rotated the shaft turns and the broom carriage, which is keyed solidly to the shaft and is in fact supported solely by it, is swung either to the right or to the left according to the direction of rotation of the motor.

It may be of interest to state that the force which is exerted by the broom as it drags forward on the street surface has been found by dynamometer test to be



NEW YORK SNOW-SWEEPER—VIEWS SHOWING ORIGINAL ARRANGEMENT OF OPERATOR'S CABIN WITH HINGED ROOF AT END OF BROOM. THIS LOCATION FOR OPERATOR WAS GIVEN UP BECAUSE OF THE FLYING SNOW THROWN BY THE BROOM



NEW YORK SNOW-SWEEPER—ELEVATION SHOWING GENERAL CONSTRUCTION

equivalent to a force of 3180 lb. applied at the broom end. As this point is 21 ft. from the mast the thrust on the worm amounts to 66,800 lb., allowing 100 per cent for suddenly applied loads. This enormous thrust has necessitated special bearings for the worm shaft and, indeed, special design throughout.

The broom carriage is composed of two main parts, one of which may be called the supporting frame and includes the center casting to which the 7-in. shaft is fastened. This section has a semi-circular end which fits into a concave casting mounted on each end-cab, thus providing a stop for the movement of the mast carriage and also a bearing to resist the horizontal thrust from the unbalanced weight of the out-board broom. The broom frame proper is hung from the supporting frame by means of a shaft acting as a fulcrum at the side opposite the semi-circular end-bearing, and this permits the outer end of the broom to tilt up and down in accordance with the crown of the street pavement. The broom itself, which is 16 ft. long and 36 in. in diameter, is carried in bearings at the ends of a simple frame work upon which is also mounted the 35-hp motor which drives the broom.

In the present machine the tilting is reduced by springs at the inner end of the broom frame. However, the matter of broom pressure has been found to be of considerable importance, and contrary to expectations difficulty has been experienced in getting sufficient pressure at the out-board end of the broom. For this reason the springs shown in the illustrations are to be replaced by air cylinders working in the opposite direction so that pressure can be applied as desired to pull up the in-board end of the broom and thus force down the out-board end.

The fender that is shown attached to the broom was considered necessary to prevent possible injuries to pedestrians who might be struck because they fail to notice that the broom occupies a considerable space outside of the rails. For the same purpose, the out-board end of the broom has been equipped with red lights and a locomotive bell which is actuated mechanically by the rotation of the broom. Another locomotive bell is placed at each end of the sweeper-car instead of the usual gong, the object of this being to provide a distinctive warning upon the approach of the machine.

It may be of interest to note that the original plan provided at the out-board end of the broom a small cabin for the broom operator. This arrangement is shown in two of the illustrations, one of which shows the hinged roof that was provided on the cabin so that the broom could be passed under the bridge structure from one side to the other. The out-board location for the operator, however, was given up for the previously mentioned location in the front cab of the sweeper because of the unbalanced weight on the broom frame and because of the difficulty of vision on account of flying snow thrown by the broom.

It should be noted that the machine shown in the illustrations was planned as an experiment only and that, in consequence, the usual track brooms at each end of the car as indicated in the line cut were not actually installed. In its final form, which has now been definitely decided, the new sweeper will sweep the track, as well as a space at one side, and will also be provided with a slot scraper for the third-rail conduit used almost universally on the lines of the New York Railways. This is required to make the machine complete from the snow-fighting standpoint, as accumulations of snow in the conduit sometimes constitute a serious cause of trouble.

Mid-Winter Meeting of Southwestern Electrical & Gas Association

The first mid-winter meeting of the Southwestern Electrical & Gas Association was held in the Westbrook Hotel, Fort Worth, on Friday, Jan. 15, and it proved to be a decided success. A report from the accounting committee, outlining a system of accounts suitable for the smaller public utilities, brought forth considerable discussion, and the sense of the meeting was that the committee should, at the next annual convention in May, prepare a modification of the various national systems of accounting that could be used by the smallest public utility without prohibitive expense and labor.

A lengthy discussion also took place on the subject of the legally uncontrolled and unrestricted competition of the "jitney bus." The president appointed a committee of six street railway members to deal with this subject, this committee being empowered to take any action that it might consider desirable and to report fully of its action at the next annual convention.

David Daly, manager Houston Electric Company, and D. A. Hegarty, general manager Houston Lighting & Power Company, were elected as second vice-president and member of executive committee respectively to fill the vacancies caused by the resignation of C. W. Kellogg, who has left the State of Texas. Also, T. R. T. Orth, general manager Wichita Falls Traction Company, and J. C. Kennedy, secretary, Brenham Compress Oil & Manufacturing Company, were elected to the advisory committee to fill vacancies in that body.

The sixth annual report on the statistics of express companies in the United States, compiled by the Interstate Commerce Commission for the year ended June 30, 1913, shows that the total express mileage increased from 283,303.57 miles in 1912 to 301,621.63 in 1913, or 18,318.06. This increase was made up of 3,197.47 miles on steam railroads, 776.81 miles on electric lines, 13,892.53 miles on steamboat lines and 451.25 miles on stage lines. The total electric line mileage in 1913 was 8,468.68 miles as compared to 7,691.87 miles in 1912. The increased mileage was mostly on lines covered by the larger express companies.

The Jitney-Bus Competition

R. W. Meade, Charles N. Black and Others Analyze Economic Problems Raised by This New Means of Conveyance—Various Regulative Measures to Control This Competition Compared

Nowhere in the history of transportation can there be found anything comparable to the recent mushroom growth of the "jitney-bus"—a term which has been coined off-hand and applied indiscriminately either to auto-buses or to itinerant automobiles carrying passengers for a 5-cent fare upon any temporary route that seems likely to produce profits. The expression "jitney" is said to be the side-show barker's slang for a 5-cent piece. Three months ago the name was hardly known outside of its place of origin, Los Angeles. To-day the movement is likened by some alarmists to the death-knell of the electric railway industry, and it must be admitted that, notwithstanding the mushroom character of the new competition, it may temporarily do a great deal of damage if it is permitted to continue along the utterly reckless lines of its beginning.

Of course, the fact that the automobile is inherently a more expensive means of conveyance than the electric car insures the ultimate end of any competition between the two, but the opportunity of the unregulated auto-bus to compete only on those streets whose highly profitable short-haul railway traffic pays the expense of operating unprofitable suburban lines may involve losses that are really serious. Since the wave of jitney-buses began to sweep over the country hardly a month ago, one vital fact has become apparent. This is that regulation by law can be and must be applied, and the experiences and views of a number of those who have already dealt with the problem are given in the following paragraphs to the end that those upon whom it may soon be thrust will be prepared to meet it. A series of articles on the progress of the jitney-bus has appeared during the past four or five issues in the department of Traffic and Transportation of this paper. The purpose of this article, therefore, is not to trace the growth of the movement so much as to record the opinions of those who have had a chance to analyze it.

ORIGINAL AUTO STAGE
SAN PEDRO & REDONDO
VIA LOMITA FARE 5¢

JITNEY-BUS—TYPICAL MACHINE USED FOR JITNEY SERVICE

ORIGIN OF THE JITNEY-BUS

The first "jitney-bus" service was commenced as a result of attempted competition with the apparently highly profitable business of the Pacific Motor Coach Company in Los Angeles, Cal. In April, 1914, this company was organized with a flourish of trumpets and a capitalization of $500,000, the announcement being made that it would place 100 double-deck buses in operation between Los Angeles and Venice, Long Beach, Pasadena, San Pedro and other nearby points. Thirty-three of these cars were actually delivered and commenced operation in July, and news notes published in the Los Angeles papers of that time indicated that the company was doing an enormous business in competition with the Pacific Electric Railway. Passengers were carried between Los Angeles and Venice—a distance of about 10 miles—for 40 cents a round trip, while the fare on the railroad was 50 cents. Later the round-trip fare was reduced to 25 cents, and pictures taken in the Los Angeles streets show the buses being mobbed by enormous crowds.

During November, 1914, stories began to appear that the owners of small cars—principally Fords—had noted with greedy eyes the business that was being done by the buses and had begun to take passengers at a 5-cent fare in certain city districts. Reports stated that the business was booming, and that some 200 buses were running on a dozen different streets, each taking in as much as $10 or $12 every day. Within a month of the time when these stories appeared the Pacific Motor Coach Company was in the hands of a receiver, and its buses, which had been bought on a deferred payment plan, were taken over by the mortgagee and recently have been transferred to San Francisco, where they are being operated on the jitney plan.

The term "jitney-bus" covers a number of types of vehicle ranging in size from the large double-deck omnibus down to the ordinary two-seated touring car familiar to everyone. The jitney-bus is distinctive, however, in that it is usually driven by its owner who picks up fares wherever they may be had. Naturally, the idea has achieved its greatest popularity in Los Angeles, San Francisco, Seattle and other cities on the Pacific Coast, but even during the past month it has spread like a malignant growth as far south as Texas and as far east as Detroit and Toledo.

When shown telegraphic dispatches appearing in the newspapers to the effect that trolley line extensions in several western cities had been stopped as a direct result of jitney-bus competition, R. W. Meade, president Fifth Avenue Coach Company, New York, said that the municipal authorities in many American cities were making a serious blunder in permitting the development of the jitney-bus. "The danger in the situation," he said, "is that the busmen, the city authorities and all others concerned, are apparently plunging ahead without giving much thought to consequences. The surface cars in these cities are subject to rigid regulation on the part of city and state commissions, they pay heavy sums into city and state treasuries in the way of taxes and license fees, and as responsible corporate bodies they can be held to account for claims for damages. This item always cuts heavily into the earnings of a traction company, as everyone knows.

"But your jitney busman, as a rule, carries none of these financial burdens. His taxes are trifling. He pays practically nothing in the way of license fees, he snaps his fingers at damage suits, and being financially irresponsible, he cannot be brought to book. Do you wonder at the complaints of the operators of the electric railway?

TEN-CENT FARE HARDLY SUFFICIENT IN NEW YORK

"However, the great danger in the situation lies deeper. If what I have outlined were all the factors in the situation, the outlook for some of the traction companies might be rather blue, but the real menace may be shown by citing the experience of the Fifth Avenue Coach Company. This company is no infant as passenger-carrying companies go. As far back as nearly thirty years ago it was operating horse-drawn stages on Fifth Avenue. Later it tried out the storage-battery type of bus, and about eight years ago it adopted the gasoline-driven type of vehicle. Now, in this history of over a quarter of a century, the company, before it became self supporting, lost something like a million dollars, but it learned a great many actual first-hand facts about bus operation. For one thing, it learned that if all fundamental factors are taken into consideration, the motor-bus costs more to operate in America than the surface car. There isn't the least doubt of this.

The surface car operators, bear in mind, are complaining, not because the jitney busmen are cutting into their earnings, but because they are doing so under wholly artificial conditions.

"The Fifth Avenue Coach Company is to-day moderately successful, but it charges a 10-cent fare, runs over a limited and favorable stretch of territory, is backed by many years' experience, has an investment of $2,000,000 in plant and equipment and is managed with scrupulous care by an operating staff that has been many years in process of development. In spite of these advantages the company spends 9 cents out of each dime on its service, that is, in providing for operating expenses, maintenance and depreciation, reserves for damage suits, taxes, interest on capital, etc. If the company was able to keep back for its own uses the $60,000 and more that it pays each year to city and state, if it was able to send out its buses when the harvest was good and take them in when the pickings were poor, if it could ignore the regulations of the authorities and all responsibility for damage claims, and if it was able to forget the morrow and cut down its reserves for maintenance and depreciation, in a word, if it was able to operate anywhere and everywhere without regard to schedule and other restrictions, the company could no doubt make a highly favorable financial showing for a few seasons. What might happen after that is another matter.

"The situation among the jitney busmen is quite like this. Few of them understand the real facts of the situation. Probably not one in a hundred of them is setting aside the proper reserves required for the successful continuance of his business. Of course there will be a reckoning some time in the future, but in the meanwhile no little havoc is being played in the traction situation as it concerns some localities. There is another phase in the situation worth noting. Much capital is being coaxed from the public by promoters interested in highly speculative bus companies, and often the basis of their claims is the showing made by the jitney busmen. This is unfortunate. The bus has a future in America, but it is not along these lines. Bus operations in London and Paris are likewise wholly misleading. The higher level of labor costs in America alone would make a comparison valueless if there were no other fundamental differences."

PAINTS J.V.H
SIGN

JITNEY-BUS—STREET SCENE IN LOS ANGELES, THE BIRTH-PLACE OF THE JITNEY, DURING THE BRIEF LIFE OF THE LOCAL BUS COMPANY

BUS CANNOT DISPLACE THE RAILWAY CAR

Charles N. Black, vice-president United Railroads of San Francisco, in a recent address before the City Club of Berkeley discussed the economics of the jitney-bus in detail. He said that if the jitney-bus is a real advance in transportation service, existing street and interurban railways will have to be discarded, but unless it can perform all the functions of an electric car as efficiently and as economically it will unquestionably fail.

The greatest and most serious problem confronting every street railway in this country is handling the people during the rush-hours. In San Francisco on Market Street over 15,000 people are transported per hour in each direction, which means a car on both inbound and outbound tracks every twenty-five seconds. Is it possible to conceive of any development of the jitney which will handle this number of people at this rate, unless the entire street is given up to their use? Even then the congestion would be impossible.

In London double-deck auto-buses are in use. In Paris they were formerly used but have been abandoned as it was found that the accidents resulting from the people attempting to reach the upper deck were very serious, and further, because the loading and unloading time required was excessive. From the experience of both of these cities one may safely conclude that any auto-bus, such as has been developed abroad, would not be a satisfactory substitute for our existing street cars. A bus that will seat from twelve to fifteen people, which is a compromise between the bus in use abroad and the jitney in use here, would be, approximately, 17 ft. or 18 ft. in length by from 6 ft. or 7 ft. in width. At least eight of such buses would be required to equal one modern street car, and eight of such buses would take up as much space in the streets as at least three electric cars. A city can ill-afford to permit any system of transportation to develop which is not economical of space in its streets, and, in fact, in large cities every effort is being made to divert as much of the traffic as possible to underground railways. Apparently, therefore, the jitney in this respect is not a step in advance, and if there were no other objections this would be sufficient absolutely to condemn it.

But the economic condition is even more difficult to meet. Out of 261 automobiles which were actually in operation in San Francisco on Jan. 26, eighty-nine were Ford machines, or practically 30 per cent of the total number, the next largest being Overlands, of which there were thirty-five. The present price of a Ford machine, capable of seating four persons in addition to the driver, is $565. Assuming that it can operate 56,500 miles before being relegated to the scrap pile, makes the proper depreciation charge 1 cent per mile.

The cost of a set of tires is within a few cents of $40. Assuming a life of 4000 miles, the equivalent is 1 cent per mile. Twenty miles per gallon of gasoline on the basis of 12 cents per gallon, makes the cost 0.6 cent per mile.

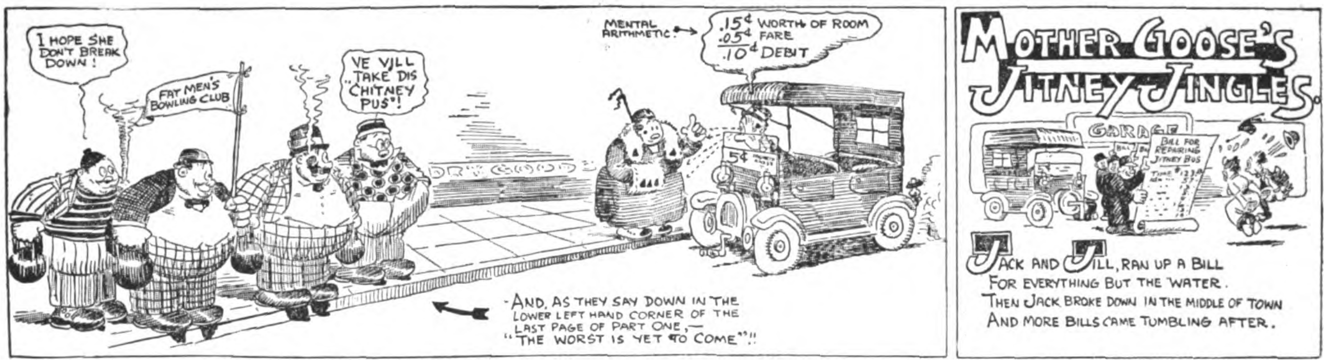
Lubricating oil at 20 cents per quart, and allowing 2 quarts per 100 miles, gives the equivalent of 0.4 cent per mile. Miscellaneous supplies, housing, cleaning and minor repairs to the car will, on a most conservative basis, average at least 1 cent per mile.

Assuming the car can make an average of 100 miles per day in actual service and that $3 per day is a reasonable wage to allow the driver, makes the cost for the driver 3 cents per mile. A résumé of the above is as follows:

Depreciation	1	cent per mile
Tires	1	" "
Gasoline	.6	" "
Oil	.4	" "
Miscellaneous, including repairs, storage, etc.	1	" "
Driver	3	" "
Total operating costs	7	cents per mile

In this estimate extraordinary expenses resulting from accidents have not been taken into consideration, nor has there been any allowance made for injuries to persons and property, which are bound to occur. It would appear, therefore, that the total operating costs as given above, viz., 7 cents per mile, are certainly as low as can be hoped for under the existing conditions of the art. Dividing this 7 cents by the passenger seating capacity, or four, gives a cost per seat mile of 1¾ cents.

The cost of a seat mile on the San Francisco railways, including a reasonable return on the investment, is, approximately, 0.7 cent. In other words, the cost of a seat mile in the jitney service is at least two and a half times the cost of a seat mile of an electric car. If the comparison was based on the total carrying capacity of the two types of vehicle, a considerably larger discrepancy would be found to exist. As a matter of fact, the gross earnings per seat mile of the street cars now operating in San Francisco are less than the actual operating costs per seat mile of a jitney-bus exclusive of any allowance for the driver's wage.


I HOPE SHE DON'T BREAK DOWN!
FAT MEN'S BOWLING CLUB
VE VILL TAKE DIS CHITNEY PUS!
MENTAL ARITHMETIC
.15¢ WORTH OF ROOM
.05¢ FARE
.10¢ DEBIT
5¢
-AND, AS THEY SAY DOWN IN THE LOWER LEFT HAND CORNER OF THE LAST PAGE OF PART ONE,— "THE WORST IS YET TO COME"!!
MOTHER GOOSE'S JITNEY JINGLES
GARAGE
BILL FOR REPAIRING JITNEY BUS
JACK AND JILL, RAN UP A BILL
FOR EVERYTHING BUT THE WATER.
THEN JACK BROKE DOWN IN THE MIDDLE OF TOWN
AND MORE BILLS CAME TUMBLING AFTER.

JITNEY-BUS—RECENT CARTOON IN DAILY "TIMES" OF LOS ANGELES, WHERE JITNEYS HAVE OPERATED SINCE NOVEMBER

EFFECT OF LACK OF REGULATION IN 'FRISCO

Mr. Black added that under similar requirements of service, it would appear that the street car had absolutely nothing to fear from the competition of the jitney-bus. But unfortunately for the street car, it has been compelled up to the present time to compete with an absolutely unregulated service and under handicaps which are most inequitable.

In the first place the burdens of taxation are far heavier. Directly and indirectly, the street railways of California pay on the average taxes amounting to at least 12 per cent of their gross receipts. Assuming the earnings of a jitney bus are simply equal to the minimum operating expenses, including a living wage to the driver, the total taxes which it pays to state, city and county, including all licenses, only amount to approximately 1¼ per cent.

In the second place, the jitney-bus is not required to adhere to any specified route. It furnishes no transfers but confines itself entirely to the short-haul travel, or what might be termed the cream of the business. Governmental authorities, recognizing that a transportation system in any city is a natural monopoly, have required street railways to furnish transfers within the corporate limits upon the payment of a 5-cent fare. This means that the street railway actually loses money on a considerable number of passengers, and this sum has to be made up from the profit of the short-haul travel.

No one factor in the development of American cities has had more influence than the system of a flat street car fare. It has enabled the working man to acquire a home in the suburbs at reasonable cost and has eliminated the congestion so common to the cities of the old world, where the transportation systems have been developed on the so-called zone system. If the American people decide to forego the present advantages derived from the flat fare and permit the street railroads to establish zone systems, charging the passenger a rate in proportion to the distance traveled, competition from the auto-bus will soon be eliminated.

To illustrate, a passenger can be transported on the street cars in San Francisco from the Ferry to Eighteenth and Castro Streets, to which point the largest number of the jitney-buses are at present operating, at the rate of 2½ cents, and still earn a reasonable return on the investment. But under such conditions the fare to the outlying districts would have to be considerably in excess of 5 cents, and the operation of many of the existing lines entirely abandoned.

Mr. Black added in his address that there was just one other matter to which he desired to refer, namely, the increased hazard to life and limb to everyone using the streets of a city where the jitney bus is operating. In London, during the year 1912, the deaths caused by motor buses exceeded in number the deaths caused by all vehicular travel of every description during the year 1905.

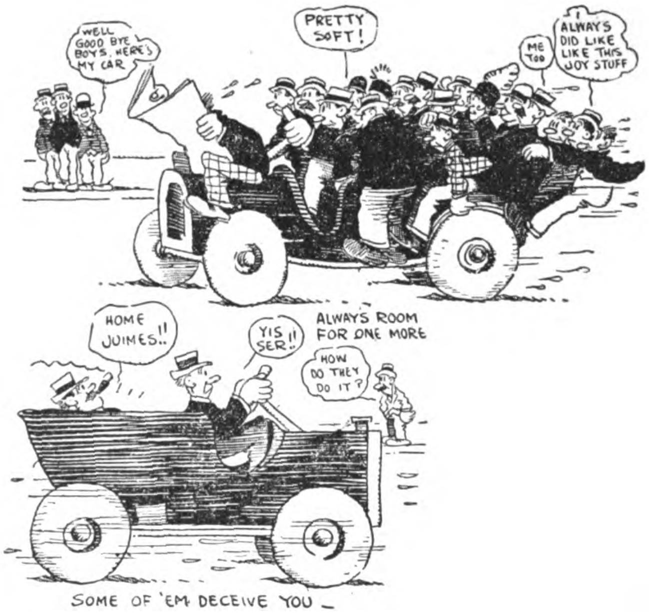
The record of the traffic squad of San Francisco's Police Department shows that during the month of November, 1914, there were five automobile accidents in the policed district with but one person injured. During the month of December, 1914, also, there were five automobile accidents in the same area and one person injured. But during the month of January, 1915, up to and including Jan. 26, there were eighteen automobile accidents, with eleven persons injured, one of whom did not survive. It is, perhaps, needless to add that prior to Jan. 1 there were practically no jitneys in operation in San Francisco.

The electric railroads, both urban and interurban, do not ask for any privileges or advantages withheld from their automobile competitors, but they do demand that the same conditions of service, the same burdens of taxation, and the same protection to the traveling public be demanded of their competitors as they are required to operate under. Under equal conditions the cost of service will unquestionably be the controlling factor, and the road to Tipperary for the jitney bus is still a very long one.

The Jitney-Bus in Smaller Cities

Mr. Black's consideration of the jitney-bus as outlined above, applies particularly to its influence upon a large city system where the discrepancy between the costs of short hauls in congested districts and long hauls to outlying suburbs is at a maximum. In smaller cities, of course, the opportunity for the jitney-bus to pick out only the highly profitable traffic is considerably lessened, with the result that the economic disadvantage against the new conveyance is more marked. However, that this has not deterred the extension of the jitney-bus idea is shown by the following outline of the views expressed last week by A. H. Rogers, president Southwest Missouri Railroad, shortly after the machines began operating in Joplin, Mo., and the nearby cities.

Mr. Rogers is quoted in part as follows: "If the motor bus people have discovered a better, more thoroughly satisfactory service than the electric railway companies can offer, the jitneys have come to stay. Electric cars will be relegated to history, just as prairie schooners, canal boats and mule cars were pushed aside by improved methods of transportation. The public demands and deserves nothing short of the best. But an accident that has just occurred in Joplin, when a prominent business man and his wife were struck by a jitney bus and narrowly escaped death, ought to be ample proof for the most enthusiastic ballyhooer for the new service that special regulations and requirements are needed, and the remark of one victim is fraught with significance: 'There are just two classes of people downtown nowadays, the quick and the dead.' The need for regulation is obvious, but with fair requirements to effect the control of its operation the jitney-bus will be entitled to fight it out with the street cars on a strictly competitive basis. In the end if the jitneys are preferred by the public, the electric railway operators will be forced to admit defeat and retire, saving as much out of the wreck as they can with which to enter the jitney-bus business themselves."


WELL GOOD BYE BOYS, HERE'S MY CAR
PRETTY SOFT!
ME TOO
I ALWAYS DID LIKE LIKE THIS JOY STUFF
HOME JUIMES!!
YIS SER!!
ALWAYS ROOM FOR ONE MORE
HOW DO THEY DO IT?
SOME OF 'EM DECEIVE YOU

JITNEY-BUS—TYPICAL CARTOON FROM THE ATLANTA "GEORGIAN"

Franklin P. Griffith, president Portland (Ore.) Railway, Light & Power Company, has also emphasized the necessity for common equity in case the competition of the jitney is to be permitted. He said recently: "The electric railway system of Portland pays to the public every year in direct taxes, bridge tolls, paving costs and franchise charges about one dollar in every five it receives from passenger revenue. The company thus pays about 6 per cent of the taxes of the city, and these charges are fixed and required, so that a loss of revenue does not stop this heavy overhead charge of 20 per cent of gross revenue. If the jitney is the coming means of transportation and can carry the load, if it is to be permanent, adequate and can bear the load of traffic efficiently, and the just tax load as well, then the jitney is the thing for the public. But that cannot be proven until the jitney is put on a business basis and made to carry the burdens the public forces present transportation corporations to assume when serving it."

In Oklahoma City, the menace of the jitney-bus was recognized with extraordinary promptness by the citizens themselves. Jitney service made its appearance in the community about Jan. 25, and on Feb. 2 an ordinance to control it was passed by the city commissioners. This action was influenced by the business men of the city, who went before the commission to the number of more than 100 and demanded that legal regulation be provided. This has resulted in the practical withdrawal of the jitney service, which in practice as well as theory appears to be unable to survive reasonable regulation. Altogether the brief experience in Oklahoma City has been anything but unfortunate, as it is reported that even during the few days when the jitneys ran they got very little patronage, the citizens almost to a man refusing to use them.

REGULATING JITNEY SERVICE

The foregoing paragraphs show the economic waste of the jitney-bus as well as the danger to which communities are exposed where there is absence of restrictions on their use. Several cities, notably Denver, Oakland and Oklahoma, have already passed such restrictive acts. An analysis and comparison of these follow:

Relief for Street Car Strap-Hangers

NO SEAT—NO FARE

Beginning next Sunday, you can ride down town and return to your home in a comfortable, modern automobile for the SAME FARE that you are now paying on street cars—5 cents.

A few far-sighted and practical business men of this city have organized an enterprise that will furnish a far superior and more comfortable passenger service than has ever been thought possible.

The success of this venture is entirely dependent on your support, which is confidently expected.

On Sunday, January 31st, Beginning at 6:30 A.M.

The Feitel Jitneymobile Company

will operate a line of Automobiles on the following routes for a **5 Cent Fare**:

JACKSON CAR: RED SIGN. From Canal and Baronne St., up Baronne to Howard Ave., out Howard Ave. to St. Charles Ave., up St. Charles Ave. to Jackson Ave., returning by the same route to Canal St. FARE, EITHER WAY, 5 CENTS.

LOUISIANA AVE. CAR: BLUE SIGN; same route as above up to Louisiana Ave., 5c Fare.

NAPOLEON AVE. CAR: GREEN SIGN, same route as above up to Napoleon Ave., 5c Fare.

CANAL ST. CARS: will operate from the corner of Canal and Camp to the CEMETERIES for a 5c Fare each way.

There will be a **BROAD STREET CAR**—RED SIGN.
HAGAN AVE. CAR—GREEN SIGN.
CEMETERIES CAR—BLUE SIGN.

Every passenger is assured a SEAT for his FARE. Drivers will not take on more passengers than a car can seat. Passengers enter from and alight on sidewalk. Cars receive and discharge at any street corner along their route.

Within a few weeks, all cars of this company will be of a uniform color: BROADWAY—yellow with red gear. (which render them readily distinguishable).

The St. Charles St. route will be extended to Carrollton Ave. as soon as equipment, already ordered, arrives, and other lines to all parts of the city inaugurated shortly.

The number of cars on each line will be increased as rapidly as possible. Cars will be operated daily from 6:30 a. m. to 8 p. m.

A red pennant will be shown when cars are full.

JITNEY-BUS—ADVERTISEMENT USED IN NEW ORLEANS PAPERS

The Denver ordinance, briefly speaking, is directly restrictive. It requires vehicles "operating for the purpose of affording a means of transportation similar to that afforded by street railways" to obtain a franchise. The penalty for violation is not less than $100 fine and not more than $300 and ninety days imprisonment, each trip or part thereof constituting a separate offense. This ordinance clearly eliminates jitney operation, as no city council would be likely to grant a franchise to a single irresponsible driver. However, the way is left open for regularly organized companies to operate autobus lines under such regulation as may be deemed necessary in case any body of responsible men is willing to invest in such an unprofitable enterprise. The Denver Tramway Company, immediately after the passage of this ordinance, issued a pamphlet analyzing the new movement by an ingenious parable, written by John A. Beeler. An abstract of this pamphlet was published in last week's issue.

The ordinances of Oakland and Oklahoma City are purely regulative in character and display a certain similarity of detail Each commences with a definition of the scope of the ordinance. This broadly includes all vehicles engaged in the business of carrying passengers for hire, as announced by sign, voice or other device, over a specified route or between specified termini. Taxicabs, hotel buses, automobile livery cars, sight-seeing buses and the like are excluded. Oklahoma City includes horse-drawn vehicles, while Oakland does not. A yearly license fee of $60, which covers any number of vehicles owned by the licensee, is required in Oakland, while in Oklahoma there is no charge for the license (which nevertheless must be obtained), but there is an annual tax for each vehicle ranging from $50 to $150, according to size.

In both ordinances the licensee must file complete data about his automobile, proposed schedule, hours of operation, termini and route. In Oakland the City Council must pass on the application for a license and has the power to change the proposed route or deny the license altogether. In Oklahoma City the license must, apparently, be issued as requested, provided the applicant meets with the various requirements as to fees and indemnity bond.

Both ordinances specify that each person engaging in the business of bus operation must file a bond of $10,000 for the protection of passengers or other persons who have established damage claims against the operator of the machine on account of his negligence, sums due to the city, and the like.

With regard to identification marks the Oakland ordinance requires the use of a front sign which is visible at a distance of 100 ft. and which shows the route of the automobile, the termini and the fare charged. The operator is also required to wear a metal badge and carry an identification card issued by the Police Department. This is to prevent the operation of cars by unlicensed drivers. In Oklahoma City the ordinance requires only the display on the car of a sign giving the name of the owner of the automobile, the license number, the route and destination.

It is unlawful under both ordinances to permit passengers to stand either on the running board or in the space in front of the front seat, to sit upon fenders or dash or doors of the car or to carry extra passengers outside the body of the car. Only one person is permitted to ride with the driver.

The sections in both ordinances with regard to loading of passengers differ materially. In Oakland the only restriction is that when passengers are boarding the automobile it must be at least 2 ft. away from the right hand curb of the street. In Oklahoma City, stops for passengers must be made at the near side of the crossing and alongside of the curb. Machines must not stand more than two minutes at any one point. Both ordinances require that the interior of the tonneau of the machine shall be lighted at night when the top is up. Unloading must be done from the right-hand side of the machines in Oakland except in the case of passengers on the front seat. In Oklahoma City the rule is only that passengers must not alight while the car is in motion.

In Oakland a violation of the terms of the ordinance is considered a misdemeanor and is subject to a fine not to exceed $100, or imprisonment for a period not exceeding six months, or both. In Oklahoma City the penalty for the violation of the terms of the ordinance is a fine not exceeding $100, or imprisonment not exceeding thirty days, or both. Both ordinances, it may be said, were classed as emergency provisions, to take effect at once.

The Oklahoma City ordinance contains two apparently important clauses which are not included in the Oakland ordinance. One of these requires that jitney-buses shall not be operated upon streets where street cars are operated for distances of more than two blocks and then only when within the city fire limits, where this is necessary in the crossing of such fire limits. There is also a section devoted to speed limits, 8 m.p.h. being specified within fire limits and 15 m.p.h. outside of fire limits, but in all cases and at all times speed must be reasonable. A clause is also inserted regarding the general regulations for vehicular traffic which are to apply to the jitney-buses the same as other vehicles.

On the other hand, the Oakland ordinance contains a number of sections which do not appear in the Oklahoma City ordinance, such as the requirement of non-skidding devices, a minimum age limit of eighteen years for drivers and provisions for forfeiture and restoration of the license by the City Council. In addition, special trips also may be made in Oakland to public schools, excursion trains and to public assemblages for a period not to exceed one hour before and one hour after the assemblage is being held. In making such special trips the signs on the jitney-bus must be changed. These special trips can only be made upon alternate days. That is to say, machines with odd license numbers may make special trips every other day and machines with even license numbers may make them on the days when the odd-numbered machines are prohibited. In this way half of the jitney-buses in the city must be operating upon their regular routes. This regulation regarding the special trips upon alternate days only does not, however, apply to the trips to public schools, which may be made every day.

JITNEY-BUS—GETTING A RIDE FOR LESS THAN COST—THIS BUS LINE FAILED AFTER SIX-MONTHS OPERATION

In Oakland, also, it is unlawful for jitney-buses to refuse passengers who apply for transportation, except when all seats in the vehicle are occupied, or when the person who proposes to ride is in an intoxicated condition or boisterous or profane. Within the Oakland city limits jitney-buses must not charge more than a 5-cent fare for a full trip or refuse to make the full trip when passengers are being carried, although one bus may transfer its passengers to another bus under permission of the council. Diverging routes are permitted to the extent that machines may turn into side streets to deliver passengers therein, but the buses must return to the original route after delivering such passengers.

The smoking of tobacco "or other mixture" and drinking of intoxicating liquors by operators while "engaged in the service of transporting passengers" is prohibited. Oakland also prohibits jitney-buses from crossing either steam or electric railway tracks unless the machine comes to a stop at the intersection with the railroad track. An exception, however, is made where traffic officers or flagmen are located.

Reducing the Fire Risk

Some interesting facts in regard to fire insurance premiums are contained in a paper recently presented by N. H. Daniels of the Stone & Webster organization before the Boston Society of Civil Engineers. An electric generating station built according to the best ideas of the insurance companies commands a yearly rate of only 19 cents per $100 of insurance, subject to an exposure charge if near other hazards; while a frame shingle-roofed building, with unprotected openings to the basement, poor wiring and slovenly management plus zero protective apparatus is likely to run as high as $3, if indeed, any company can be found to take the risk in view of its combined external and internal conditions.

Between these limits is a large range of rates varying with what might be called the personal equation of each station. Changes in construction which might seem relatively unimportant to an engineer throw the insurance rates up or down to an extent which justifies close attention to these points. For example, if the oil-insulated transformers in a plant are not installed in a fireproof compartment, the rate goes up 3 cents per $100, representing an increased yearly premium of $300 in a 10,000-kw plant. This means that about $6,000 more might be expended at a 5 per cent interest charge to house the transformers in the safest manner, without materially increasing the expense burden of the station, and in a concrete case may justify putting a transformer house outside the main building, even in a hydroelectric plant, whose fire hazards are not ordinarily looked upon as of much importance by the layman. Far beyond the amount of the insurance premium is the valuation to be set upon continuous service.

Even in a plant well designed from the fire prevention point of view, there is no small responsibility laid upon the operating staff to avoid increasing the hazards. A not uncommon practice is the storage of planking among roof trusses during construction periods, which gives also favorable opportunities for the careless disposal of boxes, crates, excelsior, gasoline torches and other supplies. The columns supporting the roof at its intermediate portion are danger points where they pass downward through the basement, and the accumulation of combustible material around footings should be prohibited. A lot of loose wiring goes into service during many repair periods, and the use of poor joints in such circuits is a fertile source of trouble. Where temporary walls of corrugated iron are used in stations, it is highly desirable that outside these flimsy partitions platforms of fireproof material shall supersede wooden structures, that oil storehouses shall be decently separated from the partitions and that a more permanent form of construction shall be settled upon as early as possible. Without listing the variety of hazards which determine the rate on an operating plant, it is none the less essential to point out the desirability of giving them frequent study, for high standards of service are only maintained by constant vigilance.

Application has been made to the Ontario Railway & Municipal Board by the Toronto Suburban Railway for the privilege of operating cars on its various lines on Sundays.

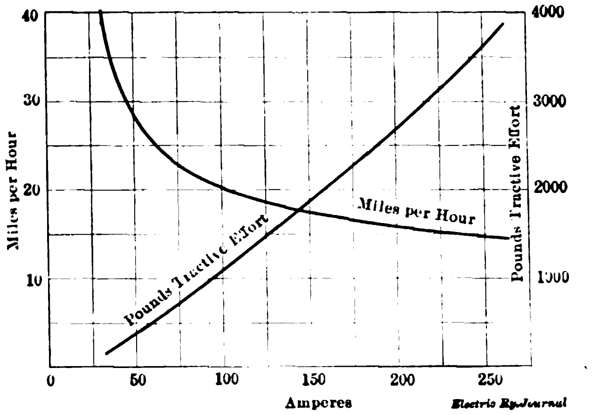
Proportioning of Railway Motor Resistances

A Simple Graphical Method of Calculating Starting Resistances Differing in Detail from that Described in the Issue for Dec. 26 Is Given and Illustrated

BY A. M. BUCK, ASSISTANT PROFESSOR OF RAILWAY ELECTRICAL ENGINEERING, UNIVERSITY OF ILLINOIS, URBANA, ILL.

In any of the methods so far devised for the control of direct current series motors, it is not sufficient to reduce the potential at the motor terminals by the use of different combinations of motors. To prevent an excessive flow of current, and to keep the torque within rather narrow limits, it is necessary to introduce a certain amount of resistance into the motor circuit in series with the motors. The amount of resistance should be just sufficient to reduce the starting current and the torque to the desired limiting values allowable for the equipment. As the motors gain speed the amount of resistance must be reduced until it is all removed from the circuit. This may constitute the entire control, or it may be done in conjunction with changes in the arrangement of the motors, such as connections in series and in parallel.

At standstill, the current flowing through the motors is limited only by the resistance of the windings of the machines connected in series, unless sufficient external resistance be inserted to cut the current down to some specified value.



MOTOR STARTING RESISTANCE—FIG. 1—CHARACTERISTIC CURVES FOR 75-HP MOTOR

As an example, take the 75-hp railway motor, curves for which are shown in Fig. 1. It is desired to accelerate a certain car by using a pair of such motors with series-parallel control at such a rate that the current will vary between the limits of 200 amp and 150 amp while resistance is included in the circuit. The actual determination of the limiting values of current depends on the weight of the car, the desired acceleration, and the allowable current through the motors. The difference between the maximum and minimum values of current is determined by the allowable number of steps on the controller, which in its turn depends on the allowable variation from the mean acceleration.

At standstill the current will be the maximum value, and the necessary resistance to be used will be found by Ohm's law:

$$I' = \frac{E}{R_1 + 2r} \qquad (1)$$

where I' is the maximum current, E is the line emf, R_1 the external resistance, and r the motor resistance. In the example cited, $r = 0.232$ ohm, hence

$$200 = \frac{500}{R_1 + 2 \times 0.232},$$

whence $R_1 = 2.036$ ohm. This represents the total resistance which must be added to the motor circuit to keep the first rush of current down to the desired limit.

With current passing through the motors a torque will be developed, which will cause the car to accelerate. As the car gains speed the motors develop a counter-emf, the production of which causes a reduction in the motor current, and hence in the tractive effort and the acceleration. In order to keep the tractive effort within the limits desired the resistance should be reduced when the current has fallen to the minimum value decided on.

When the current has fallen to some value I'', the counter-emf developed by the two motors in series, $2E_c$, will be

$$2E_c = E - I''(R_1 + 2r) \qquad (2)$$

It is then necessary to determine the new value of external resistance (R_2) which will cause the current through the motors to increase to the maximum value I'. The change in resistance will be made instantaneously, so that there will be no opportunity for the speed to change during the operation of the controller from one notch to the next. If the field flux remained constant with changes in armature current, as in a shunt motor, the counter-emf would be the same after the resistance had been reduced; except for the small change in IR drop in the motor windings. But with the series motor, an increase in armature current carries with it an increase in field flux, so that the counter-emf will also be increased. In order to find the amount of this increase in counter-emf, the saturation curve of the motor may be used, and the two values of flux, corresponding to the currents I' and I'' determined from it. Unfortunately, the railway engineer does not usually have a saturation curve of the motor available. A good substitute can be found from the tractive effort curve, as follows:

The torque developed by an electric motor depends on the fact that a conductor carrying an electric current tends to be pushed sidewise out of any magnetic field in which it is situated. The value of this push varies directly with the current in the conductor, with the flux density of the magnetic field, and with the length of the conductors, and their number and arrangement. For any particular motor the conductors on the armature are permanently arranged, so that we have

$$D = k\Phi I \qquad (3)$$

where D is the torque produced by the motor, k a constant depending on the windings, Φ the field flux, and I the current in the armature. It may be seen at once that for a given value of current the torque of the series motor is fixed, since the armature current also flows through the field coils and determines the field strength. Changes in potential have no effect on the torque characteristic of the series motor and serve only to vary the speed at which any torque is produced.*

Equation (3) gives the relation between torque, flux and current. If the torque and current are known (as, for example, from the characteristic curves in Fig. 1) a value may be obtained proportional to the flux:

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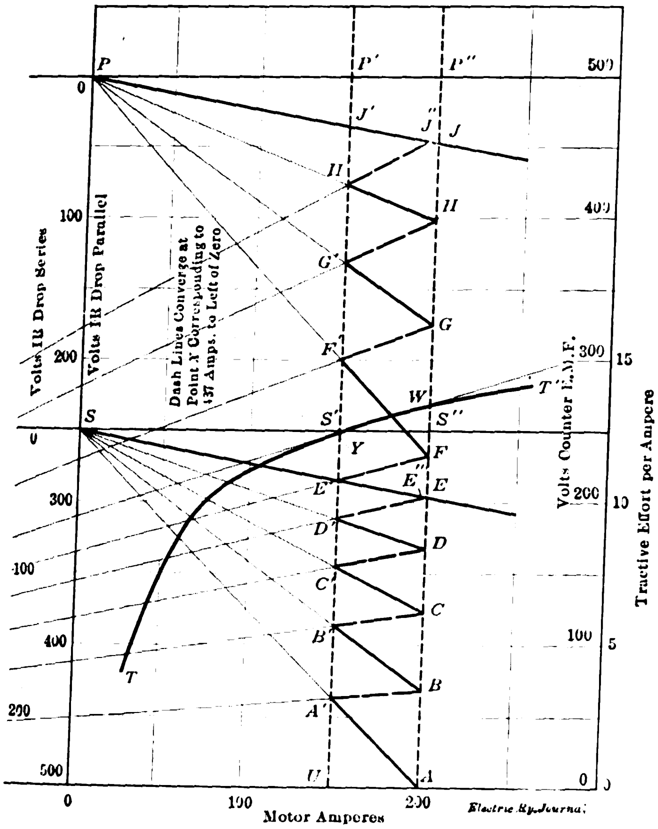
*A small change in the losses and in the magnetic relations will cause a slight difference in the torque produced under different conditions, but the changes are so small as to have very little effect on the general form and value of the torque characteristic.

$$\frac{D}{I} = k\Phi \qquad (4)$$

Since tractive effort and torque only differ by the constant ratios of gearing and wheel diameter, the former may be used equally well in equation (4), merely changing the value of the constant k. A curve plotted between tractive effort per ampere and motor amperes, as *TYWT'* in Fig. 2 will then represent the variation in flux with magnetizing current. This relation holds true only in the case of motors whose field current varies directly with the load current.



MOTOR STARTING RESISTANCE—FIG. 2—DIAGRAM FOR CALCULATING RESISTANCES

In finding the increase of counter-emf when the resistance is reduced so that the current increases from I'' amp to I' amp, it is only necessary to determine the values of tractive effort per ampere for the two values of current. That is,

$$\frac{E_{c_1}}{E_{c_2}} = \frac{D'/I'}{D''/I''} \qquad (5)$$

where E_{c_1} and E_{c_2} are the counter-emfs corresponding to currents I' and I'' respectively, and D' and D'' the values of tractive effort for those currents. The value of E_{c_1} having been found already by equation (2), the value of E_{c_2} can be determined from equation (5). The new value of resistance will have to be such as to give the counter-emf E_{c_2} when a current I' flows through the circuit, which will satisfy the equation

$$I' = \frac{E - 2E_{c_2}}{R_2 + 2r} \qquad (6)$$

This equation is similar in form to equation (1), but takes account of any value of counter-emf which may exist at the moment.

Applying these equations to the example cited, we have from equation (2),

$$2E_{c_1} = 500 - 150\,(2.036 + 2 \times 0.232) = 125 \text{ volts.}$$

This is the counter-emf existing the instant before the resistance is reduced. The instant after the resistance has been reduced, this becomes

$$2E_{c_2} = 125 \times \frac{13.43}{12.40} = 135 \text{ volts.}$$

The necessary value of resistance is found from the relation

$$200 = \frac{500 - 135}{R_2 + 2 \times 0.232}$$

from which R_2 is found to be 1.361 ohms.

The same reduction in torque as the speed of the motor increases will be noted, and, when the current has fallen to 150 amp, the counter-emf may be calculated by equation (2) as before. A new value of resistance may then be found by the use of equations (5) and (6). This process will be continued until all the resistance is cut out, and the motors are connected in series directly across the line.

To obtain further acceleration it is necessary to reconnect the motors in parallel. The counter-emf per motor will be the same; but when the connections are changed to parallel the two emfs will not add. Equation (2) will have to be rewritten as follows:

$$E_{c_1} = E - 2I''\left(R + \frac{r}{2}\right) \qquad (7)$$

Having found the new value for E_{c_1}, the value of E_{c_2} may be found by equation (5). By this method all the values for the parallel resistances may be determined. The table shows these values as determined for the problem outlined. In the columns for counter-emf, the upper values are for each motor (E_c), and the lower for the two motors when they are in series. In the columns for resistance, the upper values are per motor and the lower for two motors in parallel.

It may be seen that on points 5 and 9, on which all resistance has been cut out, the current will not rise to quite 200 amp. This is unavoidable with the assumptions made.

This method of calculation lends itself very readily to a graphical solution. Referring to Fig. 2, a diagram has been plotted between motor amperes and motor volts. If the line emf is 500 volts, then when the two motors are in series, each will be taking 250 volts, less what is consumed in the resistance. The lines *SE* and *PJ* have been drawn at an angle such that the ordinate, as *S'E'* or *P'J'*, represents the *IR* drop in one motor at any current *I*. The line *SA* has been drawn to represent the *IR* drop per motor for any value of current, when the resistance is so chosen as to bring the motor to a standstill at 200 amp. When the current has fallen to 150 amp, the total *IR* drop is represented by the ordinate *S'A'*, and the drop in external resistance by *E'A'*. If the resistance is then reduced so as to increase the current to 200 amp, the counter-emf will be increased by the ratio given in equation (5). The curve *TYWT'* between tractive effort and current has been plotted to the same base, although, if the current limits are to be those decided on, the points *Y* and *W* are all that need to be located. The straight line *WYX* is then drawn through *Y* and *W*, intersecting the current axis prolonged at *X*. It will be seen at once, from similar triangles, that any line drawn through *X* will produce intersections on the lines *UP'* and *AP''* that are proportional. That is,

$$\frac{UA'}{AB} = \frac{UY}{AW}$$

and so on, for any possible line drawn through *X*. If then the line *XA'B* is drawn through *X* and *A'*, intersecting *AP''* at *B*, the ordinate *AB* will represent the counter-emf developed when the current has been increased from 150 amp to 200 amp without changing the speed. The ordinate *S″B* gives the total *IR* drop, and *EB*, the drop external to the motor; this latter, divided by the current, determines the new value of resistance. The *IR* drop will then decrease along the line *BB′* as the current falls off, until, at point *B′*, the current must be increased again. The same construction is repeated until the two motors are in series without resistance. The current which will be obtained when the last point of resistance is cut out may be readily determined, since the *IR* drop in the motor alone is plotted as *SE*. When the last line radiating from *X* is drawn it will intersect this line at some point as *E″*. The abscissa determines the current.

In changing to parallel it is only necessary to move the axis of reference for *IR* drop to the proper point, in this case the ordinate for 500 volts, and continue the construction from that point. The construction is otherwise exactly the same as before.

As shown, the diagram is theoretically correct, and a comparison of the values found graphically for resistances with those calculated and tabulated as below shows how closely they agree. Further, the diagram may be used for any value of line potential without any further change than shifting the origin for the *IR* drop. For different current limits it is necessary to take new points on the tractive effort per ampere curve, thus getting a new location for *X*. The shape of the curve, as drawn on the diagram, shows that a small variation may be made without relocating this point, and the error will not be great.

Points on Controller	Speed		Counter emf		*I R* Drop		Resistance		
	200 amp	150 amp	200 amp	150 amp	200 amp	150 amp	Total	Motor	External
1	0.0	2.35	0.0	62.5	500.0	375.0	2.5	0.464	2.036
				125.0					
2	2.35	4.26	67.5	113.0					
			135.0	226.0	365.0	274.0	1.825	0.464	1.361
3	4.26	5.82	122.2	154.5					
			244.4	309.0	255.6	191.0	1.278	0.464	0.814
4	5.82	7.06	167.0	188.5					
			334.0	377.0	166.0	123.0	0.830	0.464	0.366
5	7.06*	8.09	203.6*	215.2					
			407.2*	430.4	92.8	69.6	0.464	0.464	0.0
6	8.09	11.24	232.0	299.0	268.0	201.0	1.340	0.232	1.108
							0.670	0.116	0.554
7	11.24	13.8	322.5	366.7	177.5	133.3	0.887	0.232	0.655
							0.443	0.116	0.327
8	13.8	15.8	395.0	421.0	105.0	79.0	0.525	0.232	0.293
							0.262	0.116	0.146
9	15.8*	....	453.6*	.....	46.4	.....	0.232	0.232	0.0

*At 196 amperes.

In general, as the resistors must be used both for the series and the parallel connections, a certain amount of adjustment must be made of the values found for definite current limits. The method of doing this is to continue the *IR* drop line corresponding to the actual resistance until it intersects the corresponding dash line. The current values will then, of course, not be those selected at the outset as the limiting ones.

The great advantage in the use of this diagram for determining motor resistances lies in its extreme simplicity. All that is needed is the tractive effort curve of the motor, and the motor resistance. The accuracy depends on the care with which the diagram is drawn, and makes no use of assumed constants, so that it can be used with any type of series motor.

According to *Railway and Locomotive Engineering* painful accidents have sometimes been caused by molten lead exploding while being poured, and many workmen have had their patience sorely tried when pouring melted lead around a wet joint to find the lead explode, blow out or scatter from the effect of the steam generated by the heat of the metal. The whole trouble may be stopped by putting a piece of rosin about the size of a hickory nut into the ladle before pouring.

Northern Ohio Traction & Light Company "Safety First" Work

During the past year the number of accidents of all kinds on this property was 34 per cent smaller than that for 1913, and there were 45 per cent fewer fatalities from all causes. The number of persons injured in getting on or off cars was reduced by 35 per cent and the number of collisions with vehicles by 43 per cent. This company operated during the past year a total track mileage of 233.2; the number of car-miles run was 8,810,466.

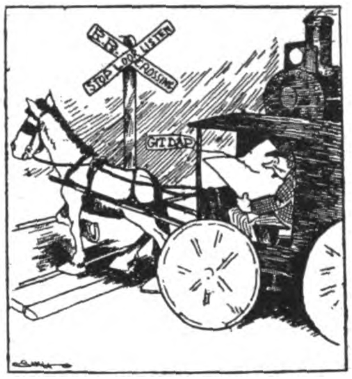


ILLUSTRATION FROM THE COMPANY'S BULLETIN

The safety work of the company is carefully organized in the department of the general claim agent, who has also the title of supervisor of safety. He is assisted by a large safety committee carefully chosen by the men. One of the effective features of the work is *The Traction Bulletin*, published twice a month for distribution on the cars. The *Bulletin* contains information regarding the operation of the company, time-tables and useful general information, not omitting a few jokes. An illustration used in a recent issue is the one taken from *The Philadelphia Times*, shown herewith. It was reproduced with editorial comment. E. H. Clinedinst is supervisor of safety of the company.

Sources of Creosote Used in the United States

The increasing demand for coal-tar creosote in the United States and the apprehension regarding the supply because of the European war, makes the question of our sources of supply a pertinent one. In a recent issue of the *Wood Preservers' Bulletin* it is stated that the consumption of coal-tar creosote in the United States during 1913 amounted to 109,373,359 gal., which was the largest on record. Of this amount less than 40 per cent was produced in this country, while that imported totaled more than 69,800,000 gal., or 64.4 per cent of the total consumption. Practically all of the coal-tar creosote imported came from countries now at war, although as stated in the proceedings of the American Wood Preservers Association's last annual convention, shipments are still being made from all these countries except Germany. According to the information furnished by the United States Department of Foreign Commerce, the sources of supply and their growth in 1912 and 1913 were as follows:

IMPORTS OF CREOSOTE

Imported from	1912		1913	
	Gallons		Gallons	
Europe:				
Belgium	396,652	$19,103	7,675,174	$326,925
France	....	....	....	....
Germany	15,602,683	611,454	17,947,501	704,802
Netherlands	3,638,793	161,700	7,062,248	412,003
Sweden	9,588	1,124	3,600	618
United Kingdom—				
England	21,380,832	1,064,143	22,383,966	1,268,988
Scotland	9,596,183	428,298	13,581,965	930,954
Ireland	635	40	......	......
Total Europe	50,625,366	$2,285,862	68,654,454	$3,644,290
North America	1,672,836	95,724	1,151,224	67,050
Total imports	52,298,202	$2,381,586	69,805,678	$3,711,340

Higher Fares Restored in Milwaukee

Commission Rescinds Low Fare Order—Says Interest of Greatest Number Best Promoted by Rates High Enough to Cover Cost of Reasonably Adequate Service

An order has been issued by the Railroad Commission of Wisconsin rescinding the decision of Aug. 23, 1912, which required the Milwaukee Electric Railway & Light Company to discontinue the ticket rate of twenty-five tickets for $1 and substitute therefor a ticket rate of thirteen for 50 cents. The decision of the commission, dated Jan. 30, 1913, is signed by John H. Roemer, who has just retired as chairman, and Halford Erickson. David Harlowe, the third member of the commission, who has also retired, did not sign the decision.

The order was issued after a hearing on a petition of Christ Woehsner, Mayor of Cudahy, Wis. He expressed his belief that the order of Aug. 23, 1912, was unreasonable and unjust in preventing the Milwaukee Electric Railway & Light Company from getting a fair return. He asked that the order be so modified that the earnings of the suburban railway system owned by the Milwaukee Light, Heat & Traction Company and the earnings of the city system of The Milwaukee Electric Railway & Light Company should be combined and considered as a whole.

Counsel for the city of Milwaukee objected that the complaint should be dismissed on the ground that under the railroad commission law an individual does not have the right to complain as to the amount of earnings made by a corporation under an order of a commission; that the proper method to test orders is through the right of appeal provided in the statutes. Counsel for the city also felt that the Milwaukee Light, Heat & Traction Company had no franchise to do business within the city limits of Milwaukee.

The Milwaukee Electric Railway & Light Company declared that by the modifying order issued Oct. 28, 1914, the commission unjustly and improperly extended fare limits and reduced rates of fare of the company and the Milwaukee Light, Heat & Traction Company. On Dec. 5, 1914, the Milwaukee Light, Heat & Traction Company instituted an action in the Circuit Court of Dane County against the Railroad Commission alleging that the order of Oct. 28, 1914, did not provide a fair and equitable return upon the property. The company also declared that the ordinance of Jan. 2, 1900, and other franchises constitute contracts. The company alleged that the return on the street railway system for many years has been and is now less than 5 per cent per annum, whether based on the proper investment therein or on the fair value of the property used and useful in the conduct of the railway, and that the rate of return which would be earned under the rates of fare existing prior to the order of Aug. 23, 1912, has been at all times and would be less than 6 per cent per annum, whether based on the investment in the street railway property or on the fair value thereof, and that the order of Aug. 23, 1912, requires reductions in the fares which will diminish the revenues and return more than $170,000 per year.

The Milwaukee Light, Heat & Traction Company in an answer to the petition alleged that the return which it is now earning and has earned for many years on its railway system is less than 5 per cent per annum, whether based upon the proper investment or the fair value of the property used and useful for railway purposes.

PHYSICAL PROPERTY CHANGES LARGE

In taking up the changes which have occurred since Dec. 31, 1911, and their effect upon the future, the decision first considers physical property. By far the most significant of the factors which have contributed to the changed conditions existing at present have been the additions to physical property. During the four years ending Jan. 1, 1915, the additions aggregated $4,691,843, resulting in a total cost new of $15,206,044 or an increase of 44.6 per cent over the property on Jan. 1, 1911. In round numbers the physical property used for railway purposes by the company in Milwaukee increased from approximately $10,000,000 in 1910 to $15,000,000 at the beginning of 1915, or 50 per cent. In 1910 the revenues amounted to $3,787,323, producing an investment ratio of 38.1 per cent. For 1911 the revenues of $3,969,072 resulted in the slightly lower ratio of 87.7 per cent, while for 1914, with property at $15,000,000 and revenues of $4,110,717, the ratio is 27.35 per cent, or a decrease of more than 10 per cent.

"In other words," adds the commission, "in 1911 there existed $2.65 of property for every $1 of revenue, which increased to $3.66 of property for every $1 of revenue in 1914. To place the year 1914 upon the same profitable basis as that of 1911 it is significant to show that the revenues should have totaled $5,665,186, or a necessary increase in 1914 over 1911, assuming the same operating ratio, of $1,702,114, or 43 per cent. This last figure, compared with the actual increase in revenues of 1914 over 1911, $147,645, or 3.7 per cent, brings out the differences in conditions admirably. It may be contended that this comparison would be effected by the depressed business conditions during the latter half of 1914, but the maximum revenues collected by the company during its entire history occurred in 1913 and were only greater by $110,592 than those of 1914."

In analyzing the expenditures for additions the commission called attention to paving as an important item contributing to the decrease in net earnings. The expenditure for four years was $593,871, or 14.5 per cent of the total other additions to property.

MAINTENANCE COSTS HIGHER

Maintenance at present requires higher relative charges than those prevailing during the period covered by the 3-cent fare case. This is due to several reasons. There was an element of deferred maintenance in 1908 to 1911, inclusive. The new physical property installed since 1911 has caused additional maintenance to cover new property and has caused the maintenance per unit to increase and, finally, the nation-wide increases in prices of materials and wages have affected the urban transportation business very materially.

In the service case the commission concluded that at least 1.8 cents per car-mile would be required to keep equipment in proper repair. The company contended for and still contends for 2.006 cents per car-mile as an adequate allowance for maintenance of equipment. The final necessary cost, the commission declares, is certain to be from 0.5 cent to 0.7 cent per car-mile higher than the average prevailing during 1908 to 1911. The final average of 1.8 cents per car-mile or higher indicates the amount of additional maintenance which will be required to cover pay-as-you-enter mechanism, air brakes, sign and signal systems, etc., added to the old equipment.

If no appreciable increases have appeared in maintenance due to other new property there is no doubt that these will occur within several years when the newness of the additions has worn off.

OPERATION

Certain increases in wages of labor, expense of supervision and general overhead charges have been due to larger power plant and repair-shop capacity, additional crosstown lines, single-fare extensions, additional carhouse accommodations and other developments. Trainmen's wages per car-hour in 1911 cost 49 cents, in 1912 49.8 cents, in 1913 51.5 cents and in 1914 53.8 cents. During 1914 an increase of $83,400 took place over 1911, of which about $24,000 was traceable to the spread of duty and minimum wage policy, $2,700 to fare-box collectors placed at important intersections where heavy loading occurs during the rush hour periods, and $58,000 to wage increases.

REVENUES

In 1909 operating revenues increased 7.6 per cent over the preceding year, in 1910 9.2 per cent, in 1911 4.7 per cent, in 1912 4.3 per cent and in 1913 2.2 per cent, while in 1914 there was a decrease of 2.6 per cent.

In 1908 operating expenses, taxes and depreciation were approximately 65 per cent of revenues. In 1913 the percentage was 75, and in 1914, 78.

Rides per capita increased from about 100 in 1897 to 250 in 1913. Recent indications point to the tendency that the present growth in rides per capita is not keeping pace with the former growth nor with the population curve. Revenues per capita increased from $5.39 in 1897 to $10.43 in 1913. The situation seems to be that the riding habit is approaching a more complete saturation than ever before in the history of the company of eighteen years.

Another factor is the decreasing average revenue per revenue passenger. The proportion of passengers paying cash fares has decreased to 15.68 per cent in 1914. The cash-fare passengers were 84 per cent of the total revenue passengers in 1900. The average fare has reached as low as 4.163 cents for 1914, whereas prior to 1900 it was approximately 5 cents.

Another important cause is the extended use of transfers. The per cent of revenue passengers using transfers increased from 25.52 in 1897 to 36.94 in 1913 and 39.66 per cent in 1914. Revenue passengers decreased from 100,073,659 in 1913 to 97,874,919 in 1914, or a difference of 2,198,740, while transfer passengers increased from 37,402,570 in 1913 to 39,263,919 in 1914, or a difference of 1,861,349. The most important causes were the installation of crosstown lines and extended transfer privileges. A conservative estimate of the annual loss occasioned by the use of these privileges is $80,000 for 1914 alone.

Among other causes which are affecting revenues adversely are automobiles, cycle cars and motorcycles.

Another more tangible cause is the order of the commission. The probable full effect of the issue of the tickets under the reduction order would be to reduce the revenues for 1912 by an additional amount of $116,000, and those for 1913 and 1914 by additional amounts of respectively $58,000 and $63,000.

Finally the general trend of industrial and financial conditions has increased materially the prices of material, labor and capital and altered economic conditions considerably in many ways. During the past eighteen years prices on commodities generally appear to have increased not far from 50 per cent. while labor in practically all lines also commands much higher prices.

The commission reached the conclusion that no encouragement can be found that for a considerable time to come the revenues can recoup their own losses, due to both permanent and temporary causes, and also make up the relative differences which now exist in the investment and operating ratios due to the large additions to physical property with the attendant outlays, to the increased costs in maintenance charges and operation and to the constantly increasing demands upon revenues on account of public requirement.

INCOME ACCOUNT

No allowances were made for working capital or going value, as it was not deemed essential for the general conclusions reached in this decision to determine a final value.

SUMMARY OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY—INCOME ACCOUNTS, 1912-14

	1912	1913*	1914
Cash investment	$16,563,559	$17,508,284	$19,246,548
Per cent return	6.377	5.906	3.634
Commission's earning value.	$12,502,836	$13,862,874	$15,441,000
Per cent return	8.448	7.460	4.530
Tax commission's value	$18,191,000	$18,700,000	$20,235,104
Per cent return	5.806	5.530	3.457

NOTE—Values under 1912 and 1913, as of Jan. 1. Values under 1914 as of June 30.

SUMMARY OF THE MILWAUKEE LIGHT, HEAT & TRACTION COMPANY—INCOME ACCOUNTS, 1912-14

	1912	1913*	1914*
Cash investment	$7,781,305	$7,890,635	$8,124,627
Per cent return	2.800	2.907	3.739
Commission's earning value	$6,184,929	$6,195,208	$6,274,889
Per cent return	3.523	3.702	4.841
Tax commission's value	$5,780,000	$6,900,000	$7,084,000
Per cent return	3.769	3.324	4.289

*Year ending June 30.
NOTE—Values as of Jan. 1.

Percentage returns upon the cost of reproduction for the city company as of Jan. 1, 1912, 1913 and 1914, respectively, were 9.87, 7.29 and 5.45. For the traction company the returns for these years were 2.16, 3.77, 2.28. Taking the two companies combined the percentage returns were 7.29, 6.14 and 4.47. The income account of the city company, which was used as the basis for these calculations, does not reflect the actual condition of the finances. The amount of revenue deducted on the basis of the coupon redemption reserve fund has not equalled the probable reduction in revenues when the thirteen-for-50-cents tickets should be sold as ordered originally. To place the income account for the three years subject to the estimated effect would require a reduction of $116,000 in 1912, $58,000 in 1913 and $63,000 in 1914, resulting in a per cent return on the cost new for the years named of 8.92, 6.86 and 4.79. It has been estimated that an additional amount for the improvement of service will no doubt aggregate approximately $100,000. When this allowance is incorporated in the income account together with an allowance for reduction in revenues on the basis of the full effect of thirteen-for-50-cents tickets, the per cent returns are reduced to 8.10 for the year 1912, 6.12 for 1913 and 3.7 for 1914. Another burden upon the city company is the deficits in suburban territory. It falls upon the city system income account to produce sufficient net earnings to provide something like fair returns upon the suburban plant values. When these plant values are included in the income account of the city company together with the allowance for the additional reduction to the thirteen-for-50-cents tickets and for service requirements the per cent returns foot up to 7.38 in 1912, 5.61 in 1913 and 3.48 in 1914. "Any adjustments that can possibly be made," the commission adds, "will not prevent the conclusion that during the last two calendar years the revenues have not been sufficient to cover all legitimate demands for the adequate transportation of passengers in the city of Milwaukee and the adjacent suburban territory."

Income accounts in the accompanying table, although not accepted by the commission in their entirety, "contain certain merits which warrant a summary representation in this decision."

CONCLUSION

"The increases in the operating expenses and fixed charges of the companies and the failure of their gross and net revenues to maintain their ordinary annual growth during the past few years are due to causes that are wholly beyond the control of the companies," the commission says in conclusion. "The net earnings of the respondent now are and for some time have been considerably lower on the investment than the rates or costs at which it is well known new capital for similar undertakings can in the long run be had. The conditions in this respect are also considerably aggravated by the fact that in this case, as in nearly all large and growing cities, there is a constantly growing demand for improvements in and extensions to the local street railway service.

"The tendencies and changes in the expenses and earnings in question were seen when the order complained of was made, but it was not then thought that they were permanent but rather temporary in their nature. Had the nature of these changes then been better understood it is very certain that the order would not have been made. Justice and the law demand that the rates charged by public utilities for the services they render shall be reasonable to the utilities as well as to their patrons. The best interest of the greatest number in matters of this kind can as a rule be best promoted by allowing rates that are high enough to cover the cost of reasonably adequate service. As the rates provided by the order complained of fall short of this, we are in fairness to the petitioner and in the interest of patrons compelled to find that this order is unreasonable and that it should be repealed or abrogated."

COMMENT OF MR. MORTIMER ON THE DECISION

Commenting on the decision of the Railroad Commission of Wisconsin, James D. Mortimer, president of the Milwaukee Electric Railway & Light Company, said to the ELECTRIC RAILWAY JOURNAL:

"The order of the commission restoring the franchise rates of fare prevailing prior to the previous order of Aug. 23, 1912, was determined upon after a most thorough examination of the facts and the finances of the railway department of the Milwaukee Electric Railway & Light Company. The original order of 1912 was predicated upon a relation between earnings and value of property which was the maximum ever attained in the history of the company. During 1911 and 1912, the company was engaged in a large amount of construction work which added very materially to its property account. The original decision contained no adequate recognition of this large additional investment then in process of completion or the further investment that would be required during the remainder of 1912 and during the year 1913. This additional investment, together with expenses arising out of higher wages, greater expense on account of injuries and damages, and additional burdens imposed by virtue of the police powers of the municipality, such as sprinkling streets, replacing pavement not apparently contemplated under the franchise, and raising and lowering tracks to conform to new grades, all contributed to bring about the low ratio between net earnings and value of physical property, upon which the commission based its recent rescinding order.

"The commission has indicated its breadth of view and strength of character in frankly admitting that the order of 1912 was in error and was issued without sufficiently complete recognition of the then current tendencies of the costs of street railway operation.

"The facts would have justified a rate of fare higher than 6 tickets for 25 cents and 25 tickets for $1, but in view of these long established commutation rates, any departure therefrom would probably not be in line with sound public policy. Even with rates of fare lower than the standard nickel, the same aggregate return may be attained by shortening the length of haul for a single fare. There are opportunities for this treatment on a number of our suburban lines."

COMMUNICATIONS

Mr. Murray's Franklin Institute Paper

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., Feb. 5, 1915.

To the Editors:

In your issue of Jan. 30 you give an abstract of a paper by W. S. Murray, which was presented at Philadelphia on Jan. 20. This last paper on the New Haven electrification, giving as it does costs of operation, is of the greatest interest, as, in fact, are all of Mr. Murray's papers. The costs given speak for themselves and need no comment. It may not be amiss, however, to discuss some of the statements in the remainder of the paper. The pause in the onward march of the electrification of steam railways, due to financial depression, is not an unmixed evil. It is of great value not only to the railways themselves but to the manufacturing companies. It offers an opportunity for a study of ways and means, of necessity and cost, of advantages and disadvantages of electrification, and for planning the work which it is recognized must come sooner or later, so that it can be done in the most economical manner and at the same time secure the maximum of advantage. The writer is very much opposed to legislation designed to force the electrification of steam railways. Electrification under such conditions will inevitably cost a great deal more than necessary and the city securing electrification by such means will lose a great part of the advantage which it should have. The work would have to be done under pressure, and plans which really require years of study would have to be rushed through in a few months. The examples of electrification which are now in progress are in places where an actual financial saving will result from them, and this is what every thorough electrical engineer expects will ultimately be the case on a great many of the roads in this country. The problem is so vast, however, that it must not be forced or there will be a heavy loss instead of a financial gain.

Another subject which is touched upon in Mr. Murray's paper is the administration in electrical operation. Manufacturers of electric locomotives are familiar with the expression "That is railroading," which has come to mean that the operating men expect a locomotive to stand any amount of abuse that can be heaped upon it no matter whether it is injured or not; that it will be expected to haul continuously any load that it can start. This method of operation is usually sufficient to eliminate entirely any possibility of financial profit from the investment in electrification, and reduces the matter simply to a question of how much more it is going to cost the company to operate electrically than by steam. Fortunately, as Mr. Murray says, this attitude has changed to a great extent on railroads where the operating men are coming to understand that electrical apparatus has limitations and that it costs vastly more to maintain it if it is abused than if it is treated as any valuable piece of machinery should be treated—namely, with some degree of intelligence and respect. There is nothing in Mr. Murray's paper that is any truer than this statement: "Successful electrification, therefore, requires that there be in the administrative forces men trained to the necessity of a different viewpoint from that which has been developed in eighty years of steam service."

The writer would, however, take issue with Mr. Murray as to the disadvantage of the employment of steam locomotive engineers for operating electric locomotives. He believes that such men, if properly educated as to the capabilities and limitations of these locomotives, will operate them as well as new men specially trained. They must, however, be given a proper point of view by men who are thoroughly familiar with electric locomotives and have authority to enforce their instructions.

One thing that would be of the greatest advantage on a railroad is a more thorough co-operation between the motive power department and the transportation department than is usually found on trunk-line railways. Both departments should have a voice in the selection of apparatus for the operation of the railway. The transportation department should state the service requirements before the capacity, speeds, etc., of locomotives are decided upon. The equipment should be purchased upon this basis if it is approved by the management of the railway, and, after it has been installed, the transportation department should be required to adhere as closely as possible to these specifications and not be permitted to take the equipment and see how much more can be done with it. Such methods always result in financial loss to the company and dissatisfaction with the apparatus if it has been designed with the ordinary factor of safety.

N. W. STORER.

Calculation of Starting Resistances for Railway Motors

NEW YORK, Feb. 2, 1915.

To the Editors:

In recent issues of the ELECTRIC RAILWAY JOURNAL several communications have appeared commenting upon the method which I proposed in the issue of Dec. 26, 1914, for calculating starting resistance. Allow me to take up some of the points raised by Professor Harding, Mr. Cameron and Mr. Simmon.

If Professor Harding recognizes that the proposed method and the calculation in itself are of interest to the manufacturer who is studying a new proposition based on certain data, it is difficult to see why, in case the data have to be changed or the existence of some trouble suggests the desirability of investigating the matter, the same procedure shall not be useful to anyone else who wishes, with little time and effort, to determine the correct arrangement of the grids.

Referring to Mr. Cameron's communication, I am of the opinion that problems regarding traction can be studied better on paper than by tests because, if the variables entering the problem are numerous we can, on paper at least, make use of reasonable averages and have some basis for comparisons, while in actual operation there are many causes of difference in addition to the variables under study. Hence it is difficult to obtain two runs with all conditions but the one in question absolutely identical. This is especially true in the problem of starting a train where the sudden "jerks" of the current corresponding to the controller operation are not easily and precisely followed by means of an ordinary ammeter, and are given in an uncertain manner and on a small scale by recording instruments. To the uncertainty of these tests are added others due to the manner of operating the controller which, with very slight variations, can produce remarkable differences in the current peaks, as the motors are operated at starting on the flat part of the torque-current curve.

Primarily the difference in ideas as to the best method of determining the proper resistance is this: By the theoretical method, as described in my plan, the work can be done on paper, accurately and in an hour's time at a cost of, say, 50 cents. By the practical method a car has to be prepared for test, the results must be plotted, the resistors must be readjusted and the car again tested, etc. This process must be continued without the operator in the end being sure that any final good results are due to a better arrangement of steps or rather than to changes in some of the variables not under the control.

In making calculations by my method it is not necessary to make arbitrary assumptions, such as that there is no line drop, that resistance grids run cold in city service or red hot in interurban service. To take care of such matters only good engineering judgment is required in assuming reasonable average data, and then the theoretical study will yield satisfactory average results.

Mr. Simmons hints at some of the difficulties of the starting resistance problem, such as the necessity for correcting the resistance on the first step. I need simply note that as the method which I outlined is based on simple and rapid calculations it permits allowance to be made for such matters without great effort.

In conclusion, it should be understood that the proposed solution does not pretend to eliminate the "cut and try" inherent to the problem, but only to hint how to "cut" and to make the "trying" less discouraging. These two operations might be irksome to the man who has not the experience of the specialist and the free use of the accumulated data of a manufacturing company.

F. CASTIGLIONI.

Efforts will be made to bring about repeal of the full crew laws in Pennsylvania and New Jersey at the present sessions of the Legislatures in these States. Thirteen railroads operating in the two States have joined to make a public appeal to the people for their support in accomplishing this object. These railroads have organized a committee to take charge of the work. R. L. O'Donnel, general superintendent of the Pennsylvania Railroad, is chairman of the committee. The other members are: C. H. Ewing, general superintendent of the Philadelphia & Reading Railway; F. Hartenstein, assistant to general manager of the Lehigh Valley Railroad; Robert Finney, general agent of the Baltimore & Ohio Railroad; J. S. Fisher, solicitor of the New York Central & Hudson River Railroad. This executive committee represents the committee which in turn represents the Pennsylvania Railroad, Baltimore & Ohio Railroad, Philadelphia & Reading Railway, Lehigh Valley Railroad, Erie Railroad, Lackawanna Railroad, New York Central Railroad, Delaware & Hudson Railroad, Buffalo, Rochester & Pittsburgh Railway, Pittsburgh, Summerville & Clarion and Cumberland Valley Railroad.

The Public Service Commission of Missouri has issued its first volume of reports for the period from April 16, 1913, to Sept. 24, 1914. Besides the complete reports of all cases decided during this period, the volume contains a table of the cases reported, a table of the cases cited, an index of cases by localities and also an index-digest of findings for all the cases with cross references.

Arrangements have been completed for handling mail at Junction City, Kan., over the Interurban Railway from Manhattan, and contracts have been sent to the Post-Office Department at Washington for approval. It is planned to serve Fort Riley and Ogden in the same manner if the Junction City contracts are approved in Washington.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Association Activity Invades Phillipine Islands—Public Service Section Announces Comprehensive Program—Company Section Committee Expending Literary Effort to Enlist Interest

MANILA ELECTRIC RAILROAD & LIGHT COMPANY SECTION

The organization meeting of joint company section No. 5 of the American Electric Railway Association and the National Electric Light Association was held in Manila, P. I., on Dec. 15. The following officers were elected: President, Oscar Keesee, superintendent of transportation; vice-president, Arthur J. Grant, superintendent of lighting installation; secretary, Walter E. Smith, purchasing agent; treasurer, E. A. Barretto, cashier; directors (1 year) H. P. L. Jollye, assistant auditor; (2 years) B. Solano, chief clerk accounting department; (3 years) Roman Lopez, superintendent of electrical distribution. J. B. Russell, auditor, was designated by the company as the director ex-officio.

J. B. Russell addressed the meeting on the aims and objects of a company section, the character and scope of its work, its advantages and benefits, and on the necessity of each individual member doing his share in furthering the interest of the section. He dwelt with special emphasis upon the advantage of a company section in Manila because of its geographical location, far removed from the headquarters of the parent associations. As this isolation makes it difficult for employees of the company to attend the annual conventions of the associations, they can profit to an unusual extent from the local association.

C. N. Duffy, vice-president and general manager, called particular attention to the gold medals awarded annually by the Railway Association and the Electric Light Association respectively for the best papers read before company sections, and urged the members to be competitors for these medals. As an extra inducement Mr. Duffy announced that he would personally give the sum of $100 to the winner of either medal and that he hoped that the Manila company section would win both medals in 1915.

Before the election of officers the constitution of the joint company section was acted upon section by section. This has since been printed in convenient pamphlet form. It provides for two classes of membership; active, consisting of officers or employees of the Manila Electric Railroad & Light Company or its affiliated companies, who are members of the American Electric Railway Association or Class D members of the National Electric Light Association; and associate, any persons interested in the objects of the section and members of either of the national associations. Associate members have all privileges of active members except the right to vote, to hold office and to attend the meetings of the executive council.

There are no membership dues other than those required for membership in these associations.

The officers of the section are a president, a vice-president, a secretary, a treasurer and four directors. Three directors are elected, one each year, and the fourth is a member of the official staff of the company and designated by it. There are two standing committees, one on program and the other on membership. The latter is to consist of not less than one member from each department of the company represented in the section. This committee is to report to the executive council, consisting of the officers and directors, twice annually.

PUBLIC SERVICE COMPANY SECTION

The following program has been announced for the meetings of the Public Service Railway company section for this season and next. The program was inaugurated with the January meeting when the topics considered were: Historical review of the development of transportation, with particular reference to the organization of the Public Service Railway; discussion of a chart giving various constituent companies of the system, and dates of organization; and analytical review of cost of operation and maintenance for 1914, with suggestions for 1915.

February: Organization and financing of a street railway company. Explanation of stock and bond issues of an electric railway and the reasons for increasing them at various times.

March: Legal steps and obstacles in the formation of the organization. Procedure to be followed in securing franchise rights, property owners' consents, right of way, etc. Tribulations of the promoter.

April: Engineering work in surveying, preparation of plans and estimates, etc. Preparation of roadbed and construction of track and bridges.

May: Design and construction of power house and substation. Construction of line and distribution systems.

June: Design and construction of carhouses and shops. Equipment of shops and construction of rolling stock.

September: Determining the rate of fare, showing limits of profitable haul per unit fare.

October: Cost of operation, including platform expenses, superintendence, power, etc. Increased cost per passenger mile during commission hours. Cost of running extra car. Operating costs.

November: Maintenance of tracks and bridges. Maintenance of distribution system.

December: Social.

January, 1916: Maintenance of powerhouses and substations. Maintenance of equipment.

February: Claim Department. Welfare work. Costs of accidents. Costs of welfare work.

March: Overhead charges, general expenses, interest, taxes, etc.

April: What constitutes the value of a service corporation?

The above will be followed by six lectures on rates of return, valuation, regulation, franchise life, etc.

TRAINING OF TRANSPORTATION EMPLOYEES

The Transportation & Traffic Association committee on this subject, C. S. Ching, Boston, Mass., chairman, has just sent out data sheet No. 127 calling for information as follows: Rules and regulations of public service or railroad commissions and city ordinances relating to or affecting the employment of men on street railways; practice regarding the issuing of letters or the posting of notices of commendation in cases where employees may have been commended by the public or may have performed meritorious acts; practice regarding the publication of company magazines to which employees contribute, and the issuing of pamphlets on general topics, such as courtesy, etc.; opinions and experience regarding employees' meetings and programs therefore; probation periods and discipline; watch inspection and standards, and bonding conductors.

COMMITTEE ON COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

The chairman of this committee, Martin Schreiber, engineer maintenance of way Public Service Railway Company, Newark, N. J., is preparing an instructive pamphlet on the advantages of company sections. The committee hopes to assist in the formation of several company sections this year. One of the most promising prospects is the Chicago Elevated Railways which has a thriving "Chicago Elevated Railway Club." The Chicago club has a membership of more than a hundred and definitely expects to enroll as a company section of the American Electric Railway Association, probably this year. It gives every indication of having a membership of 150 before the end of the year.

JOINT COMMITTEE ON OVERHEAD AND UNDERGROUND LINE CONSTRUCTION

A largely attended meeting of this committee was held at the New York Railroad Club rooms, 30 Church street, New York, on Jan. 27. The discussion was of a general nature.

COMING COMMITTEE MEETING

Feb. 19, and 20 (if necessary), 10:00 a. m., New York, committee on way matters of the Engineering Association, C. S. Kimball, engineer maintenance of way Washington Railway & Electric Company, Washington, D. C., chairman.

Annual Meeting U. S. Chamber of Commerce

The third annual meeting of the Chamber of Commerce of the United States was held in Washington, D. C., on Feb. 3, 4 and 5. At a meeting of the national council before the convention on Feb. 2, Harvey S. Chase, Boston, spoke in advocation of a national budget in order to give citizens a more intelligent understanding of the financing of the government. At the opening meeting of the chamber on Feb. 3, President John H. Fahey, Boston, described the progress of the Chamber of Commerce into its present position as the largest, most representative and most democratic organization of its kind in the world. He told how the Chamber was performing its functions of crystallizing the business opinion of the country in legislative matters and of bringing into closer co-operation the business men and the government.

At the afternoon session on Feb. 3, William Jennings Bryan, Secretary of State, discussed the factors that enter into the extension of American trade in foreign lands, the advantages of the administration shipping bill and the work of the Department of State in establishing amity and good-will between foreign nations and this country. Following Mr. Bryan, Samuel McRoberts, vice-president National City Bank, New York, outlined government co-operation with business through consular channels and diplomatic intervention, and said that a campaign of education and publicity regarding foreign trade and enterprises was necessary. At the evening session the feature was an address by President Wilson. The most serious reference made was that the anti-trust laws should be amended so as to make it possible for American business houses, particularly the small firms, to band together for common action in the export trade, provided they did not form combinations to exclude any manufacturer or exporter.

In discussing trade expansion and the European war on Feb. 5, Edward A. Filene, Boston, recommended that business men should begin a national discussion of peace terms as a means of helping to end the European war, that banks should do more pioneer work for trade expansion, that foreign trade contracts should be protected by insurance and indemnity provisions and that the Chamber of Commerce should adopt a quality stamp for the goods of its members. Other papers and reports were of less interest to electric railways.

Presentation of Brady Medals

The ceremony in connection with the presentation of the Anthony N. Brady memorial medals for safety work on electric railways occurred at the annual meeting of the American Museum of Safety, Feb. 10. This meeting was held in the auditorium of the United Engineering Societies' Building, New York, and four other medals were presented and addresses were made on the work of the museum during the year. President Wilson sent a message to those at the meeting saying that he was very much interested in the effort made to conserve life and safeguard health by the museum. The dies for the medals are now being cut according to the accepted artist's sketch published on page 239 of the issue of Jan. 30, and the medals will be delivered in due course.

The speech in connection with the presentation of the medals was made by Prof. F. R. Hutton, chairman, jury of award of museum medals. The gold medal was awarded to the Boston Elevated Railway, and the speech of acceptance was made by Gen. William A. Bancroft, who said that he realized the honor conferred by the award and expressed the appreciation of the company for it. Russell A. Sears of the legal department and Henry V. Neal of the mechanical department of the company, to whom were respectively awarded the silver and bronze replicas, were also present. In his presentation speech Prof. Hutton referred to the fact that the jury of awards had made honorable mention in its report of the Public Service Railway of New Jersey and the Northern Ohio Traction & Light Company. E. W. Heilig of the former company and E. A. Clinedist of the latter company were the representatives of those companies in attendance.

At the same meeting the E. H. Harriman memorial medal, which is awarded to the steam railroads each year under very similar conditions to those covering the Brady medal and the electric railways, was presented to the New York Central Railroad. A. H. Smith, president of the company, received the medal for the company. Mrs. Anthony N. Brady and Mrs. E. H. Harriman were among those seated on the platform.

Berlin Stadtbahn Will Test High-Tension Direct Current

In the *Elektrotechnische Zeitschrift* for Dec. 24, 1914, Dr. Zehme states that the Prussian State Railways have decided to test high-tension d.c. motor car third-rail operation as well as single-phase equipment in connection with the Berlin Stadtbahn electrification. The sum of $6,250,000 has already been granted by the Prussian Diet for this electrification. This change in plans is the result of the government's study of recent progress made in high-tension d.c. operation.

The experiments will be conducted on the Wannsee-Stahnsdorf branch of the State Railways with a 1600-volt third rail, four motor cars and six trailers. Dr. Zehme suggests that the experimental section, which later would form a part of the electrified network, be so equipped that the third-rail voltage could be raised later to, say, 3000.

Equipment and Its Maintenance

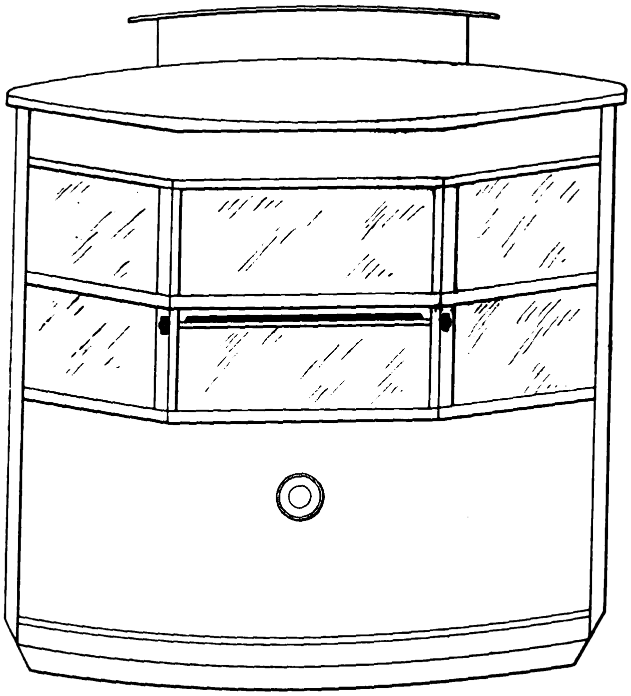
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Fixed Squeegee for Vestibuled Cars

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY SYSTEM, NEW YORK

In remodeling about 630 convertible cars to the pay-within type the Third Avenue Railway System, New York, realized that the removal of the bulkheads necessitated some means of keeping the vestibule sash free of rain, snow and ice with the least discomfort to the passengers and also of avoiding accidents from clouded sash. To attain this end a fixed window cleaner or squeegee was devised. This cleaner consists of two pieces of $1/8$-in. x $3/4$-in. strap iron with a strip of rubber clamped between them, the straps being bolted to the two center vestibule posts. Where the straps project beyond the posts they are twisted, their ends being secured by means of two thumbscrews. Furthermore, springs are set between the straps and the posts to allow clearance between the sash and the straps while permitting close contact of the sash and rubber. The squeegee extends across the bottom vestibule sash, which is stationary, and close to the upper stile of the same in order to be out of the way. As the top center sash is lowered and then raised by the motorman, the outer side of the pane is swept by the rubber tongue so effectually that rain streaks and snow are readily cleaned off.



FIXED SQUEEGEE FOR VESTIBULED CARS

Recording Progress in Construction of Cars and Assembly of Equipment

BY NORMAN LITCHFIELD, M. E.

The modern electric multiple-unit motor car is a highly complex machine requiring in its construction the completion of a number of processes at the works of the car body and truck builders, and also necessitating for its full equipment the assembling of multitudinous detail parts after the main body and truck structures are completed. It is often advantageous for the railway company to purchase various specialties such as doors, seats, etc., directly from the manufacturers instead of from the car builders, and if this course be followed then it is essential that these parts be delivered to the car builders at a sufficiently early date to permit the prompt construction of the cars to proceed without interruption from lack of material.

It is often impossible to place the order for these parts at an earlier date than that of the order for the car bodies themselves, and it becomes, therefore, a difficult matter to keep track of the various items and to be able to ascertain quickly just what material is coming forward properly and what needs attention to insure its arrival in time.

In the same manner parts may be bought separately for the trucks, such as wheels, axles, springs, etc., and

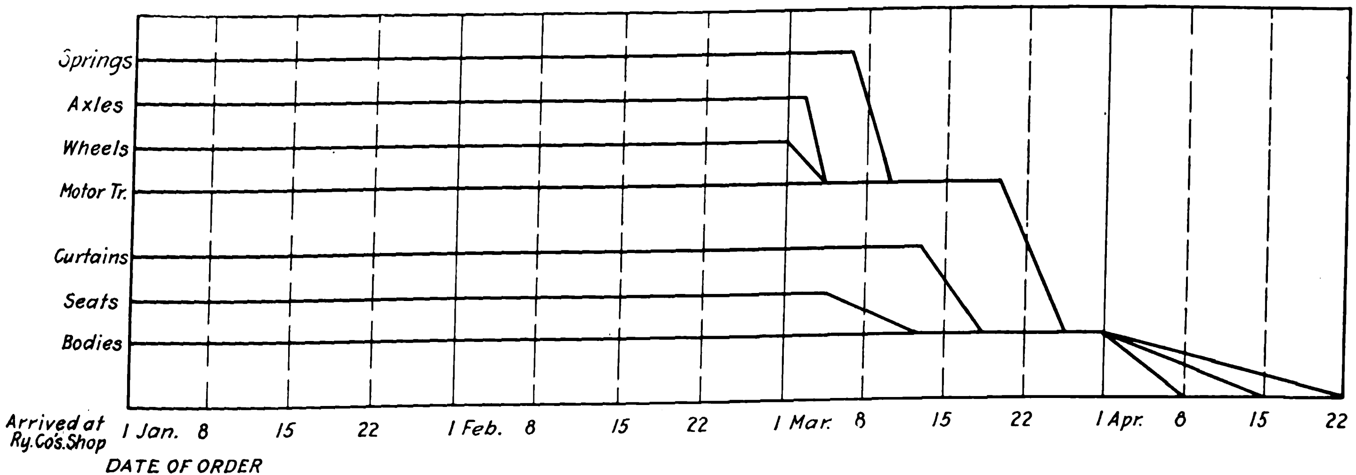


FIG. 1—CO-ORDINATION OF PARTS DELIVERED FOR ASSEMBLY AT TRUCK AND CAR-BODY BUILDERS AND THEN SHIPPED TO RAILWAY. THE DIAGONAL LINES INDICATE THE TIME THAT THE MATERIAL IS IN TRANSIT

they must reach the truck builders at specified dates. Furthermore, if the trucks are built by contractors other than the body builders and it is desired that the cars be shipped on their own wheels, then it must be seen to that they arrive at the car builders' works at the proper time.

All of these matters involve considerable accounting, and numerous methods have been devised to prevent the tangles that arise when shipments of materials fail to meet the progress in construction. The problem becomes more complicated when, as is often the case, the contract for the bodies and trucks is divided among several firms for reasons of economy, convenience and quick delivery.

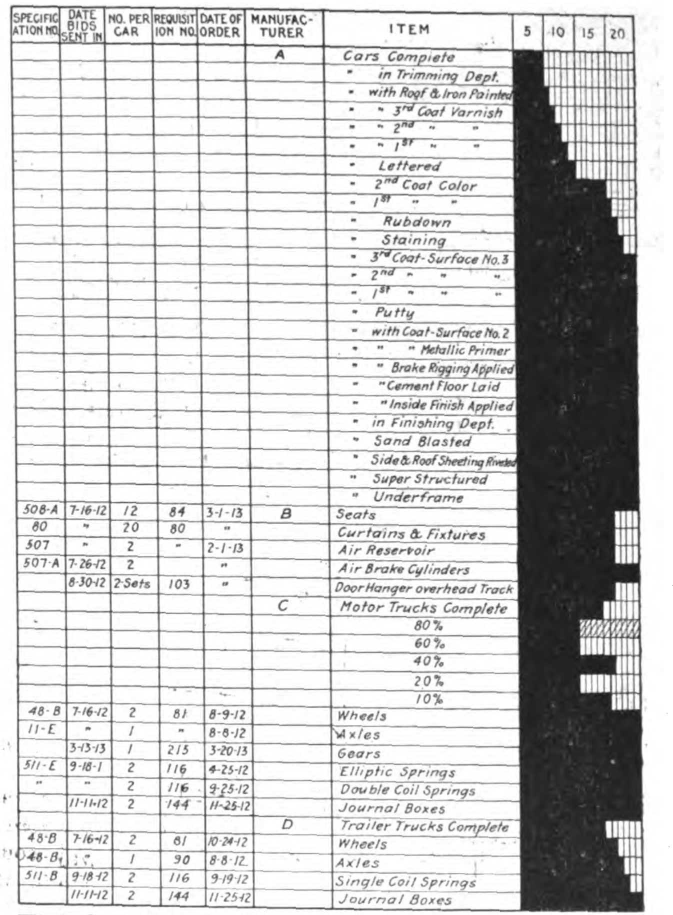
Some railroads permit the car builders not only to build the body and truck structure but also to assemble the electrical and brake equipment on the car. Other roads prefer to send a force of their own men to the car builders' works and do that work themselves. Still others have the car builders do only a very limited amount of strict equipping work and wait until the cars arrive at the railroad's own shops before applying the equipment. The deliveries of material to the company's own shops then have to match with the progress in the construction of the cars at the builders and also with the progress obtained in the equipment of the cars at the home point.

As in all other matters, an orderly procedure, well and definitely recorded, has proved not only convenient but economical in this work, and the following method has proved its worth in a series of construction jobs of considerable magnitude.

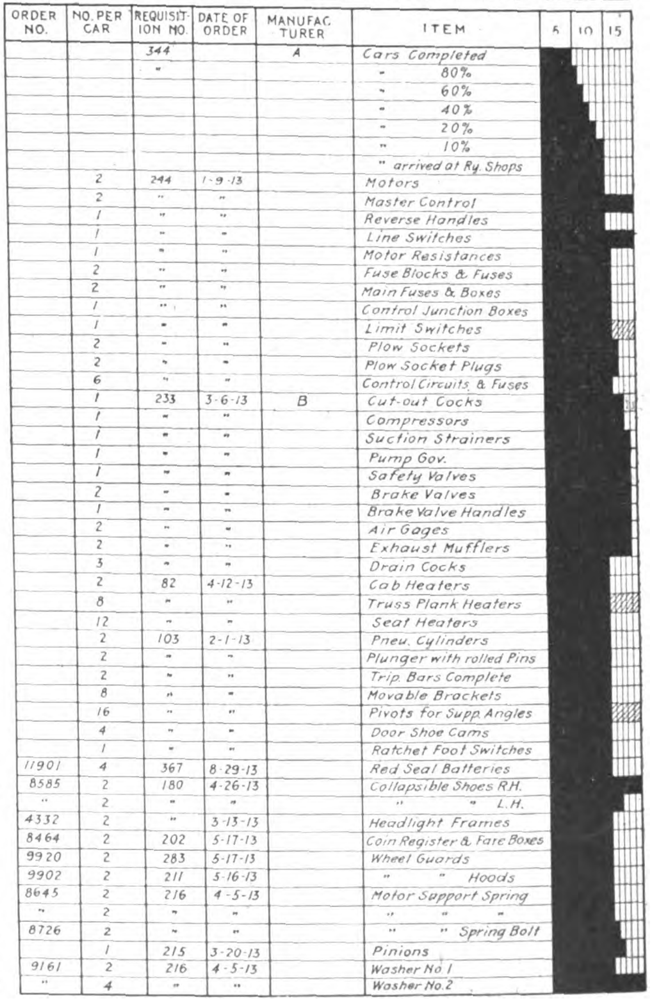
As soon as arrangements have been definitely completed with the car-body builders, and an agreement has been reached in regard to the promised rate of delivery, a chart is made up as shown in Fig. 1. This chart gives a list of the parts to be furnished to the car and truck builder, and the approximate dates at which they should be delivered. This form, with the aid of the diagonal lines, shows at a glance at what date the wheels, etc., must be delivered to the truck builders in order that the trucks may be completed to be shipped in their turn to the body builders in time to meet their requirements. Requisitions are then made in manifold, giving the number of each article required for the complete job, a description of the material and reference to the detail blueprint number and specification number, and date of desired delivery. In addition to the copies forwarded to the purchasing and storekeeping departments, copies are furnished to the material clerk of the car equipment department, the engineer's office, the construction foreman and the inspector at the works of the car builder.

From these requisitions, file cards are made out and handled by the material clerk in a regular card index system, with the usual follow-up methods. The value of the card index for this work is very great, but on account of the great number of detail parts, each varying in the number required per car, and made by numerous different manufacturers, it is very difficult, almost impossible to be sure that some items have not fallen behind in their delivery and will cause a serious delay by their non-appearance. In other words, a comprehensive, lucid picture is lacking.

For this purpose the charts shown in Figs. 2 and 3 have been devised. These charts have been in successful use for some years. Fig. 2 is a chart of progress at the works of the car and truck builders. This chart, made on tracing cloth, is held at the railroad company's home office, and its chief value lies in the fact that the unit used throughout is that of the complete car, and not the detail itself, i.e., if twenty ½-in. x 3½-in. machine bolts are required per car and up to date 200 have been delivered, then they are shown on the chart, not



SPECIFICATION NO.	DATE BIDS SENT IN	NO. PER CAR	REQUISITION NO.	DATE OF ORDER	MANUFACTURER	ITEM
					A	Cars Complete
						" in Trimming Dept.
						" with Roof & Iron Painted
						" " 3rd Coat Varnish
						" " 2nd " "
						" " 1st " "
						" Lettered
						" 2nd Coat Color
						" 1st " "
						" Rubdown
						" Staining
						" 3rd Coat-Surface No. 3
						" 2nd " " "
						" 1st " " "
						" Putty
						" with Coat-Surface No. 2
						" " " Metallic Primer
						" " Brake Rigging Applied
						" " Cement Floor Laid
						" " Inside Finish Applied
						" in Finishing Dept.
						" Sand Blasted
						" Side & Roof Sheeting Riveted
						" Super Structured
						" Underframe
508-A	7-16-12	12	84	3-1-13	B	Seats
80	"	20	80	"		Curtains & Fixtures
507	"	2	"	2-1-13		Air Reservoir
507-A	7-26-12	2		"		Air Brake Cylinders
	8-30-12	2-Sets	103	"		Door Hanger overhead Track
					C	Motor Trucks Complete
						80%
						60%
						40%
						20%
						10%
48-B	7-16-12	2	81	8-9-12		Wheels
11-E	"	1	"	8-8-12		Axles
	3-13-13	1	215	3-20-13		Gears
511-E	9-18-1	2	116	4-25-12		Elliptic Springs
"	"	2	116	9-25-12		Double Coil Springs
	11-11-12	2	144	11-25-12		Journal Boxes
					D	Trailer Trucks Complete
48-B	7-16-12	2	81	10-24-12		Wheels
48-B	"	1	90	8-8-12		Axles
511-B	9-18-12	2	116	9-19-12		Single Coil Springs
	11-11-12	2	144	11-25-12		Journal Boxes



ORDER NO.	NO. PER CAR	REQUISITION NO.	DATE OF ORDER	MANUFACTURER	ITEM
		344		A	Cars Completed
		"			" 80%
					" 60%
					" 40%
					" 20%
					" 10%
					" arrived at Ry. Shops
	2	244	1-9-13		Motors
	2	"	"		Master Control
	1	"	"		Reverse Handles
	1	"	"		Line Switches
	1	"	"		Motor Resistances
	2	"	"		Fuse Blocks & Fuses
	2	"	"		Main Fuses & Boxes
	1	"	"		Control Junction Boxes
	1	"	"		Limit Switches
	2	"	"		Plow Sockets
	2	"	"		Plow Socket Plugs
	6	"	"		Control Circuits & Fuses
	1	233	3-6-13	B	Cut-out Cocks
	1	"	"		Compressors
	1	"	"		Suction Strainers
	1	"	"		Pump Gov.
	1	"	"		Safety Valves
	2	"	"		Brake Valves
	1	"	"		Brake Valve Handles
	2	"	"		Air Gages
	2	"	"		Exhaust Mufflers
	3	"	"		Drain Cocks
	2	82	4-12-13		Cab Heaters
	8	"	"		Truss Plank Heaters
	12	"	"		Seat Heaters
	2	103	2-1-13		Pneu. Cylinders
	2	"	"		Plunger with rolled Pins
	2	"	"		Trip. Bars Complete
	8	"	"		Movable Brackets
	16	"	"		Pivots for Supp. Angles
	4	"	"		Door Shoe Cams
	1	"	"		Ratchet Foot Switches
11901	4	367	8-29-13		Red Seal Batteries
8585	2	180	4-26-13		Collapsible Shoes R.H.
"	2	"	"		" " L.H.
4332	2	"	3-13-13		Headlight Frames
8464	2	202	5-17-13		Coin Register & Fare Boxes
9920	2	283	5-17-13		Wheel Guards
9902	2	211	5-16-13		" " Hoods
8645	2	216	4-5-13		Motor Support Spring
"	2	"	"		" " "
8726	2	"	"		" " Spring Bolt
	1	215	3-20-13		Pinions
9161	2	216	4-5-13		Washer No. 1
"	4	"	"		Washer No. 2

FIG. 2—PROGRESS OF CARS, TRUCKS AND PAINTING; FIG. 3 PROGRESS IN DELIVERY TO HOME SHOPS

as 200 bolts but as twenty cars. Each day the reports of the inspector at the car builders' works as to the progress in the construction of the cars are noted on this chart and in conjunction therewith the progress in delivery of material. For material which has been shipped but not yet arrived the chart is cross-hatched, and for material delivered and found O. K. it is filled in solid.

Fig. 3 shows a similar chart for material delivered to the company's own shops and the rate of progress in turning out the cars complete for service.

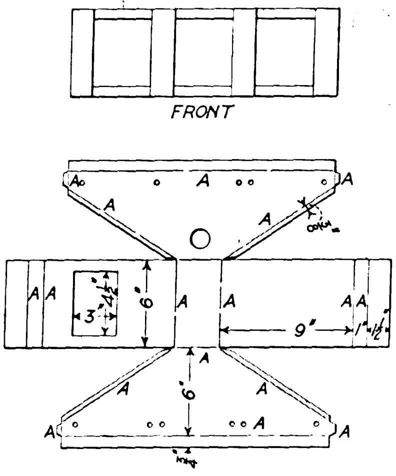
These charts permit the executive to see at a glance whether any items are falling behind. Thus in Fig. 3 it is evident that the delivery of heaters and batteries must be pushed if work is to proceed at the desired rate.

The charts give a ready picture of the status of the work from the placing of the order for the car bodies to the placing of the complete cars in service. Together with an index card file system they have furnished a satisfactory solution of the equipment problem.

Illuminated Train Number Box

BY J. N. GRAHAM, MASTER MECHANIC ROCKFORD & INTERURBAN RAILWAY, ROCKFORD, ILL.

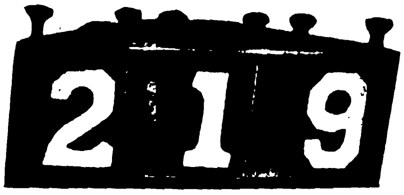
The accompanying sketch of our train number box shows one that is very easily made in any railway shop. The body of the box is cut from a single piece of tin or light galvanized iron. If cut according to measurements no trouble will be experienced. All lines marked *A* must be turned at a clean sharp angle, a machinist's vise being used for the purpose. After the bends are made the box is ready to solder together. The divisions that separate the numbers are made of two strips of tin 1½ in. x 6 in. in size, soldered to the front of the box as shown in the sketch. The round hole shown is for an ordinary sign socket, preferably of Federal type. The rectangular hole, 3 in. x 4½ in. in size, is for the door on the outside of the box. Two U-shaped slides are soldered to the box to hold the door in place. This door is made from a piece of tin or iron and has a small loop soldered thereto for convenient removal. The door gives access to the box when it is necessary to replace the lamp.



PATTERN FOR CUTTING OUT TRAIN NUMBER BOX

The number strips are made of painter's white muslin placed against a black background. These numbers run from 1 to 9 and 0. One strip is furnished with an *E* to designate extra trains. All strips are also provided with a black blank to be used when fewer than three numbers are needed. These number strips are glued at the ends to ½-in. x 6-in. wooden rolls. These rolls have a ¼-in. hole through the center through which the operating rod passes. For such operating rods we use trip rods from GE ML-2 circuit-breakers. However, a piece of ¼-in. round iron will answer the purpose if provided with some sort of a knob with which to turn it. The rods pass through the small holes shown in the sketch and through the hole in the wooden rolls. They are held firmly in the rolls by friction.

The boxes are placed in the center front window of the car and are supported by iron or brass brackets screwed to the sash. In wiring, enough slack is left so that the motorman can lift the box out of the brackets while changing the numbers. The light can be wired either in series with one of the car circuits or with the marker and classification light circuit.



TRAIN NUMBER BOX

Voltmeter Measurements of Direct Current

BY G. H. MCKELWAY, DISTRIBUTION ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

Practically all engineers are familiar with the use of a voltmeter for determining current in a wire from voltage drop, but few of them have tables that will give them quickly and easily a statement of the amount of current in the wire causing the drop found. Generally, after the measurement has been made, it is necessary to look up in a table the resistance per 1000 ft. of the size of wire upon which the measurements have been taken and then calculate from that the amount of current.

Much time will be saved by using tables which give the number of amperes in each size of wire corresponding with a drop of 1 millivolt over any specified length. A table such as the following is a great help.

AMPERES PER MILLIVOLT

	Number of Feet				
Size of Copper Wire	1	2	3	4	5
5,000,000 circ. mils......	476.0	268.0	158.6	134.0	95.2
2,500,000 circ. mils......	238.0	134.0	79.3	67.0	47.6
2,000,000 circ. mils......	190.4	95.2	63.4	47.6	38.0
1,500,000 circ. mils......	142.7	71.4	47.6	35.7	28.5
1,000,000 circ. mils......	95.2	47.6	31.7	23.8	19.0
500,000 circ. mils......	47.6	23.8	15.9	11.9	9.5
No. 0000................	20.1	10.0	6.7	5.0	4.0
No. 000.................	16.0	8.0	5.3	4.0	3.2
No. 00..................	12.7	6.4	4.2	3.2	2.5
No. 0...................	10.1	5.0	3.4	2.5	2.0
No. 1...................	7.9	4.0	2.7	2.0	1.6
No. 2...................	6.8	3.2	2.1	1.6	1.3
No. 3...................	5.0	2.5	1.7	1.2	1.0
No. 4...................	4.0	2.0	1.3	1.0	0.8
No. 6...................	2.5	1.2	0.8	0.6	0.5
No. 8...................	1.6	0.8	0.5	0.4	0.3
No. 10..................	1.0	0.5	0.3	0.25	0.2

An even quicker method is to measure off different lengths on different sizes of wire and so arrange these lengths that the current in the wire can be read off either directly from the indications of the millivoltmeter or with a constant of 100, 10, 1 or 0.1. This will avoid all figuring after the meter reading has been obtained.

LENGTH OF WIRE

	Constant							
	100		10		1		0.1	
Size of Copper Wire	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
5,000,000 circ. mils......	4	9	47	7	..	..	..	..
2,500,000 circ. mils......	2	4½	23	9½	..	..	..	..
2,000,000 circ. mils......	1	11	19	9½	..	..	..	..
1,500,000 circ. mils......	1	6	14	3¼	..	..	..	..
1,000,000 circ. mils......	..	..	9	6½	95	3	..	..
500,000 circ. mils......	..	..	4	9	47	7¼	..	..
No. 0000................	..	..	2	0	20	1	..	..
No. 000.................	..	..	1	7	16	0	..	..
No. 00..................	..	..	1	7	16	0	..	..
No. 0...................	..	..	1	3¼	12	8½	..	..
No. 1...................	..	..	..	..	7	11	79	0
No. 2...................	..	..	..	..	6	3½	63	0
No. 3...................	..	..	..	..	5	0	50	0
No. 4...................	..	..	..	..	4	0	40	0
No. 6...................	..	..	..	..	2	6	25	0
No. 8...................	..	..	..	..	1	7¼	16	0
No. 10..................	..	..	..	..	1	0	10	0

Some objection may be made that the measurements just given are not close enough for very fine work, but they are close enough for anything required by engineers in the field. When it is remembered that ¼ in. in 5 ft. is within 0.5 per cent of the total distance few will dispute that the measurements are close enough for practical purposes and as close as can be readily measured on a wire. Even if the measurements could be made more exact it would be unnecessary, for with the fluctuating current in railway circuits any reading even approximating 0.5 per cent would be very close. For the reasons given, no correction has been attempted to allow for the change in the resistance of the conductor with varying temperature, the values given being correct for about 68 deg. Fahr.

Bridge and Building Inspection Report Forms

Rather unusual and extensive inspection report forms have been devised by the maintenance of way department of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill. A feature of these reports is that the same form serves for both the inspector's record and the department record. For example, the bridge and building inspectors are furnished with a loose-leaf binder, 5½ in. wide x 14 in. long, which may be slipped into a workcoat pocket. On this form the inspector records information as required and indicated in a reproduction of the form shown.

For the convenience of the men, a complete list of abbreviations is furnished at the bottom of each report form so that the inspector will be able to supply all the data required in the space allotted for it. In order that the report record, which is written in pencil, will be legible when it reaches the department office to be transcribed, each inspector is supplied with a 2-H pencil which is hard enough to prevent the writing from becoming unreadable.

Thorough inspections of bridges and buildings are made twice a year, in the spring to determine that no more material than was required at the previous fall inspection is necessary, and in the fall to determine the safety of the structure for winter operation, as well as to estimate what new material will be necessary for repairs for the following year. In addition to these inspections track foremen are required to inspect all bridges and culverts within their territories and report any unsafe or unusual condition upon its discovery. As a check against this inspection by the track foreman, the foreman of bridges and buildings inspects all timber bridges once each month, following which all defects needing immediate repairs are cared for promptly.

In connection with each way and structure inspection a list of the material needed is compiled by the foreman of the way department so that repairs may be made promptly and in accordance with his ideas as to what is needed.

CHICAGO, OTTAWA & PEORIA RAILWAY

BRIDGE INSPECTION REPORT

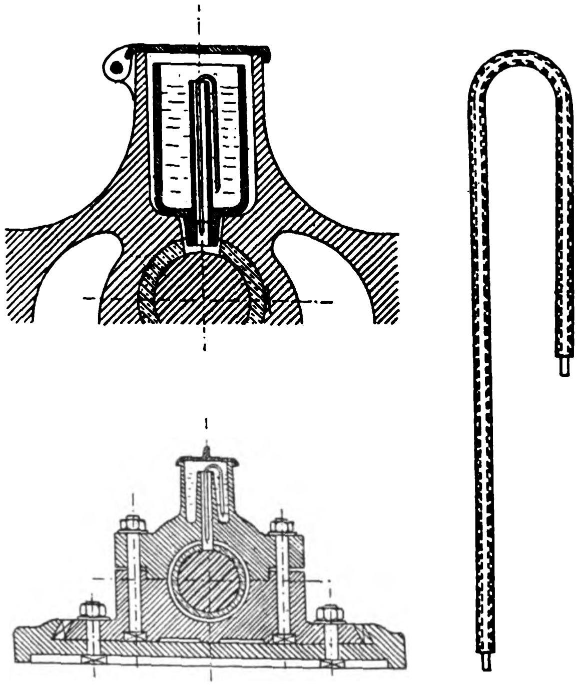
Bridge No.	Date Erected	Kind of Bridge or Culvert	No. of Spans	Length of Spans	Total Length	Size of Pipe or Culvert. Width First, then Height	Approximate Drainage Area	Date Inspected	Condition of Bridge and Description of Work to be Done	Material Required	Remarks

BRIDGE INSPECTION REPORT OF THE CHICAGO, OTTAWA & PEORIA RAILWAY

Siphon Motor Lubrication at Budapest

In 1908 the Budapest, Hungary, Railway installed on a number of its railway motors for experimental use a siphon lubricator invented by Joseph Zsarko, its chief engineer. The results under great variations of service and temperature were so satisfactory that the railway equipped all of its cars in the following year. Most of the motors are of the Westinghouse or Allgemeine types, made originally for grease lubrication. For this system the company substituted cast-iron cups equipped with the new lubricating device as illustrated.

This lubricator consists of a suction pipe in which a copper wire is inserted to increase the surface of contact for the transmitted oil; thereby clogging is practically obviated. The oil is conducted to the point of use in a uniform degree, the rate of flow being fixed in advance by selecting the proper diameter of pipe and wire.



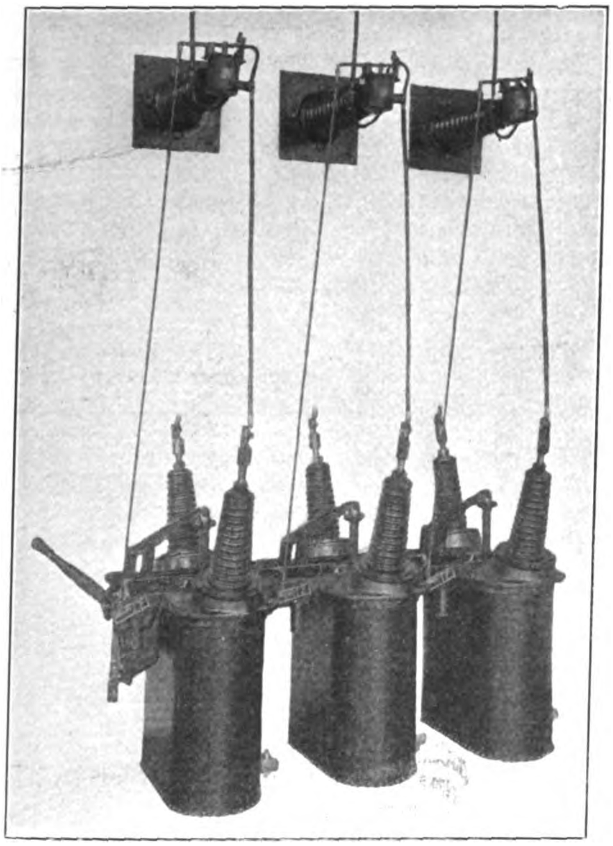
DETAIL AND GENERAL VIEWS OF SIPHON LUBRICATOR

To start the lubricator, water is first drawn through the pipe, after which the shorter branch is dipped in the oil. The pipe will then fill with oil automatically and be ready for use with the expulsion of the water. The pipes can be maintained in perfect condition by blowing them out about once every three months. It is asserted that the saving in lubrication as compared with the grease is 75 per cent, and 50 per cent as compared with wick and oil lubrication. This lubricating system has given no trouble from freezing because the heat conducted from the bearing by way of the brass suction pipe actually will melt frozen oil at a greater rate than is required for lubrication. The representative for the inventor in this country is Joseph Gelbert, who is in the way and structure department of the Brooklyn Rapid Transit System.

Series Trip for High-Voltage Oil Switches

Low-voltage current is usually employed to trip high-voltage automatic oil switches on the occurrence of abnormal conditions against which the automatic features are intended to guard. Electrically-operated switches are usually tripped by direct current; and for tripping hand-operated switches, alternating current is generally used. In many cases, however, neither low voltage direct current nor alternating current is conveniently or cheaply available; and then, automatic protection is secured by the aid of a high-voltage series trip.

For this service, the General Electric Company has developed an arrangement representing considerable improvement on types of high-voltage series tripping devices heretofore in use. The new features are: accessibility of the working parts for inspection; cleaning or adjustment while in service without danger; calibration at the oil switch itself, and not at the insulator supporting the series tripping solenoid; and the use of a new type of solenoid, which consists of but a few simple and rugged parts that need practically no attention whatever after installation.



TRIPLE-POLE SINGLE-THROW 45,000-VOLT OIL SWITCH WITH TRIPLE-POLE TIME-LIMIT SERIES TRIP

The solenoid plunger is connected to the tripping mechanism of the oil switch by a wooden rod. Calibration, namely, change in current tripping values, is accomplished by a movable weight located near to the operating mechanism of the switch at a considerable distance from the high voltage current. This type of series trip is furnished for instantaneous or inverse time-limit operation. Time delay is obtained by means of a dashpot mounted on the tripping mechanism at the switch.

New Trolley Retrievers and Catches

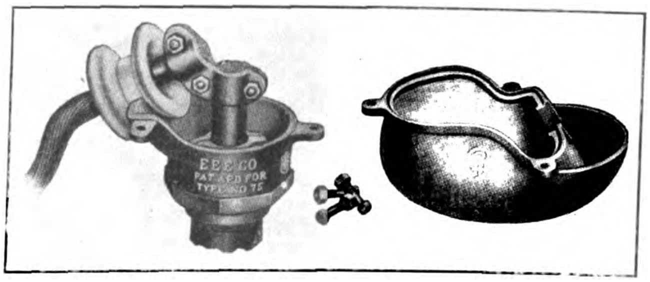
The New Haven Trolley Supply Company, New Haven, Conn., is just placing on the market the "Sterling Universal" trolley retriever, and the "Sterling" trolley catcher. These devices contain a number of novel features. For example, only one weight retrieving spring is used in the trolley retriever. This spring can be adjusted to meet any tension of trolley pole desired, thereby making it unnecessary to carry in stock various sizes of retrieving springs. Action of the retrieving spring does not affect the service spring. It is asserted that these machines positively will prevent skipping or "walking up" of the pole after it leaves the wire. They contain very little mechanism, and the few parts are strong and simple. Repairs can be made without the use of tools other than a wrench with which to remove the case. The company absolutely guarantees for a period of five years all parts except springs. The springs, nevertheless, are said to be the best obtainable, and were designed specially for the characters of service required. Where desired, the company can supply machines that are interchangeable with present equipment.

STERLING
UNIVERSAL
TROLLEY RETRIEVER
PATENTED

EXTERIOR VIEW OF TROLLEY RETRIEVER

Third-Rail Cable End Bell

A cable end bell for use in connection with feeders supplying third rails has recently been developed and placed on the market by the Electrical Engineers Equipment Company, Chicago, Ill. The desire for more adequate protection for this class of feeders by a large electric railway in the West prompted the development.



THIRD-RAIL CABLE END BELL

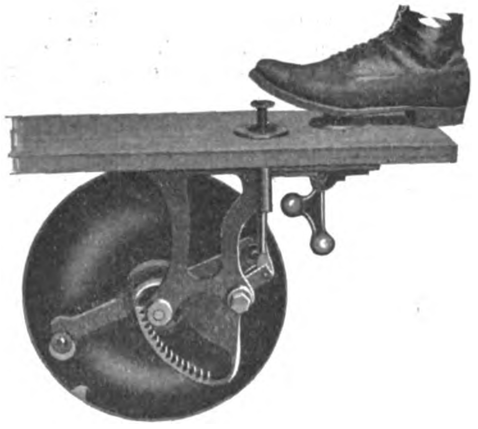
The bell is so constructed that it can be mounted upon any size of iron pipe or fiber conduit, which is used in conducting the feeder cable. In case a lead-covered cable is used for the feeder, the lead sheath is cut away for a short distance from the end. The lead is then belled out so as to make a tight fit into the patented grounding clamp with which all of this company's end bells are equipped. The cable insulation is also cut away a few inches, depending upon the size, and a split tinned copper sleeve is slipped over the bare end. A similar sleeve is placed over the bare end of the rail cable which is introduced into the bell through a porcelain bushing. The two cables are then bolted rigidly together by means of a copper angle connector which fits over the copper sleeves. The bell can be used in connection with braided as well as lead-covered cables. This construction is shown in the accompanying cuts.

The lower portion of the bell is then filled with a compound completely sealing the cable, and the cover is put in place. This cover has been designed with an extension over the porcelain bushing to form a watershed which prevents moisture from entering the bell. By removing the cover and loosening the angle connectors the bell is readily made detachable. The completed bell forms a safe, simple and efficient means of protecting this class of feeders.

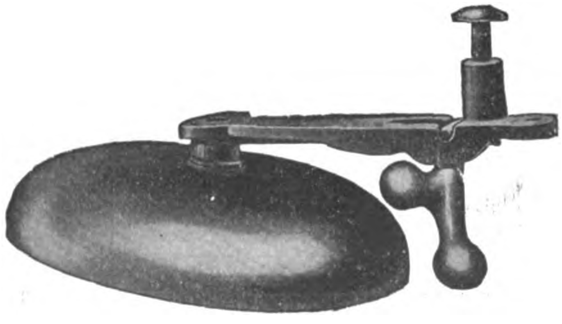
While designed originally to meet the specifications of one railway a number of other third-rail systems are now using the same equipment.

Modern Gongs

One of the two accompanying cuts shows a combination rotary multiple ringing and single stroke foot gong made by G. C. Reiter, Canton, Ohio. This gong gives forth a loud, clear ring which can be varied from a single tap to a continuous alarm. No springs are used. The gong itself is made of a most resonant bell steel, the hanger and knocker wheel are of cast iron and the lugs, which are electrically welded to the gong, are of steel. The mechanism inside the gong includes a centrifugal internal gear connected to a pinion whose ratchets engage with teeth on the rocker arm. A black japan finish is usually employed to prevent oxidation, etc. Mr. Reiter also supplies gongs of simpler form, such as single-stroke foot or hood gongs and single-tap inside striking gongs. Although it is not generally known, this manufacturer not only makes gongs for every purpose but supplies a large number of those sold by the leading supply houses and car builders. These gongs are also used in large numbers by foreign tramways.



COMBINATION ROTARY MULTIPLE RINGING AND SINGLE-STROKE FOOT GONG



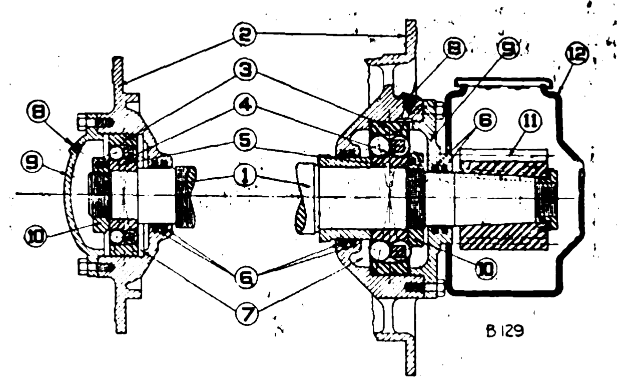
SINGLE-TAP FOOT GONG

Ball-Bearings on Storage-Battery Cars

Arthur V. Farr, M. E., who is with the S. K. F. Ball Bearing Company, New York, has recently prepared the following summary of the value of ball bearings in electric railway service:

The necessity for extreme accuracy in energy consumption has made the builders of storage-battery cars lead in the use of anti-friction bearings for journal boxes and motors. Every tie-up required for charging or boosting and every percentage increase in the coefficient of friction of the bearings limits directly the application of this type of car.

A storage battery of given ampere-hour capacity is able to take the car over a definite schedule. The amount of the starting and tractive efforts determines, among other factors, the limitations of this schedule. The use of ball bearings has reduced the starting effort upward of 50 per cent, which makes possible either quicker acceleration, using the same size motor, or greater mileage on the one charge, using a smaller motor. Ball bearings in this way increase the sphere of application of accumulator cars, improving the running schedule and decreasing the number and duration of charging periods.



BALL-BEARING HEADS FOR A 65-HP RAILWAY MOTOR

1—Motor shaft
2—Bearing head
3—Outer ball race
4—Balls and ball retainer
5—Inner ball race
6—Oil retaining grooves
7—Lubricant chamber
8—Tap for lubricant supply
9—Housing cap
10—Lock-nut to hold inner race
11—Driving pinion
12—Pinion casing

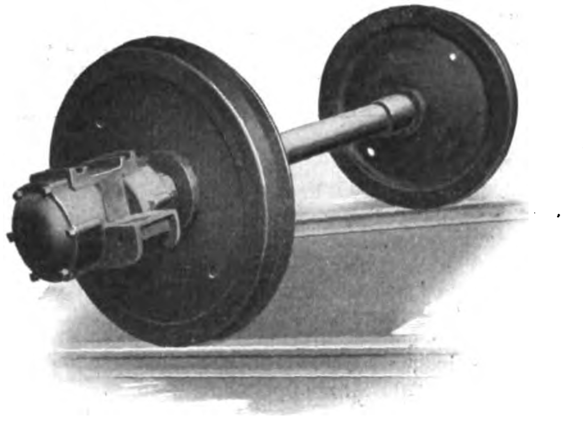
The reduced starting effort directly affects the battery characteristics. Battery efficiencies vary widely, depending upon the rate at which the battery is charged and discharged, and the extent to which the discharge has been carried when the charge is begun. High rates of discharge lower the efficiency, consequently types of axle bearings which necessitate heavy starting effort put a severe handicap on the storage-battery car.

Ball bearings, besides decreasing the starting effort, permit the car to coast farther than where plain bearings are used. This coasting feature is so noticeable that it is possible to take advantage of even the slightest inclines. On the whole, actual tests have shown that an increase of 10 per cent in mileage may be expected from the use of ball bearings.

Almost, if not quite, as important to the car maintenance department is the saving in upkeep and inspection which results from the use of ball bearings. The saving in maintenance charges due to the freedom from hot journals, frequent lubricant renewals, repairs, etc., is held to be from 35 per cent to 70 per cent. This significant saving is due to the fact that where ball bearings are properly mounted they do not require adjustment or repairs and are free from the intrusion of dirt and grit.

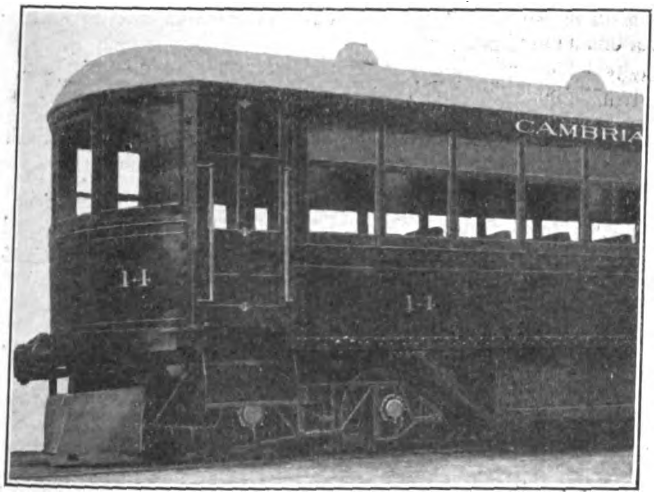
The saving in the lubricant used on the car journals is about 85 per cent. The ball-bearing journals can be sealed so that there is no leakage out of the journal box, and it is not necessary to lubricate the bearings more often than once in three months.

The reason for the reduced friction of ball bearings is that they substitute rolling action for the rubbing friction of plain bearings. With bearings that are self-aligning, binding or wedging action of the balls is impossible. Also, bearings with the double row of balls permit the use of twice as many balls per bearing to carry the load and consequently reduce the load carried by each ball.



BALL-BEARING JOURNAL BOX FOR STANDARD 0-50 TRUCK—RADIAL LOAD ON EACH JOURNAL 6500 LB.

Ball bearings on the driving motors increase the life of the driving gears by maintaining the gear center distances. To prevent rapid wear, gears must mesh properly. When plain motor bearings wear or the armature shaft wears, the entire driving strain is taken by the inside corners of the driving teeth, and rapid wear with frequent failure of teeth results. Ball bearings minimize bearing wear and eliminate shaft wear, keeping the gears properly in mesh.



CAMBRIA & INDIANA RAILROAD BALL-BEARING AXLES—CAR WEIGHT 59,100 LB. TRUCKS, BRILL 69-E

The substitution of the rolling of ball bearings for the rubbing action of plain bearings reduces the bearing wear to an amount that is so small that it cannot be measured and consequently the armature air gap is maintained constant. This eliminates the danger of the armature falling on to the pole pieces and causing costly repairs. In fact, a prime cause of motor repairs is thus eliminated. Cars in the repair shop for motor trouble are generally there because of worn bearings, worn-out armatures, burnt-out armatures, etc., due directly to the fact that the plain bearings have worn down.

Editor Eichel on Conditions in Germany

In a personal letter to a member of the editorial staff of the ELECTRIC RAILWAY JOURNAL, Eugen Eichel, editor of *Elektrische Kraftbetriebe und Bahnen* has some interesting things to say on conditions in Germany at this time, particularly with regard to railway and electrical affairs.

Mr. Eichel says that the war has led to a relaxation in the police rules governing passengers standing in electric railway cars, so that it is now quite common to see a car carrying as many passengers as it will hold. Consequently, the railways are operating at a lower service cost than in times of peace.

A number of autobuses and automobiles are still running in Berlin with the consent of the war department, although rubber tires and gasoline are extremely costly. In many cases a mixture of gasoline and wood alcohol is used, as the latter is abundant in Germany. Gasoline is also manufactured largely in Germany as a by-product of the coal-tar industry, and as both tar and coal are at hand in large quantities the question of fuel is not a pressing one.

Naturally the war offers a very favorable opportunity for the exploitation of electric lighting and electric vehicles, since both gasoline and petroleum have risen in price very much. The military authorities who first installed petroleum lighting for barracks, military hospitals, encampments and prisoners' quarters prefer electricity wherever it is possible to make connections with existing central stations or transmission systems. The use of electricity is particularly valuable for prison camps because the wiring and lamps can be so arranged that the turn of a switch will flood any suspicious area with light. In connection with the prison camps, Mr. Eichel writes that large numbers of illiterate Russian prisoners are being taught to read and write.

The large electrical companies of Germany have done praiseworthy service in fitting out military hospitals with electrical apparatus for sterilizing, cooking, x-ray and electro-therapeutical purposes. The Siemens-Schuckert Company, in particular, has equipped part of its new main building as a hospital with 400 to 500 cots, including an all-electric kitchen.

War Affects Buenos Aires Underground

The Compagnie Générale de Tramways de Buenos Aires of Brussels reports that the first section of the Anglo-Argentine Tramways in Buenos Aires was opened for traffic in December, 1913, the length being 4.2 miles. During the first nine months of operation the average receipts, if applied to a whole year, would amount to about $368,000 per mile per anuum, as compared with $249,600 in Paris, $179,200 in London and $377,600 per mile in New York. As a consequence of the financial crisis in Argentina the construction of the second underground section has been indefinitely postponed, although the hope is expressed that an extension of time will be granted by the authorities. The European war has reacted unfavorably on Argentina and a reduction in the operation of the tramways is held in prospect.

News of Electric Railways

NEW YORK COMMISSION INVESTIGATION

Summary of Testimony of Commissioners McCall and Wood Before Legislative Committee

Edward E. McCall, chairman of the Public Service Commission of the First District of New York, was the witness before the legislative investigating committee on Feb. 4. He was examined first as to the methods and scope of the commission. Mr. McCall explained that he took the position because he believed a crisis had arisen in the subway contract situation. The commission was divided two to two over the dual system now well under way. He cast the deciding vote, after considering the matter five weeks. Five commissioners were necessary to the work of the commission. Colonel Hayward, counsel for the committee, recited the record of work outside of the commission on which Mr. McCall had been engaged during his early connection with the commission, to show that Mr. McCall had spent fifty-seven days in court or sitting as a referee and had missed nine stated meetings of the commission. Mr. McCall expressed the opinion that the jurisdiction of the commission should be extended so as to take in more of the Long Island Railroad and all Westchester County. He favored the first district commission looking after the New York telephones. He did not believe that any of the transit managers were disregarding the people's interests. He did not favor turning over the supervision of the construction of the new rapid transit lines to the Board of Estimate.

At the hearing on Feb. 5 Mr. McCall said that he was familiar with the conditions at the Brooklyn Bridge in rush hours and that he often used the subway. The fleet of automobiles of the commission consisted of five autos and two trucks. Colonel Hayward read into the record the chauffeur's slips. Mr. McCall explained that he was accustomed after his work at the office to ride in the commission's car toward his country home until he was met by his own and could transfer to it. All the rides were taken for the public service. His experience showed that a commissioner could not possibly practice law. He found that if he tried to do so he would break down. Mr. McCall considered that the civil remedies were adequate for the commission's purpose. He did not believe it was ever intended that the commissioners should seek an indictment for misdemeanor because a train was five minutes late or twenty-five people were standing in one place for ten minutes. He referred the committee to Commissioners Maltbie and Williams when the question of security issues was brought up.

Robert Colgate Wood, the member of the Public Service Commission appointed from the Bronx about eight months ago by Governor Glynn, was the witness on Feb. 6. He had been solicited to take the appointment. He was not a lawyer and had had no administrative experience except as a corporation director and in contract work. His lack of exact knowledge of the commission law he attributed to his short term of service with the commission. He consulted counsel for the commission in regard to all matters concerning the law. He had been active in public service corporation work only with the New York City Interborough Company and the Lincoln Gas Company, but retired from the former seven years ago. This experience had been valuable to him in his commission work. The property of the New York City Interborough Company was now included in the system of the Third Avenue Railroad. Mr. Wood had two telephones to his office in the commission, one connected through the local switchboard in the commission office and one, a personal wire, connected with the telephone central at headquarters. Mr. Wood did not know whether other commissioners had similar unlisted wires. He understood, however, that there had always been two wires connecting his office. In this connection Senator Foley, the Tammany member of the investigating committee, explained that everybody in public service had a private wire. The testimony showed that Mr. Wood had paid personally for his private wire.

The hearings were resumed on Feb. 10.

In consequence of the attention that the legislative committee has devoted to the regulatory side of the commission's functions as apart from its work in providing for the dual subway system, the commission has caused to be issued a statement of what it has accomplished in the way of regulating public utilities since its creation on July 1, 1907.

BAY STATE ARBITRATION HEARINGS

Testimony by Prof. Irving Fisher of Yale University in regard to the cost of living was the feature of the Bay State Street Railway arbitration at Boston during the week. In general Professor Fisher's evidence dealt with the relation between the cost of living and the shrinking value of the dollar, which topic is discussed at length in Professor Fisher's book, "Why the Dollar Is Shrinking," reviewed in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1915, page 264. Under cross-examination by Attorney James M. Swift, counsel of the company, Professor Fisher said that the expense of increasing the wages of employees should be laid upon the passengers. He said in conclusion: "It seems to me that the true solution for this difficulty into which the world is put by the rising cost of living and the shrinkage of the dollar, is for the railroads to raise their rates. That course was granted to a limited degree for the steam railroads against opposition with which I have no sympathy. I think it may well be true that the electric roads will come to the same necessity of raising their rates over the fixed 5-cent fare, to a 6-cent or a 7-cent fare, or a fare that changes from time to time like other prices in the community. This depreciation of gold necessitates the raising of all prices to correspond."

Professor Fisher held that almost all the large public problems of the day were due to the fact that the prices of commodities, labor, and of public service do not move together. He advanced the opinion that in reality the adjustment was not taken out of the passenger, because he got higher wages and income himself. In response to an inquiry by Chairman Pelletier, the witness said that the company should increase wages first and then apply to the Public Service Commission for permission to establish higher rates of fare, along the lines followed in the Middlesex & Boston Street Railway case, which offered an excellent precedent.

FRANCHISE UPHELD

Supreme Court of Minnesota Decides in Favor of the Duluth Street Railway

An important decision concerning the validity of the franchises of the Duluth (Minn.) Street Railway was rendered recently by the Supreme Court of Minnesota. The case was brought before the court on quo warranto proceedings by the Attorney-General of the State and was tried first in the District Court, where a decision was rendered in favor of the company on May 23, 1914. The contention of the State was that the original franchise of the company, granted in 1881, provided that the company should build 1 mile of street railway within one year of the date of the grant; that while the company did lay such a mile of track, the line was not equipped and put in operation until some months later after it had been reconstructed; that consequently the terms of the franchise had not been complied with, and since then the company had been operating on the street merely on sufferance and not by virtue of its contract. The company's claim was briefly that the State and the city, after thirty years' acquiescence and recognition of the franchise, was now estopped from raising any question on its validity.

In the trial in the lower court it was brought out that since the railway had been in operation, various actions had been brought against the company by the city and State on taxation and other matters, and that during this time there had been no claim, with one exception, which was not material, that the company was not occupying the streets by virtue of its franchise, and that the city had levied taxes on the company in which the franchise was assessed at a large sum. It was also shown that the company had sold securities to the public, based on the validity of the franchise, that these securities had been purchased in good faith and that the company had been encouraged to do this because the city during this long period of time had never disputed the validity of the franchise. In view of these facts the court held that even had there been any failure to meet the terms of the franchise, action now was barred by the statute of limitations.

The court did not deny that a statute may create a self-executing forfeiture, but it held that none of the cases cited where such self-execution was held to have occurred contained facts especially like the case in question. The court held that the intent of the Legislature in the original grant was to have a railway built, but that the terms on which it should be built were largely of local concern. This was shown by the fact that the city could require extensions. Moreover, the city in 1882 had consented by formal resolution to a postponement of operation, and the railway was in operation within the time fixed by this last resolution.

The court finally held that as the franchises of the company were granted in 1881 for a period of fifty years, they would not terminate until 1931.

LEGISLATION IN INTEREST OF TORONTO

The Council of Toronto, Ont., has decided to oppose the application of the Metropolitan Radial Railway for power to lay double tracks on Yonge Street within the city limits; to apply to the Legislature for a declaratory act restoring the order of the Ontario courts declaring the Toronto Suburban Railway was liable to restore pavements as well as to repair, and to give the same definition to the word "tracks" as given by the courts; to seek an order for the cancellation of the company's franchise within the city limits for having refused to carry out the provisions of the agreement, and to give the city power to take over the system on similar terms to which it took over the Mimico & Scarboro divisions of the York Radial. A special committee has been appointed to confer with representatives of the Harbor Board and the Provincial Hydro-Electric Power Commission and consider and report upon a plan for a rapid transit system for the city and for the entrance of the radial lines. It was also decided to apply for an act declaring that the agreement between the city and the Toronto Railway means that the company is compelled to extend its tracks and to operate a service within the limits of the city as they may exist at any time. and not solely within the old limits of the city; for the confirmation of the Barnes report suggesting the company spend $2,950,000 on new cars and extensions; for an amendment to the assessment act to provide for the assessment of railway rolling stock, and for the imposition of a percentage tax on capital stock of the railway companies. The Mayor's proposal that application be made to the Ontario Railway Board for an order compelling the Metropolitan Railway to reduce its fares within the city limits was referred back to the Board of Control, as was his suggestion that power should be sought to enable the city to purchase and operate a system of motor busses.

At a joint meeting of the members of the City Council of Toronto, the Harbor Commissioners and Sir Adam Beck, representing the Hydro-Electric Power Commission of Ontario, on Feb. 4. it was decided that the engineers and legal advisers of the three bodies should confer on the legal and engineering aspects of the transportation situation and that the engineers should prepare a general scheme for a rapid transit system for the city and suburbs, embracing a common entrance for the radial lines on the north, west and east of the city. Sir Adam Beck said the Government intended to oppose the granting of new franchises to electric companies and refuse an extension of time for construction to those who had obtained franchises in the past. The Provincial Hydro-Electric contemplated the construction of 1600 miles of radials in the province, and the success of the system depended upon being able to obtain an entrance into Toronto, the hub of the system. As soon as the engineers have prepared the general scheme for the radial railways it will be submitted to the conference, the object being to advance the project so that it may be submitted to the people at the next municipal elections.

INDIANA LEGISLATURE

The following new bills have been introduced in the House: a bill providing that the officers of all incorporated companies in the State shall send annually to the stockholders a report of the business transacted; a bill providing that newspapers may contract with railroads for advertising, taking mileage or transportation in payment for the same; a bill providing for the regulation of labor for hire, for the adjustment of all controversies arising therefrom by arbitration, and that all labor for hire shall be "compensated on a truly competitive basis."

The following bills have been killed in the House: House bill 554 of the 1913 session, which was vetoed by the Governor after the Legislature adjourned in March, 1913, providing that railroad engineers be permitted to run their trains across electric railway tracks without stopping; bill for amendment providing that towns of 500 population can order the installation of protective signal devices or flagmen at railroad crossings; bill providing for installation of suitable signs at railroad crossings, cost to be borne between township and companies; bill providing that electric railways shall pave between the tracks with the same material that is used for the remainder of the street.

A bill has been passed by the House providing that steam and electric railways shall maintain station flagmen or automatic signal devices at all crossings where the view is obstructed, provided a petition for such man or device is presented by five freeholders.

The following new bills have been introduced in the Senate: a bill providing certain regulations for the ventilation of street and interurban cars and passenger stations; a bill providing that where a public utility does an interstate business the rates charged in Indiana shall be no greater than the rates charged by the utility in another State; a bill providing for a uniform bill of lading to be used by all shippers; a bill making uniform the law in regard to transfer of stocks of corporations; a bill making it unlawful for a public service corporation to supply service to another State unless a schedule of rates charged in the foreign State shall first have been filed with the Public Service Commission of Indiana; a bill prohibiting the payment of dividends by corporations unless the dividends have been actually earned; a bill prohibiting any person from acting as a director in any corporation unless he is a bona fide stockholder in such corporation; a bill giving the Public Service Commission power to order the separation of grade crossings in cities of 20,000 population or less.

The bill to prevent public utilities from diverting funds or assets after an examination of the property of the company has been ordered by the Public Service Commission has passed the Senate.

STORM IN ONTARIO

The whole Province of Ontario was in the grip of the storm king on Feb. 2. In one of the worst gales which has swept over the province during the past decade, Toronto was cut off entirely from railway communication for more than eight hours. The storm paralyzed radial traffic in and out of Toronto. During the morning all traffic was practically at a standstill, and only the snowplows were able to make headway against the gale. These were of little practical use, however, as the wind swept the drifts over the tracks again. The Toronto Railway ran cars without any attempt to keep to the schedule, and residents of the eastern and western sections were without service for more than three hours. About noon, however, the street railway officials succeeded in bringing about the opening of all lines in the city.

The Galt, Preston & Hespeler Railway ran sweepers all night in Galt so as to keep the line open. The service was irregular. Street railway service in Guelph has practically been out of business since Jan. 30. The electric railway service between Woodstock and Ingersoll was completely tied up. The Hamilton Street Railway operated cars all night in order to keep the system open. In Kingston steam and electric railway service was demoralized and business was practically at a standstill, and in St. Thomas the street railway system was tied up all day and the electric line from St. Thomas to London and Port Stanley was blocked.

CLEVELAND MATTERS

The opinion prevails in Cleveland that the Council will not authorize the Cleveland Railway to purchase some additional auto busses to determine their adaptability for passenger business. John J. Stanley, president of the company, said recently that a dozen busses in addition to the two now in use would be necessary to test their work on East Thirtieth Street, as is proposed in the Stolte resolution now before Council. He is not in favor of the plan.

City engineers have reported that the plan to build a subway under the Cuyahoga River, in connection with the elimination of a dangerous bend near the site of the proposed Lorain-Huron bridge, is feasible. Councilman Moylan requested the investigation in the belief that a tube could be built in connection with the construction of the bridge and that it could be used by a rapid transit line in the Walworth Run valley.

At a recent meeting of the Lakewood Chamber of Commerce it developed that Lakewood is willing to grant the Cleveland Railway an extension of franchise in return for the extension of the West Madison line from West 117th Street to Riverside Avenue, Lakewood. The company desires the franchise to expire with that of the Tayler grant in 1934. The plan would give the Lakewood people 3-cent fare within their own city.

ONTARIO RAILWAYS UNDER COMPENSATION ACT

The steam and electric railways of the Province of Ontario learned through their representatives on Jan. 15 what the Workmen's Compensation Commission expects of them under the operation of the compensation act. Lawyers representing the different companies called upon the commission and went fully into the subject of their responsibilities and duties under the act. The board pointed out the procedure established. The railways are in Schedule 1 of the act, which means that while they are under the general provisions of the measure they are not brought within the grouping system, each company being held individually liable for the compensation due a workman or his dependents in case of injury or death. According to the board's plans, when a workman is injured or killed, the company must at once notify the commission, supplying a physician's report and other data. The commission passes upon the case, fixes the compensation due the workman and notifies the company. A check for the amount fixed must then be forwarded to the commission, which places it upon record and sends it on to the workman. In every respect the employee of a railway receives the same protection and compensation as the worker under the general scheme, the only difference being that he gets his compensation from his employer instead of from a general fund. The board has met one objection to the individual liability system advanced by the men by arranging that the worker need not go to the employer to claim his rights. This is designed to protect the timid workman against relinquishment of his compensation or a part of it, especially in case of slight injury, owing to the fear that the pressing of his claim may prejudice his situation.

DEVELOPMENTS IN CINCINNATI.

The Rapid Transit Commission of Cincinnati has been asked by the Central Avenue Improvement Association to have the subway, necessary to the proposed rapid transit road, run down Central Avenue instead of Plum Street, no matter which of the four schemes under consideration may be adopted.

On Feb. 5 the People's Power League filed a petition with the city auditor, with 10,632 signatures, asking that a referendum vote on the franchise granted the Cincinnati, Newport & Covington Street Railway be taken at the regular election in November. The auditor has asked the city solicitor's opinion as to whether two elections will be necessary, one at the regular date in the fall, in compliance with this petition, and a special election on March 9, as asked in a petition filed by the business men of the city previously. The latter contained 30,000 names. While City Solicitor Schoenle had given no opinion early in the week, it is believed that the special election will be held. This company has informed the city that it will use some other streets than those designated in its franchise, if its plan should interfere with the rapid transit road that is now under consideration.

I. C. C. ACCIDENT BULLETIN FOR YEAR

The Interstate Commerce Commission has issued accident bulletin No. 52, covering the three months ended June 30, 1914, and the year ended June 30, 1914. The table of collisions and derailments on electric railways for the year contained in the bulletin follows:

			Number of Persons		Damage to Road and Equipment and Cost of Clearing Wrecks
No.	Classes	Number	Killed	Injured	
	Collisions:				
1	Rear	69	18	675	$24,793
2	Butting	32	4	143	51,906
4	Miscellaneous	53	1	208	17,473
	Total	154	23	1,026	$94,172
	Derailments due to:				
5	Defects of roadway	18	1	38	$11,032
6	Defects of equipment	16	..	37	8,033
7	Negligence of trainmen, signalmen, etc.	8	..	9	1,173
8.	Unforeseen obstruction of track, etc.	14	1	38	5,750
9	Malicious obstruction of track, etc.	3	..	7	395
10	Miscellaneous causes	19	2	134	11,003
	Total	78	4	263	$37,386
	Total collisions and derailments	232	27	1,289	$131,558
	Total for year:				
	1913	275	29	1,401	211,777
	1912	261	21	1,605	117,865
	1911	255	92	1,291	110,466

The summaries of casualties to persons on the electric railways for the years ended June 30, 1914, and 1913 follow:

		1914		1913	
No.	Item	Killed	Injured	Killed	Injured
	Passengers:				
1	In train accidents	18	1,182	10	1,252
2	Other causes	40	2,047	26	1,789
	Total	58	3,229	36	3,041
	Employees on duty:				
3	In train accidents	9	100	18	154
4	In coupling accidents	2	25	1	19
5	Overhead obstructions, etc.	2	28	6	34
6	Falling from cars, etc.	8	126	8	138
7	Other causes	25	289	17	203
	Total	46	568	50	548
	Total passengers and employees on duty	104	3,797	86	3,589
	Employees not on duty:				
8	In train accidents	..	16	..	5
9	In coupling accidents	..	....	..	....
10	Overhead obstruction, etc.	..	....	..	....
11	Falling from cars, etc.	1	13	1	19
12	Other eauses	2	5	2	4
	Total	3	34	3	28
	Other persons not trespassing:				
13	In train accidents	1	4	1	8
14	Other causes	247	1,081	196	860
	Total	248	1,085	197	868
	Trespassers:				
15	In train accidents	..	....	..	....
16	Other causes	168	139	117	123
	Total	168	139	117	123
	Total accidents involving train operation	523	5,005	403	4,608
17	Industrial accidents	28	1,053	19	798
	Grand total	551	6,108	422	5,406

CHICAGO TRACTION FUND FOR AUTO BUSES

According to an opinion handed down by the corporation counsel of Chicago, the City Council is at liberty to use the traction fund, which represents the city's share of the net earnings of the surface lines, for the purchase and operation of a municipal bus system. In brief the opinion states that the city may, upon the passage of an appropriate ordinance, use the traction fund to acquire these buses and other property necessary for the operation of the bus line. The city may also acquire and own a bus system and lease it to a corporation for operation. Before an ordinance for acquiring and conducting the system would be legal, however, it must have the approval of the voters, and they must also approve the plan for operating the system. This opinion was based upon the fact that although the traction ordinances provide that the city traction fund shall be used for the purchase and construction of street railways, the Supreme Court held that subways come under this provision. Furthermore, it was claimed that the 1907 City Council had no right to bind the succeeding councils on the purpose for which the traction fund should be used, providing the city's contractual relations were not molested.

Ohio Legislation.—A bill has been introduced in the Legislature to require all interurban and street cars to be equipped with a particular style of air brake and a particular sander.

Utah Commission Bill Opposed.—The Evans bill to create a public utilities commission in Utah was opposed by the representatives of the railroads and the public utilities on Feb. 5 as being unfair and unduly burdensome. The hearing was continued by the Senate committee to Feb. 9.

Kansas City Enabling Act.—A bill has been introduced in the Legislature of Missouri authorizing Kansas City to put aside the percentage it receives under the new franchise granted the Metropolitan Street Railway until sufficient money has accumulated to purchase the system.

Transfer of Ferry Service Sought.—Mayor Malone, of Chelsea, Mass., will shortly confer with the Boston Chamber of Commerce on behalf of turning over the ferry service between Chelsea and Boston to the Boston Elevated Railway and Bay State Street Railway in case the consolidation of the two companies is approved by the Legislature.

Toledo Prize Awards.—In the contest for the best criticism of the first franchise draft prepared by Henry L. Doherty and his associates in the Toledo Railways & Light Company awards were announced on Feb. 2. Judge John A. Doyle received the first prize, $100; Orville S. Brumbach, second, $75; William C. Clark, third, $50, and S. P. Bowles, fourth, $25.

Recent New York Bills.—Among the bills introduced recently in the New York Legislature are the following: to amend the public service commissions law in relation to quotation of rates by common carries; to amend the railroad law in relation to the minimum number of employees to be employed in the operation of certain trains; to amend the railroad law in relation to the length of trains.

Extension Question in Toronto.—The suggestion of Mayor Church, of Toronto, Ont., that application be made to the Ontario Legislature for the passing of an act compelling the Toronto Railway and the Toronto Suburban Railway to extend their lines and improve their services and equipment forthwith was adopted by the Board of Control on Jan. 29. The matter was expected to come before the Council on Feb. 1.

Subway Report in Los Angeles.—The Council of Los Angeles, Cal., by a unanimous vote, has adopted a resolution instructing the Board of Public Utilities to make a careful study of the traffic situation between Temple Street on the north, Tenth Street on the south, Main Street on the east, Hill Street on the West, and submit a report showing the results of such investigations and estimates of cost covering the construction of a subway system.

Rehearing Denied in Mill-Tax Case.—The Supreme Court of Missouri has denied the application of the United Railways, St. Louis, Mo., for permission to file a motion for a rehearing in the mill-tax case. The case will be appealed to the Supreme Court of the United States. The company will contend in presenting the case to the United States Supreme Court that the Missouri Supreme Court misinterprets a former decision of the United States Supreme Court.

Important Question Before Ohio Commission.—Walter M. Schoenle, city solicitor of Cincinnati, and Lawrence Maxwell and Ellis G. Kinkead, attorneys for the company, requested the Public Utilities Commission of Ohio on Jan. 25 to state the extent to which the Cincinnati Traction Company will be allowed credit in its reproduction value for the money spent in paving between its tracks. The opinion of the commission is desired as a guide in the consideration of the questions that have come up with regard to the road.

Illinois Public Utilities Commission Closes First Year.—The State Public Utilities Commission of Illinois has closed its first year of work and reports receipts of $510,173 and expenditures of $180,000, including all salaries and the fitting up of offices in Springfield and Chicago. More than 3000 cases were considered during the year, and of approximately 500 formal cases heard eighteen appeals were taken from the decision of the commission. Nine of these appeals were heard in the circuit court of Sangamon County at Springfield and in no case was the decision of the commission reversed.

Bills Introduced in Maine.—Two workmen's compensation measures known respectively as the Swift bill and the Cole bill, have been introduced into the Legislature of Maine. A bill regarded as the most drastic bill by far presented at the present session has just made its appearance in the Senate. This measure would create the People's Water Rates & Power Commission. Under it all water powers now privately owned would be taken over by the commission, rented for the benefit of the State and the entire question of the control of water powers taken from the jurisdiction of the Public Utilities Commission.

Key Route Must Build Interlocker.—The Railroad Commission of California has rendered a decision in which it finds that the interlocking plant at Lowell Street and Stanford Avenue in the city of Oakland is inadequate and unsafe. This tower protects the tracks of the San Francisco-Oakland Terminal Railways, the Southern Pacific Company and the Atchison, Topeka & Santa Fé Railway. These carriers are directed to replace the present tower with a first-class, standard, interlocking plant within six months from the date of the commission's order. The first-named company will have to bear the greater portion of the expense.

Proposed Consolidation of Utilities and Tax Commissions.—There has been talk in Ohio, in connection with the Governor's program of economy, of consolidating the State Public Utilities and the State Tax Commissions. James Boyle and J. H. McGiffert have been nominated as members of the Tax Commission to succeed Frank E. Munn and Christian Pabst. Mr. Boyle served as private secretary of the late William McKinley when he was Governor and as consul to Liverpool during Mr. McKinley's administration as president. Mr. McGiffert was connected with the State Auditor's office under Walter D. Guilbert and E. M. Fullington and afterwards was transferred to the State Tax Commission in charge of the collection of the excise tax on corporations.

Los Angeles Railway Purchase Considered by City.—The City Council of Los Angeles, Cal., is considering what policy it shall follow in handling expiring street railway franchises. The acquisition of the street railways by the city under the charter provision whereby the city may issue bonds against a revenue-producing utility is being urged. At a recent executive conference of the Council, George A. Damon, associate of Bion J. Arnold, Chicago, who made the transportation study for the city several years ago, said that the city could take over the railways by paying a portion of the equity value of the railways, and issuing bonds against the railways themselves for the balance. The Council as a committee of the whole has referred the matter to the board of utilities.

Philadelphia Councils Desire Rapid Transit Details.—Councils, in both chambers, on Feb. 4, adopted a resolution requesting Transit Director A. Merritt Taylor to present to Councils, if possible by Feb. 18, a complete list and full description of the subway, elevated and surface lines contemplated to be constructed under his rapid transit improvement plans. Robert S. Dripps, reform floor leader in Common Council, declared that Mr. Taylor had made a full report to Councils on his plans last summer and that the resolution was aimed to prevent the people expressing their views at the proposed special election next month on the Taylor plans by vote at the polls on the $30,000,000 permanent loan for carrying on the work. Mr. Taylor said: "All the information required by the resolution has been worked out in detail and is on file in the Department of City Transit. I am very glad to have the opportunity of furnishing this information to the City Councils in the specific form requested, with every detail which is relevant thereto."

Financial and Corporate

MR. BYLLESBY ON BUSINESS

This Public Utility Operator Looks Forward to a Recurring Period of Reasonable Expansion of Utility Business

H. M. Byllesby, speaking in a recent interview particularly about electric light, power and gas properties, stated that these seem to be enjoying a greatly increased popular standing on account of the stability which they have shown during the last few years of legislative attacks and generally depressed business conditions.

In regard to the general business conditions, Mr. Byllesby said:

"From one end of the country to the other there is a growing confidence in a revival of general business, and there is no enterprise which responds more quickly to such a revival than the public utilities. The corollary naturally follows that with a revival in the activity of the utilities, a corresponding increase is immediately felt in the operation of the vast industries whose business is the manufacture of wire, pipe, structural material, electrical machinery, boilers and various adjuncts for utility operation.

"Within the last few years there has been a very pronounced curtailment of the development of all classes of utilities on account of a variety of reasons, principal among which have been the extreme difficulty of providing capital for their further development and the disinclination of the operators of such properties to engage in further development risks in the face of the drastic attitude of the public and regulatory bodies and the uncertain business conditions. Believing that both of these conditions have materially changed for the better within the last few months, however, I have reason to expect a recurring of reasonable expansion of the utility business."

MR. FARRELL SEES BUSINESS BOOM

Head of Steel Corporation Sees Unprecedented Opportunities at Hand in the United States

President Farrell of the United States Steel Corporation, in a recent address before the Engineers' Society of Western Pennsylvania, stated that the financial tide in the United States has turned and that the country now has before it a period of unprecedented prosperity. In his opinion, every day now records a marked improvement in the general situation.

Continuing Mr. Farrell said:

"Our foreign trade balance for January will approximate $150,000,000, a figure never before approached in our history. Eminent authorities have calculated that this may easily reach $1,000,000,000 for 1915. This is important, for the years of greatest prosperity have been when the balances were largely in our favor.

"We are furnishing Canada with capital and we have made a beginning in extending investment to South and Central America. Moreover, the United States is to-day the chief granary of Europe. The prices received should insure for our farming population and therefore for the general population an unprecedented measure of prosperity.

"The steel trade is improving and the outlook is encouraging. The lumber industry is showing similar results. Large orders from belligerents and neutrals in Europe are keeping various lines of industry quite busy. Building has been quiet, but investors are coming to realize that money can be saved by starting operations now, material being available at unusually attractive prices. There is evidence of increasing merchandise traffic on the railroads, of opportunity to earn more money to establish credit and make expenditures for materials and equipment—which all mean activity in manufacturing lines dependent upon railroads for orders."

Mr. Farrell, in closing his address, announced the resumption of new construction work by the United States Steel Corporation. He said that last year the company had suspended all operations of new construction in the Pittsburgh district, but as evidence of its faith in the immediate future it had decided to proceed with work at once in order that it might be prepared for greater things.

ANNUAL REPORTS

Cleveland Railway

The statement of income, profit and loss of the Cleveland (Ohio) Railway for the year ended Dec. 31, 1914, follows:

BASED ON ORDINANCE ALLOWANCES

		Cents Per Car Mile
Operating revenues:		
Revenue from transportation	$7,610,592	
Revenue from operations other than transportation	81,751	
Total operating revenues	$7,692,343	23.80
Expense allowances:		
Maintenance allowance	$1,602,398	4.96
Operating expense allowance	3,910,934	12.10
Total expense allowances	$5,513,332	17.06
Operating income	$2,179,011	6.74
Non-operating income	43,334	0.13
Gross income	$2,222,345	6.87
Taxes	466,996	1.44
Net income	$1,755,349	5.43
Interest	1,702,259	5.27
Surplus	$53,090	0.16
Special allowances	180,000	.055
Deficit	$126,910	0.39

BASED ON DISBURSEMENTS

Operating revenues	$7,692,343	23.80
Actual expenses:		
Maintenance of way and structures	$1,158,683	3.58
Maintenance of equipment — except power plant	649,898	2.02
Maintenance of power plant	119,677	0.37
Power	728,227	2.25
Conducting transportation	2,406,999	7.45
Traffic	899	0.00
General and miscellaneous	815,113	2.52
Total maintenance and operating expenses	$5,879,676	18.19
Operating income	$1,812,667	5.61
Non-operating income	43,334	0.13
Gross income	$1,856,001	5.74
Taxes	466,996	1.44
Net income	$1,389,005	4.30
Interest	1,702,259	5.27
Deficit	$313,254	0.97
Obsolete equipment	120,000	0.37
Total deficit	$433,254	1.34

The increase in passenger revenue during the year, exclusive of transfers, amounted to $299,616 or 4.31 per cent, while the increase in passenger revenue, including transfers, was $532,336 or 7.66 per cent. Gross income increased $554,911 or 7.58 per cent. The increase in maintenance allowance was $99,267 or 6.6 per cent, and the increase of maintenance expenses was $235,427 or 13.91 per cent. The operating allowance increased $216,111 or 5.85 per cent, while the operating expenses increased $246,953 or 6.66 per cent. Taxes increased $32,323 or 7.3 per cent, and interest $130,688 or 8.31 per cent. The total increase in operating expenses, taxes and interest amounted to $409,965 or 7.18 per cent, and the increase in maintenance and operating expenses, taxes and interest was $645,392 or 8.72 per cent. The year showed the following increases in transportation statistics: Fares, 9,638,017 or 4.37 per cent; transfers, 5,056,031 or 5.77 per cent; rides, 14,349,271 or 4.61 per cent; ordinance car-miles, 1,965,425 or 6.52 per cent, and actual car-miles, 2,605,760 or 8.43 per cent.

The report states that the most important development during the year, in its effect upon the finances of the company, was the increase in the rate of fare. In July the net balance in the interest fund fell below $300,000 and on Sept. 1 the company began to retain the 1 cent charge per transfer instead of returning it. The effect of this on the passenger revenue was an increase of 8.97 per cent for September, 11.21 per cent for October, 16.06 per cent for November, and 9.07 per cent for December as compared to the corresponding months of 1913. The first eight months of 1914 showed an increase in passenger revenue of 5.84 per cent and the last four months an increase of 11.21 per cent, or an average for the twelve months of 7.66 per cent.

The receipts for transfers in the last four months amounted to $232,719. Omitting these transfer receipts, the report shows that the increase for the last four months dropped to 1.32 per cent, which was made up of increases as follows: September, 0.87 per cent; October, 1.24 per cent; November, 5.75 per cent and December, 0.42 per cent. The receipts for November, 1913, was less by about $40,000 than they would have been but for the great storm of that month. If this amount were added to this month's revenues to bring them up to normal, the increase in November, 1914, would be changed to a decrease. The last four months of the year would then show a decrease of 0.375 per cent instead of an increase of 1.32 per cent. The serious drop in earnings came in August. On the basis of actual earnings the passenger revenue for the first seven months increased 6.59 per cent and for the last five months 1.27 per cent. On the basis of the revised figures for November, 1913, the passenger revenue during the last five months decreased 0.07 per cent, giving an average of 3.71 per cent as compared to 4.31 per cent under the preceding calculation. The increase in the rate of fare, which was intended to make up the depletion in the interest fund, was therefore but little more than enough in the four months to take the place of the reduction in earnings in the last five months caused by the change in general business conditions.

The charges to expense during the year for repairs of the physical property and for such renewals as were properly chargeable to expense, amounted to $1,928,437 or 5.97 cents per revenue car mile. The total amount allowed for these purposes and for depreciation was $1,602,398. The expenditures, therefore, exceeded the ordinance allowance by $326,039, and the maintenance, renewal and depreciation reserve at the end of the year was over-expended to the extent of $490,687. During the ten months ended Dec. 31 the company deducted from gross receipts and credited to the reserve $120,000 for abandoned property, whose reproduction value is set at $705,348. The company is also charging gross receipts and crediting to the reserve $6,000 per month from March until $217,444 has been paid in, this sum being the amount of over-expenditures in the maintenance, depreciation, and renewal reserve on March 1, 1913.

The operating expenses for the year were 12.22 cents per car mile, or 0.12 cents in excess of the operating expense allowance. The report states that it may be necessary, therefore, to make an application to the City Council before the end of the ordinance year for at least a temporary increase in the allowance. It is stated that there was an increase in revenue car miles in the year as a whole, but that the service was reduced in August and figures for the last four months show a decrease of about 305,000 miles. If this reduction in service had not been made, the operating expense allowance would have been $37,000 greater, but the actual expenses would have been increased only about half of this amount. Furthermore, the earnings of the entire road per car mile were 23.32 cents, but the earnings of new crosstown lines varied from 10.09 cents to 20.75 cents and their total cost of operation, including maintenance, operating expenses, taxes and interest, was 25.27 cents. There was also an increase of expenditures in the accident department, due to causes beyond the control of the management, from 1.02 cents to 1.27 cents per car mile.

One hundred and sixty new cars were added to the company's rolling stock during the year, and sixty-nine cars were retired. On the basis of numbers only, the net increase in the year was 8 per cent. On Dec. 31 the company had 1373 revenue cars and 183 service cars. Its single track mileage was 344.746 miles. Betterment expenditures during the year amounted to $2,577,867.

The total number of stockholders of the company is 4262, with average holdings of thirty-nine shares. The stockholders residing in Ohio, 3813 or 89.5 per cent, own 88 per cent of the outstanding stock. Of these stockholders, 2979 with an average holding of sixty-six shares, reside in Cleveland and Cuyahoga County.

In March the stockholders were allowed to purchase additional capital stock to the amount of 10 per cent of their holdings. Of the $2,141,000 offered, $2,137,400 was so sold. In September an additional offering of $2,382,000 was made, of which $1,914,800 had been issued up to Jan. 20. On Dec. 31 the total amount of capital stock outstanding was $25,221,200.

KANSAS CITY REORGANIZATION PLAN

No Assessment on Stock Issues of Kansas City Railway & Light Company—New Bonds Proposed—$3,400,000 of Working Capital Needed

Chairman Dunham of the reorganization committee of the Kansas City Railway & Light Company, Kansas City, Mo., on Feb. 8 announced the details of the proposed plan of reorganization for the company. The $9,407,500 of preferred stock and $9,543,080 of common stock of the Kansas City Railway & Light Company outstanding in the hands of the public will remain undisturbed, and no assessments will be levied.

The secured indebtedness of the company, amounting to $28,700,000, is to be cared for in the following ways: To pay off $24,920,000 of overdue securities (including $10,200,000 of Kansas City Railway & Light Company first lien refunding mortgage 5's, $5,478,000 of Kansas City Railway & Light Company Series A and Series B 6 per cent notes, $7,242,000 of Metropolitan Street Railway consolidated mortgage 5's and $2,000,000 of Central Electric Railway first mortgage 5's), to provide for additions and to pay debts, there will be a new issue of twenty-five-year 5 per cent first mortgage bonds exclusively upon the street railway property of the Kansas City Railways, the successor to the Metropolitan Street Railway, and also an issue of new twenty-five-year 6 per cent first lien collateral mortgage notes of the Kansas City Railway & Light Company. The collateral for this second new issue will be the stock of both the street railway and the lighting properties. The electric light company will be left without a direct lien on its property, and will have power to mortgage it for future extensions, provided the stockholders under commission approval raise $150 for every $850 raised by bonds.

In changing the old overdue issues into these two new issues, the Metropolitan Street Railway consolidated mortgage 5's and the Kansas City Railway & Light Company first lien refunding mortgage 5's are to be exchangeable at 107 for the new Kansas City Railway bonds. Provision is made, however, that the Metropolitan bonds may be changed at par into a separate issue of three-year 5½ per cent notes of the Kansas City Railway & Light Company. The matured Series A and Series B notes of the Kansas City Railway & Light Company are to be exchanged at 105 for the new Kansas City Railway & Light Company first lien collateral mortgage 6 per cent notes. The $2,000,000 of Central Electric Railway first mortgage 5's are also to be exchanged for these first lien notes at 105.

Thus far all the outstanding issues except $680,000 of Corrigan Consolidated and East Side bonds and railway and light 5 per cent notes to banks, and except $3,100,000 of Kansas City Elevated Railway and Kansas City & Westport Belt Railway first mortgage bonds have been covered. The first named group will be paid in cash, while the bonds of the second group, maturing in 1922 and 1926, will be left lying on their respective properties. An amount of $3,410,000 of the new Kansas City Railways bonds, however, is set aside to acquire these unmatured bonds or obtain a clear title to the property securing them. Portions not so used are to be cancelled.

To insure the success of this reorganization plan it is necessary to raise working capital estimated at $3,400,000. For this purpose an arrangement has been made to underwrite at 85 $4,000,000 of an authorized issue of $15,000,000 of new twenty-five-year 6 per cent second lien Kansas City Railway & Light Company notes. The stockholders are offered the option of taking their proportionate share of these notes at the same figure. Chairman Dunham states that it is hoped to have the plan in operation by July 1. It must be approved by the Federal Court, the Mayor and City Counselor and the Public Service Commission.

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—The Public Service Commission for the Second District of New York has authorized an issue of $150,000 of eighteen-months 6 per cent notes and $43,400 of 6 per cent equipment trust certificates of the Auburn & Syracuse Electric Railroad. The notes are dated Feb. 1, 1915, and due on Aug. 1, 1916, and are to be sold at not less than 99½. The net proceeds, or $149,250, are to be applied toward the payment of outstanding notes payable and bills payable and also part of the company's $300,000 of notes heretofore authorized. The equipment trust certificates, issued in connection with the Guaranty Trust Company, New York, are to be accompanied by a cash payment of $10,580 and are to be paid in four installments with interest on the deferred payments at 6 per cent. The proceeds are to be used to purchase twelve new enclosed body electric passenger cars.

Bryan & Central Texas Interurban Railroad, Bryan, Tex.—It is reported that J. A. Turner was on Jan. 26 appointed receiver of the Bryan & Central Texas Interurban Railroad. The appointment was made at Houston by the United States District Court on the application of A. C. Price, New York, trustee.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Ohio Public Utilities Commission has authorized the Columbus Railway, Power & Light Company to issue and deliver to the holders of a like amount of the preferred and common stocks of the Columbus Light & Power Company, an amount of $516,300 of the preferred stock, series A, and $210,500 of the preferred stock, series B, of the Columbus Railway, Power & Light Company, in full and final payment for the property of the Columbus Light, Heat & Power Company. These amounts constitute an amendment to the original order of consolidation of April 22, 1913, and show the basis for the purchase of the lighting and heating company, which was authorized by the stockholders of the railway company on Jan. 26, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 6.

Jersey Central Traction Company, Keyport, N. J.—The Board of Public Utility Commissioners of New Jersey has issued a certificate approving an issue of bonds to the amount of $1,754,000 by the Jersey Central Traction Company.

Lincoln Railway & Heating Company, Lincoln, Ill.—The Lincoln Railway & Heating Company has been granted a certificate of incorporation by the Secretary of State of Illinois. The company's capital stock is stated to be $15,000. The incorporators are J. R. Patton, John A. Hoblit and Frank S. Bevan. This company succeeds the Lincoln Railway & Light Company, which was sold at public auction on Jan. 14 to J. R. Patton, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

New York State Railways, Rochester, N. Y.—Harris, Forbes & Company, New York, announce that practically all of the first consolidated mortgage fifty-year 4½ per cent gold bonds of the New York State Railways recently offered by this company and N. W. Harris & Company, Inc., Boston, and the Harris Trust & Savings Bank, Chicago, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 30 and Feb. 6, have already been sold.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Sacramento Valley Electric Company has leased its 12-mile line, connecting the town of Dixon with the Oakland, Antioch & Eastern Railway's tracks, to the latter company for a period of six months, with the privilege of then renewing the lease. The lessee plans to operate the Dixon line as a feeder for the main system. The Railway Commission of California has authorized the Oakland, Antioch & Eastern Railway to issue two notes in the sum of $58,000 to replace two other notes previously issued without the consent of the commission. The company is further granted authority to mortgage certain real estate in the city of Sacramento now used for terminal purposes, as security for the notes. The amount of these notes was by a misprint stated to be $68,000 in the ELECTRIC RAILWAY JOURNAL of Jan. 30.

Oklahoma Union Traction Company, Tulsa, Okla.—The Oklahoma Union Traction Company was sold on Feb. 5 at receiver's sale for $53,500 to A. J. Biddleson, who represented interests of the Colonial Trust Company. This company has 5 miles of track completed and 15 miles under construction.

Ottumwa Railway & Light Company, Ottumwa, Iowa.—H. M. Byllesby & Company reports that the gross earnings and miscellaneous income of the Ottumwa Railway & Light Company for the twelve months ended Dec. 31, 1914, were $324,928, as compared to $320,684 in 1913. The expenses and taxes in the two years amounted to $179,126 and $175,172, leaving net earnings of $145,802 and $145,512. The interest charges were $66,918 and $66,786, and the preferred stock dividends in each year $31,493, so that the balance was $47,390 for 1914 and $47,233 for 1913.

Peoria Railway, Peoria, Ill.—The Peoria Railway has been granted authority by the Illinois Pacific Utilities Commission to issue $570,000 of first and refunding mortgage bonds, dated June 20, 1906, and secured by a mortgage to the Chicago Title & Trust Company, trustee.

Public Service Railway, Newark, N. J.—The Board of Public Utilities Commissioners of New Jersey has granted permission to the Public Service Railway for the thirty-year extension at 5 per cent of the payment date for $100,000 of 5 per cent bonds of the North Hudson County Railway, due on Feb. 1.

Puget Sound Traction, Light & Traction Company, Seattle, Wash.—Lee, Higginson & Company, Boston, and Harris, Forbes & Company, New York, are offering at 100½ and interest, to yield about 5.85 per cent, an additional $557,000 of five-year 6 per cent mortgage gold bonds of the Puget Sound Traction, Light & Power Company. These bonds are dated Jan. 15, 1914, and are due on Feb. 1, 1919. This issue will make $8,067,000 outstanding of the $15,000,000 issue.

San Francisco (Cal.) Municipal Railways.—The December net earnings of the San Francisco municipal railway system amounted to $42,136, according to a report filed on Jan. 29 with the Board of Works. The city's cars are unharmed by the "jitney" busses, the report stated, as the new carriers have not come into competition with the city except for the short distance on Market street. The total receipts for December were $110,483, less United Railroad transfer reductions, and the expenses totaled $68,347.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The Railroad Commission of California has issued a supplemental order amending a previous decision in which the San Francisco-Oakland Terminal Railways was allowed to use $75,000 of a promissory note issue for the purchase of new cars, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2. Under the terms of the new order, the company receives permission to expend $60,000 of this $75,000 in reimbursing its treasury for moneys expended from income, provided after such reimbursement the money is used for the payment of taxes falling due on Feb. 1, 1915.

Seattle, Renton & Southern Railway, Seattle, Wash.—In a recent decision holding the Illinois law declaring interest rates higher than 7 per cent to usury applied, Judge A. W. Frater of the King County Superior Court awarded Peabody, Houghtaling & Company, Chicago, only $270,000 of its $300,000 claim against the Seattle, Renton & Southern Railway on collateral trust notes of this electric line held by the banking firm. The amount allowed was the principal of the notes, the court holding that $30,000 of interest and discount, amounting to 8 per cent, was invalid because in excess of the interest allowed by Illinois law. Judge Frater, however, decided that a bond issue of $125,000 made by the railway, bought by the banking house and resold to small investors, was valid, inasmuch as the combined interest and discount did not exceed 6.8 per cent.

Southern Pacific Company, San Francisco, Cal.—According to a statement issued in the West, the Southern Pacific Company is preparing to take over various lines which it owns in Oregon and Washington. These include the electrically-operated Portland, Eugene & Eastern Railway. The statement says that the Southern Pacific Company owns the capital stocks of these companies, and their purchase is merely in accordance with the stock ownership. It is largely a bookkeeping matter and does not affect the public interest.

Southern Public Utilities Company, Charlotte, N. C.—The Southern Public Utilities Company has sold $2,600,000 of first and refunding mortgage 5 per cent gold bonds, due on July 1, 1943, to William Morris Imbrie & Company. This banking house has been appointed the fiscal agent of the company. The Southern Public Utilities Company owns and operates various electric power and lighting plants, gas plants and water works in the Piedmont section of North and South Carolina. It also owns the property of the former Winston-Salem Railway & Electric Company.

United Traction Company, Pittsburgh, Pa.—No action has been taken upon the declaration of a dividend on the preferred stock of the United Traction Company, and the committee representing the preferred stockholders has called for deposits with the Philadelphia Trust, State Deposit & Insurance Company. Previous references to the dividend situation with this company were made in the ELECTRIC RAILWAY JOURNAL of Jan. 9 and Jan. 16.

Waverly, Sayre & Athens Traction Company, Waverly, N. Y.—A bill has been filed in the New York State Senate to validate the consolidation of the Susquehanna Valley Electric Traction Company, a New York State railway corporation, with the Waverly, Sayre & Athens Electric Traction Company, a Pennsylvania railway corporation, by which the Waverly, Sayre & Athens Traction Company was formed in 1894. The bill requires the certification of the Public Service Commission for the Second District of New York that the consolidation was made with the consent of the holders of more than two-thirds of the capital stock of each of the constituent companies and that all of the stockholders have acquiesced therein.

West Jersey & Seashore Railroad, Camden, N. J.—The stockholders of the West Jersey & Seashore Railroad voted on Feb. 4 to increase the common capital stock of the company by $3,000,000 and to execute a mortgage to secure not to exceed $6,000,000 of general and refunding bonds. Preliminary mention of these changes was made in the ELECTRIC RAILWAY JOURNAL on Jan. 2.

DIVIDENDS DECLARED

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., quarterly, three-fourths of 1 per cent, common.

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1⅜ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, first preferred; quarterly, 1½ per cent, original preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.						
1m., Dec.,	'14	$76,639	*$67,046	$9,593	$17,385	†‡$7,697
1 " "	'13	76,164	*71,253	4,911	15,523	†‡10,528
6 " "	'14	524,025	*466,938	57,087	103,306	†‡45,304
6 " "	'13	541,338	*450,954	90,384	90,881	†‡369
CONNECTICUT COMPANY, NEW HAVEN, CONN.						
1m., Dec.,	14	$630,642	*$446,564	$184,078	$97,462	‡$108,479
1 " "	'13	631,963	*472,854	159,109	88,374	‡93,076
6 " "	'14	4,192,386	*3,097,200	1,095,186	589,707	‡635,637
6 " "	'13	4,282,333	*3,113,432	1,168,902	537,153	‡763,728
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.						
1m., Dec.,	'14	$24,466	*$23,590	$876	$7,876	†‡$6,980
1 " "	'13	24,879	*23,759	1,120	7,726	†‡6,580
6 " "	'14	214,808	*161,924	52,884	47,254	†‡5,902
6 " "	'13	210,133	*155,594	54,538	46,092	†‡8,733
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.						
1m., Dec.,	'14	$38,043	*$45,618	†$7,575	$6,878	†‡$14,383
1 " "	'13	34,173	*47,705	†13,532	4,976	†‡18,073
6 " "	'14	225,116	*261,352	†36,236	36,886	†‡72,386
6 " "	'13	205,185	*296,005	†90,820	31,550	†‡119,763
RHODE ISLAND COMPANY, PROVIDENCE, R. I.						
1m., Dec.,	'14	$411,509	*$314,187	$97,323	$117,308	†‡$18,337
1 " "	'13	424,554	*327,952	96,603	107,589	†‡10,255
6 " "	'14	2,788,017	*2,038,480	749,537	709,108	‡78,440
6 " "	'13	2,833,670	*2,021,454	812,217	638,467	‡235,365
WESTCHESTER STREET RAILWAY, WHITE PLAINS, N. Y.						
1m., Dec.,	'14	$18,421	*$21,922	$3,501	$1,312	†‡$4,807
1 " "	'13	19,334	*20,154	821	1,137	†‡1,944
6 " "	'14	141,806	*138,562	3,244	7,537	†‡4,219
6 " "	'13	137,008	*128,466	8,543	6,417	†‡2,273

*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE "JITNEY" BUS

Failure of Original Los Angeles Company—Jitney Idea Still Spreading—Notes Regarding New Regulatory Measures and Services Discontinued

A weird series of developments presents itself for record this week in connection with the "jitney." That the theory of the small profit and the quick turn-over in connection with the large bus has been carried to excess in one case at least is instanced by the news from Los Angeles that the Pacific Motor Coach Company of that city has filed a voluntary petition in bankruptcy in the United States Court. Insolvency proceedings had been previously instituted. The schedule of assets and liabilities shows the total indebtedness of the short-lived corporation amounts to $86,788. This includes a claim for thirty-three double-deck motor buses and one 2-ton fuel wagon. An aggregate of $1,729 is due employees for wages. The assets of the company are scheduled at $3,026. This company is not to be confused with any of the "jitney" bus associations, and was, in fact, hastened into bankruptcy by the diversion of such traffic as it at first enjoyed to the more speedy "jitney."

The idea of the "jitney" is still spreading. Two of the most important cities to be invaded are Toledo and Louisville. On Feb. 2 "jitney" service was started in Toledo, in competition with the Cherry Street line of the Toledo Railways & Light Company. In an address before the Toledo Automobile Association on the day the bus was started, F. R. Coates, president of the Toledo Railways & Light Company, said that the operation of the "jitney" will teach the people that a ride is worth 5 cents and in that way benefit the local railway.

In the case of Louisville, a charter has been filed in the county court there by the Nickel Automobile Company, with an authorized capital of $10,000. The incorporators announce that they will have lines of specially designed motor buses, each capable of hauling ten or fifteen passengers, and that they will ply between residence districts and the business section. Close on the heels of this project comes the announcement that other similar companies are in process of formation. William P. McDonough, attorney and secretary of the Louisville Retail Grocers' Association; Louis C. Heck, Jr., attorney; Stephen S. Jones, attorney, and William A. Baker, real estate man, are incorporators of the first company. J. S. Roberts, formerly with the Overland Automobile Agency, is promoting another company, while R. M. Cunningham, a lumberman with offices in the Inter-Southern Building, Louisville, is interested in organizing a third venture. It is stated the first of the Nickel Company's vehicles will be put on the streets some time in March, while it is declared by promoters of other venture that they will begin service immeditely. Officials of the Louisville Railway have declined to discuss the development.

H. M. Byllesby & Company, Chicago, Ill., report that two days' operation of "jitney" buses at Fort Smith convinced an auto-livery concern of that city that such competition with the street cars would not be profitable and the buses have been discontinued. The "jitney" line was started on the principal traffic artery of the city, and a ten-minute service with 5-cent fare was announced to the public in newspaper advertisements.

It is reported from Phoenix, Ariz., that the twelve cars which were started there in "jitney" service have been ordered to suspend operations by the Mayor. The service was installed in December. The city asked a license of $60 a year from the operators of the service and a $2,000 bond on each car. The owners of the service were censured severely by the city officials for allowing the passengers to ride on the steps of the cars and were finally forced to suspend.

On Feb. 2 the Board of Commissioners of Oklahoma City passed an ordinance regulating the "jitneys," and on the same day the Mayor signed the measure. This measure provides among other thing that all vehicles called "jitneys" must file an application with the city clerk stating the type of car, horse power, factory number, seating capacity, name of chauffeur, terminals, hours of operation, file a bond of

$10,000, pay an annual fee of $50 for each eight-passenger vehicle, $75 for each vehicle seating more than eight passengers, and $150 for each seating more than twelve passengers. Specifications are set out for signs to be carried and speed limits are fixed. It is made unlawful for "jitneys" to operate longitudinally upon any street occupied by a street car line, except that within the fire limits the vehicles may operate for not more than two blocks in one direction along such streets where necessary in crossing such fire limits.

The "jitney" did not make any large inroads on the receipts of the Oklahoma Railway. On Feb. 5 they were still plying their service, however, but there was a marked falling off in the number of vehicles running. At no time does it seem that they made anything like their expenses.

An ordinance is pending in Spokane to require "jitney" operators to file a bond of $5,000 and in addition pay an annual tax ranging from $25 to $100 a year.

The ordinance enacted by the City Commissioners of Denver to regulate the "jitney" was passed by a vote of four to one. An emergency clause was attached which made it effective immediately without having to wait the usual thirty days. The ordinance provides in short that it shall be unlawful to operate an automobile or other vehicle for hire without first securing a franchise and that violations of the ordinance shall be punishable by a fine of not less than $100 nor more than $300 or by imprisonment for not more than ninety days, or both. Every trip is to constitute a separate offense.

On Jan. 29 the City Council of Corpus Christi, Tex., took prompt measures to regulate the operation of "jitney" cars, when under the emergency clause an ordinance was passed requiring that any person, firm or corporation operating a "jitney" line must first secure a franchise from the city. In addition the ordinance provides that the applicant shall also furnish to the city a bond in a sufficient amount to guarantee the payment of any claims that arise as a result of damages, and that "any person injured by a 'jitney' car may sue the bondsmen."

In regard to the effort to regulate the "jitney" in Birmingham the *Herald* of that city said recently: "Disagreement among the members of the city commission over the provisions of the proposed ordinance to regulate the 'jitney' auto lines of the city has temporarily at least held up the new law, and in all probability has killed it. The proposed ordinance provided for a $2000 indemnity bond to be placed on each company operating cars and a license to be charged for each car in operation of probably $15 or $20. A very authentic report was to the effect that counsel for the Birmingham Railway, Light & Power Company has prepared an ordinance for the regulation of the 'jitney' autos, but which was not accepted by the commission because it was in some ways too drastic."

The City Council of Portland, Ore., has authorized Commissioner Daly to proceed at once with the formulation of legislation to govern the operation of "jitney" buses in that city. Mr. Daly hopes to report by Feb. 15.

Two hundred thousand little "missionaries" are to be sent out by the San Antonio (Tex.) Traction Company in the interest of public patronage of the street railway. The "missionaries" are in the form of "stickers" printed in blue, yellow, green and red, with this caption: "The Traction Company Has Helped Build San Antonio—Use the Street Cars." A picture of one of the modern steel cars operated by the company, as a background for a small mule car of the type used when the public carrier service first was established, is shown on the stamps. Printed under the drawing is: "1881-1915."

Automobile Topics seems to see the hand of the Standard Oil behind the "jitney" development. That paper says: "One of the most extensive fields of influence that the automobile industry has yet encountered lies in the 'jitney' bus. No less than a revolution has been effected in the used car market; the Standard Oil Company, seeing large increases in gasoline sales, is throwing its influence in favor of the movement; the leading tire companies are contemplating the strongest possible support for the promoters and operators of 'jitney' lines; and traction interests are concerned lest the values of their street railroad securities be impaired by traffic losses occasioned by the new competitors."

The Dallas *Dispatch*, Dallas, Tex., is offering prizes of $2 for best jingles about the "jitney." Here are a few of the gems published by that paper:

Hush, little Ford,
  Don't you cry,
You will be a "jitney"
  Bye and bye.

"Jitney" means a nickel,
  A nickel means a ride,
If the "jitney" hadn't come along,
  I suppose I would 'a' died.

If the "jitneys" jar and jingle like
  The "jitney" jingles jar,
You can't blame a single human for
  Preferring the trolley car.

The Fort Worth *Telegram* has also gone in for "jitney" jingles. There appeared in that paper recently the following:

Oh you "jitney"!
  You give me a pain;
I rode in you once,
  But never again.

If a street car meets a "jitney"
  Coming down the lane,
And the street car hits the "jitney,"
  I wonder who's to blame.

The trolleys are bad,
  The "jitneys" are worse;
I always walk,
  Safety first.

ATLANTA SERVICE DECISION

Synopsis of Georgia Railroad Commission's Decision Deals Interestingly with Seating Capacity

The Georgia Railway & Power Company, Atlanta, Ga., asked the Georgia Railroad Commission recently for authority to discontinue certain tripper or extra cars among the number operated in its system during rush hours, its position being that traffic had fallen off on the lines involved to an extent justifying the withdrawal of services not needed. The commission's decision, referred to very briefly in the ELECTRIC RAILWAY JOURNAL of Feb. 6, was against the company in all but three counts and was partially favorable in some four others. The synopsis of the decision of the commission contains one or two interesting points, particularly that which the commission makes as to the number of passengers above seating capacity that are allowable under abnormal conditions at rush hours. The commission said in part:

"While it is reasonable and wholly probable that during December, 1914, there was a smaller volume of traffic than during rush hours in 1913, the commission is of the opinion, from many considerations, that this decrease has been relatively smaller than in non-rush hours. Granting, however, that the rush-hour traffic is reduced under 1913, the commission is not inclined to agree with the assumption that the facilities supplied during these periods in 1913 were entirely adequate on every route. On some routes we feel sure they were not, and in making this statement the commission does not base it upon the contention that every passenger on every car operated should be furnished a seat. This contention may be sound in theory. Under street car traffic conditions as they exist daily, such a theory is frequently impossible of actual operation.

"In our opinion it is the duty of the common carrier to provide seats, that is, reasonable accommodations, in its cars for such patrons as desire them, in so far as they can reasonably anticipate and measure the volume of traffic which will offer. Experience shows that there is, with fair regularity, an estimable volume of traffic during certain hours of the day. This should be provided for. But this does not mean that if an average of forty passengers customarily board a given schedule car on a certain route upon which is operated a forty-seat car, the car is then loaded to its reasonable capacity, and that when forty-one passengers begin to ride additional facilities must be provided.

"Careful observation has shown that an appreciable percentage of regular street car patrons prefer riding on the platforms to occupying seats inside the cars. These are styled 'voluntary standees.' Again, it must be borne in mind that city street car transportation is generally for comparatively short distances. A given route we will say is 5 miles long; cars are operated regularly the entire distance of the route. At an ascertained peak point, where the load is always heaviest, a forty-seat car will customarily have on board, say, forty-eight passengers. This maximum was only reached one block back. At the next block forward the car begins to discharge its load, and within two or three blocks the load is again below the seating capacity, no one having stood for a longer distance than three or four blocks or for a longer time than five or ten minutes. This particular schedule may have been—and observation demonstrates this—the only one at all overloaded during the whole day. Conditions frequently arise in street car traffic when it is impossible to avoid overloading for short distances or for short periods of time.

"Taking into consideration such conditions some commissions have held that facilities are fairly reasonable where the peak point loads do not exceed 30 per cent of the seating capacity offered for a continuous period of thirty or forty minutes. In our opinion, an allowance of 30 per cent over the seating capacity for standees, whether voluntary or involuntary, is too large. We are rather inclined to allow only 20 per cent on this account, to be extended not longer than thirty minutes with schedules operated or not exceeding ten-minute headway. It would not be reasonable to apply this rule to only one day's travel, or even a week's. The congestion should extend over such a reasonable period as would show that it is regular and not spasmodic; that it is permanent in nature and not due to temporary conditions. It would be unreasonable to require a carrier to operate sufficient cars to provide a seat for every passenger on every schedule or every day of every year and for every distance. Moreover, it is impossible even if the public would render the absolutely necessary co-operation in distributing the loads as between the cars offering.

"We have deemed it advisable to submit the foregoing general observations in order that the public may be reminded that the carrier is only required by law to supply reasonably adequate and comfortable facilities. It is the province of the commission to compel this reasonably adequate and efficient service. If at any time or upon any route there are shown to be facilities and service in excess of the reasonable needs of the public, it is just as much our duty to allow a reasonable reduction of this excess as to order more cars when service is shown to be inadequate. In the pending application our conclusions and action are based upon such facts as we have found to exist."

SAN FRANCISCO EXAMINATION RESULTS

Instructing Ninety New Crews in Twenty Days on San Francisco Municipal Line

When the Panama-Pacific Exposition opens on Feb. 20, the Municipal Railways of San Francisco plans to add ninety new cars to the number now in service, and the motormen and conductors who will be employed were selected from the Civil Service Commission eligible lists in time to allow twenty days for instruction, as most of the new men are without experience. The Civil Service Commission, working in conjunction with Thomas A. Cashin, superintendent of the Municipal Railway, some months ago planned the general nature of the examination and results have been highly satisfactory, it is now reported. The examination consisted of two parts, physical and written, and applicants who failed to pass in the first were not allowed to take the second. The physical tests were considered rather severe, and although about 3000 men made applications only 711 took the written part of the examination for motormen, and 798 the written examination for conductors. Of these, 554 passed the motormen's examination and 633 the conductors' examination. Those who passed successfully were then listed in the order of the written examination percentage made, and the first ninety men in each of the two lists were employed.

New Freight Service.—The Pacific Electric Railway, Los Angeles, Cal., has begun a freight service between San Bernardino, Los Angeles and way stations.

Increase in Fare.—The Cumberland & Westernport Electric Railway, Cumberland, Md., has increased the price of books of one hundred tickets good over its lines from $4 to $4.50. The cash fare remains at 5 cents in each zone.

Fare Hearing Continued.—The hearing in connection with the fare complaint against the Public Service Railway, Newark, N. J., by representatives of Gloucester City, Woodbury and other towns will be continued before the Board of Public Utilities Commissioners on Feb. 23 at Trenton.

Hitching Sleds to One-Man Cars.—Instructions have been issued to the city police force of Regina, Saskatchewan, to take vigorous measures to suppress the practice indulged in by youths of the city of tying their sleds to the cars of the Regina Municipal Railway. One-man cars are operated.

Rounding Up Deaf Teamsters.—The Metropolitan Street Railway, Kansas City, Mo., has this order posted in the carhouses: "Conductors and motormen will obtain the names of all wagons which remain on the tracks after sounding the gongs and report the same to the division superintendents."

Ventilation in Louisville.—Instructions to conductors of the Louisville (Ky.) Railway provide that at all times two of the ventilators in the cars shall be kept open. This is the answer of the company to the agitation of the question of street car ventilation in which certain Louisville newspapers and the city health authorities have been indulging.

I. T. S. Reduction in Fare.—The Illinois Traction System, Peoria, Ill., has announced reduced passenger tariffs between Bloomington, Peoria and St. Louis, claiming a differential over steam lines. The old round-trip rate from Bloomington to St. Louis was $5.30; the new rate is $5; the old rate, round trip, Peoria to St. Louis, $5.50; new rate, $5.30; old rate, round trip, Springfield to St. Louis, $3.10; new, $2.80.

E. R. Kelsey Wins in Membership Contest.—A membership contest for the Young Men's Christian Association at Toledo, Ohio, ended on Jan. 28. Two teams were organized and christened the "Electrics" and the "Steams." E. R. Kelsey, publicity manager of the Toledo Railways & Light Company, captained the "Electrics" and Hugh Campbell, the "Steams." The object was to increase the membership by at least 300. Mr. Kelsey's team won with 185, while Mr. Campbell's team secured 130.

Hearing Regarding Trailers.—The Public Utilities Commission of the District of Columbia will hold a formal hearing on Feb. 16 to consider the application of the Capital Traction Company with respect to Section 13 of order No. 21 regulating the operation and equipment of cars in the District of Columbia. Section 13 provides that no trail car shall be operated for the purpose of carrying passengers unless a separate conductor or an employee acting as such is provided for each car of the train.

New Fare on Schenectady Railway.—Local round-trip tickets good until used for transportation between Stop 19, or any stop between Stop 19 and Stop 14½, inclusive, and Schenectady, or for transportation between Stop 19, or any stop between Stop 19 and Stop 22½, inclusive, and Albany, will be sold in the Schenectady and Albany terminals and at a convenient place in the vicinity of Stop 19 at 25 cents a ticket. This is a new fare established under order of the Public Service Commission in cases Nos. 4545 and 4587 and will go into effect on March 1, 1915.

Action on "Jim Crow" Bill Postponed.—The House by a vote of 168 to 107 has decided not to take up, for the present, the bill introduced by Representative Clark, of Florida, providing for the operation of "Jim Crow" cars on the electric railways in the District of Columbia. The Clark bill was introduced in the House on April 7, 1913. After lying dormant for almost two years, it was suddenly revived on Feb. 2, 1915, when it was ordered reported to the House. It is possible for this legislation to come up on Feb. 22, or by a special agreement among the House leaders on some other day.

Accident on New York Elevated.—Nine persons were injured in an accident on the Manhattan Elevated Railway, at 8:37 a. m. on Feb. 6, when a south-bound Ninth Avenue local train crashed into the rear car of a local-express that was halted at the Fiftieth Street station. After the collision a short circuit started a fire in the wrecked rear car of the local express and the first car of the local, which had telescoped each other by the force of the collision. The immediate effect of the accident was to suspend all traffic on the Sixth Avenue elevated line, the trains of which turn into Ninth Avenue through Fifty-third Street.

Brooklyn Transfer Order.—The Public Service Commission for the First District of New York has rescinded an order adopted in November last and adopted three new orders, requiring the Van Brunt Street & Erie Basin Railroad to exchange transfers with the intersecting lines of the Coney Island & Brooklyn Railroad, the Brooklyn Heights Railroad and the Nassau Electric Railroad at Hamilton Avenue. The order directs the companies to agree between them as to the portion of the 5-cent fare to which each shall be entitled by Feb. 10, 1915, and to report to the commission upon Feb. 11 whether such an agreement has been reached, so that the commission may apportion the joint rate if the companies fail to agree.

Motorman Not Entitled to Engineer's Pay.—In the hearing before the Railroad Board of Arbitration, which is considering the demand of engineers and firemen of the Western district for an increase in wages, R. E. Hewitt, general foreman of electric car shops, Southern Pacific Company, West Alameda, Cal., stated that motormen on electrified steam roads are not entitled to the wages of the locomotive engineer. Mr. Hewitt is quoted as saying: "The only thing the motorman has to do is to lift his kit of tools into the cab and to see that he has a supply of fuses. Everything has been made ready for him before the motor leaves the shop. The employees have dubbed the motor 'the dead man's outfit,' and the motormen certainly are not entitled to an engineer's wages."

Ambulance Chaser Fined at Boston.—The first case to be brought at Boston, Mass., under the so-called ambulance-chaser law (Chap. 432) of 1914 has resulted in the conviction of Harry Noonan and the imposition of a fine of $100 for soliciting a claim in a damage case against the Boston Elevated Railway. The act provides penalties for disbarred attorneys and also includes in its prohibition any person not having been admitted to the bar who represents himself as having authority in behalf of persons having claims for damages to procure settlements for such claims, or whoever, not being an attorney, solicits either for himself or for another the management and control of such claims. The maximum penalty for the first offense is a fine of $100 or six months' imprisonment and for each subsequent offense a fine of $500 or imprisonment of one year.

Accident Figures for Detroit.—During 1914 a total of 16,331 accident reports were filed with the Detroit (Mich.) United Railway as against 17,938 the year before, a reduciton of 9 per cent. The records of the company show that while 4142 cars were in collision in 1913 this number was cut down to 2343 in 1914, a reduction of 43 per cent. There was a decrease of 11 per cent in derailment of cars, an increase from seventy-one to eighty reports on running into open switch points, while there was a decrease of 47 per cent in running over street and steam railroad crossings. In 1913 there were 2595 reports on passengers hurt in boarding or alighting from cars, while last year this was cut to 2143, a reduction of 17 per cent. In reports on falling from cars, mostly moving, there was a reduction from 304 in 1913 to 191 in 1914, or 37 per cent. There was an increase from 248 to 309 in reports of passengers hurt while within the body of the car. In 1913 there were 3210 automobile collisions with cars on the Detroit United Lines, mostly within the one-fare zone. In 1914 this class of accident reports increased to 4072. This is an increase of 27 per cent, with more than eleven automobiles struck every day. The worst month of all was December, when 491 automobiles were struck, an average of sixteen a day. The company says: "Let us have some 'safety first' operation among the automobile drivers."

Personal Mention

Mr. C. E. Brown has succeeded Mr. J. H. Hornung as manager of the San Francisco, Napa & Calistoga Railway and will make his headquarters at Napa, Cal.

Mr. H. E. Blain has been appointed operating manager of the Metropolitan District Railway, London Electric Railway, City & South London Railway and Central London Railway, London, England.

Mr. Frederick L. Siddons has been appointed an associate justice of the Supreme Court of the District of Columbia and has been succeeded as a member of the Public Utilities Commission by Mr. Louis Brownlow.

Mr. J. M. Nelson has resigned as chief engineer of the power station of the Houghton County Traction Company, Houghton, Mich., to become connected with the Standard Oil Company as a traveling engineer.

Mr. Z. E. Knapp has been appointed manager of maintenance and construction of the Metropolitan District Railway, London Electric Railway, City & South London Railway and the Central London Railway, London, England.

Mr. J. P. Thomas has been appointed general superintendent to the London (England) General Omnibus Company, Ltd., and in this capacity will have charge of all the work of operation, under the general control of Mr. H. E. Blain, operating manager.

Mr. W. E. Mandelick, in addition to his office as secretary to the Metropolitan District Railway, London Electric Railway Company, City & South London Railway and the Central London Railway, London, England, has been appointed business manager of the companies.

Mr. W. E. Blake, in addition to his position as superintendent of the line to the District Railway, has been appointed superintendent of the line to the London Electric Railway, City & South London Railway and Central London Railways, in place of Mr. J. P. Thomas, who has resigned from these companies to become general superintendent of the London General Omnibus Company, Ltd.

OBITUARY

G. Benz, director of the Gesellschaft für den Bau von Untergrundbahnen (Underground Railways Construction Company, Berlin, Germany), is reported killed in battle. Mr. Benz had previously received the iron cross for valor.

James F. McElroy, president of the Consolidated Car Heating Company, Albany, N. Y., died at Laconia, N. H., on Feb. 10. Mr. McElroy was born in Greenfield, Ohio, Nov. 25, 1852, and was graduated from Dartmouth College in 1876. For four years following Mr. McElroy was the principal teacher of the Indianapolis Institution for the Blind, and then for seven years was superintendent of the Michigan Institution for the Blind. In 1887 he organized the McElroy Car Heating Company. Two years later it was combined with the Sewall Car Heating Company.

Norman B. Ream, capitalist, died in New York on Feb. 9. Mr. Ream was born in Somerset County, Pa., on Nov. 15, 1844. At the age of fourteen he became a teacher, and in 1861 enlisted as a private in the Union army. He was wounded in a battle near Savannah and returned from the war a commissioned officer. He then clerked for awhile in Pennsylvania, but in 1866 opened a general store in Princeton, Ill. The following year he moved to Osceola, Ia., increasing the line of goods handled. In 1871 he moved to Chicago and engaged in the commission business. He prospered immensely and was a member of the famous big four which included N. S. Jones, John Cudahy and Sidney A. Kent. Mr. Ream had made his headquarters in New York for many years. He was connected with many corporations as an officer or director, among them the following: Baltimore & Ohio Railroad, Brooklyn Heights Railroad, Brooklyn Rapid Transit Company, Chicago & Erie Railroad, Chicago & Alton Railroad, Chicago, Burlington & Quincy Railroad, Erie Railroad, International Harvester Company, National Biscuit Company, New York, Susquehanna & Western Railroad, Pennsylvania Coal Company, Pullman Company, Seaboard Air Line Railway, United States Steel Corporation.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Black Mountain & Eastern Railroad, Combs, Ark.**—Chartered in Arkansas to build a 20-mile interurban railway between Combs and Cass. Capital stock, $250,000. Edward C. Jeter, Fayetteville, Ark., director.

***New Britain (Conn.) Street Railway.**—Application for a charter has been made by this company in Connecticut to build an electric railway from the corner of Myrtle Street and Main Street, in New Britain, to connect with the existing electric line, westerly along Myrtle Street to Grove Street, to Broad Street, Washington Street, Farmington Avenue to Stanley Street and on the Hartford road to connect with the existing line at Elmwood. Another line would begin at Grove Street and extend along Plainville road to the center in Plainville. A third line would extend westerly from Main and Broad Streets to Washington Street and a fourth would extend from North Burritt Street to Farmington Avenue and Commonwealth Avenue where it would connect with the line first mentioned. Capital stock, $50,000 to be increased to $500,000. Incorporators: Mayor George A. Quigley, George M. Landers, Joseph M. Halloran, Edward O. Kilbourne, William J. Farley, George Glover, George P. Spear and Mortimer H. Camp.

***Lincoln Railway & Heating Company, Lincoln, Ill.**—Incorporated in Illinois, presumably as the successor to the Lincoln Railway & Light Company, the property of which was sold under foreclosure recently, and to build electric railways in Lincoln. Capital stock, $15,000. Incorporators: J. R. Patton, John A. Hoblit and Frank S. Bevan.

***Marietta-Parkersburg Railway, Marietta, Ohio.**—Chartered in Ohio to build an interurban railway between Marietta and Parkersburg. Capital stock, $10,000. Incorporators: H. H. Archer, E. Clark, Jr., and John Kaiser.

FRANCHISES

Phoenix, Ariz.—The Phoenix Railway has received a franchise from the Council for an extension along Monroe Street between First Street and Second Avenue in Phoenix.

Los Angeles, Cal.—The Los Angeles Railway has received an extension of time on its franchise in which to complete the work of reconstruction of tracks and paving certain sections of its lines in Los Angeles.

Los Angeles, Cal.—The public utilities committee of the City Council decided recently to recommend the granting of a franchise for an incline railway in Griffith Park, for which Colonel Lewis Ginger has made application. The Board of Public Utilities is to outline the route and the mode of operation, and the city attorney will then prepare the notice of sale. Colonel Ginger states that he is ready to begin construction as soon as the legal phases of the subject are fulfilled and he hopes to have the line in operation within six months after it starts. [E. R. J., Dec. 26, '14.]

Mill Valley, Cal.—The Railroad Commission has denied the application of the Marin County Electric Railways for permission to proceed with the construction of 1 mile of new track from the Northwestern Pacific Depot, Mill Valley, to the Cascades. [E. R. J., Jan. 30, '15.]

Riverside, Cal.—The Pacific Electric Company has received permission from the Council to abandon portions of its second track franchise on New Magnolia Avenue in Riverside. The company will be granted a new double track franchise over the street with the understanding that if the second track is not installed within three years the city will have the power to require the company to place its tracks in the center of the street.

San Francisco, Cal.—The Board of Works has been directed to prepare plans and specifications and advertise for bids along the lines of Engineer O'Shaughnessy's plan No. 9 for the Church Street railway in San Francisco.

Evansville, Ky.—Extension of the Bell Street line of the Evansville Railway from Kentucky Avenue to the city limits is to be undertaken at once under a franchise which has just been approved by the Board of Public Works. The East End Improvement Association has subscribed a part of the money needed. Construction work will begin when the weather permits.

Henderson, Ky.—A thirty-year contract under which the Henderson Street Railway has been operating its lines in Henderson expires on Oct 21 and, although it is reported never to have declared a dividend the company wants to extend the contract on the same terms. There has been much agitation of the questions which have been raised in this connection and it is intimated rather definitely that the city authorities will require that certain conditions be complied with before action on extending the franchise is taken. Among these, it is said, will be extensions of the lines to outlying towns and establishment of schedule services on them before the Council votes a franchise.

Hamilton, Ont.—A special committee of the City Council will request the Hamilton Street Railway to build two cross town lines and also relay new tracks on several streets in Hamilton.

Toronto, Ont.—The Toronto & York Radial Railway will apply at the next session of the Ontario Legislature for power to construct a double track line on Yonge Street, from the Canadian Pacific Railroad to the north city limits of Toronto.

Three Rivers, Que.—The Three Rivers Traction Company has received a twenty-year franchise from the Council in Three Rivers.

TRACK AND ROADWAY

Gadsden, Ala.—Application for a charter will soon be made to build a 30-mile line between Gadsden and Centre, Ala. Louis Hart, Gadsden, is interested. [E. R. J., Nov. 7, '14.]

Mobile Light & Railroad Company, Mobile, Ala.—Two new loop lines to connect with its present tracks will soon be built by this company in Mobile.

Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—This company has completed its electric line in Tuscaloosa and will place it in operation at once.

Montecito Railroad, Las Angeles, Cal.—This company has placed in operation its electric railway over Montecito drive, beginning at the north end of Griffin Avenue and East Avenue Forty-seven in Los Angeles. W. L. Larrabee, president. [E. R. J., Aug. 22, '14.]

Hartford & Springfield Street Railway, Warehouse Point, Conn.—Plans are being made by this company for an extension from the local waiting station in Thompsonville through Main Street and across the Connecticut River, connecting at a point on Mapleton Avenue in Suffield with the present Suffield Street Railway.

***Washington, D. C.**—A recommendation to Congress for legislation that will permit the extension of electric lines to East Potomac Park will be made in the next annual report of the chief of engineers in Washington.

Palm Beach & Everglades Railway, West Palm Beach, Fla.—Offices have been opened by this company in the McGinley Building, West Palm Beach. Plans are being considered to award contracts in the near future to build this steam or electric railway from West Palm Beach westerly to a point 6 or 8 miles from the shore of Lake Okeechobee; thence south and northwesterly parallel with the shore of Lake Okeechobee to a point at or near Lake Hicopochee, the line to be about 75 miles. [E. R. J., Jan. 23, '15.]

Georgia Railway & Power Company, Atlanta, Ga.—Preliminary surveys have been made and plans are being considered by this company to build an extension to the site of the Oglethorpe University, about 1½ miles north of the present terminus at the DeKalb County line near the Capital City Country Club.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—Plans are being considered by this company for improving its lines in Augusta.

Waycross Street & Suburban Railway, Waycross, Ga.—Plans are being made by this company to build an extension through the southern section of Waycross.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company is asked to consider plans to build its tracks along Main Street from Broadway to Missouri Avenue in East St. Louis.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—This company has decided to run its new line from Peoria to Canton on the most direct route from Hollis to Glasford and from Glasford direct to Canton. The Chapman Construction Company of Chicago is the engineer for the construction and the Woolf Company will sell the stock. A considerable amount of stock has been sold in both Peoria and Quincy. [E. R. J., Jan. 9, '15.]

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is now engaged in installing automatic block signals between Huntington and Peru, Ind., a distance of 25 miles. This work is being done in pursuance of the order of the Indiana Public Service Commission.

Union Traction Company, Coffeyville, Kan.—It is reported that plans are being considered by this company to extend the line from Coffeyville to Collinsville. Eventually this line will be extended south from Collinsville to Tulsa.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being made by this company to build ½ mile of new track within the city limits of Hutchinson. It will extend through the Carey district.

Hagerstown & Frederick Electric Railway, Frederick, Md.—Many plans for improvements of this railway during the summer are being considered by this company. One of the extensions contemplated is a branch from Hagerstown to Security, 2 miles east of Hagerstown, where the new power house of the company is located. Straightening curves and strengthening culverts over the entire system are also planned.

Boston, Mass.—Bids are desired until Feb. 25 by the Boston Transit Commission, 15 Beacon Street, Boston (B. Leighton Beal, secretary), for building Section H of the Dorchester Tunnel, located in Dorchester Avenue, between Old Colony Avenue and Woodward Street and is about 2200 ft. long. The structure is to be mainly of reinforced concrete and consists of a single-span double-track tunnel, to be built by the cut and cover method. The work also includes a pump well, an emergency exit and sewer changes. Specifications and forms of contract can be obtained at 15 Beacon Street, ninth floor. The right to reject any and all bids and to award the contract as is deemed to be for the best interest of the city of Boston is reserved.

United Railways, St. Louis, Mo.—This company is asked to consider plans to extend its lines along Tamm Avenue in St. Louis to Art Hill, in Forest Park.

International Railway, Buffalo, N. Y.—As soon as the legal preliminaries in connection with the construction of this company's line between Niagara Falls and Buffalo, permission for which was granted by the Public Service Commission recently, are concluded and the $2,395,000 bond issue floated, actual construction work will begin. This will probably be early in the spring. The company has yet to obtain permission of the State Canal Commission to bridge the Erie canal at Tonawanda, arrange with the New York Central and the Erie for crossing the tracks of the steam roads and obtain a few consents. While items for the construction of new carhouses at the Falls and stations along the line are included in the estimated cost of the line authorized by the Public Service Commission, the company has not yet definitely decided upon the exact location of these buildings. This is a matter that probably will not be decided upon until actual construction work is well under way.

Black River Traction Company, Watertown, N. Y.—Plans are being contemplated by this company to re-track its line on the Public Square in Watertown during the summer.

Cleveland (Ohio) Railway.—This company is asked to consider plans for an extension of the West Madison Avenue electric line from West 117th Street to Riverside Avenue, Lakewood. Other extensions and betterments of its lines in Cleveland are being contemplated.

Conneaut, Kingsville & Ashtabula Railway, Kingsville, Ohio.—Surveys have been completed by this company on its 14-mile line between Conneaut and Ashtabula. It has not been decided when construction will be begun. W. E. Hawley, Kingsville, president. [E. R. J., Oct. 26, '12.]

Ohio Valley Traction Company, Portsmouth, Ohio.—Right-of-way has been received by this company through eight pieces of property in Porter. Plans are being considered by this company to build its 23-mile extension from Sciotoville to Ironton within the next few months.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—Plans are being made by this company to build an extension in Portsmouth.

Muskogee (Okla.) Electric Traction Company.—It is reported that R. D. Long, general manager of this company, plans to build an electric railway between Muskogee and Drumright.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—An interurban line 130 miles long and connecting Columbus and Galena in southeastern Kansas with northern and central Oklahoma and Oklahoma City, will be begun this spring, according to John R. Rose, Oklahoma, president of this company. Mr. Rose put his proposal to the commercial clubs of the cities affected at a meeting recently. The cities represented were Columbus, Galena and Baxter Springs, Kan., and Commerce and Miami, Okla. Interurban lines already extend as far south as Columbus and Galena, and the representatives of the commercial clubs expressed the belief that the cities would co-operate to obtain the right-of-way and the money that has been asked for the line.

Sand Springs Interurban Railway, Tulsa, Okla.—It is reported that this company plans to build an extension this summer to Owasso Lake, north of Owasso, and that the new line will enter Tulsa over the tracks of the Sand Springs Railway, which would save the construction of 10 miles of new track.

Hamilton, Ont.—In order to improve the present railway service in Hamilton, Mayor Walters has suggested the construction of a crosstown line from the new Burlington Street line to Barton and King Streets, the tracks to be laid on Wentworth Street in Hamilton. Mayor Walters and the Board of Control were told by representatives of the Hamilton Street Railway on Jan. 26 that no railway extensions or important improvements could be thought of until the present war was over. Industrial and financial conditions made it impossible.

Kirkton, Ont.—It is reported that the Hydro-Electric authorities in Kirkton have agreed to the resolutions approving of the construction of a hydro-radial line in Kirkton, and also a hydro-radial line to connect London and Stratford, via St. Mary's.

London & Port Stanley Railway, London, Ont.—This company has completed the reconstruction of its track and roadbed on the line between London and Port Stanley and will proceed at once with the erection of the overhead construction.

Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.—Work will be begun in the spring by this company on the Perth to Smith Falls section of the electric railway which is making a belt 300 miles in length in Eastern Ontario. E. Malone, chief engineer. [E. R. J., Dec. 12, '14.]

Toronto, Ont.—Another step was taken on Feb. 4 toward a start upon the Toronto-Port Perry Hydro Radial Railway when the Hydro-Electric Power Commission of Ontario forwarded to the Provincial Government for approval the by-laws and contracts of eleven municipalities in the radial zone which have voted in favor of the establishment of a radial service. The contracts were from Scarboro, Markham, Pickering, Stouffville, Port Perry, Whitby town and township, Uxbridge and Whitchurch. As the system now stands it will comprise 94 miles of track. Two matters of importance have yet to be dealt with before work can be begun on the line. The entrance to Toronto must be agreed upon and will be taken up in the consideration of the general transportation question in Toronto. The other matter yet to be settled is that of a Federal subsidy to aid in the construction.

Toronto, Ont.—Ratepayers in Rosedale will seek legislation to compel the construction of an electric railway loop around Rosedale.

Toronto, Ont.—The city will oppose the application to the Ontario Legislature of the Forest Hill Electric Railway for an extension of its contract. The company's original bill gave them until December, 1913, to expend $50,000 in construction. An amendment extended the time to December, 1914, and now the company is asking until December, 1915. All that has been done up to the present is some grading work on Forest Hill Road. The bill was put through in the face of strenuous opposition by the city.

Toronto & York Radial Railway, Toronto, Ont.—Plans are being considered by this company to build a double track line on Yonge Street, from the company's southerly terminals to the north limits of the city of Toronto.

***Klamath Falls, Ore.**—An electric railway is being planned from Eureka, Cal., up the coast to Requa, and thence up the Klamath River to Klamath Falls according to an announcement recently made. D. W. Hanson, president of the Eureka Development Association, Eureka, Cal., is interested.

***Chambersburg, Pa.**—Application for a charter will soon be made to build an electric railway to connect McConnellsburg and Fort Louden, a distance of 10 miles. Edward J. Post, D. H. Patterson and Herbert A. Duffy are among those interested.

***Monaca, Pa.**—It is reported that residents of Monaca, Pa., will organize a company to build an electric line from Monaca south to Coraopolis, about 20 miles. J. W. Reid, D. J. Mitchell, J. J. Allen and H. L. Grimmell, all of Monaca, are among those who are reported to be interested in the project.

Joplin & Pittsburgh Railway, Pittsburgh, Pa.—Plans are being considered by this company to build an extension of its line from Dunkirk, Kan., to Arcadia, Kan., via Hazen and other coal camps, probably within the next few months.

Pottstown & Phoenixville Railway, Pottstown, Pa.—This company has placed in operation its extension from Sanatoga Park to Linfield. Grading has been begun on the section between Linfield and Spring City.

Bristol (Tenn.) Traction Company. — This company has been asked to consider plans for an extension of its line from Big Creek into the Shady Valley section of Johnson County.

Jonesboro, Tenn.—In the interest of the project to connect Jonesboro and Johnson City, 7 miles distant, by an electric railway, Mayor A. S. Murray has appointed a committee composed of J. H. Epps, J. H. Anderson, R. M. May, A. L. Shipley and J. S. Pritchett to confer with representatives of Johnson City and the Tennessee Eastern Electric Company. Jonesboro has voted bonds of $25,000 to further the project, and it is proposed that Johnson City issue an equal amount and that the electric company make up the remainder. Six miles of railway would be necessary to connect with the Johnson City line, and it is estimated that construction and equipment would cost from $75,000 to $100,000.

Portland, Vancouver & Northern Railway, Vancouver, Wash.—Surveys have been begun to determine the most practicable route for an electric line in Vancouver to extend east of Garrison, to be constructed by this company. [E. R. J., Feb. 6, '15.]

SHOPS AND BUILDINGS

Puget Sound Traction, Light & Power Company, Seattle, Wash.—A lease for a term of years of the entire eighth floor of the new Stuart building at Fourth and University Streets, owned by the Metropolitan Building Company, has been made to the Puget Sound Traction, Light & Power Company, whose offices, long located in the Pioneer Building at First and Yesler Streets, will be removed to the new quarters at once.

POWER HOUSES AND SUBSTATIONS

Pacific Gas & Electric Company, San Francisco, Cal.—The contract between this company and the Great Western Power Company, whereby the latter supplies the former company with electric power, has been renewed for eighteen months.

Holyoke (Mass.) Street Railway.—This company is increasing the capacity of its Berkshire Street plant.

Manufactures and Supplies

ROLLING STOCK

Warren-Bisbee Railway, Warren, Ariz., during 1915 will probably purchase two closed cars.

Gary, Hobart & Eastern Traction Company, Hobart, Ind., will purchase two interurban and one baggage and express car during 1915.

Charles City-Western Railway, Charles City, Ia., expects to purchase two interurban cars, one electric locomotive and three city cars during 1915.

Manhattan City & Interurban Railway, Manhattan, Kan., expects to purchase several trailers and good single-truck motor cars during 1915.

Charleston-Dunbar Traction Company, Charleston, W. Va., expects to purchase one motor express car and one electric locomotive during 1915.

Kansas City, Clay County & St. Joseph Railway Company, Kansas City, Mo., has ordered five all-steel cars from the Cincinnati Car Company. The cars will have a seating capacity of 68; length over all, 59 ft.; length over body, 58 ft.; length of smoking compartment, 14 ft. 8 in.; extreme width, 9 ft.; truck centers, 37 ft.; dia. of wheels, 36 in.; wheelbase, 7 ft.; width of seats, 40 in.; width of aisle, 22 in. The specifications call for a center entrance arranged somewhat along the lines used on this company's present center-entrance equipment, except that the smoking compartment will be smaller. This is accomplished by an additional partition separating one-half of the car into smoker and passenger compartments. The equipment will include four 100-hp motors; air brakes, both automatic and straight. The seats will be of the Hale & Kilburn type with those in the passenger compartment upholstered in green plush, while those in the smoking compartment will be covered with a black fabrikoid. The interior finish of the car body will be mahogany, and all windows will be fitted with storm sashes. The ceilings of the car body are to be of steel with no covering, so that the carlines are exposed. Heat and ventilation are furnished by Peter Smith heaters and sixteen 8-in. Railway Utility ventilators.

Interborough Rapid Transit Company, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9, 1915, as having ordered twelve all-steel subway cars from the Pressed Steel Car Company, has specified the following details for this equipment:

Date of delivery, about May 1
Length over body corner posts...........39 ft. 4 in.
Length over draw-bars, 51 ft. 4 in.
Width over side sills 8 ft. 6¾ in.
Width over window sills 8 ft. 10 1/16 in.
Bolster centers, length, 36 ft.
Interior trim ....steel
Roof .... monitor
Air brakes, Westinghouse automatic
Axles...ry. std., heat treated
Bumpers, Hedley anti-climber
Car trimmings...Aero metal
Control, 6 West., type A B F
6 G. E., type PC
Couplers, West. automatic, car, air & electric
Curtain fixtures, Cur. Sup. Co.
Curtain material...Pantasote
Gears and pinions, stub-tooth, oil-tempered
Hand brakes....geared type
Journal boxes........ry. std.
Motors,
Two 100 hp, field control
6 equipments, West. 302-F2
6 equipments, G.E. 240-C
Seats, Hale & Kilburn, rattan
Springs....Std. Steel Works
Trucks, Hedley cast steel frame type, built by Brill
Wheels.....solid rolled steel

TRADE NOTES

Asbestos Protected Metal Company, Pittsburgh, Pa., has removed its head office from Beaver Falls to the First National Bank Building, Pittsburgh, Pa.

Cambria Steel Company, Philadelphia, Pa., will appoint C. B. McElhany, who has been assistant general manager of sales, to the position of general manager of sales, succeeding J. Leonard Replogle.

Cement-Gun Construction Company, Chicago, Ill., has received a contract to encase all the structural steel work on the new power house now being erected by the Ford Motor Company at its Detroit factory.

Murphy Varnish Company, Newark, N. J., at a meeting of its board of directors on Jan. 12 created the office of chairman of the board and appointed Franklyn Murphy to that position. Franklyn Murphy, Jr., was appointed to succeed his father as president of the company. John J. Nicholson succeeds Mr. Murphy, Jr., as vice-president. The office of second vice-president was abolished.

J. Leonard Replogle, vice-president and general manager of sales of the Cambria Steel Company, with headquarters in Philadelphia, has terminated, by resignation effective March 1, 1915, a connection of twenty-six years with that company and will become vice-president and general manager of sales of the American Vanadium Company. His new headquarters will be at both New York and Pittsburgh.

Titan Storage Battery Company, Newark, N. J., owing to the existence of a battery jar marketed under the name "Titan" and the fact that any battery using these jars might appear as a Titan battery, has changed its name to the General Lead Batteries Company. No change whatever in ownership, officers or policy is involved. The change is made entirely to avoid confusion.

Industrial Works, Bay City, Mich., has added to its extensive line of locomotive and wrecking cranes, a small locomotive bucket crane operated by a gasoline engine. This crane is especially adapted for light or intermittent work, such as handling coal, ashes, etc., or for service in places where the use of steam is objectionable. A crane of this type has a further advantage in that it is always available for immediate use without waiting to get up steam. In operation it should be very economical as there is no waste of fuel when the crane is not actually working.

Union Switch & Signal Company, Swissvale, Pa., has appointed Thomas S. Grubbs, auditor and secretary of the Westinghouse Machine Company, as secretary and assistant treasurer. George F. White, of the Westinghouse Machine Company, has been appointed assistant secretary of the signal company. Mr. Grubbs has been with the machine company for twenty-seven years and was one of the oldest employees, having previously been with the Philadelphia company which was owned by the Westinghouse interests. Mr. White has been with the machine company for the past eleven years.

Edison Storage Battery Company, Orange, N. J., has had a pleasant custom for several years, in common with other Edison interests, of celebrating in a quiet but loyal way, Feb. 11, the birthday of Mr. Edison. The custom, in which all of the employees of the Edison interests as well as a number of Mr. Edison's intimate friends participate, is to wear a small ribbon or button containing Mr. Edison's portrait in the left lapel of the coat. As Mr. Edison was born in 1847, he is sixty-eight years old this year. The *esprit de corps* of the Edison organization, which is always very strong, is intensified this year by the energy which the company and its distinguished chief have exhibited in rehabilitating the works after the fire a short time ago.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, reports shipments during the month of January to the following railway companies: Roanoke (Va.) Railway & Electric Company; Boston & Maine Railroad, North Adams, Mass.; Great Northern Railway, Cascade Tunnel, Wash.; Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; Scranton (Pa.) Railway; Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.; New York & Long Island Traction Company, Hempstead, L. I., N. Y.; Niles Car & Manufacturing Company, for new cars of East Liverpool Traction & Light Company; Cincinnati Car Company for new cars of Corpus Christi Street & Interurban Railway; Philadelphia & Western Railway, Upper Darby, Pa.; Wausau (Wis.) Street Railroad; Jamestown (N. Y.) Street Railway; Osgood-Bradley Car Company, for new cars of Richmond Light & Railroad Company; Empire United Railways, Syracuse, N. Y.; St. Petersburg & Gulf Railway, St. Petersburg, Fla.; Muskegon (Mich.) Traction & Lighting Company; San Antonio (Tex.) Traction Company; Lincoln (Neb.) Traction Company; Texas City (Tex.) Street Railway; Central New York & Southern Railway Company, Ithaca, N. Y.; Altoona & Logan Valley Electric Railway; Des Moines (Ia.) City Railway.

Kennedy-Stroh Corporation, Pittsburgh, Pa., with a capitalization of approximately $2,500,000, has taken over all rights, processes and factories of the Kennedy Manufacturing & Engineering Company, New York, the Stroh Steel Hardening Process Company, the Lawrence Steel Casting Company and the Best Manufacturing Company, Pittsburgh, Pa. The corporation will operate as a main plant the factory at Oakmont, Pa., formerly operated by the Best Manufacturing Company, also the old Lawrence Steel Plant at Thirty-second Street and A. V. R. R., Pittsburgh, as the Lawrence department. The Kennedy line of mining, crushing, cement making and conveying machinery is one of the most extensive of American manufacture. The Stroh steel hardening process is a method of casting two kinds of steel in one solid casting in such a manner that the hard alloy comes on, and only on, the parts which are subjected to wear. The Lawrence Steel Casting Company, which was established in 1883, is one of the first concerns of its kind in the Pittsburgh district, and is well known. The Best Manufacturing Company has been manufacturing a line of power piping flanges, fittings and valves for thirty years and has made some of the largest piping installations in service in the United States. W. H. Schoen, formerly connected with the Schoen Pressed Steel Company, now the Pressed Steel Car Company, is president of the new corporation and will be the active business head. J. E. Kennedy, who is vice-president and chief engineer, has been well known as a designer of mining and other machinery for more than twenty years. J. L. Kendall, of the Kendall Lumber Company and allied interests, is treasurer. J. D. Hiles, who has been connected with the Best Manufacturing Company for the past fourteen years, is secretary. W. Y. Stroh of the Stroh Steel Hardening Process Company, is general manager and metallurgist.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, has issued a folder describing and illustrating its O. B. trolley retriever.

American Veneer Company, Hoboken, N. J., has issued a folder describing its three-ply laminated wood headlining for railway and street cars. The headlinings are light and substantial and are supplied ready for installing in any required curve. They are furnished in the following woods: mahogany, quartered oak, birds-eye maple, white maple, sycamore, plain oak and poplar.

Terry Steam Turbine Company, Hartford, Conn., has issued a sixty-four page bulletin on the subject of centrifugal pumps. The bulletin gives details and data on various turbo-pump applications. The principles of operation and construction of the centrifugal pump are fully explained, as are the details of the steam turbines, which have been used during the past ten years for driving them. Because of the wide latitude of speed possible with the turbine the unit occupies a much smaller space than would be required for performing the same duty but driven by a reciprocating engine. The range of conditions in this service varies from large volumes of water pumped against low heads up to high head work. Special attention is directed to the reliability of these pumping units and freedom from shutdown owing to accidents, repairs or packing renewals.

Delta-Star Electric Company, Chicago, Ill., has issued Bulletin No. 15, which describes and contains 188 illustrations of its "unit type" high-tension indoor equipment, including switches, fuses, choke coils and entrances. These insulators are said to eliminate the disadvantages and embody the good points of both pillar and post types, in that the top and bottom fittings are adjustable, detachable and occupy minimum space. The unity type insulator consists of a corrugated pillar, each end having a socket, into which is "key cemented" a threaded malleable iron thimble. By means of standard bolts any desired fitting can be secured to an insulator unit. "Key cementing" thimbles into the insulator ends to receive fittings rather than clamping fittings around the outside maintains a maximum creepage distance between live parts and ground. The voltage ratings conform to the standard commercial pressure of 6600, 13,200 and 22,000 volts. At the end of the bulletin is a technical data section, containing a number of useful tables essential for reference in dealing with busbar operation. This company has also issued Bulletin No. 20, which describes its high-capacity outdoor substation high-voltage equipment, including pole-top air-brake switches and S. & C. lightning arresters.

Electric Railway Journal

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THE STATUS OF THE ENGINEER

It was a notable group of engineers that gathered on the auditorium platform at the home of the United Engineering Societies in New York last Wednesday evening to define the status of the engineer and to suggest means for improving it. The group included the presidents of two great electrical manufacturing companies, a chief telephone engineer and four past presidents of the electrical, civil and mechanical national societies, all prominent in their respective fields and two of them also as educators. Surely the composite picture drawn by these men without collaboration ought to be worth more than a passing glance. To epitomize our impressions of the picture it can be said first that the engineer as a man is more important than the engineer as a technician. It was clearly shown that the nature of engineering compels accuracy and honesty in all technical matters and this fact produces the same qualities in the engineer's character; that no amount of specious argument can offset the inexorable test of the laws of nature. But the status, or reputation of the engineer depends partly upon his personal qualities, largely inherited, and partly upon his activity in taking a practical interest in the large problems of his community and his profession. To be of benefit to the auditor a pronouncement like that of the A. I. E. E. symposium must suggest action. The practicable and desirable thing for the conscientious engineer to do is, by introspection, to determine whether or not he is doing what he can personally to enhance the reputation of the profession as a body of effective citizens and then to map out his course by the result.

REGULATION FOR THE JITNEY BUS

One feature of the jitney bus situation that stands out above all others is the need for regulation. Primarily the new conveyance aims only at competition with the much-regulated street railway for the cream of its traffic—a fact borne out by the naïve testimony of a jitney operator in one of the western cities to the effect that he couldn't operate on streets other than those occupied by railway tracks because he could keep his car full only by picking up groups of people who were waiting for the street cars. From the standpoint of ethics it is manifestly impossible to enforce the principle of regulation for the electric railway and to permit its competitor to go free of all restraint. Unfortunately, however, ethics are frequently a poor basis for argument, and regulation of the jitney, at least during its early stages, will probably come about not so much through a spirit of fair play as through the realization by the affected cities that the advent of the unrestricted jitney involves more direct dangers to the community than the abandonment of outlying and unprofitable electric railway lines. Already reports of extreme vehicular congestion are heard from the western towns where appreciable numbers of jitneys are operating, and fatalities to pedestrians struck by the recklessly driven vehicles have brought home generally the need for imposing responsibility by means of indemnity bonds. This matter is a serious one for every citizen to consider. If a man is injured while on the public thoroughfares he can look for damages only to the owner of the vehicle that hits him, and if the owner's only asset is a second-hand automobile, the victim is not likely to be well compensated. This is a point which might well be emphasized in communities where the advent of the jitney has been hailed as a complete solution for the transportation problem. Another is that, to the jitney, a schedule has not even the value of a "scrap of paper," one driver admitting with perfect frankness that he never completed his advertised route in rush-hours because it wasn't profitable.

WORDING OF NOTICES TO THE PUBLIC

The use of public notices on railway property is essential to safe and expeditious service. The wording of these often leaves much to be desired. "This way out," "Leave by the front door," "Keep to the right," etc., do not necessarily indicate curtness in the attitude of the management, but patrons would be better pleased, unconsciously perhaps, if the signs were more diplomatically worded. If brevity is sought a simple notice, "Entrance" or "Exit," answers the same purpose and cannot offend the most peevish passenger. The liberal use of the word "please" in the proper places involves little extra cost for lettering and is an effective lubricant in eliminating friction in the contact between management and public. The term "proper places" was used advisedly above. There are signboards upon which it would be out of place or incongruous. "Look out for the locomotive" is none too curt to startle the heedless pedestrian—it suggests the imperativeness of appropriate action. "Watch your step" would be weakened by "politeness." The criterion for notice wording appears to be this: Where the patron is asked to do a favor for the convenience of the company and his fellows a notice should be phrased much as a verbal request would be, with due allowance for brevity. Where the favor is to the passenger, particularly if it relates to his safety, the wording should be chosen primarily on the basis of securing attention. Harshness in an automobile horn is justified, but there are places where deference is preferable to emphasis.

THE COMPANY SECTION AND INDIVIDUALISM We have discussed various phases of the company-section movement, but one point which has not been mentioned is the development of the individual employee. After such a section has been organized, experience shows that a great many surprises in the form of latent ability will be discovered, the reason being that hitherto there had been no channel through which it could express itself. In a large industry like electric traction in this country, it is of the utmost importance that the prudent managers or department heads surround themselves with efficient assistants. Moreover, these understudies should be selected from the ranks rather than from outside sources, because of the moral effect such a plan will produce. Some railways have been averse to publicity in any form, and this policy has tended to suppress individualism among the employees. But the company-section movement encourages these employees, especially among the younger men, who have ideas which may be of help to the company, to demonstrate their ability to solve difficult service problems. Many instances, no doubt, can be recalled where employees have shown an inaptitude for certain work, but a change in their duties has revealed unlimited capacity. The broad policy of showing no favoritism in the company-section work is also certain to result in improvement in the personnel of any organization. Other opportunities assisting in this development present themselves from time to time, and the individual employee should be encouraged by and under the direction of his superior to take advantage of every occasion.

SUGGESTED CHANGES IN THE CODE

An extended discussion of the code of principles, written by Oscar T. Crosby, is published elsewhere in this issue in the form of a letter to the editors. Although we do not agree with all of the author's contentions, we are glad to give space to this communication, partly because of Mr. Crosby's attainments and service in the field, and partly because we consider with Mr. Crosby that the JOURNAL should be the forum where those who wish to better the conditions in the industry should have an opportunity to express their views, whether or not these views coincide with those of the editors. Again, some of the changes suggested by Mr. Crosby, perhaps all of them, may have occurred to others, and it is well to have expression given to them so that they can be analyzed and discussed. Before taking up the suggestions in detail, however, it is well to state that in the present code, as we understand it, brevity was considered one of the essentials. The purposes for which it was intended necessitated that it should be kept within small compass. This made it impossible for the committee to expand on any of the principles and give the reasons for the wording used.

Mr. Crosby's objections to the code are principally on two points. The first of these is in regard to the return which a public utility should be allowed to earn. The second is in regard to labor disputes. These two points will be considered in their order.

The code says that in an appraisal of an electric railway for the purpose of determining reasonable rates all methods of valuation should have due consideration. This means, as Mr. McCarter explained in our issue of Nov. 7, a consideration of the investment, the reproduction cost new, the amount and market value of the stocks and bonds, the going concern value and all intangible elements which have served to bring the physical property and the business of the company to its present state of development. After this is done, and the rate for service to give a fair return on the value so obtained, all things considered, is found to be abnormally high, it may properly be reduced, but if found to be abnormally low it should be raised. Mr. Crosby, on the other hand, believes that where a specific charge for service has been agreed to, the railway and the public should stand or fall by that. Where no specific service charge appears in the contract, he says: "The investor is not to be forced into loss by arbitrary exercise of power in fixing rates."

The discussion, therefore, centers largely, as we understand it, on the case where there is a specific charge for service, such as exists on most city lines. Is it for the benefit of the public and the public utility that this rate should be always fixed, for eternity in the case of a perpetual franchise, or should either side under restrictions be able to petition for a change in the rate? Again, are there not precedents to show that the public, acting through the legislature or other authoritative body, will reduce rates for public utility service when they are abnormally high? If this is being done where the rates are high, or are considered to be so by the public, should not the public utility make the claim that the opposite should prevail and its rates should be increased when they are abnormally low?

The idea of a flexible charge for public utility service, depending on the rate of return earned by the public utility and the quality of service, is comparatively new, and the argument has been made that it is theoretically unsound because it is equivalent to a guaranteed return on the capitalization of the public utility, irrespective of the quality of its management. We think this claim is incorrect. But if the state is to exercise authority over rates for service, as it seems disposed to do and practically has to do on account of the monopolistic character of public utility service, it can take into consideration the questions of management, capitalization, return requisite to attract new capital, etc., in establishing its service rates. Under such a system there would be fewer bonanzas and fewer bankruptcies among public utilities than under the "common law" system of free competition and rates which the traffic will bear. But for good or evil, the former times when the public utilities could be conducted with the same freedom from restraint as a private business have passed. The present plan of state control of rates and service may not be the ideal system, but it at least is better for the community as well as the companies than municipal ownership, which seems now practically the only alternative. For these reasons we prefer the thought as expressed in the code on this point to Mr. Crosby's proposed substitute.

Let us pass now to the criticism of Mr. Crosby upon the seventh principle, which is the one on labor. We think that there is a difference in meaning which is an essential one between the principle as it appears in the code and the wording suggested by Mr. Crosby. Mr. Crosby's principle reads: "Electric railway companies, being public servants regulated by public authorities, should be protected from all forms of violence or intimidation during strikes." This, of course, is entirely proper, but protection against violence or intimidation is a kind of protection to which every employer of labor is entitled. The code goes further than this and says that owing to its public character an electric railway company is entitled to something more, just what it does not state, but this added protection may be simply a sympathetic public opinion. As Mr. McCarter said in his article in our issue for November 7, "a strike among the employees of such a railway company should be regarded with as much public disfavor as a strike in the police department of the municipality." Owing to the public character of his services the railway employee should recognize a duty to the public as well as to his employer and take a justifiable pride in it. As it reads, the code does not require the service to be put upon a military basis nor does it recommend any interference with an employee's freedom to stop work in a reasonable manner.

Mr. Crosby concludes his letter with the suggestion that before any changes are introduced in the code an endeavor should be made to interest other public utilities in the adoption of a standard set of principles applying to all. To this proposal that the other classes of utilities should co-operate in formulating the "rules of the game," as described by President Wilson, there can be no dissent. Such a plan should greatly help in clarifying public opinion in this important matter. But as the electric railway companies have formulated a code applicable in principle to any class of utility and as none of the other interests has drafted any similar statement, so far as we know, it seems to us that the present electric railway code could well be used as a basis for such a standard code, or even adopted in toto, with such changes in wording as are required to make it apply to public utilities in general.

A RATIONAL UNIT FOR STEAM BOILER RATING

Our esteemed contemporary, *Power*, has taken rather an iconoclastic stand in regard to the method of rating boilers which has been recently suggested by *The Locomotive*, whereby the anomalous "boiler horse-power" may be replaced by the more rational unit, heating surface. Of course, every one admits the inadequacy of the boiler horse-power as a convenient or even intelligible term. In fact, it was admittedly misnamed when it was originated some forty years ago as an arbitrary basis for comparison in the famous boiler tests at the Centennial Exposition, and it has held on, in spite of its limitations, merely because of the lack of attention that has been devoted to getting something better.

Apparently the difficulty that stands in the way of any change is the fact that the boiler instead of the furnace is almost invariably considered as the productive unit. The very acceptance of a unit of boiler output on a power basis shows that fact beyond a doubt, and it is obvious that in the minds of engineers generally the true meanings of the terms boiler, heating surface, and furnace are inextricably confused. For example, take the case of the description of a plant with 300-hp boilers, as cited by our contemporary, and assume that the data about the so-called boiler output are worth mentioning. If the plant has a 150-ft. stack and Roney stokers, each boiler will do well to make 9000 lb. of steam per hour, but if forced-draft, underfeed stokers are installed under the same boilers, is there any doubt that each can evaporate 27,000 lb. of water? Just what difference does the size of the boiler make, except to a boiler expert? Is not the stoker the important feature? Here is a case where the same boiler might have two perfectly legitimate but widely different ratings if the fallacy of measuring boiler output is persisted in. How much simpler it would be to rate the stokers!

As a matter of fact, the ultimate ability of boiler heating surface to transfer heat has not even been approached in stationary practice, and within limits that are far beyond anything that is now considered permissible, the whole matter of output and practically the whole matter of economy rests directly upon the furnace or stoker. Before the recent years of scientific stoker operation we were all obsessed with the idea that the extent of heating surface had a vast influence upon economy, but now that the principle of reduced excess air is understood, it is recognized that the admission of a few more pounds of air than are needed to burn the coal will have far more influence upon the coal pile than any reasonable increase in the rate of driving.

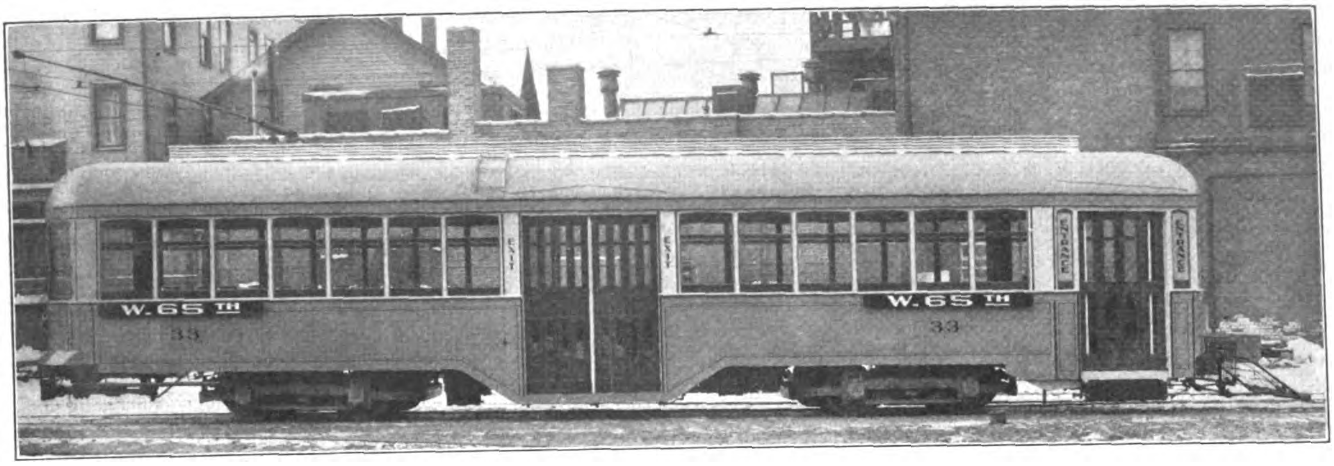
The heating surface—a term which is frequently considered to be synonymous with "boiler"—is merely a means for transmitting the energy, or heat that is liberated by the stoker, into a form that is available for use. It would be quite as reasonable to rate steam piping on a horse-power basis as it is to speak of boiler output in terms of horse-power, unless, perchance, the term boiler was intended to mean furnace. The piping transmits heat in the form of steam between the water in the boiler and the prime mover, and the duty of the heating surface is no whit different in principle when it transfers heat between the furnace and the water.

When a boiler is bought, the purchaser gets heating surface, which is nothing but a means for heat transfer, and what he obtains from this heating surface in the way of heat transferred will depend solely upon himself. If he is up to date he will use the boiler in connection with a modern stoker and will get 10 lb. of steam or more from each square foot. If he is somewhat behind the procession he will only get 3 lb. Manifestly the measure by which he should buy is heating surface, because that is the practical measure of the cost of boiler construction.

Front Entrance, Center-Exit Car for Cleveland

This New Semi-Steel Car, Which Is Designed Especially for Crosstown Service, Combines the Principles of the Near-Side and Center-Entrance Types, and also the Pay-As-You-Leave and Pay-As-You-Enter Systems of Fare Collection

The most recent experiment in car-body arrangement is the Cleveland Railway's new combination near-side-entrance, center-exit, pay-as-you-leave car for crosstown line service. In this car there are longitudinal seats in the front half of the body, and the fare box is located beside the center-exit doors, so that the front entrance loading area embraces practically one-half of the car body in addition to the vestibule. Practically speaking, the arrangement is expected to permit loading the maximum number of passengers found at any transfer point without the delay incident to collecting fares on the platform. At the same time the usual jostling of ingoing and outgoing passengers on center-entrance cars is eliminated, while the center-exit assures quick alighting. Loading at the front end also is advantageous, because the boarding passengers are under the surveillance of the motorman.



CLEVELAND CROSSTOWN CAR—GENERAL VIEW OF CAR

DIMENSIONS AND WEIGHTS OF CLEVELAND CAR	
Length over bumpers	51 ft. 1 5/16 in.
Length over corner posts	40 ft. 4¾ in.
Truck centers	2[illegible] ft. 1 in.
Wheelbase	4 ft. 10 in.
Floor to rail	32 in.
Width over side plates	8 ft. 2 in.
Width over belt rail	8 ft. 4¾ in.
Height inside	8 ft.
Height of exit doors	7 ft. 2¾ in.
Height of entrance doors	6 ft. 4¾ in.
Step heights front vestibule	12—11—9 in.
Step heights center entrance	12¾—9⅝—9⅝ in.
Passengers seated in summer	56
Passengers seated in winter	55
Passengers standing	77
Total passenger load	133
Weight of body with accessories	27,590 lb.
Trucks	5,300 lb.
Air-brake equipment	1,826 lb.
Motors	9,600 lb.
Control	1,300 lb.
Total weight completely equipped	45,616 lb.

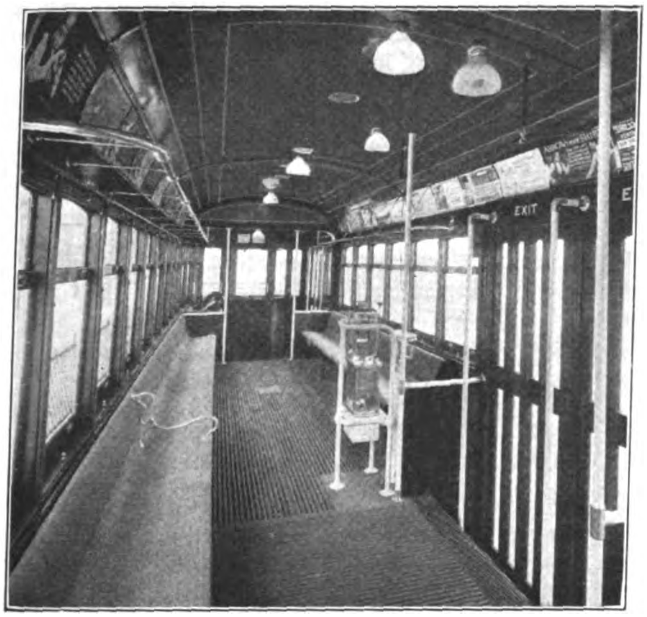
The car was designed especially for crosstown-line service, and if the experiment proves successful other cars of this type will be built in the near future. The necessity for it is found in the fact that, in Cleveland, some of the crosstown lines intersect as many as twelve main trunk lines within a distance of less than 3 miles, and this makes transferring passengers the principal business of the crosstown lines. The character of this service involves the movement of a large number of passengers at each transfer point, and it is important that they should be encouraged to move quickly.

Since all stops on crosstown lines are on the near side, the reason for the adoption of the front-end entrance is obvious. Past experience also has shown that, even with the roomy platforms as are used on Cleveland cars, the number of transfer passengers picked up at any intersection is so large that they cannot be handled without considerable delay. However, with the enlarged loading area provided by the pay-as-you-leave system that is applied to the front half of the new car, it is believed that this delay will be obviated.

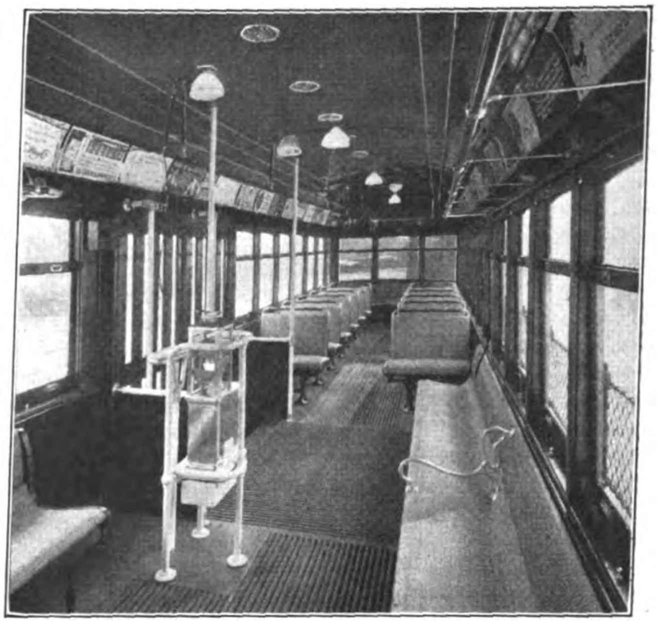
FEATURES OF DESIGN

The new car, like most cars in Cleveland, is equipped for single-end operation. Its construction is semi-steel, and it is practically similar to that of the Cleveland center-entrance motor cars, which were described in the

CLEVELAND CROSSTOWN CAR—VIEW OF CENTER EXIT



CLEVELAND CROSSTOWN CAR—INTERIOR VIEW LOOKING TO FRONT PLATFORM



CLEVELAND CROSSTOWN CAR—INTERIOR VIEW LOOKING TO REAR

ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, on page 455, the only modifications being to make the body floor continuous from the front to the rear by the elimination of the center-entrance well and to provide for a front platform. The table on the opposite page gives general dimensions and weights.

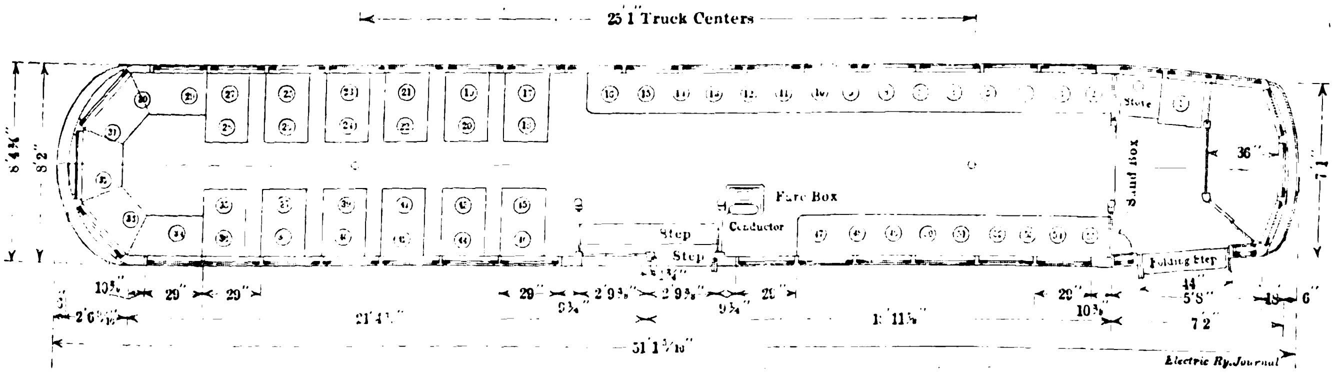
The clear width of the front entrance with the folding doors open is approximately 40 in., and this is sufficient to permit two passengers abreast to board at one time. Stanchions flanking each side of this opening are installed to encourage the rapid movement of passengers in boarding the car. The 10-in. step from the front platform to the car body floor is flanked by two pipe stanchions which, in addition, protect the feet of passengers seated on the longitudinal seats. All pipe stanchions are white enameled.

The clear width of each of the two center-exit doors is 33⅜ in. Stanchions on each side of this opening and one at the center are installed on the second step, while two more stanchions are located inside the car. Two-leaf folding doors are used instead of the sliding doors employed on the Cleveland center-entrance motor cars. In the open position these occupy a portion of the available entrance and exit width, but the clear openings are still ample for the free movement of passengers. At the same time the use of this style of door eliminates the usual complications incident to providing sliding-door pockets in the side of the car, which, in the center-entrance motor car, were in the panel separating the two door openings. In the new car, of course, the panel between the center doors is unnecessary.

Seats for fifty-six passengers are provided in summer and for fifty-five in winter, two of these occupying space immediately to the rear of the motorman's cab on the front platform. In winter one of the platform seats is removed, the space being occupied by a Peter Smith heater. The motorman is inclosed in a small cab with windows on all sides. Partly as a means for getting passengers to occupy the rear of the car twelve cross-seats and a semicircular seat in the rear vestibule were provided, as it was believed that the passengers would avail themselves of vacant seats in the rear end of the car before the longitudinal seats would be occupied.

METHOD OF COLLECTING FARES

All passengers availing themselves of the seats in the rear of the car pay their fares as they move by the conductor's stand. Passengers remaining in the front half of the car and occupying the longitudinal seats, however, are not required to pay their fares until they approach the center-exit doors to alight. In consequence, all the advantage of the center-entrance car in shortening the movements of alighting passengers is afforded, and an increased loading area is provided, thus tending to eliminate congestion incident to collecting fares at the entrance. A hand-rail, in place of the usual hand-straps, has been provided at a convenient height over the longitudinal seats in the front half of the car body. The brackets supporting the hand-rail, as well as the other car hardware, are made of Aero metal—a new light-weight, high-strength alloy which recently has been placed on the market by the Garford Engineering Company, Elyria, Ohio, through its selling agents, the Ellcon Company, New York.



CLEVELAND CROSSTOWN CAR—SEATING PLAN

EQUIPMENT

By a combination of the Peter Smith Heater Company's forced hot-air heater and the Scullin exhaust ventilator, which takes the form of a dummy monitor on the arch-roof car, with louvres along its sides and grated, circular ventilator openings in the car-body ceiling, ample ventilation is assured. The scheme of artificial illumination that is used is the result of exhaustive tests conducted by Mr. Scullin, being similar to that adopted for the Cleveland center-entrance motor cars. The lighting system includes five 92-watt Mazda lamps in series. These lamps are fitted with Alba shades and are mounted in the headlining along the center line of the car. A sixth, or spare, lamp is so connected with a selector switch that it can be instantly cut into the circuit in case of failure of any one of the five lamps regularly lighted. In addition to these lamps for general illumination, five 23-watt tungsten lamps are also used, one on the front platform, one over the fare-box, one in the headlight and two in the destination sign.

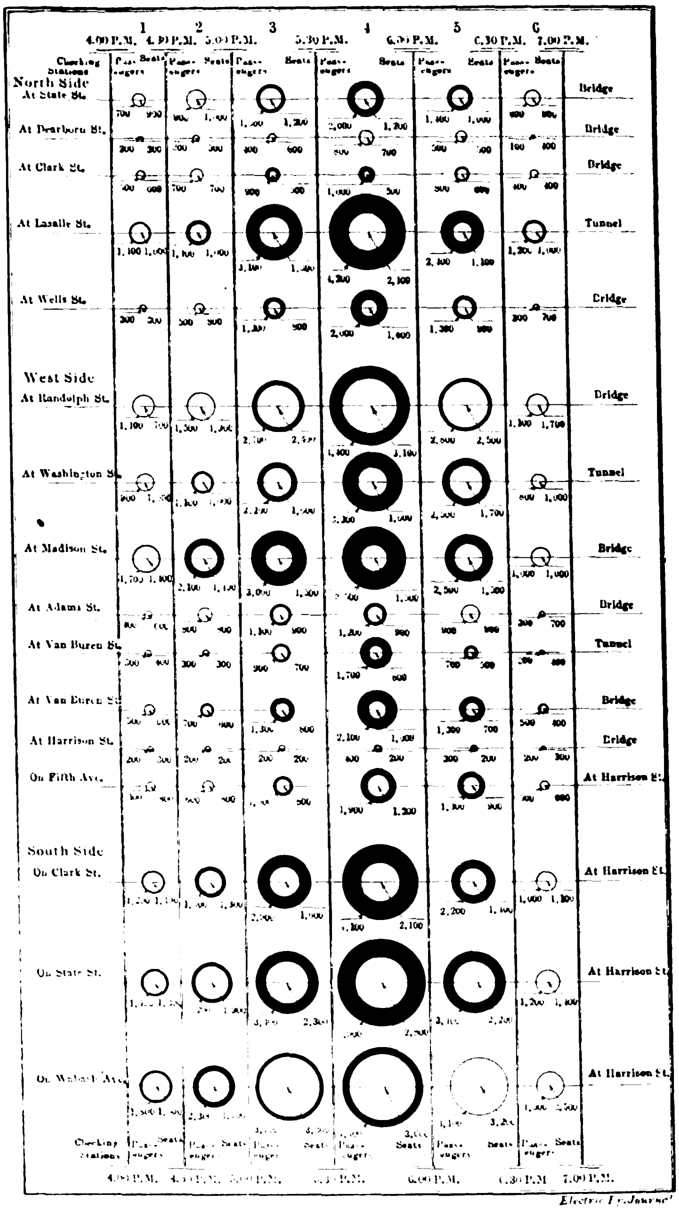
This car body is mounted on two Brill 51-E-1 trucks with 26-in. wheels. Each truck carries two Westinghouse, No. 340, 40-hp, 550-volt commutating-pole motors with PK control. This type of motor was selected because it was well adapted to low-floor cars where wheels smaller than 33 in. were used. The motor equipment is also exactly like that used on the center-entrance motor cars, but the adoption of the PK control is new, the advantages claimed for it being the removal from the car platform of all heavy current-carrying parts, thus eliminating controller burnouts and circuit-breaker flashes, and at the same time providing increased platform space through the use of a small master controller. It was described in full in the ELECTRIC RAILWAY JOURNAL for Nov. 28, 1914.

The novel combination of passenger-interchange facilities and fare-payment systems imbodied in the new car should be credited to Peter Witt, street railway commissioner, Cleveland. The experimental car itself was designed and built in the shops of the Cleveland Railway Company under the supervision of Terrance Scullin, master mechanic.

A Novel Service Record Chart

From time to time engineers making service checks are confronted with the problem of putting these checks in such form as to make them readily understandable to the layman. In its effort to accomplish this end, R. F. Kelker, Jr., in charge of the transportation bureau of Chicago's Department of Public Service, has devised a service record chart which at once indicates to the alderman the service condition existing at certain fixed points during certain periods of the day. As shown in the accompanying illustration of one of these charts, which was originally designed to show in a comparative form a record of the number of seats offered and the number of passengers on the car, the white space in the center of each ring represents the number of seats, and the black area surrounding it shows the number of passengers standing.

While this chart does not show the instantaneous peaks at any one period, it does indicate the average number of seats offered to the total number of passengers during any half hour between 4 o'clock p. m. and 7 o'clock p. m., which comprises the evening rush period. In addition to the diagrammatic indications, the actual number of seats offered and the total number of passengers carried are also shown in figures. The circles on each horizontal line show the condition at any single checking station for each of the half-hour periods, and the circles in the vertical columns show, comparatively, the character of service rendered in each period at each checking station. Many other interesting comparisons may be made from a study of this chart, such as the maximum number of passengers carried in the maximum half hour, the minimum number of passengers carried in the minimum half hour, the minimum and maximum traffic checking points, and as the comparative service offered at the different checking points.



NOVEL SERVICE RECORD CHART

C. A. Reynolds, chairman of the Public Service Commission of the State of Washington, has announced that the board will organize a department to handle all complaints relative to service. According to Mr. Reynolds, the distance between the city in which the complaint arises and the city in which the office of the commission is located frequently precludes the possibility of immediate attention. Complaint branches have already been established in Spokane, Everett, Seattle and Tacoma.

The Pueblo *Star-Journal* in a recent industrial edition devoted nearly a page to an illustrated description of the electrical and street railway properties of the Arkansas Valley Railway Light & Power Company which serves Pueblo, Colorado, the Cripple Creek mining district, Canon City and the Arkansas Valley agricultural district between Pueblo and La Junta.

Results Obtained by Instruction Department New York State Railways, Rochester Lines

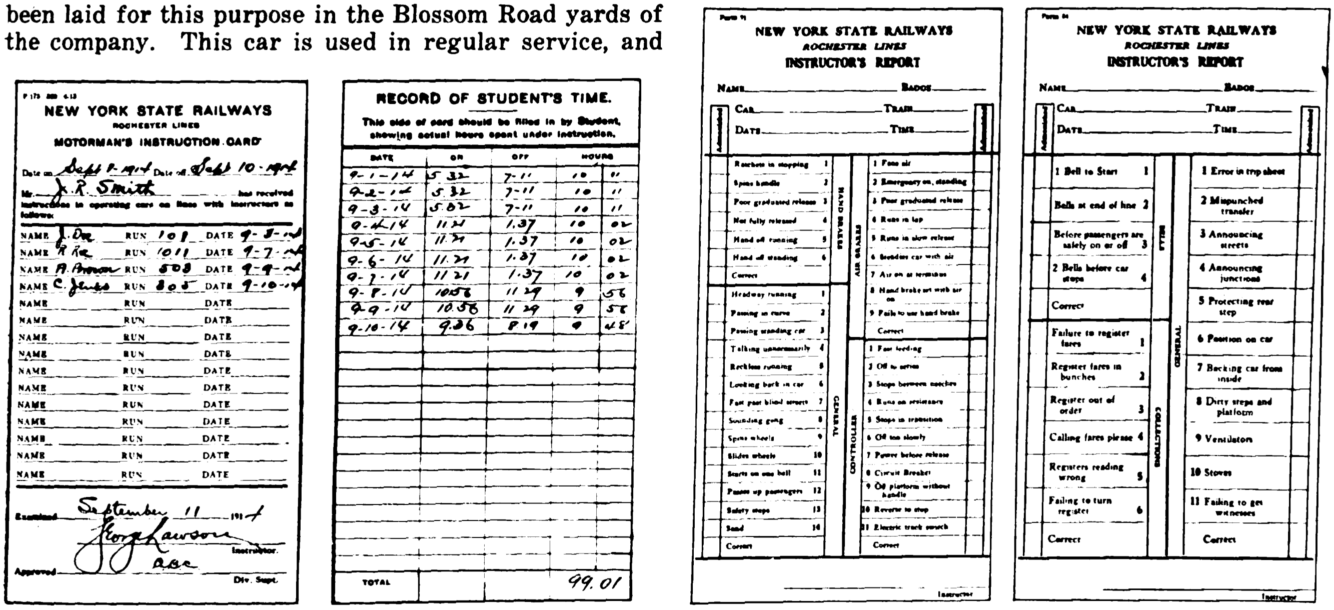
The Author Describes the Methods of Instruction Employed and the Remarkable Reduction in Number of Accidents Secured by Concentration of Effort on Instruction of New Platform Men

BY GEORGE LAWSON, SUPERVISOR EMPLOYMENT AND INSTRUCTION

A brief description of the instruction department of the New York State Railways, Rochester lines, appeared in the ELECTRIC RAILWAY JOURNAL for Dec. 2, 1913. The results obtained since July, 1913, are given in this article, with further details of the methods used in instructing and recording the work of new men.

INSTRUCTION METHODS

Men are employed for the train service between 8 a. m. and 10 a. m. daily except Saturday, by the supervisor of employment and instruction. After filling out the necessary application blanks, they are taken out on an instruction car operated over some 2000 ft. of track that has been laid for this purpose in the Blossom Road yards of the company. This car is used in regular service, and differs in no way from others of the same type except that it is equipped with an air brake in addition to the hand brake. Along the instruction track are found the usual signs used throughout the system, such as passenger stop, circuit breaker and safety stop signs, with which the student thus becomes familiar.



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NEW YORK STATE RAILWAYS
ROCHESTER LINES
MOTORMAN'S INSTRUCTION CARD

Date on Sept 1-1914 Date off Sept 10-1914

Mr. J. R. Smith has received instructions in operating cars on lines with instructors as follows:

NAME J. Doe	RUN 101	DATE 9-3-14
NAME R. Roe	RUN 1011	DATE 9-7-14
NAME A. Brown	RUN 503	DATE 9-9-14
NAME C. Jenks	RUN 805	DATE 9-10-14
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE
NAME	RUN	DATE

Examined September 11 1914

George Lawson Instructor.

Approved abc Div. Supt.

RECORD OF STUDENT'S TIME.

This side of card should be filled in by Student, showing actual hours spent under instruction.

DATE	ON	OFF	HOURS	
9-1-14	5 32	7-11	10	11
9-2-14	5.32	7-11	10	11
9-3-14	5.02	7-11	10	11
9-4-14	11.21	1.37	10	02
9-5-14	11.21	1.37	10	02
9-6-14	11.21	1.37	10	02
9-7-14	11 21	1.37	10	02
9-8-14	10.58	11 29	9	56
9-9-14	10.58	11 29	9	58
9-10-14	9.36	8.19	9	48
TOTAL			99.01	

Form 91

NEW YORK STATE RAILWAYS
ROCHESTER LINES
INSTRUCTOR'S REPORT

NAME ________ BADGE ________
CAR ________ TRAIN ________
DATE ________ TIME ________

Admonished			
	Ratchets in stopping	1	HAND BRAKES
	Spins handle	2	
	Poor graduated release	3	
	Not fully released	4	
	Hand off running	5	
	Hand off standing	6	
	Correct		
	Headway running	1	GENERAL
	Passing on curve	2	
	Passing standing car	3	
	Talking unnecessarily	4	
	Reckless running	5	
	Looking back in car	6	
	Fast past blind streets	7	
	Sounding gong	8	
	Spins wheels	9	
	Slides wheels	10	
	Starts on one bell	11	
	Passes up passengers	12	
	Safety stops	13	
	Sand	14	
	Correct		

		Admonished
AIR BRAKES	1 Fans air	
	2 Emergency on, standing	
	3 Poor graduated release	
	4 Runs in lap	
	5 Runs in slow release	
	6 Bumping car with air	
	7 Air on at terminus	
	8 Hand brake set with air on	
	9 Fails to use hand brake	
	Correct	
CONTROLLER	1 Fast feeding	
	2 Off to series	
	3 Stops between notches	
	4 Runs on resistance	
	5 Stops in transition	
	6 Off too slowly	
	7 Power before release	
	8 Circuit Breaker	
	9 Off platform without handle	
	10 Reverse to stop	
	11 Electric track switch	
	Correct	

________ Instructor

Form 84

NEW YORK STATE RAILWAYS
ROCHESTER LINES
INSTRUCTOR'S REPORT

NAME ________ BADGE ________
CAR ________ TRAIN ________
DATE ________ TIME ________

Admonished			
	1 Bell to Start	1	BELLS
	Bells at end of line	2	
	Before passengers are safely on or off	3	
	2 Bells before car stops	4	
	Correct		
	Failure to register fares	1	COLLECTIONS
	Register fares in bunches	2	
	Register out of order	3	
	Calling fares please	4	
	Registers reading wrong	5	
	Failing to turn register	6	
	Correct		

		Admonished
GENERAL	1 Error in trip sheet	
	2 Mispunched transfer	
	3 Announcing streets	
	4 Announcing junctions	
	5 Protecting rear step	
	6 Position on car	
	7 Backing car from inside	
	8 Dirty steps and platform	
	9 Ventilators	
	10 Stoves	
	11 Failing to get witnesses	
	Correct	

________ Instructor

NEW YORK STATE RAILWAYS—MOTORMAN'S INSTRUCTION CARD AND INSTRUCTOR'S REPORT

Students are given one or two hours' practice on this car under the supervision of the traveling instructors and are then sent to the company's doctor for medical examination. After passing the doctor they are sent to the divisions to which they have been assigned, where they present to the station master the instruction card shown in an accompanying illustration. On this card is kept the record of the men with whom the student breaks in on each line, and the number of hours of practice done each day. A list of instructing motormen and conductors is furnished to each station master by the supervisor of employment and instruction, by whom the time slips of the instructing trainmen are compared with the time entries on the students' cards before they are passed for payment.

Motormen are required to practice for ninety hours, and conductors seventy hours before reporting to the employment office for final instruction. The men report between 8 a. m. and 9 a. m., and read over the bulletin book while other men are being employed. This work is usually completed by 10 o'clock, and the men are then taken in hand and examined on their work and duties. Full instruction is given on accident reports, handling complaints from passengers, and conduct while in uniform, as well as explanation of the why and wherefore of the various rules. Suggestions are given as to how the work may be most easily and accurately done and how men may get work other than that provided by the extra board. New men are told of the irregular hours they will work while "bucking the list" and are advised to be regular in their habits to avoid sickness and depression. The writer has known men who were thoroughly discouraged to take an entirely different view of their work after one or two visits to the company's physician, whose services are furnished by the benefit association.

The final instruction occupies usually from one and a half to two hours; the shorter this can be made the better it is for the student and the company. More good can be done by impressing a few necessary and important details than by giving vague ideas on a number of points of minor importance.

During the first six months of his service, the new man is followed up by the traveling instructor, who corrects his faults and tries to impart the fine points of his duties that can only be learned by experience. The instructor makes a report on the forms shown in accompanying figures every time he rides with a student. In the column headed "Admonished" a punch mark denotes that the man has been in error on the subject opposite the punch mark, and that he has been instructed on this point. A punch mark outside this column would denote that he was in error but was not admonished. Such a report would be made, for instance, if the instructor noticed a man following his leader too closely, but did not have an opportunity at the time to warn him.

RECORDS AND RESULTS

The reports received from the instructor are entered on the men's record of instruction, on forms like those reproduced herewith, which are kept in the office of the supervisor of employment and instruction. On these records the reports are stamped in red ink in the appropriate column, the letter on the stamp showing by whom the report was made, and the horizontal line showing the date. If a man's work was correct under any general head, a green stamp is used instead of the red. It is, therefore, possible to tell at a glance what sort of a record any individual is making, and on what points he needs additional instruction.

The reports of accidents made out by men during their first six months of service are also sent to the instruction department. On the backs of the instruction record cards of the individual trainmen the records of these accidents are entered in columns headed as follows: On the back of the motorman's card are columns for date, claim number, collisions with vehicles, collisions with persons, rear-end collisions with cars, side-swipe with cars, derailments, open switches, injured on car, frightened horses, damage to company's property, controller trouble, heater trouble, grade crossing accidents and miscellaneous. On the back of the conductor's card are columns for date, claim number, alighting, boarding, fare trouble, injured on car, disturbance on car, damage to company's property, heater trouble, grade crossing and miscellaneous. On each card is a liberal space allowed for remarks in which is entered a short history of the accident and the discipline administered.

Instead of being disciplined under the merit-and-demerit system, the new men receive additional instruction. This takes the form either of verbal instruction, written instruction, e.g., copying out a rule nine or ten times, or additional practice on the road of from five to thirty hours. In some cases a little talking is sufficient, and an offense which is followed by written instruction is not apt to be repeated. Additional practice has a good effect not only on the man at fault but also on other new men.

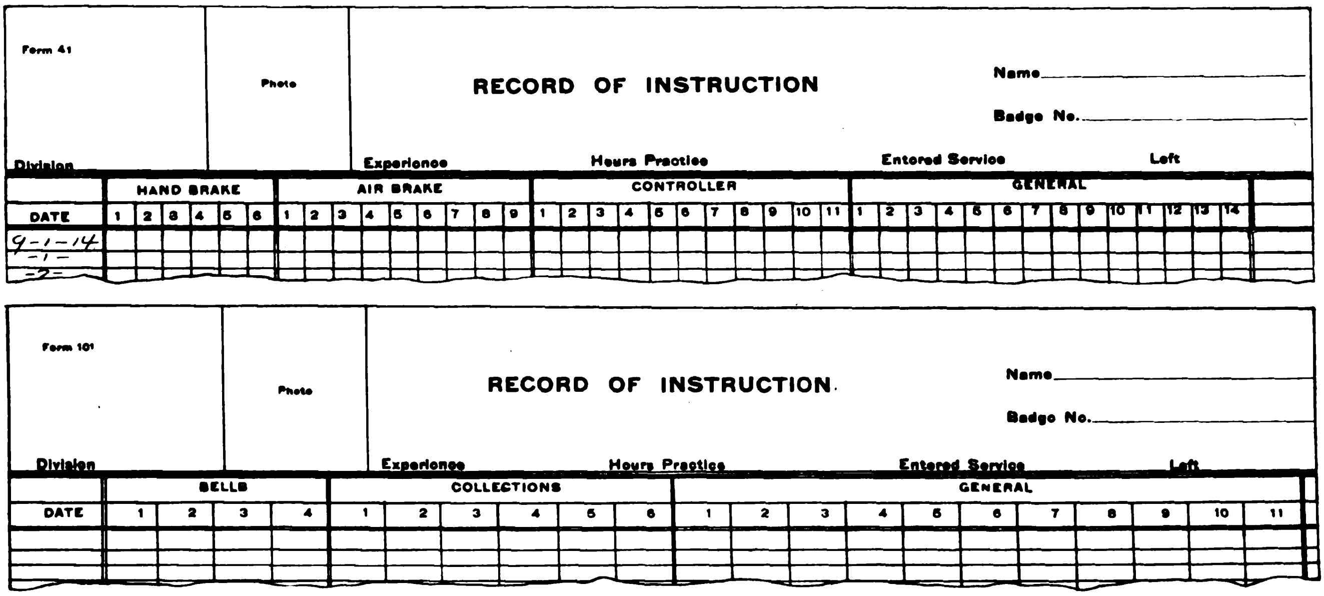
The following table shows the number of men in service on the first of each month from July, 1913, to September, 1914, and the percentages under six months in service:

EMPLOYMENT TABLE—NEW YORK STATE RAILWAYS, ROCHESTER LINES

	Motormen		Conductors	
1913	Total	Per Cent Under Six Months	Total	Per Cent Under Six Months
July	459	18.01	478	19.95
August	477	20.69	474	18.68
September	474	19.31	475	19.25
October	486	20.74	519	26.37
November	489	20.08	578	25.09
December	492	18.80	520	24.23
1914				
January	503	17.67	521	22.48
February	490	12.85	576	20.34
March	488	12.08	512	17.02
April	495	11.30	527	16.90
May	477	10.25	522	15.54
June	467	9.00	488	12.07
July	473	9.29	479	12.93
August	460	7.60	483	13.02
September	464	7.11	489	12.46

During the two years previous to July, 1913, the company had found difficulty in keeping enough men to operate the cars during the rush hours, and it was necessary, on the organization of the employment and instruction department, to employ additional men immediately. The most pressing need was for motormen, which accounts for the rapid increase in numbers from July, 1913, to January, 1914. During the late fall, trailers were put in service, but the snowplow crews required additional men, and no reduction in the number of motormen was possible until February or March, when the number begins to fall off. About the same time the age limit for motormen was changed from 21 years to 25 years, which resulted in our obtaining more reliable men who were less likely to leave the service. Economic causes were also at work to reduce the number of changes in personnel. The names of a number of inspectors who were still carried on the seniority list were also taken off, which had the effect of reducing the number of names counted in compiling the figures for 1913. The net result of all changes has been that the number of motormen has increased from 459 on July 1, 1913, to 464 on Sept. 1, 1914; while the percentage of men with less than six months' experience has fallen from 18.01 to 7.11 during the same period.

The need for additional conductors was not felt until the winter schedules were put in operation during September, 1913, when the total number of conductors shows a rapid increase. The number then attained was maintained throughout the winter months, and allowed to drop off during the spring. A rapid reduction is apparent during May, caused by the calling in of old badges and the weeding out of undesirable men. Economic causes, of course, had the same effect as in the



Form 41

Photo

RECORD OF INSTRUCTION

Name__________

Badge No.__________

Division

Experience

Hours Practice

Entered Service

Left

	HAND BRAKE						AIR BRAKE									CONTROLLER											GENERAL														
DATE	1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
9-1-14																																									
-1-																																									
-2-																																									

Form 101

Photo

RECORD OF INSTRUCTION

Name__________

Badge No.__________

Division

Experience

Hours Practice

Entered Service

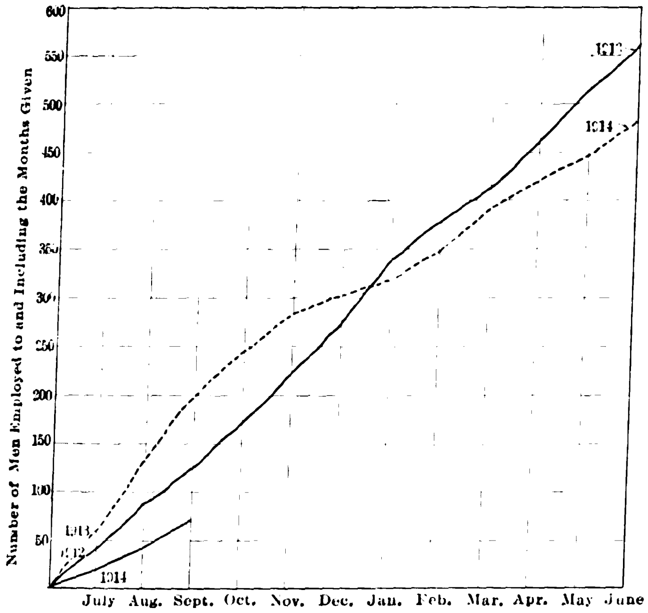
Left

	BELLS				COLLECTIONS						GENERAL											
DATE	1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	

NEW YORK STATE RAILWAYS—RECORD-OF-INSTRUCTION BLANKS case of motormen, but the age limit for conductors was not changed from 21 years and the greater instability of the younger men is shown by the larger proportion that are under six months in service. The net change in number of conductors has been an increase from 478 on July 1, 1913, to 489 on Sept. 1, 1914, while the percentage of men less than six months in service has decreased from 19.95 to 12.46 during the same period.

A comparison between the number of men employed for the two years from July, 1912, to July, 1914, is shown on the accompanying diagram.

The effect of the instruction on the number of accidents occurring to new men is shown in the accompanying table. In this table, column 5 shows the accident index for the men under six months in service, i.e., the ratio of the accidents per 100 men under six months to the accidents per 100 men for all periods of service. The low figures for October and November are due to changes that were made in the method of compiling the figures at the time this record was first kept. Since December these figures have been computed on the same basis and the index shows that the performance of the new men improved steadily up to April, 1914. At that time changes were made in the organization of the department due to the necessity for retrenchment, and the efficiency of the new men has decreased to some extent. It should also be noted that with smaller numbers involved a numerically small increase in the number of accidents makes a relatively larger showing in the percentage table.



COMPARATIVE CURVES, MEN EMPLOYED 1912-1913

ACCIDENT TABLE—NEW YORK STATE RAILWAYS, ROCHESTER LINES

1913	(1) Percentage of Men Less than Six Months in Service	(2) Percentage of Accidents for Men less than Six Months in Service	(3) Accidents per 100 Men Under Six Months in Service	(4) Accidents per 100 Men. for Total Men in Service	(5) Index 3 ÷ 4
October	22.66	35.16	67.5	43.4	1.55
November	21.63	35.00	66.2	40.9	1.62
December	20.10	34.60	83.5	48.5	1.72
1914					
January	16.72	27.60	76.8	46.3	1.65
February	14.60	23.31	78.0	48.9	1.60
March	14.18	21.92	83.4	54.0	1.54
April	13.02	18.30	50.0	35.7	1.40
May	10.58	20.43	94.0	48.7	1.92
June	11.16	20.98	76.4	40.6	1.88
July	10.40	18.24	78.5	44.7	1.75
August	9.87	19.30	63.8	33.1	1.93

It has been the aim of the instruction department to make the new men as efficient as the old men in respect to the record of accidents, and this result was apparently at one time within the possibility of achievement. The net result obtained, however, has not been altogether unsatisfactory, as the reduction in the number of men new in the service has brought down the proportion of accidents due to new men from 35.16 per cent in October, 1913, to 19.30 per cent in August, 1914; a reduction of 45.2 per cent, and this reduction has accompanied a reduction in the total number of accidents of approximately 21.50 per cent for the current year.

A. I. E. E. Midwinter Convention

The third midwinter convention of the American Institute of Electrical Engineers was held in New York on Feb. 17, 18 and 19. The program comprised a dozen papers of which five contained practical information on power transmission matters. In other papers the topics discussed were: Characteristics of electric motors, distortion of a.c. wave form, dimmers for tungsten lamps, searchlights, and the theory and practice of electrical precipitation of matter suspended in gases. An evening was devoted to a symposium on "The Status of The Engineer," abstracted elsewhere in this issue, in which several very prominent engineers took part.

F. W. Peek, Jr., consulting engineer General Electric Company, compared the results of line corona loss tests, made during ten years under various conditions, with formulas developed on the basis of laboratory measurements. The agreement was satisfactory. The discussion brought out that voltages of less than visible corona values produce uncertain losses due to irregularities on conductor surfaces.

L. E. Imlay, superintendent Niagara Falls Power Company, described a successful method for keeping underground cables cool by insuring moistness of the earth surrounding conduits. Temperatures of cables are measured systematically and when they indicate deficient heat radiating capacity, due to soil dryness, water is distributed through porous drain tiles laid parallel with the conduits. Mr. Imlay gave valuable test data bearing on the heat conductivity of soils.

K. C. Randall, engineer Westinghouse Electric & Manufacturing Company, spoke upon arc phenomena in oil circuit breakers showing that an arc hangs on until the next zero value of current after a switch opens, generating an amount of heat depending upon the frequency. He described the improvements being made in breaker design, including the accelerating feature and the reactance shunt. On the rating of circuit breakers he recommended that "if a unit may immediately be put back into permanent satisfactory operation without immediate repair, it is proper for the particular application." In this he was seconded by Philip Torchio, chief electrical engineer New York Edison Company.

The 100,000-volt portable substation described by C. I. Burkholder, general manager Southern Power Company, and Nicholas Stahl, commercial engineer Westinghouse Electric & Manufacturing Company, consisted of three 1000-kva, self-cooling transformers with supplementary fan ventilation and three horn gap switches mounted on a steel flat car. It was arranged for convenient connection to the transmission lines of the Southern Power Company and adapted to use a wide range of supply voltage. The weight was 135,000 lb. and the cost $21,000, i.e., $7 per kva.

The paper on electrical porcelain by E. E. F. Creighton, consulting engineer General Electric Company, was a 100-page report of exhaustive character. It was divided into three parts, the first covering the principles and methods of testing insulators; the second, the factors in porcelain manufacture, and the third, the results of elaborate tests made with the high-frequency oscillator. The paper contained the results of extensive research many of which were presented graphically.

The Code of Principles

In a Letter to the Editors, O. T. Crosby Suggests Certain Changes in the Present Code—The Sliding Scale of Returns to Capital Discussed and Co-operation with Other Public Utility Associations Recommended.

WARRENTON, VA., Jan. 26, 1915.

To the Editors:

It is with sincere regret that I find myself unable to approve all that the Code seems to stand for. May I point out some of the difficulties as they appear to me?

It is doubtless your habit, as it is mine, to consider all problems, first, from the point of view of a citizen of the United States, and second, from the point of view of one's own personal interest. In my judgment, the question of private ownership versus public ownership rises above any question of the interests of those now putting their money or their time into public utilities. If every dollar which I, myself, happen to have in public utilities, and all the other dollars that my friends have, were to be fully repaid by the state in the taking over of public utilities, I should still feel strongly opposed to that action. The opposition would be based upon fundamental political convictions. It is because some of the opinions stated in the code seem to lead inadvertently toward state ownership or its equivalent, purely bureaucratic private ownership, that I feel it a duty to comment upon them.

It is not probable that the Association—a numerous body having very short hours of discussion every year—would undertake to amend a code presented to it by a committee of distinguished members. It is not with this presumption that I suggest changes in the language of several articles. It is only that such redrafting offers a convenient form of expressing my own views. The expansion suggested of Articles III and VIII results in mere commentary on, rather than change in, the original text.

Whether the forum in which we have usually appeared for such discussions, namely, the JOURNAL, is open for criticisms of the code, I do not know. You alone have the right to make that determination.

The first article of the code reads as follows:

The first obligation of public utilities engaged in transportation is service to the public. The first essential of service is safety. Quality of service must primarily depend upon the money received in fares. For this reason it is necessary that the rate of fare should be sufficient to permit the companies to meet the reasonable demands of patrons and to yield a fair return on a fair capitalization.

I think the last two sentences should be changed to read as follows:

"Quality of service, must, in the long run, depend upon the money received in fares. For this reason, it is necessary that the rate of fare should be sufficient to permit companies to meet the reasonable demands of patrons and to yield average returns to the whole industry sufficient to obtain, in competition with all other enterprises, necessary capital from the general investor."

My reason for substituting the words "in the long run" for the word "primarily" rests upon the fact that in the inception of any enterprise the selling price of its product may be placed so low, or there may be temporarily such small market for its product, that its operations are carried on at a loss of original capital. Moreover, as the excellent brief of the Public Service Corporation in its recent gas case points out, the company undertakes an obligation which may require the exhaustion, in losses, of all its capital. It is important that this element of risk should never be obscured. But, *in the long run*, the operation will cease unless selling prices be greater than costs.

The change suggested in the last sentence reflects my objection to the use of the term "fair," when it is possible to express more clearly the specific conditions which we mean to set forth. The fact that this word "fair" has found its way into decisions of courts and commissions, has not, unfortunately, clarified its meaning.

We are quite likely to cut each others' throats in controversy over the application of such words. Today in Europe, both the British and the Germans conscientiously believe that they are upholding a "fair" cause. In all rate controversies, commissions and companies declare for these same "fair" words.

Article II of the code reads as follows:

Regulated private ownership and operation of electric railways is more conducive to good service and the public welfare than government ownership and operation because the latter are incompatible with administrative initiative, economy and efficiency, and with the proper development of cities through the extension of transportation lines. The interests of the public are fully protected by the authority given to regulatory bodies.

I merely suggest that the word "is" should be changed to the word "are," thus securing euphony and grammatical uniformity at the same time. The general idea expressed by this article seems to be sound.

Article III of the code reads as follows:

In the interest of the public and good service local transportation should be a monopoly and should be subject to regulation and protection by the state rather than by local authorities.

The preference here expressed for state control as distinguished from local control is a wise one in our present political development. My own thought on the matter would be more fully expressed if we should add to the article as it stands, the following:

"When sound general principles of regulation shall have been developed by the state, and when municipal or other local governments shall have developed higher efficiency and conservatism than is now usually found, then the regulation of local monopolies might be left to local authorities."

Article IV of the code reads as follows:

Short-term franchises are detrimental to civic welfare and growth because they ultimately check the extension of facilities and discourage good service.

This is so sound that even short-term advocates of a few years ago have been generally converted wherever the twenty-year limitation has been tried.

Article V of the code reads as follows:

In order to render good service, electric railways must be allowed to earn a fair return on a fair capitalization, and the foundation for this result will be obtained if the issuance and sale of securities representing such fair capitalization shall be legally authorized on such terms as will produce the requisite funds.

I would suggest that this article be changed to read as follows:

"In order to render good service, the electric railway industry must be allowed to earn average returns on investment comparable to those obtained in other enterprises of like riskfulness, and the foundation for this result will be obtained if companies be legally authorized to sell their shares, or to borrow money on such terms as will produce the requisite funds."

It will be observed that the word "securities" is stricken out. The reason for this will be found in the comment on Article VI. The word "average" inserted before "returns" has an important bearing, appearing below.

Article VI of the code reads as follows:

Securities which have been issued in accordance with the law as it has been interpreted in the past should be valid obligations on which an electric railway is entitled to a fair return.

In substitution for it, I would suggest the following language:

"Shares of capital stock and evidences of debt which have been issued in accordance with the law, as it was interpreted at the time of issue, should be considered as valid, and on the total capitalization composed of evidences of debts (including net floating debt) and shares of stock, the company should be entitled to earn such returns as its contract for rendering service will permit, when the charge for such service is made specific in the contract. In the absence of a specific contract charge for service, the company should not be prevented, merely by the arbitrary use of public authority, from earning such returns on its legal capitalization as might have been legally contemplated from time to time when investments were made or debts incurred."

It will be observed that the word "obligation" has been stricken out. This, I think, follows from the fact that shares of stock are not obligations, but, on the other hand, they plainly were meant to be included in the term "securities." We have all come to use the latter term rather loosely, as standing for everything which represents the capital of a company. Such loose usage is quite excusable in many discussions, but it is out of place, it seems to me, in such a formal document as the Code of Principles.

It will be noted that a suggestion is made limiting the returns on legal capitalization to those that may have been "legally contemplated." This is the reason for that suggestion. It is (or it has been) possible in many states to issue legally capitalization which might be in excess of the investment by many hundreds of per cent. Thus, $100,000 in cash, or cash values, might be legally capitalized at $1,000,000 par value. Can it be said that stockholders in such a corporation, should, immediately after its organization, be "entitled to a fair return," on such capitalization?

Is this "legal capitalization" necessarily the same as the "fair capitalization" of Article V? Has not the mass of legislation, adjudication and discussion of the last twenty years created at least the beginnings of a new common-law rule, which would put the investor on notice that he would not be permitted to make a profit of 80 per cent or 100 per cent per annum, on his real investment, unless, perchance, it should flow from a specific (or fixed customary) service charge? And in such case, is it not true that such a profit would rest, not upon the basis of legal capitalization but upon the contract right to perform service on a given piecework basis?

I have also thought it important to make a distinction, which does not appear in the Code of Principles, between the case of a company which, on the one hand, has a contract right and a contract obligation to perform service at a specific rate, and, on the other hand, a company which finds itself subject wholly to public authority in the matter of rates.

In the electric railway field it was thought that a majority, at least, of the franchises were, in fact, contracts for the performance of service at what may be called "piecework" rates. And it was thought that that rate was fixed in the contract.

There were, indeed, variations in the language of the contracts concerning this point. In some cases, the doubt was great enough to justify, perhaps, some of the surprising decisions which have been made. On the other hand, a good many franchises still stand unattacked, and probably unattackable, in the matter of a specific charge for service as being a contract right and obligation. That specific charge may be found too small for profit, but when it is large enough for profit, then even if the returns be considerably above average, they should in no way be disturbed unless by mutual consent. That is what the investor is "entitled" to—that is to say, to losses or to gains, as the contract happens to work out.

In the other case, namely that in which no specific service charge appears in the contract, and if there be no customary charge then ruling the field of operations, the investor must fall back upon the good faith of the public and upon the contemplation of law, that he is "entitled" to try for the usual returns to capital and that he is not to be forced into loss by arbitrary exercise of power in fixing rates.

If a company enters a field in which rates have long been fixed by custom, then the case is similar to that of the contract rate. The investor must lose—he is not "entitled" to win—if he guessed wrongly as to the profits derivable from a customary rate. That is the sound common-law rule. He is entitled to big returns, if things go well. He is not to be held to the "average" return. That average is made up of his good luck and his neighbors' bad luck, and it is, under another aspect, made up of his good luck today and his bad luck yesterday.

Invention has destroyed the force of custom in modern affairs. Hence our turmoils.

Ancient common law looked to custom for the fixation of rates. It declined to consider return to capital in any specific case. Nevertheless, underneath the customary rate, there must have been an implication of variable returns from very high to very low. One innkeeper might grow rich, another might grow poor. Differences of result were due to differences in management and to other conditions over which the innkeepers had no control.

In the long run, however, there must have been "a return to capital" in the inn business, substantially equivalent to that in other lines of industry. The particular innkeeper was not "entitled" to any particular return to capital, whether called "fair" or otherwise. He was entitled, while charging customary rates, to the presumption that he might grow rich or poor. He was not to be made poor by interference of the state in lowering the customary rates.

The novelty of modern methods in nearly all public utility work renders it very difficult to rest any case upon custom. But the presumption that even very high returns may occasionally be made, still existed as an implication in common law, when vast quantities of private money went into the development of public utilities.

It is this presumption which is threatened by the frequent use of the expression, "entitled to a fair return." The courts, when using that expression, have, for the most part, been engaged in preventing confiscation of property. The Supreme Court of the United States has gone from ½ of 1 per cent to 8 per cent, under certain conditions, in an endeavor to establish return to capital as the definition or measure of the property which was threatened. As they have groped their way toward some understanding of the problem, they have always been handicapped by the natural desire to interfere as little as possible with legislative enactments.

At first they contented themselves by stating substantially, as in the Munn case, that property was not taken unless the actual fee was transferred. In later cases they have seen that the property is valueless unless it can be used for making, or trying to make, an annual net profit, and that such profit is, in the last analysis, the measure of the value of the property.

Their recent decisions substantially establish the fact that a going concern has a property right, good against state intervention, to charge such rates as may yield 6, 7 or 8 per cent on the value arrived at by considering a number of elements. The decision is far from clear in respect to these elements.

The court has not recognized a right which was generally contemplated by investors fifty or sixty years ago, namely, that they might occasionally secure big profits, far beyond 8 per cent, as an off-set to occasional losses. It may be urged that practically this failure to recognize such a right has, in fact, through the power of the court, destroyed the right.

But we are now concerned in educating ourselves, the public, the legislative bodies and the courts, as to the true and necessary principles underlying such a treatment of public utilities as will continue to bring into existence new ventures and such as will preserve in old ventures the desirable qualities of private ownership. In view of the great steps forward, made by the Supreme Court itself, in its own education, it is no disrespect to authority that any citizen should urge views which, if adopted, would carry the Court still further.

Not only has invention destroyed substantially the force of custom for the determination of rates in the past hundred years but, in my opinion, it will continue to make so many changes in productive and distributive processes that we can no longer count upon this ancient guide to lead us through the mazes of the future.

Contracts for long periods at specific rates of service will also, in my opinion, gradually cease to be desired by public authorities. They may not even be wanted by investors in public utilities.

It seems to me, therefore, that new relations must be established in respect to the important matter of rates. I believe that the basis of that new relation will be "return to capital." And I believe, also, that this new basis must be made far more clear than it now is, before we can feel that we are working under a régime of law.

In trying to find a way out of the chaos which exists at present, it seems to me necessary to hold clearly before our minds just what the conditions are which are being changed or cast aside. That is the reason I feel we should refer in the code to the returns that must go to the industry as a whole, rather than those which go to individual companies, unless in the case of specific contract rates, or clear customary rates. The original language of the code, in Articles V and VI is not clear, it seems to me, as to this distinction. Hence the suggested change.

When we shall have emerged from the present difficulties, I believe we shall have statutes drawn which will express clearly the principle of a sliding scale return to capital. Such a statute would provide that specific sliding scale returns might be adopted, varying from case to case. Maximum and minimum rates of return to capital, with intermediate rates for varying periods and varying conditions, would appear in such contracts. In the general case, none of these returns to capital would be guaranteed.

The spirit of the contract would permit service rates to be controlled by the companies operating within the limits of the permitted returns to capital.

The same statute would provide such a sliding scale guidance for those cases in which public service might be undertaken without specific understandings as to return to capital. It would impose upon such cases limitations of profit which the investor is supposed to contemplate, just as if to-day a loan should be made without specific interest rate, it might be presumed to carry the so-called legal rate of interest.

And the same statute would provide that, as nearly as possible, the principles thus enunciated for new enterprises should be applied in the solution of the difficulties presented by old enterprises. In this latter case, however, an extremely important consideration must always be held in view, namely, that of the market values of stocks and bonds during past periods, when such stocks and bonds had been permitted to be freely bought and sold throughout the world, on the assumption that the investment would be controlled by the old common law rule which gave to the investor the full profits of customary or contract service rates, and at the same time threw upon him losses resulting from the application of such rates.*

If by the words "fair returns," as they appear in the adjudicated cases, we could assume that in some cases unusually large returns would be authorized, then one need not fear the use of such an expression. The fact is, however, the continued use of the expression "entitled to a fair return," both in the briefs of attorneys representing established corporations and in the appeals of public prosecutors, is gradually crystallizing to a maximum of 8 per cent. That is the danger.

The principle to be preserved is this—that any industry, as a whole, must receive "fair returns, etc.—" or it will cease to exist. But within the industry, there will be occasional bankruptcies, balanced by bonanzas. Unless the bankruptcies be prevented, the bonanzas should be permitted.

Article VII of the code reads as follows:

The relation of adequate wages to efficient operation should always be recognized, but electric railways, being public servants regulated by public authorities, should be protected against excessive demands of labor and strikes.

I should make it read as follows:

"The relation of adequate wages to efficient operation should always be recognized. Electric railway companies being public servants, regulated by public authorities, should be protected from all forms of violence or intimidation during strikes."

It is apparent that one element considered important by those who drafted the code, is in my suggestion eliminated, viz., that of protection by the state from "excessive demands" and from strikes. I do not believe that any employer can be protected against excessive "demands" of labor. This clause, as written, seems to imply that the rate of wages paid by public utilities should be fixed by public authority.

But even more, it is further implied that the right to leave the employment of the company is denied to its employees, if they go out simultaneously and make what is known as a strike.

Of course, the converse of the proposition is, that they shall be forced to serve against their will. It is true that enforced service of citizens is required by all governments in military defense. It is equally true that enforced service, except for military defense and as a punishment for crime, is considered as contrary to all that modern political progress has assured us. Nobody knows better than I how serious, even how tragic, may be the result of strikes, yet I cannot approve any restrictions of personal liberty in the relation contemplated, except that which restrains an ex-employee, or anybody else, from violence or intimidation directed against an employer, whether an individual or a company.

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*A statute expressing these views in legal form and drawn for application to interstate railway commerce, was presented by me several years ago to the Senate committee on interstate commerce. It appeared on page 94 of the ELECTRIC RAILWAY JOURNAL for July 20, 1912.

We may make progress by the adoption of contracts for personal service, including a money penalty for failure to continue the service during an agreed period. In the case of such contracts, the protection which would be given by the state is only that which it must afford to all citizens in the enforcement of legal contracts freely made.

We should not forget that if the principle of submission of wages to public authority is adopted, it cannot consistently be restricted in application to the wages paid to motormen, conductors and others constituting the more numerous body of employees. It would be legitimately extended to the determination of all salaries paid, from that of the president to that of the sweeper. If commissioners are to stand between the stockholders and the demands of motormen, they may legitimately stand between the stockholders and officials of the company.

If, however, the commissioners are supposed to protect—not the stockholder—but the receipts of the company required for improving the service, then equally should they control big salaries as well as little salaries. The result would be a complete hierarchy of employees, who must look to the public authorities for fixing their compensation. This would be a long step towards public ownership.

Even if this step were not followed by others in the same direction, it would do much to paralyze the effectiveness of private ownership as we now understand the term. The subject is a large one. I content myself with expressing very positive views on the subject, without much argument.

Article VIII of the code reads as follows:

The principle of ownership of securities of local companies by centralized holding companies is economically sound for the reason that the securities of the latter have protection against the varying business conditions of a single locality or company and because money for construction and improvements can thus be more readily obtained.

The principle appearing in this article seems to me sound. However, for the word "because" I would substitute the word "hence." Furthermore, to be quite accurate, the last statement of this article should be extended to read as follows:

"—and hence money for construction and improvements can thus be more readily obtained, unless public authorities strike down occasional prosperity in an electric railway company to the low level of the most unprofitable among such enterprises."

It is well known that the opposition to holding companies rests chiefly on the idea that one locality is milked for the benefit of another. Put in other words, that means that in the present hectic temper of the public no locality is willing to see its own public utilities showing a prosperity above the average. Indeed, there are not a few critics who desire to depress every prosperous public utility to the lowest known level of mere existence. Should this sentiment become more general than it now is, it will make the last statement of this article unsound.

The fact which that statement intends to bring out is this: that of several companies whose stocks are all owned by a holding company, one may be prosperous and another unfortunate, and that the strength given by the prosperous company to the holding company's stock will permit money to be advanced to the weak concern. The investor is given a chance in a very simple way, through the purchase of one stock, to average his returns, which is the very essence of all investment, but if the average is to be made a maximum and no guaranty be given to support the bad cases, obviously a new low average is created and the whole scheme fails.

Article IX of the code reads as follows:

In the appraisal of an electric railway for the purpose of determining reasonable rates, all methods of valuation should have due consideration.

In my judgment there should be added to this article the following words:

"—but actual investment in cash or cash values, including profits invested, and average market values of bonds and stocks, during a period of years, should be given greater weight than valuations by other and more artificial methods."

Article X of the code is sound and requires practically no comment.

Since writing the above, I find that one of the speakers at the mid-winter convention, adverted to the probability of action by the Association looking to possible modifications in the code.

Although the letter above written expresses my own dissatisfaction with some portions of the code as it now stands, I venture to suggest, before formal action be taken in the matter of change, that endeavor be made to co-operate with other public utility associations, such as those of the gas, electric light, telephone and steam railway interests.

The latter industry, particularly by reason of its magnitude and by reason of the influence throughout the country of the Interstate Commerce Commission, is likely to affect very seriously the public utility policies in every state. These policies in the long run and in principle should be the same for all public utilities. Hence, it seems to me desirable that co-operation should be brought about in giving formal and public expression to the views of those who are conducting public utilities of all kinds.

OSCAR T. CROSBY.

Ohio Compensation Rulings

The Ohio Industrial Commission, in connection with the claim of Flora Hamilton for the death of her husband, has announced the following four principles on compensation of importance to electric interurban railways:

"1. Electric interurban railways and their employees engaged only in interstate commerce are subject to the provisions of the workmen's compensation act of 1913.

"2. Electric interurban railways and their employees engaged in intrastate and also in interstate and foreign commerce are subject to the provisions of the compensation act only to the extent that their mutual connection with intrastate commerce may and shall be clearly separable from interstate commerce, and then only when the railroad and its employees have filed written acceptances of the provisions of the act.

"3. There is no distinction between steam railroads and electric interurban railways so far as the application of the compensation act is concerned.

"4. An electric interurban railway company whose track lies wholly within the State, but which has traffic arrangements with other common carriers and accepts freight and passengers for transportation into other states, and which has filed its freight and passenger traffics with the Interstate Commerce Commission, is engaged in intrastate and also in interstate and foreign commerce."

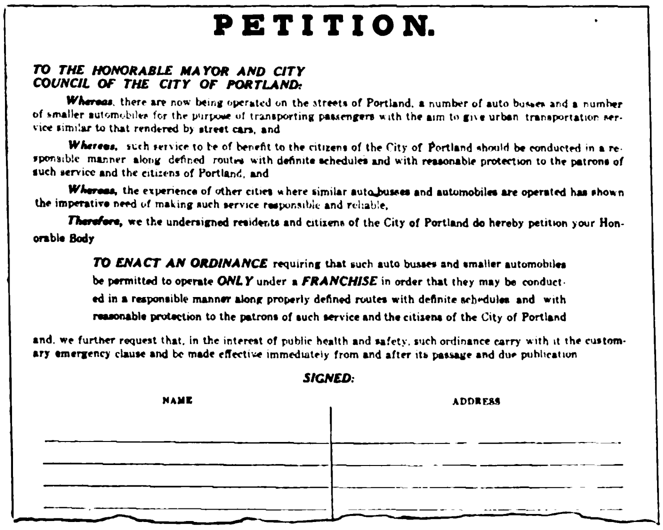
Regulation for the Jitney Bus

Recent Developments Have Shown the Need for Controlling the Operation of Itinerant 5-Cent Bus Lines, and the Steps Taken in This Direction by Various Communities Are Outlined, with Brief Accounts of the Experiences Making Them Necessary

The sudden advent of the jitney bus in urban transportation has placed before the electric railway systems of the country a situation which obviously needs prompt attention. To this end it may be said that the policy of regulation for the new conveyances appears to have been generally accepted as a satisfactory solution by most communities that have taken the problem under serious consideration, and in many cases restrictive measures either have been or are about to be applied. Even in Los Angeles, where the jitney bus movement started and where the city's friendliness toward the auto bus has been demonstrated, the need for regulative measures has become obvious to many of the citizens.

ESSENTIALS OF JITNEY BUS ORDINANCE IN LOS ANGELES

As a result of this sentiment Mayor Rose of Los Angeles submitted on Feb. 8 an urgent request for immediate regulation of the jitney bus traffic. His statement pointed out that the city of Denver had met the situation by passing an ordinance requiring each bus to take out a franchise, that San Francisco had under consideration a regulatory ordinance, and that Pasadena had already passed such a measure. He then outlined the following points which appeared to be essential for a satisfactory ordinance:



PETITION.

TO THE HONORABLE MAYOR AND CITY COUNCIL OF THE CITY OF PORTLAND:

Whereas, there are now being operated on the streets of Portland, a number of auto busses and a number of smaller automobiles for the purpose of transporting passengers with the aim to give urban transportation service similar to that rendered by street cars, and

Whereas, such service to be of benefit to the citizens of the City of Portland should be conducted in a responsible manner along defined routes with definite schedules and with reasonable protection to the patrons of such service and the citizens of Portland, and

Whereas, the experience of other cities where similar auto busses and automobiles are operated has shown the imperative need of making such service responsible and reliable,

Therefore, we the undersigned residents and citizens of the City of Portland do hereby petition your Honorable Body

TO ENACT AN ORDINANCE requiring that such auto busses and smaller automobiles be permitted to operate *ONLY* under a *FRANCHISE* in order that they may be conducted in a responsible manner along properly defined routes with definite schedules and with reasonable protection to the patrons of such service and the citizens of the City of Portland

and, we further request that, in the interest of public health and safety, such ordinance carry with it the customary emergency clause and be made effective immediately from and after its passage and due publication

SIGNED:

NAME	ADDRESS

PETITION FOR REGULATION OF JITNEY SERVICE CIRCULATED IN PORTLAND, ORE.

A proper definition distinguishing automobiles acting as public carriers from those engaged in delivery business. A proper form of application covering the name of the owner, make of the machine and the carrying capacity, the proposed route and the schedule. The vesting in the Public Utility Board of the right to pass upon all applications and to adjust them if the routes as scheduled are unsatisfactory, together with the right to change or modify routes when traffic conditions or public necessity, in the opinion of the Board, demand such action. An approved indemnity bond of not less than $10,000 to accompany each application. A prohibition for carrying passengers on the running board, and a provision for uniform signs. Provision for the revocation of the license for failure to cover route and meet schedule, carrying passengers upon running board, failure to pay claims for damages, changing routes without permission of Board, and running an insufficiently lighted car after dark.

CAMPAIGN FOR REGULATION IN PORTLAND, ORE.

Shortly after the jitney bus appeared in Portland the Portland Railway Light & Power Company, recognizing the need for regulation of the jitney competition with its railway lines, published two pamphlets, one of which explained the situation in detail to the company's employees, but copies were also available for the public. The text of this pamphlet appears in full on page 396 of this issue. The other pamphlet was addressed directly to the public and was generally distributed. It contained the following statements:

"Concerning Taxes—Nearly one million dollars! $971,836.06 per year, $80,986.33 per month, $2,662.50 per day, or 15½ per cent of its gross revenue was contributed in 1914 by the Portland Railway, Light & Power Company to federal, state, county and city governments for the mere privilege of doing business! Thus:

Taxes and licenses	$649,762.16
Bridge tolls	61,464.00
Interest, depreciation and maintenance on street paving	260,609.90
Total	$971,836.06

"Consider the annual charge for paving. The company is required under its franchise to pay for the paving along its tracks, to maintain this paving during its life and to renew it when it is worn out. The actual bare cost of the specific construction of this paving now in use amounts to the vast sum of $1,737,399.33 which is 15½ per cent of Portland's total investment in street paving. This great sum does not include any allowance for overhead charges, for engineering, superintendence. etc., a very large amount in itself, which could be fairly included, but figuring only the actual specific construction cost, the company, on account of the street paving, must take from its revenues yearly: Interest at 6 per cent; maintenance at 3 per cent; depreciation at 6 per cent, or a total annual charge of 15 per cent of $1,737,399.33, equal to $260,609.90 per annum.

"Excepting such paving charges which are levied against the company's realty, all paving assessments along the company's tracks are but a survival of the system of charges from the old horse car days when the motive power did wear out the paving, but, in these days, since the electric cars do not need or use the pavement, assessments for its construction, up-keep and renewal are in effect nothing more nor less than a governmental charge or franchise tax on the street car company.

"Do you believe in double taxation? Of the total taxes collected by the city and county for the operation, maintenance, bond interest, rentals and sinking funds, for all bridges used by the general public, crossing the Willamette River in this city, the pro-rata share of the taxes paid by the company apportioned to these purposes for 1914 was $11,513. On top of this the company was required to pay $61,464 for bridge tolls. Was any other firm, person or corporation in Portland required to pay a toll in addition to their regular tax for the privilege of using the bridges? Even forgetting the tolls, did any other firm, person or corporation contribute as much to the expense of these bridges as this company?

"Over $10,000 per month for the schools! Do you know that, of the total taxes paid by the utility company in 1914, $120,110 was applied to the education of children in public schools in Portland? This is over $10,000 per month or about $550 per school day.

"Nearly $1,500 per month for the fire department! Of the total general taxes paid by the company, $17,720 per year was applied to the support of the fire department.

"Over $1,000 per month for the police department! In the same manner, $12,739 per year went to the support of the police department.

"Over $555,000 a year from the street car system alone, or 18 per cent of total street car revenues! Of the huge sum of nearly $1,000,000 charged the Portland Railway, Light & Power Company in 1914 for the privilege of doing business, about $550,000 per year, $45,800 per month, or over $1,500 per day must be contributed by the city street car system. The average revenue per passenger carried (cash, commutation ticket and transfer passengers) for all of whom facilities have to be furnished, was 3.58 cents for the year 1914.

"Even omitting the cost of carrying them, consider how many passengers at the average fare must be carried to pay this immense charge! In round numbers—42,000 passengers per day, 1,275,000 passengers per month, 15,350,000 passengers per year.

"Also just figure for yourself how many passengers had to be carried during the year to help maintain the police department, the fire department, the public schools and the bridges. Furthermore, letter carriers and county employees are carried for several hundred thousand rides at compensation which is less than cost for the service.

"In conclusion, did you ever stop to think that during 1914, police and firemen and other city employees, enjoyed free transportation as required by our franchises to considerably more than 750,000 rides, which, at the usual ticket rate, would have cost the city for this service about $33,750. Is not this additional tax?"

The effect of these two pamphlets had almost immediate results. The employees of the company, realizing that they would be directly affected by unrestricted jitney bus competition, prepared and circulated a petition to the Mayor and City Council. A reproduction of this is shown in an accompanying illustration. Last reports indicated that some 40,000 signatures would be on the petition when it was presented to the Council.

One of the complications arising in Portland is the general opinion that regulation over the jitney buses should be in the hands of the State Railroad Commission. The State Railroad Commission, however, can do nothing legally until the jitneys obtain franchises from the city. Two State bills are under consideration at the present time in Oregon, one of which plans to make the jitney subject to the same regulations as the street railways and the other provides for regulation of automobile common carriers outside of the city, placing them in the category with steam railroads. Another measure is at the present time under consideration by the State Senate requiring the issuance of a certificate of public convenience and necessity prior to the beginning of any new construction or exercising of franchise rights by public utilities. This also appears to affect the jitney situation.

It is interesting to note that in Portland the principal owners and drivers of jitney buses have formed a temporary organization and plan a permanent organization and a general system for the service throughout the city. Four citizens have already petitioned the City Council for a franchise for a permanent jitney line. The applicants intend to establish routes to all parts of the city, running on schedule from seven in the morning to twelve at night, the fare being 5 cents. Waiting stations are planned for designated places, together with signs erected at proper points.

ORDINANCE IN BOISE, IDAHO

Jitney service in Boise City, Idaho, has been recently proposed by several promoters, but in every case it has been discouraged by an ordinance which was recently passed by the city council. This ordinance appears in full on page 397 of this issue. In Lewiston, Idaho, a peculiar situation has developed in connection with the jitney-bus craze. The city has at present no local street railway, but the inauguration of jitney service on Jan. 26 brought out a great deal of comment that was unfavorable. This attitude was emphasized by the possibility that, within a short time, an electric railway will be brought into the city of Lewiston and that the prospect of jitney competition would tend to discourage the promoters. Another interesting situation arising from the jitney in Lewiston was the statement of the operators of the jitney buses that the first day's operation had shown that the 5-cent rate could not be maintained and that consequently the fare for all routes would have to be raised to 10 cents.

JITNEY SERVICE IN ST. LOUIS

In St. Louis the introduction of the jitney has developed along unusual lines. An unincorporated organization has been formed by an individual who styles himself as president and general manager. The members act as chauffeurs of the cars, each chauffeur owning his own machine. Each chauffeur is supposed to pay to the general manager 5 per cent of his gross receipts.

Under these circumstances jitney service was inaugurated on Feb. 8. On the second day of operation seven cars were in use and amid considerable enthusiasm the president of the company reported a most satisfactory day. On the third day, however, two of the jitney buses fell by the wayside after counting up the day's receipts. Features of succeeding days' operation were the entrance of women chauffeurs, and the wave of indignation which arose because of the announced ban on negro passengers, anonymous communications from negroes being reported to have stated that, "Street cars are good enough for us anyhow." The jitneys remaining in service were all seriously overcrowded, five-passenger-machines carrying eight and ten persons on one trip, and one seven-passenger car having been reported to have carried eighteen passengers, of whom six stood on the running boards, while two sat on the housed canopy with their legs hanging over the shoulders of the passengers in the rear seat.

At the end of last week, the reports were that 2000 passengers were being carried daily by eleven automobiles and one thirty-passenger auto truck. The average daily earnings of the touring cars in operation are said to have been about $10, the record for receipts reaching a maximum of $13.50. This applied to a man driving a seven-passenger touring car.

A remark made by the promoter of one of the autobus lines in St. Louis provides an interesting insight into the mental attitude of the jitney-bus operator. The statement was that it was doubtful whether the jitney-bus could be made to pay on streets other than those upon which cars were run. The passengers who were waiting for street cars were those to whom the jitney-bus appealed, and they had to see the jitney in front of them before they would consider riding in one. It was doubtful whether they would seek another street to get a bus.

No provisions for regulation of the jitney service have been made as yet in St. Louis, and on Sunday last the fares were all raised to 10 cents for the day, rides being given to those looking for an outing at various parks. Contrary to experience in other cities no serious accidents to pedestrians have been reported from St. Louis, but the operators have already provided that damages from accidents are not to be assessed upon the jitney-bus organization as a whole.

MANY ACCIDENTS IN KANSAS CITY

The jitney appeared in Kansas City about the middle of February. The service was well received by the public, and the business has grown until they now have over 200 buses in service and there are all kinds of plans for special uses of jitney buses in the air as well as plans for new routes. In Kansas City the jitneys are organized under two non-incorporated companies, to which the bus operators pay weekly fees of $1 and 50 cents respectively for arranging schedules and routes and preventing competition. Each organization has rented a waiting station in the downtown district past which all cars run.

Congestion is the notable feature of the situation at Kansas City, although as yet no definite means for regulating the service has been developed. A number of serious accidents have already occurred, and the first death caused by a jitney-bus took place on Feb. 7. There appears to be difficulty in placing insurance for jitney owners, as the insurance companies do not care to take the risk. The committee of the city council has asked the city counselor to draft an ordinance providing for the control of the cars and for the imposition of a reasonable tax.

During the past week numerous fines have been imposed on jitney drivers for violating traffic rules, and frequent hard-luck tales have thus been brought out. These are borne out by the report that the number of small automobiles in jitney service in Kansas City seems to be diminishing. However, many larger cars, chiefly trucks fitted with bodies capable of seating from twelve to eighteen passengers, have been recruited, and these have good custom during rush hours in fair weather. The managers of the jitney associations are admitting frankly that the small cars, at least, cannot be operated profitably except on definitely arranged schedules over routes of less than 2 miles. Several large passenger cars have assumed boulevard routes, one owner picking up passengers from several family hotels.

The "Kansas City Jitney Transportation Company" is now being organized, the trustee being W. H. Miller, who ran the first jitney and has been organizing the service at one of the jitney stations. An advertisement was published on Sunday, Feb. 14, stating that subscriptions for stock would be received.

The police have been attempting to regulate the jitney traffic, but owing to the absence of a restrictive ordinance the only recourse is arrest for violation of traffic rules. Judges of city courts are fining violators $5 and $10 for failure to stop behind a standing street car, for driving on the wrong side of the street, for blocking traffic by standing at street crossings, for fast driving and for failure to show licenses. The judges have declared that fines would soon be increased if frequent violations continued.

There have been at least two holdups of jitney drivers and passengers. In one case the robbers forced the driver to go to the State line, where $7.85 was taken from him and $1.75 from a passenger. Another case was that of a visitor to Kansas City, whose pockets were picked of $75 and railroad tickets in a jitney. One jitney owner narrowly escaped arrest by federal officers. He had a picture of a nickel painted on the side of his car but covered it after being warned that money must not be pictured.

JITNEY MEN OPPOSE SPOKANE REGULATION

Ever since the first of February the city of Spokane, Wash., has been in the throes of development of regulatory measures of the jitney bus. Numerous letters from citizens have been received from the City Council and four different ordinances have been under consideration. Among these is one that has been prepared by the jitney operators, who have combined and employed counsel to meet the issue of regulation.

The ordinance proposed by the jitney operators includes a flat-rate license tax ranging from $25 for cars carrying five passengers or less, and $75 for cars carrying ten or more passengers. No bond is provided for on the ground that the jitney men will voluntarily carry insurance to protect themselves and their patrons. In commenting on this at a recent hearing, the attorney for the jitney operators stated that a $5,000 bond or even a $2,000 bond would mean the practical exclusion of many men from the business, but how protection could be given without it was not explained in detail. Owing to the existence of the initiative-and-referendum law in the State of Washington, the jitney operators are talking about the use of a referendum to protect the interests of the jitney operators in case a drastic ordinance should be passed, with the expectation that the public would support the jitney buses.

In a recent hearing a great deal of stress was laid on the lack of protection in the car to women and girls. Other comments by citizens are "The jitneys run when they feel like it and only where the business is best." "Any old automobile will do for a jitney as long as it hangs together." "If barbers need an examination, jitney drivers certainly do." "The jitneys are no more than pirates, unless they are made to go as far as the street cars." "Do not let the jitneys pile in passengers like pigs. I have no sympathy for adult women who sit on men's laps, but I do not approve of this for young girls." One sarcastic citizen suggested that the jitneys should provide free rides for police and firemen and half fare for children.

COMPETITION WITH SAN FRANCISCO MUNICIPAL LINE

Notwithstanding the fact that the city of Oakland has passed a jitney ordinance as outlined in the ELECTRIC RAILWAY JOURNAL for Feb. 13, the city of San Francisco, just across the bay, took no action for a considerable period after the jitneys began to operate, regardless of the protests against them. On Feb. 6, however, the jitneys began to operate on Geary Street alongside of the municipal street-railway line, and this, according to press reports, has awakened the interest of the local authorities in the preparation of a jitney ordinance. When inquiries began to be made as to who was responsible for the invasion of the territory of the municipal line, the leaders of the local jitney-bus association pleaded not guilty with considerable vehemence. In consequence a rumor promptly started to the effect that the United Railroads of San Francisco were behind the scheme, with the idea of showing the city fathers how the jitney competition felt. According to the local newspapers, Charles N. Black, of the railroad company, unemotionally stated that he did not even know the jitneys were running on Geary Street. However, the Mayor of San Francisco is going to investigate the unfair competition with the city-owned railroad and will announce his findings later on.

Newspaper comments point to the fact that the jitney buses as at present conducted in San Francisco constitute an almost intolerable nuisance to all except those who wish to ride in them, and that at present those who do not ride in the jitneys greatly outnumber those who do. It is said already that pedestrians are unable to cross Market Street in the congested district without taking grave risks of accident, thus bearing out the prophecy that transportation by jitney-bus on a large scale was a physical impossibility.

REGULATION BY COMPETITION IN JOPLIN, MO.

The Southwest Missouri Railroad, which operates the electric railways in Joplin, Mo., and adjacent cities, has suffered from the jitney-bus competition for some weeks without any prospects of relief by regulation of the new service. Therefore the organization of an auto-bus company to compete with the jitneys has been hit upon as a means for driving the latter out of business. This novel expedient has been fathered by the stockholders of the railway, although they are acting in their individual capacities and not in behalf of the railroad.

The new company already has bought four new autobuses, each with a seating capacity of twenty passengers. All are of the latest and best type, and upon arrival from the factory they will be placed in service between Carthage and Jasper, Joplin and Neosho, and Galena and Baxter Springs. The four buses contracted for are said to be only a beginning, and as many more will be obtained as may be necessary to give adequate interurban service between the towns named or to supply the demand for service elsewhere if it should arise.

The citizens of the towns to which the new auto-bus service is to be given have been waiting for some time for the Southwest Missouri Railroad Company to extend its lines into their precincts, but for good reasons these extensions of the electric railway tracks have not been built. Now, however, the towns will have an interurban service by the use of gasoline propelled vehicles.

One of the promoters, in sardonic vein, states that two advantages in the proposed mode of transportation are: First, freedom from the cost of constructing and maintaining street paving. Second, the ability to flit into a new territory whenever regulation in the original one becomes unbearable.

MYSTERIOUS PLAN FOR REGULATION

In connection with the matter of jitney-bus regulation the following self-explanatory letter is of certain interest. It has, apparently, been sent to a large number of electric railways in the country:

"To the ——— & ——— Railway Company,

"Gentlemen:

"Conscious of the growing evil of the 'Jitney Bus' as a competitor of the Street Railway Companies, I have evolved a plan, which, in my judgment, if placed in operation, will practically, and perhaps completely, eliminate the 'Jitney Bus' as a competitor of your Street and Suburban Railways.

"My Plan is short, simple and comparatively inexpensive to put into operation, and will in no way disturb the present order of your management; and I hereby offer to communicate to you the Plan upon the execution of the enclosed agreement.

"My Plan is one which your Company can operate successfully without interference by State, City or County Authorities.

"Your prompt attention will be profitable to you.

"Yours truly,

"F. A. MARCHER."

Attached to the letter is a blank form for a formal agreement proposing, for a consideration, to put the recipient next to "a Plan which, if put into operation by the parties of the second part, will work greatly to their advantage in eliminating the jitney." The consideration appears to vary from $5,000 down to $50. It is not known how many clients have been obtained, but no doubt the idea is a gem. Mr. Marcher is a Los Angeles jeweler.

Standard Boiler Code Approved

The American Societyof Mechanical Engineers Has Adopted Universal Standard Specifications for the Construction of Steam Boilers

The American Society of Mechanical Engineers has placed its final stamp of approval upon the standard code for the design and construction of steam boilers which has been in course of preparation for the past three years. This, it is hoped, will become standard throughout the United States. Its general adoption will make it possible for manufacturers and the public to obtain from any manufacturer in any state a uniform and safe boiler. Its formulation has made possible the elimination of the necessity which exists at present for making a special design of boiler for each state in the Union, and owing to the fact that boilers built under the new code may be universally used the cost of manufacture will be materially reduced. Before this condition is reached, however, it will be necessary for five states, namely, Massachusetts, Ohio, Pennsylvania, Wisconsin and Indiana to amend their present laws so as to permit the use of the standard code. The laws existing in these states are so different from each other as to make conditions chaotic.

It is expected that immediate legislative action toward the legal adoption of the new code will be taken in many of the states in the country as the American Society of Mechanical Engineers has been advised in many cases that measures legalizing the use of the standard code are to be proposed at the present sessions of various state legislatures. This, in fact, accounts for the pressure which has been brought upon the American Society of Mechanical Engineers and the boiler-code committee to bring out at the earliest possible moment specifications in a form such that they could be used by the state legislatures.

The successful formulation of a single code which can be universally used has been due largely to the faithful and painstaking efforts of the boiler-code committee of the American Society of Mechanical Engineers. This has been composed of John A. Stevens, chairman; William H. Bohn, Rolla C. Carpenter, Richard Hammond, Charles L. Huston and Edward S. Miller. On the original committee were also H. C. Meinholtz and E. D. Meier, but both of these members died before the work of the committee was complete. During the last seven weeks the committee met daily including Saturdays and holidays, and would frequently work until midnight, in order to complete the code and to harmonize the necessities of the various interests involved. These included the manufacturers of steel and of tubes, the builders of boilers of various types, such as heating boilers, pressure boilers, and agricultural boilers, and the makers of safety valves and other classes of boiler equipment.

By instruction of the Council of the American Society of Mechanical Engineers, the code as now issued covers only the design, construction and materials entering into the boiler. Rules for inspection, for operation and for licensing operators have not been included at the present time. The society, as such, will have nothing to do with the work of getting the standard code adopted by the various state legislators, as that is obviously the province of the various governing bodies interested. It has not been thought consistent for the organization which has been interested in the technical details of the code to concern itself with the making of the laws by which these details may be brought about as a universal standard.

It might be said at this time that the new specifications do not apply to boilers which are subject to federal inspection and control, including marine boilers, and boilers of locomotives and other self-propelled apparatus. The new code will be printed and ready for distribution within a few weeks.

Status of the Engineer

Noted Engineers, Executives and Educators Contribute to Important Symposium in New York on February 17

The Wednesday evening session of the third midwinter convention of the American Institute of Electrical Engineers was devoted to a symposium on the status of the engineer. Those contributing to the discussion were L. B. Stillwell, E. W. Rice, Jr., E. M. Herr, Alexander C. Humphreys, George F. Swain, H. G. Stott and J. J. Carty. The chairman of the meeting was President P. M. Lincoln.

Mr. Stillwell defined the character and reputation of the engineer and pointed out how the latter can be improved. He outlined what the engineering societies can do in this direction, particularly by more carefully selecting and grading their members and by enforcing their codes of ethics, expelling members who violate them. Joint committees of the engineering societies might also reach a decision for or against the licensing of engineers. Engineering societies can also assist in improving the status of the engineer by furnishing information to legislative bodies regarding broad economic policies.

Mr. Rice pointed out that honesty is a habit with the engineer, necessarily so because his work must stand the test of experience. He pointed out a new field for the engineer in politics. The House of Representatives and the Senate of the United States are largely made up of lawyers, 65 per cent in the former and 75 per cent in the latter, while there is only one engineer in both houses. He believed that the engineering fraternity should be represented not only in an advisory capacity but also in an administrative one.

Mr. Herr showed that engineering and the engineer must stand for progress and improvements. An important field in addition to others mentioned for the engineer is the commercial one. The handling of men is a most important part of his work. Mathematics, which forms a vital element of the engineer's training, unfits him for solving human problems. He must apply himself to solving these human problems and in doing so the reaction upon him will be favorable.

Dr. Humphreys stated that the sooner a young man gets the fundamentals of engineering and graduates into the school of experience the quicker will he become a real engineer. He should, of course, have more than the mathematics and science of engineering, but life is too short to study in college all that might be desired. Dr. Humphreys especially dwelt upon the work of engineers as public service commissioners. While he did not advocate commissions made up exclusively of engineers, he thought that an adequate representation of engineers should be the rule.

Prof. Swain contended that the engineer is recognized to the extent that he deserves. In analyzing the status of the engineer as a leader, he pointed out that this depends upon knowledge and personal qualities, of which the latter are more important. If the engineer does not lead it is largely because he lacks the necessary personal qualities. In Prof. Swain's opinion, engineers are adequately paid and recognized as compared with other professional men. Engineering training as given does not attract the best type of men and it has a tendency to narrow the outlook of those who take it. The remedies for this condition are first to induce more able men to embrace the profession by pointing out to them its possibilities. Technical education should be influenced in the direction of providing broader training and giving skill in the use of English. The engineer should somehow be given a broader outlook upon engineering problems, as the great questions of the day are not mathematical but social.

Mr. Stott made a plea for the government engineer, who, in his opinion, does not receive proper recognition. The great public works performed under government supervision are due to engineers who are not adequately paid and who receive little fame for their endeavors. Taking up the subject of specializing, Mr. Stott showed that engineers must necessarily be divided into two classes: first, those who specialize and whose reward is in achievement in one or two lines; second, those who generalize and gradually pass from engineering to administrative work.

In closing the discussion, Mr. Carty showed that the engineer is one who can design machinery to produce results at an ultimate cost lower than is possible without it. A labor-saving machine is really a labor-making machine unless it produces this result, for while it may transfer the labor to remote parts of the economic system, the labor is there just the same.

Need of Regulation

W. W. Atterbury, vice-president in charge of operation of the Pennsylvania Railroad, in a recent address before the combined commercial organizations of Philadelphia, discussed the subject of regulation. Mr. Atterbury said that regulation heretofore has largely consigned itself to correcting transportation abuses. The evils are obvious, but so much attention has been paid to the pulling of the weeds in the transportation garden that the very important duty of cultivating and strengthening the growth of the healthy and useful plants has been neglected. In Mr. Atterbury's opinion, the great transportation machine of this country is found. It needs continued regulation, but the regulation must be competent and sympathetic. The most pronounced weakness of the present system is that it is incompetent. Laws are lightly passed by legislatures without any real knowledge of what is involved, and action is taken by commissions who have no full conception of the delicate mechanism they are handling, or of how the public interest may be finally affected by their lack of experience and training.

To overcome these defects, Mr. Atterbury made the following suggestions:

"'A minority of the railroad commissioners of the states and nations should consist of men trained in the practical conduct of railroad affairs. All appointments should be for life or during good behavior, and the salary should be such as to attract the ablest brains in the country. These positions should be surrounded with such prestige and honor that any citizen would feel that he could serve his country and his fellowmen in no more exalted capacity than in representing the people in promoting, encouraging and regulating the development of its transportation agencies. The business men of the country, whose welfare is so intimately interdependent with the transportation system, represent the class of citizens from whom the initiative should come in putting a new spirit into the present system of regulation. Scientific management is needed in business but it is also needed in regulation or the latter must and will result in strangulation.'"

American Association News

Reports of Meetings of Committees on Rules, Engineering-Accounting and Passenger Traffic—Additional Details of First Manila Section Meeting—Manufacturers' Association Notes

COMMITTEE ON RULES

A meeting of the committee on rules was held in New York on Feb. 11, 1915. There were present W. H. Collins, chairman, Gloversville, N. Y.; Edward Dana, Boston; W. R. W. Griffin, East Liverpool, Ohio; S. W. Greenland, Fort Wayne, Ind.; C. E. Morgan, Jackson, Mich.; W. C. Callaghan, Helena, Mont.; and L. H. Palmer, New York. J. W. Brown, Newark, N. J, representing the committee on block signals, also attended the meeting.

The matter of indexing of rules of the city and interurban codes was first taken up and this was referred to Mr. Palmer to act in conjunction with Secretary Burritt. The rules covering markers and their location, which had been referred back to the committee by the 1914 convention, were then discussed at length, and a new rule regarding display of markers was adopted, providing greater flexibility in the character of signals than was the case in the rule proposed last year, yellow flags and unlighted marker lamps being permitted as alternatives to the usual green flags for day indications, and yellow as well as green lights at night. It was then decided unanimously to re-submit to the 1915 convention the three rules covering the display of classification signals that were submitted in the 1914 report to take the places respectively of present rules 105, 106 and 107.

In connection with a subsequent discussion as to the advisability of displaying flags by night as well as lights, it was decided to follow present customary practice on interurban railways, and to omit flags by night, lights only being displayed.

The matter of the use of the flagging rule on block signalled roads in cases where communication with the dispatcher could not be established, as referred to the committee by the 1914 convention, was then taken up. Mr. Collins read a number of replies to a letter that had been sent by the committee asking for opinions from electric railway operators. It was moved by Mr. Dana to appoint a sub-committee to confer with the block-signal committee regarding the modification of rule 554 now in the standard code of block signal rules. This sub-committee was instructed to draft a new form for the rule for the information of the block signal committee and to submit it by mail for the consideration of that committee. The sub-committee was instructed also to consider possible further modifications in all of the block signal rules. Chairman Collins appointed to this sub-committee Messrs. Palmer, Morgan and Greenland.

J. W. Brown of the committee on block signals then presented a statement from the block signal committee regarding the contactor signal rule No. 10, as submitted at last year's convention. This statement included letters from the signal manufacturers, whose opinions were divided. It was decided to send copies of the correspondence to the members of the newly-appointed sub-committee on block signal rules for their consideration and action on the matter.

Mr. Morgan then moved to re-submit at the next convention the modified form of present rule 159 that was proposed in the 1914 report of the rules committee. This was carried.

It was then decided to have published a statement that the rules committee was prepared to pass upon questions of interpretation of the standard rules that might arise on the lines of member companies, in accordance with the resolution to this effect passed at the last convention.

The committee referred to Secretary Burritt the work of compiling and analyzing operating rules that have been established by the various state commissions and also asked him to report upon the number of railways that have adopted the standard rules of the association since the 1914 convention. The committee then took under advisement the request of one of the member companies to pass upon the scope of an order that had been issued on one of its lines to cover a specific train movement, and after discussion a detailed reply was formulated and submitted to Secretary Burritt for transmittal.

JOINT COMMITTEE ON ENGINEERING-ACCOUNTING

A meeting of this committee was held at the rooms of the Railroad Club of New York, 30 Church Street, on Feb. 5. Those present were C. R. Harte, New Haven, Conn., chairman; F. H. Sillick, New York, co-chairman; C. H. Clark, Cleveland, Ohio; M. W. Glover, Mobile, Ala.; C. H. Lahr, Akron, Ohio; R. J. S. Pigott, New York, and J. P. Ripley, New York. After general discussion to determine the best possible organization the following members were assigned as sub-committees to consider the subjects indicated: To draft a set of standard forms for use with the system recommended by the 1914 committee; J. P. Barnes, Rochester, N. Y., chairman, and Messrs. J. C. Collins, Rochester, N. Y., Lahr and Clark. To revise sub-division of operating maintenance accounts to meet the new Interstate Commerce Commission classifications; F. H. Sillick, New York, chairman; and Messrs. Harte, Ripley and H. A. Gidney, Boston, Mass. To develop a proper ledger for the maintenance of a continuous inventory; F. H. Sillick, chairman; and Messrs. Clark, Glover and Martin Schreiber, Newark, N. J. A general discussion on the broader phases of the subject followed the appointment of committees. The sub-committee on the continuous inventory ledger was scheduled to meet the following day and the other sub-committees were to meet on early dates.

COMMITTEE ON PASSENGER TRAFFIC

This committee, of which P. P. Crafts, Davenport, Iowa, is chairman, has sent out a form for collecting data on one-man car operation, on the effect of the use of automobiles on interurban and suburban passenger traffic and on the motor bus and trackless trolley. The last named does not include the so-called "jitney" bus, which is to be covered in another data sheet. More than fifty main topics are considered, some of these being divided into many sub-topics. The committee wishes full information concerning the extent of one-man car operation, the conditions under which such cars are operated and the results secured. The proposed analysis is very thorough and includes all factors even to details of car arrangement and alterations made in old cars when such were adapted to fit the new service. Opinions are requested as to the effect of the use of automobiles on passenger traffic with details of the methods followed in studying the situation. The motor bus and trackless trolley situation is taken up to determine the effect on trolley lines of the use of these vehicles, especially as to whether the buses act as feeders or as competitors.

PUBLIC SERVICE COMPANY SECTION

The regular meeting of Company Section No. 2 was held in Newark on Feb. 18. In accordance with the program outlined in last week's issue, page 337, the topic of the meeting was electric railway promoting and financing. L. D. H. Gilmour, general solicitor of the company, summarized the history of New Jersey laws under which electric railways are incorporated and enumerated the steps involved in promoting and incorporating a project. He illustrated some of the difficulties of such work by relating several humorous personal experiences. He showed by census returns that, in northern New Jersey, Public Service serves a population of two millions and at the assured rate of growth due partly to nearness to New York, a good future is before the company.

H. C. Donecker, assistant general manager, prefaced his paper with an excellent summary of the benefits of company section activity to the men and their employers. He emphasized the Public Service motto, "Safety, Courtesy, Loyalty." He then contrasted old and new methods of corporation financing, defining clearly such terms as bond, stock, mortgage, car-trust certificate, discount, bonus, "water," etc., and concluded with an explanation of the details of the Board of Public Utilities' supervision of electric railway financing.

MANILA ELECTRIC RAILROAD & LIGHT COMPANY SECTION

In the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 13, page 337, some details of the organization of section No. 5 were given. The first meeting, held on Dec. 15, was a great event in the community. The attendance was over 500 and the meeting was held in the roof garden on the Company's building, which compares favorably with any roof garden in New York.

L. L. Vincent, superintendent of electrical testing, presented a paper on "The Future of Electricity in the Philippines." He first outlined the history of the development of electric lighting and of the telephone and the telegraph, and then analyzed the conditions in the islands as they relate to the use of electricity. In his opinion there appears to be little prospect that the power business will be much more than a by-product of the lighting business for some time to come. He urged the development of the water powers, with government aid if necessary, as a factor in the economic independence of the country and showed the relation of this to electric railroading. He said also "that electrical transportation awaits that condition of intense commercial activity when a people has already amassed wealth, and can afford expensive machinery for applying it," implying thereby that the future of the electric railways in the Philippines will keep pace with the industrial growth of the country.

In closing the discussion C. N. Duffy, vice-president, outlined the relative status of railways, lighting and power in the United States and took a different point of view from that of Mr. Vincent with respect to the future of the local power business.

The executive committee has appointed the following chairmen of committees: Membership, F. J. Tew, superintendent of shops and carhouses; program, C. E. Haywood, superintendent of track; reception, Jerome Grindstaff, inspector transportation department.

MANUFACTURERS' ASSOCIATION

A committee consisting of W. F. Cutler, chairman, E. J. Clark, Edwin B. Meissner and A. S. Partridge, attended the National Foreign Trade Council Convention held recently in St. Louis. The chairman reported that Secretary McConnaughy's office would be furnished promptly with a report of the discussion on foreign trade conditions, to be filed for the use of members.

Another committee, consisting of C. C. Peirce and H. G. McConnaughy attended the third annual meeting of the Chamber of Commerce of the United States in Washington. They call attention particularly to the papers by the Argentine ambassador, Hon. R. S. Naon and Vice-President McRoberts of the National City Bank of New York. The former suggests to manufacturers the desirability of initiative in sending at least small cargoes to Argentina, and especially of their adapting themselves to the custom of not demanding payment on delivery. Mr. McRoberts made a clear statement regarding the practical possibilities of financial investments abroad, showing remarkable opportunities for American manufacturers. Full reports of this meeting will be sent to the members of the association.

COMMUNICATIONS

Important Factors in Steam Railway Electrification

PHILADELPHIA, PA., Feb. 5, 1915.

To the Editors:

Mr. Murray's presentation of the electrification problem, as abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 30, 1914, is most interesting, especially as figures are given for the various costs. These are likely to prevent any careless assumption that electrification should be introduced indiscriminately but that each problem must be studied in connection with its own environment.

Mr. Murray states that the success of electrification is entirely dependent upon density of traffic, but the writer thinks that uniformity of traffic is equally important, otherwise the power plant must be large enough to take care of the occasional "peak loads," and the average load factor may be so low that the savings in operation will be more than overcome by the excessive overhead charges. This was demonstrated several years ago in connection with the New York Central electrification, which showed a saving over steam operation, but if a greater variation in the load had entailed a power plant of twice the size, the economy of operation would have been in favor of steam locomotion.

In the discussion of this paper at the Franklin Institute meeting it was stated that the fuel comparison was made with the former saturated steam locomotives, so that modern superheater engines would probably use only one and one-half times as much coal as the electric power plant, instead of twice as much for the same power at the drawbar. This will very considerably affect the comparison.

In considering the cost of equipment and installation, it is stated that electric and steam locomotives for suburban service would cost about $40,000 and $15,000 respectively, and that for every electric engine purchased the railroad would be justified in making a capital investment of $40,000 to cover cost of power plant and transmission equipment. As the latter depends largely upon the mileage operated, it is evident that a great difference due to environment would exist between a road, like the New Haven with about 1½ miles of track per locomotive, and another, such as the Northern Pacific with 4½ miles to each engine. In the latter case the capital investment per locomotive would be about 50 per cent greater than in the former case. Such an application to terminal yards would be very costly, as the proportional mileage would be even greater.

In pleading for conservatism in these matters, Mr. Murray shows that he has a clear conception of the costs and difficulties in the matter of financing, and does not claim the unconditional advantages assumed a few years ago by some electrical experts, regardless of the local conditions and environment of the properties to be electrified.

GEORGE R. HENDERSON, Consulting Engineer.

Starting Resistance for Railway Motors

NEW YORK, Feb. 16, 1915.

To the Editors:

I have read the article by Professor A. M. Buck, appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 13, 1915, page 330.

I find this study very interesting, especially the graphical solution, which gives a clear idea of how the *IR* drop subdivides itself between motor and external resistance and also shows the variation of the rather elusive counter-emf. A further merit of this study is that it explains clearly how to produce a good equivalent of the saturation curve, which is very seldom in the hands of the railway engineer not connected with the manufacturing concern. A glance at this substitute, which is defined as the "tractive effort per ampere" curve, reminds one of another very familiar curve, the usual speed characteristic curve as it would appear if turned upside down. In fact, it would be easy to demonstrate that if the efficiency of the motor were constant the ordinates of this curve would be proportional to the reciprocals of those of the speed curve. As it is, the variation of the efficiency, which is not very great between the ordinary current limits, alters somewhat the reciprocal relation.

The foregoing consideration is made to point out how this solution to determine the starting resistances, although absolutely different from mine published in the ELECTRIC RAILWAY JOURNAL of Dec. 26, 1914, has, however, some points in common with it. In Fig. 2 of Professor Buck's article the lines of voltage drop correspond to the speed lines in Fig. 6 of my article. Again, in his Fig. 2, we might consider the lines *A'B*, *B'C*, etc., to be corrections of the counter-emf corresponding to corrections in the speed factor in my construction.

As to the practical use of Professor Buck's method, the graphical solution as given is indeed of very simple character and general use, but it saves but a small part of the work required to reach the final determination of the resistances. In this problem the graphical solution is there to check up the final results and to give the first hint as to how the resistance steps are to be chosen. It would require good luck indeed to strike at once the values of resistance which would serve equally well for series and parallel. The fact is that, after having obtained a satisfactory arrangement either for series or for parallel only, we have first to calculate the resistances of the resistors per motor for the position considered, series or parallel, and then to check up to see if the resulting resistances per motor for the other position are acceptable. This operation will very likely have to be repeated. Hence, what we need is not only a simple graphical solution but also simple and quickly usable formulas connecting the data of the figure with the resistances which we wish to determine.

In my method I use $R = (\alpha - 1)\, r$, which is simple enough. In Professor Buck's method the graphical solution gives only voltage drops and counter-emfs, thus saving only part of the work to solve for the values of R in the formulas.

F. CASTIGLIONI.

The Sale of Scrap Metals

PITTSBURGH RAILWAYS COMPANY
PITTSBURGH, PA., Feb. 5, 1915.

To the Editors:

The article in your issue of Jan. 23, 1915, on the "Sales of Scrap Metals" is one which is of particular interest to me, and it seems is entitled to much thought and study by every one who handles such business for any company.

The article states that the average scrap value of copper and brass sold during a period of four years, ending 1911, was 20 cents per pound. There would seem to be some unusual condition surrounding the sale of scrap where such prices were paid, since the average price per pound of new electrolytic copper during the four years mentioned was $.12985, New York, according to the statistics of a national authority. Your readers would undoubtedly be interested in knowing how such prices can be obtained.

The sale of scrap metals at regular intervals is equivalent to a practice by a steel mill or brass foundry of making its purchases of new or scrap metals at regular intervals during the year without regard for the market conditions. If the whole country were canvassed, I doubt whether it would be possible to find any concerns who would do such a thing.

The brains of the organization will be found studying the problem and taking advantage of the market to increase the profits. The scrap dealers make their living by taking advantage of the varying market conditions.

Even though the sale of scrap material is merely an incident to the operation of a transportation company, and inefficiency in this regard would not mean success or failure to the same extent as with a foundry, for instance, yet it is just as important for an electric railway to exercise the brains of its organization in handling such business and taking the profits.

We have observed that with some companies the sale of scrap materials is handled by one who is unfamiliar with the subject, who, himself, has no knowledge of the materials, how it can be assembled and graded to bring the best prices. Some companies large enough to have a considerable accumulation of scrap materials still adhere to the old-time practice of selling "mixed scrap"—meaning that no attempt is made to assort it according to the standard classifications, which specify the grading most convenient for the mills. Where it is not properly assorted it is usually impossible to sell to the mills. The scrap dealer who buys it grades as he loads it or ships the indiscriminate mass to his yard and grades it there. For all of which the company selling the scrap must pay in reduced prices.

There is such a diversity of practice, which is not wholly the result of peculiar local conditions, that it would be interesting to have a discussion through the columns of your journal on this important subject.

Many five-cent fares can be saved right at the scrap pile.

B. J. YUNGBLUTH, General Storekeeper.

[NOTE—In answer to the inquiry in Mr. Yungbluth's letter, Mr. Alexander says that the price of 20 cents in his article in the issue of Jan. 23, referred to copper scrap only.

He states that this was obtained as an average during a six months' period of reconstruction by a medium-sized electric railway in the year mentioned, owing to the high price of copper at that time. He says that the figure was given to indicate the desirability of being able to arrange and carry out sales quickly to take the advantage of good prices that might prevail temporarily.—EDS.]

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Equipment Defects—Controller Reverse Drums and Interlocking Mechanism

BY C. W. SQUIER, E.E.

Reverse Drums.—The most common form of controller reverse drum consists of a wooden cylinder with the necessary copper contacts mounted on it and fastened with screws. Some of the later types of controller have reverse drums made of a molded insulating material and have the contacts molded in place. This is a much better construction as it does away with the trouble of loose contacts due to the working out of screws. The principal argument against its general adoption is that the entire drum has to be replaced whenever the contacts become excessively worn or burned. The wear on the reverse contacts is very small, however, due to the few operations of the reverse drum as compared with that of the main drum. Hence the contacts do not require frequent renewal. As the circuit is never opened on the reverse drum the only cause for burning of the contacts is insufficient pressure of the fingers for carrying the motor current or poor contact between the fingers and their contacts. By proper care of the fingers excessive burning will be prevented and the life of the molded reverse drum thus made equal to that of the wooden drum with less liability to short-circuits.

A type of reverse drum built up of insulating bushings fitted to a shaft and held in place by a clamping nut was developed several years ago. While this type has not come into general use, it has an advantage over the molded cylinder in that the contacts can be easily renewed without the necessity of replacing the complete drum, as the contacts consist of punchings clamped between the bushings.

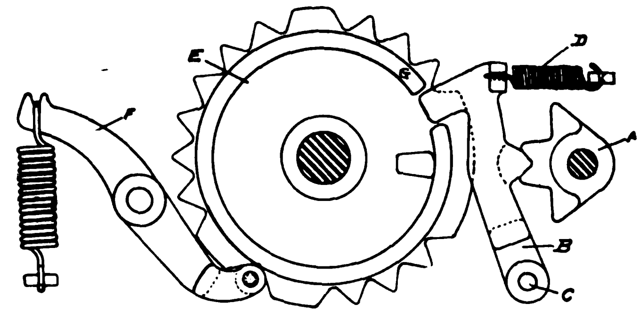
Aside from contact troubles, the difficulties experienced with reverse drums are very few. The drums sometimes become loose on the shaft due to wear on the pins or drum but this is overcome by more frequent renewal, and short-circuits sometimes occur due to the accumulation of oil and dirt on the surface of the drum. Whenever a short-circuit does take place the drum is usually destroyed as no provision is made for opening the circuit on these drums.

INTERLOCKING MECHANISM

Controller power and reverse drums are so interlocked that the reverse drum can be thrown only while the power drum is in the "off" position, and the power drum can not be operated while the reversed drum is in the "off" position. This interlocking prevents the opening of the motor circuit on the reverse drum, as it is necessary to shut off power by throwing the main drum to the "off" position before the reverse drum can be thrown.

One form of interlocking mechanism for a railway controller is shown in an accompanying illustration. The star wheel *A* is pinned to the reverse drum shaft, so that any movement of this drum operates the reverse pawl *B*, which is pivoted at *C* and held in contact with the reverse star wheel by the spring *D*. The main star wheel, which is shown at *E*, is pinned to the main or power drum shaft. *F* is the main pawl, and its function is to make certain that the main drum is stopped only on the operating points of the controller, and not between notches, by the roller at the end of the pawl riding into the different notches of the star wheel. This insures a quick movement in passing from notch to notch and also enables the motorman to feel when he has the controller drum on the various points.

The mechanism as drawn shows a position with both the power and reverse drums in their "off" position. It is seen that the upper end of the reverse pawl *B* fits into an opening in the rib *G* of the main star wheel to lock the main drum against turning. By throwing the reverse drum to either the "forward" or "reverse" position the pawl fits into a deeper notch of the reverse star wheel so that the end of the reverse pawl is withdrawn from the opening in the rib of the main star wheel, and the main drum can then be rotated. As soon as the main drum has been moved from its "off" position, however, the rib *G* on the main star wheel prevents the reverse pawl from moving far enough to permit throwing the reverse drum. The drum is then locked against turning.



DETAIL OF INTERLOCKING MECHANISM

TROUBLES WITH THE INTERLOCKING MECHANISM

The principal troubles experienced with the interlocking mechanism are broken pawl springs and loose star wheels. Most pawl springs break at the first turn from the end. This may be due to improper material or manufacture, or to the method used in installing the springs. The end loops of the springs should be made with a sufficient opening so that these loops may be readily hooked into the eye of the pawl or stationary post where this method of fastening is used. Where the end loops are entirely closed it is necessary to open them when the springs are installed. The usual practice is to open the loops with a pair of pliers or a screw driver, hook the end into the eye and then close the loop slightly again. This is liable to start a fracture in the spring which will ultimately cause it to break. All springs should be made with a large radius curve between the loop and the first turn as sharp bending at this point is often the cause of their breakage later.

When installing springs after the loop has been hooked into the eye, it is necessary to stretch the spring in order to fasten the other end. This is usually done by one of the following methods: By using a pair of gas pliers around the spring, by gripping the loop with a pair of pliers, by using a screwdriver as a lever through the loop, by forcing a screwdriver between the turns of the spring or by using a wire or cord through the loop of the spring. Where the last method can be used, it is the best because it is least liable to injure the spring. Some controllers are so constructed, however, that it is next to impossible to install a spring without straining it.

In a number of cases, I have found that a slight change in the stationary spring post will permit easier and quicker installation of the springs. The practice of forcing the point of a screwdriver between the turns of the spring and then using this as a lever to stretch the spring is very bad. This is sure to force the turns apart, so that they will not close again, thus weakening the spring. The turns at this point suffer a severe strain as well.

I have seen controller men use a blow-torch to take the temper out of the springs to make them easier to install. They were also under the impression that it was the tension that caused the springs to break, and that by taking the temper out of them the troubles due to breaks would decrease. It is needless to say that such a spring is worthless in a short time because it takes a permanent set too readily. The best design of interlocking mechanism is one in which all the parts are carried on the controller cap plate, so that when this is removed the entire mechanism is open to inspection, and any necessary renewals can be made quickly and easily at the bench.

Car Life of Plain Curves

BY M. BERNARD, ASSISTANT ENGINEER WAY AND STRUCTURE DEPARTMENT BROOKLYN RAPID TRANSIT SYSTEM

Not many data seem to be published concerning the life of open-hearth steel rails in comparison with manganese steel rails located in curves. For this reason the following service study may be of interest to other way engineers.

The curves in question are located under the Brooklyn Bridge deck near Fulton and Tillary Streets, Brooklyn; the inner (east-bound) curve is at the foot of a 4.5 per cent grade while the outer (west-bound) curve is located practically in a horizontal plane.

EAST-BOUND PLAIN CURVE

Installed	Construction	Renewed	Life	Number of Cars
December, 1907	70 lb. A. S. C. E.	April, 1909	1 yr. 4 mos.	750,000

Running rail with guard of same section.
Open-hearth steel.
Estimated cost of 1907 installation, $600.

RENEWAL OF EAST-BOUND PLAIN CURVE

Installed	Construction	Renewal	Life	Number of Cars
April, 1909	80 lb. A. S. C. E.	Probably July, 1915	6 yr. 3 mos.	3,525,000

Manganese steel double-web section for inner rail as shown in sketch.
Open-hearth steel 80-lb. A. S. C. E.
Running rail with bolted-on rolled guard for outer rail.
Estimated cost of 1909 installation, $1,600.
Inside radius of middle portion of this curve, 37 ft. 7½ in.

WEST-BOUND PLAIN CURVE

Installed	Construction	Renewed	Life	Number of cars
December, 1907	70 lb. A. S. C. E.	June, 1911	3 yr. 6 mos.	1,290,000

Running rail with guard rail of same section.
Open-hearth steel.

Installed	Construction	Renewal	Life	Number of Cars
June, 1911	80 lb. A. S. C. E.	Probably March, 1916	4 yr. 9 mos.	1,750,000

Open-hearth steel.
Inside radius of the middle portion of curve, 47 ft. 7½ in.

The foregoing comparison will give an approximate idea of the relative values of weight of rail and kind of steel in curves. It shows also the influence of grade upon the life of curves.

Maintenance of Cars at Rome, Ga.

BY A. WADE, MASTER MECHANIC, ROME (GA.) RAILWAY & LIGHT COMPANY

We operate five equipments of 12-A motors, one 92-A, two 101-B, one GE 52, one GE 54, six GE 67 and four GE 219. All of these motors are mounted on single trucks, with cars averaging 11½ tons in weight. The data follow:

	1913	1914
Total car-miles	607,100	627,428
Total cost of maintenance of cars	$8,892.78	$8,176.48
Total maintenance of cars per car-mile, cents	1.465	1.303
Total cost of oil for cars and truck curves	$153.61	$151.97
Cost of oil per 1000 car-miles, cents	25.31	24.22
Average mileage made by 33-in. chilled iron car wheels	46,700	39,214
Average energy required to operate cars per ton-mile, watts	143.0	135.9
Derailments	56	33
Car failures	10	7

The low wheel mileage in 1914 was due to several broken axles, which prevented the wheels on such axles from being used up to the limit of their useful life.

In the item of "car failures" we have listed only the car failures that were serious enough to delay the schedule ten minutes or more.

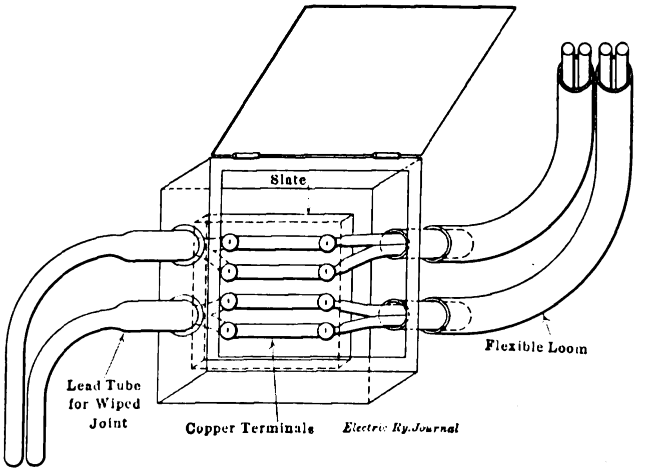
In the item of "average energy required to operate cars per ton-mile" we have metered, at the d. c. busbars at the power house, the entire kilowatt hours required to operate the motors, heaters, interior lighting, arc headlights, and we have also included the line losses.

A Home-Made Junction Box

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES, SAULT STE. MARIE, MICH.

The accompanying illustration shows a home-made junction box, installed between paper-insulated, lead-covered and extra flexible rubber-insulated loomed cables.

A short time ago a steam drive for a drawbridge was replaced by an electric motor. The cables for the motor energy supply were installed underground in clay ducts and the ends were run up the center pier of the bridge. From the base of this center pier a coil of extra flexible, rubber-insulated and loomed cable was run, so arranged that when the draw swings out the coil will unwind, and when the draw swings in the coil will rewind. The problem, however, was to find a suitable junction box which would permit the lead-covered cables to stay in place permanently while the flexible cables could be disconnected after due wear without breaking a costly wiped joint.



JUNCTION BOX INSTALLED ON CENTER PIER OF DRAWBRIDGE TO CONNECT STRAIGHT RUN AND FLEXIBLE CABLES

Several catalogs were examined for a suitable pothead but without success, because the clearance between the steel and the masonry was too small to permit the use of a standard pothead. The problem was solved by making a steel box with a hinged and rubber-gasketed cover into which was placed a slate slab cut from an old switchboard and drilled for four copper terminals, with thumbscrews on each end of the terminal. On one end of the box two lead sheaves were soldered to take the lead-covered cables and to make a wiped joint, while the other end of the box was fitted with two iron-pipe nipples to take the loomed cables. Lugs were put on the cable ends and secured to the terminals, after which the box was filled with hot ozite compound. The job was finished by coating the outside of the box with weatherproof paint.

Maintenance Costs—Reducing Handling of Equipment and Departmental Co-operation

BY H. A. LEONHAUSER, ASSISTANT SUPERINTENDENT ROLLING STOCK AND SHOPS UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE, MD.

Much has been said and published in the past two or three years in regard to maintenance costs of railway equipments, while but little has been published as to the enormous saving that could be effected by proper schedule speeds, proper car spacing, proper handling of equipment by the platform men, especially the motormen, and proper co-operation of the several departments; namely, transportation, power and overhead line, maintenance of way and purchasing.

The operating department as a rule endeavors to bring its receipts per car-mile up to the highest standard. In order to accomplish this it generally does three things: first, reduces the running time, which, of course, means greater speed; second, reduces the lay-overs, and third, lengthens the headway, which means increased capacity and weight of car. The first means that the equipment is called upon to withstand conditions for which it was not designed; namely, the improper handling by the operator; the second and third mean the overloading of the motors, axles, springs, etc., thereby increasing the maintenance costs decidedly, to say nothing of the possibilities of increasing the troubles of the claim department as well as loss of revenue due to the inability of the conductor to collect all fares.

There is not the slightest doubt in the minds of those who are in charge, or those who have studied maintenance costs, that a saving of at least 25 per cent can be effected by the proper schedule speed, spacing, and, above all, the proper and careful handling of the equipment while in service. There is a great difference in motormen. Some take an interest in the equipment generally, which means not only an enormous saving but adds much to the safety and comfort of the riding public, while others do not take the proper care and interest. It is the men in the latter class who are responsible for many failures, delays and increased costs generally. It is not uncommon to see a motorman operating a car with the controller on the proper running notch either in series or in parallel with the brakes applied. If we stop to analyze this particular "stunt" to find out what it means we can readily see without the slightest doubt how it increases the maintenance costs.

IMPROPER CONTROLLER MANIPULATION WITH BRAKES ON

First, improper controller operation with brakes on means the overloading of the motors. This causes a decided rise in temperature, which means deterioration of the insulation and consequent burn-outs of armature and field coils, burning off of leads, and the flashing at the brushes, which frequently extends to the motor frame, melting a portion of the brush-holder as well as the spring. The last trouble leads in many instances to controller explosions which, in turn, add to the troubles of the claim department. Further unnecessary and frequent blowing of the circuit breaker increases the maintenance costs of that part of the equipment and also disturbs, even if it does not frighten, the passengers. In cutting out the controller a much heavier current is broken, and when we consider how often a controller is cut out in a day (to say nothing of a year) we can readily understand how this cutting out increases the cost due to excessive burning of the fingers, tips, contact plates and arc dividers. These troubles also lead more or less to controller explosions.

If the motorman dwells on the resistance points under the conditions aforesaid the resistors reach a red heat in a few moments, causing the mica tubes to break down and the grids to warp; the same result applies particularly to grades without the brakes applied. It is far better on steep grades to bring the car to a stop and then start up with the controller on the series notch or running point, rather than to cut in and out continually. The latter action not only makes resistance defective in time but is severe on gears and pinions.

Second, the application of the brakes with the power on means the grinding away of brakeshoes and wheels. Both are very expensive items, wheels especially so. It has been my good fortune, as well as duty, to inspect all worn-out wheels in this city for many years. It is appalling to one who has had years of experience in the inspection of cast-iron car wheels to see so many relegated to the scrap heap, when they should have given approximately from four to six months' further service; or in other words from 12,000 to 20,000 miles more.

RUNNING OVER SPECIAL WORK

Third: "Run slow through switches, curves and over crossings" is a splendid rule. What does this rule mean? It means that we would have very few broken or bent trolley poles, bent trolley wheels, broken or torn-off trolley boards, and last but not least, damaged hoods. What does it mean to the overhead line department, and still more, what does it mean to the maintenance of way department? In so far as the latter department is concerned, the passing or running over crossings or special work soon hammers them out of shape, bringing or diverting the trouble again to the car equipment, resulting in bent axles and chipped and broken flanges. Passing or running through switches too rapidly very often causes the rear wheels or truck to jump the switch. This generally means considerable damage and expense to the equipment, to say nothing of the possibility of disabling the car by breaking off motor leads, etc., or of bending the brake rods.

CORRECT USE OF AIR BRAKES

Further, the proper and careful handling of air brakes means a great reduction in maintenance costs to those in charge of the equipment. An air brake is really a luxury and should be looked upon as such by all motormen. To stop an ordinary 42,000-lb semi-convertible car in city service under average rail conditions, two applications, or two movements of the valve, are sufficient. Yet in many cases motormen make from four to six applications, thereby wasting from 50 per cent to 60 per cent of the air. This increases the maintenance considerably, due to the grinding in, or scraping, of the valve parts. In short, wasting air means increased energy consumption, as well as increased maintenance costs for the electrical and mechanical parts of the compressor, for the governor, brake cylinder, brake levers, rods, pins, wheels and shoes. One more point is the heavy shock that is transmitted to the transom bars by failure to exhaust the air to make a smooth and even stop. This adds appreciably to the maintenance account, to say nothing of the inconvenience to passengers, especially to those who are standing.

FLAT WHEELS

The question of flat wheels is another item that is directly in the hands of the motormen as one which not only increases maintenance costs decidedly, but also brings into play the wheel grinder with costly carborundum wheels and expensive energy or truing shoes, to say nothing of rail corrugations. Another point which should be kept before the motormen is that flat wheels not only pound and loosen bolts, but are detrimental to the equipment generally. They also lead to complaints from the public, and officials of the company know where these complaints generally end.

STORMS

Operating and drifting through water slowly and carefully again depends upon the judgment of the motorman. Lamps should be turned on at the beginning of an electrical storm. The spinning of the wheels during a snow storm may be avoided by the proper feeding of the controller as well as the use of a little sand at the right time.

DAMAGES

Motormen as a rule believe that the angle-iron bumper will stand all sorts of abuse, simply because it is called a bumper. When they bring cars into the carhouse, either during the day or night, they strike the bumper of the car ahead, bending both. This practice is very bad indeed, as the platform knees which support the bumper are generally bolted to the crossing and side sills by one bolt passing through each knee. The heavy bolts which pass through the end sills simply carry the platform. There should be a strict rule demanding that a small space must always be left between bumpers.

In passing vehicles, panels frequently are damaged. What the motorman terms a scratch in reality means the removal and replacement of three or four panels, together with their painting, striping, lettering and numbering. All of this spells a large sum.

Grab-handles of both open and closed cars are frequently knocked loose in passing vehicles, but at times this fact is not reported promptly, which, aside from the repair charges, makes trouble for the claim department. Passing over stones and other foreign substances causes the breakage of gear cases, with possible derailments and long delays. The motormen should be instructed to stop the car and remove the stone or foreign substance.

MOTORMEN'S DAILY REPORT

It is of the utmost importance to the mechanical department that the motormen should turn in reports properly and carefully marked covering any and all defects, promptly for each and every car that they operate at any time.

INSTRUCTIONS TO MOTORMEN

The writer does not believe in trying to crowd a lot of "stuff" into the heads of motormen. On the contrary, he believes that they should be taught a few, and only a few essential things; namely,

1. Safety first.
2. Cutting out the defective motor or motors and doing it properly.
3. The right way of placing the coupling link and pin in order to make proper, safe and quick coupling.
4. Proper braking.
5. To know when wheels are sliding or revolving.
6. To use sand on a "bad" rail while wheels are revolving in making a stop.
7. To cut in and out the controller as little as possible.
8. To drift as much as possible and use the brakes as little as possible, and to use the reverse only to avoid an accident.

DEPARTMENTAL CO-OPERATION

The writer is a firm believer in the old adage, "People living in glass houses should not throw stones." Therefore he will go after the rolling stock and shops department first.

It is of the first importance to design a car that will properly meet the requirements of city service and appeal to the public. The writer has always maintained that the single-truck car is the only car for city service, and that a modern, comfortable car body of the pay-within semi-convertible type seating forty-two people would earn the largest dividends. Let us see from the following comparison whether this statement is correct:

SINGLE-TRUCK CAR (SEMI-CONVERTIBLE)		DOUBLE-TRUCK CAR (SEMI-CONVERTIBLE)	
Cost, approximately	$2,700	Cost, approximately	$5,200
Seating capacity	42	Seating capacity	42
Weight, approximately, pounds	22,000	Weight, approximately, pounds	42,200
Trucks	1	Trucks	2
Wheels	4	Wheels	8
Axles	2	Axles	4
Journal bearings	4	Journal bearings	8
Journal boxes	4	Journal boxes	8
Brakeshoes	4	Brakeshoes	8
Gears	2	Gears	4
Pinions	2	Pinions	4
Motors	2	Motors	4
Trolley base	1	Trolley bases	2

In addition to the foregoing we must consider that the differences in the design of the controllers and in the number of brake levers and brake parts also favor the single-truck car most decidedly. Again the difference in energy consumption, feeder distribution, the pounding of crossings, maintenance of all special track work, etc., must also be taken into account. Other items may also be added. Finally, when it is considered that a car runs nineteen hours on an average all-day schedule and that for fifteen of those hours a single-truck car would carry all of the passengers without inconvenience, leaving a few extra single-truck trippers to take care of the rush-hour surplus, it is only fair to conclude that the single-truck car eventually will replace the double-truck car for city service. In fact, the writer can see no other answer, since both labor and material have increased steadily for the past twelve years, while the nickel must carry people further than ever.

POWER AND OVERHEAD LINE DEPARTMENT

Increases in rolling stock costs in a great many instances are brought about by high voltage playing havoc with the older types of equipment, and picking the "bugs" out of modern equipments, especially at or near substations. Numerous brush-holder troubles and controller explosions have been due to this cause. On the other hand, low voltages lead to the heating of the motors and compressors, the burning of the governor contacts and to low air pressure, which is followed by bad braking.

The failures and damages due to bad alignment of the trolley wire or slack wire and malleable-iron frogs are as follows: Badly bent and twisted trolley poles, broken hoods, and trolley boards torn from the roof of car. In many instances the use of a malleable-iron frog is responsible for pitted wheels. Such wheels arc, causing the burning of the trolley wire and the early scrapping of the wheel itself.

MAINTENANCE OF WAY DEPARTMENT

Having had the opportunity of inspecting and passing on all worn-out or defective wheels for the past ten to twelve years in our city, I have reached the conclusion that a girder-grooved rail is very expensive from the standpoint of both cast-iron and steel wheels, owing to the fact that it causes very irregular flange wear. Cast-iron wheels particularly are frequently relegated to the scrap heap for this reason. Loose and broken crossings, as well as loose switches, are responsible for many chipped flanges, especially on pilot wheels, and are liable to cause derailments which lead to damages to the electric equipment, car body and brake rigging generally. In both instances the mileage of the wheel is greatly reduced. Broken tie-rods and badly-worn crossings, especially steam railroad crossings, are responsible for many bent axles; the former are responsible for the sudden swerving of the car, especially a single-truck car; the latter are due to the hard jolt. The flat, square flanges caused by badly-worn rail necessitate the removal of the wheels while they still possess plenty of chill and mileage. Badly-worn rail also leads to the rapid destruction of both bodies and trucks.

PURCHASING DEPARTMENT

The purchasing department can be of invaluable assistance to the rolling stock and shops department by keeping in close touch with the superintendent of that department and his assistants. This is absolutely essential for the following reasons: To combine quality with price; to inform it about the performance of the material that has been purchased; to maintain at all times an adequate stock of repair parts; to promote better deliveries. It is also absolutely necessary that reliable, intelligent men should be selected to assist the storekeeper to keep up a regular and legitimate stock of all standard supplies. To be out of supplies means very often the shopping of the car or cars, or else their temporary retention in service before going to the shops. Then the cost of renewing or replacing the part or parts is much higher because the difficulties have increased. Volumes could be written on this subject, but the fact still remains that in order to assist the rolling stock and shops department to operate economically it is necessary for the purchasing department to bear in mind the following:

1. Have reliable and intelligent help.
2. Eliminate the stories "just out," or "it has been shipped," etc.
3. Get the best at the best price.
4. Secure prompt deliveries (no fake promises).
5. Keep up your stock and save us from losing our religion.

CONCLUSION

The writer has tried to show in a very brief manner how maintenance costs of car equipment can be reduced, aside from the rolling stock and shops department, by the co-operation of the heads of all departments and employees generally. He earnestly hopes that he has not offended anyone; not even our own gray-haired, congenial purchasing agent, who has caused him on numerous occasions to warm up considerably under the collar.

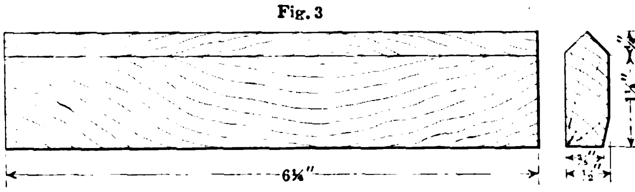
Block to Protect Switch Blades of Type K Controllers

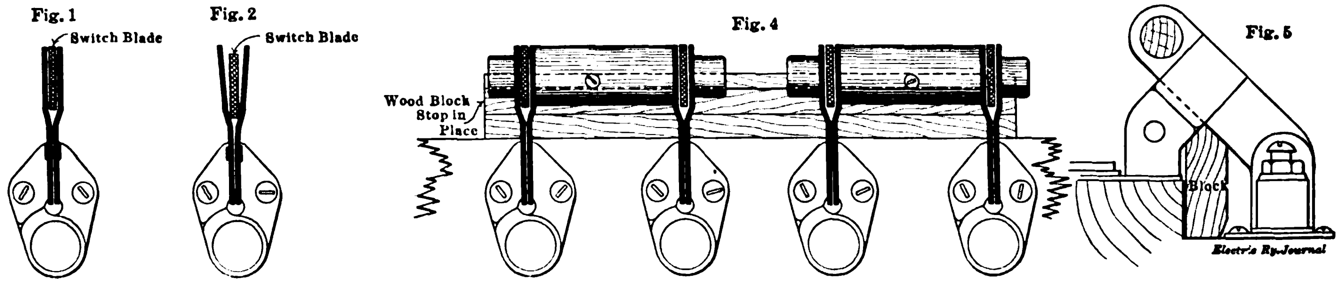
BY R. H. PARSONS, ELECTRICAL FOREMAN

The later patterns of Type K controllers are fitted with motor cut-out switches constructed of two metal strips riveted together, replacing the older ones which were cast solid of bronze or similar composition.

After many of the common controller troubles have been eliminated by redesign, special care, etc., it will be found that a large number of controllers still give trouble from failures caused by burning or poor contact of the cut-out switches. Perhaps some careless shopman has allowed the car to go out with the blade bent or the clips out of position. Again, the motorman, in a hurry to make time, imagines that he has a grounded motor because his circuit breaker is blowing. So he cuts out first one and then the other switch, hoping to overcome the trouble. Sometimes he replaces the switches properly but often he leaves them in only partly or else uses his controller handle to drive them down hard, with the result shown in Fig. 2 instead of retaining the correct position shown in Fig. 1. The usual consequence is a poor contact which heats up the switch and melts the solder from the wires at their connections back of the terminal board.

Fig. 3





FIGS. 1 AND 2—PERFECT AND IMPERFECT CONTACT OF SWITCH BLADES. (ELEVATION 45 DEG. TO HORIZONTAL); FIGS. 3 AND 4—WOOD BLOCK SWITCH LEVER STOP IN PLACE; FIG. 5, APPLICATION OF BLOCK

To overcome this trouble a block has been designed constructed as shown in Figs. 3 and 4 and applied as shown in Fig. 5. This block is screwed to the terminal board under the switch blade, in which position it so limits the travel of the blade that the blade cannot be forced down to spread the contacts.

The block is made of well-seasoned hardwood and is fitted accurately. After finishing the block smoothly, it is treated like controller boards, as described by the writer in the issue of Jan. 2, 1915. The block illustrated is used in a K-27 controller. Its dimensions, of course, vary according to the type of controller used.

The Southwestern Electrical & Gas Association has increased its active membership to 125 public utilities in Texas. Its membership now includes every interurban line in the State and all but two of the street railways.

Pennsylvania Locomotive on Turntable at Panama-Pacific Exposition

One of the mammoth exhibits to be made at the Panama-Pacific Exposition will undoubtedly be that of the Westinghouse Electric & Manufacturing Company. This exhibit will include one of the Pennsylvania Railroad locomotives mounted on a turntable.

The location of the turntable is under the center of the dome of the immense transportation building at the junction of the two main aisles. The turntable is 65 ft. long, and, including the locomotive, weighs 440,000 lb. The height of the track is 12 ft. above the floor, and steel ties are used, a new type of construction for this class of work. By means of a 10 hp., three-phase, 220-volt motor the turntable is caused to revolve at a rate of once in three minutes, thus giving the crowds in each end of the building different views of the locomotive. The rotation, which can be reversed, is under the control of an operator in a booth nearby.

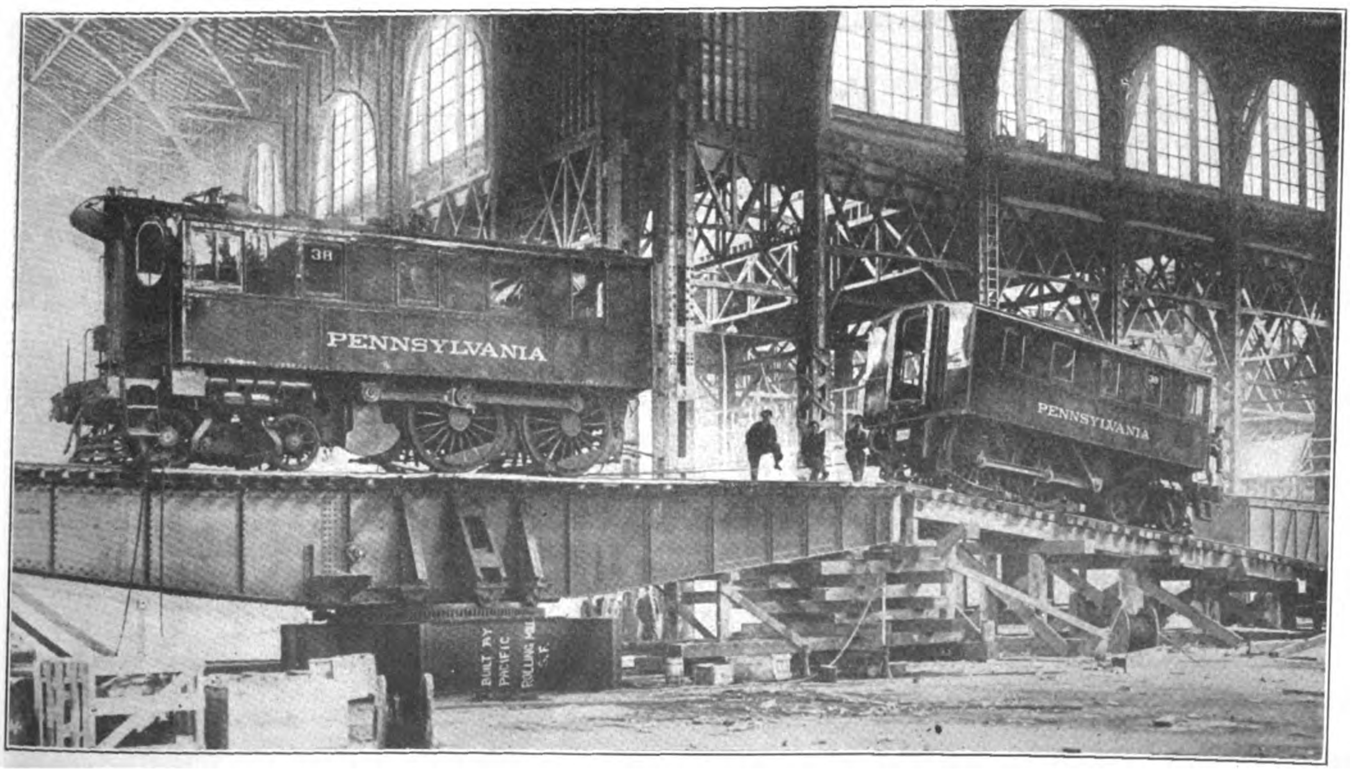
An unusual method of collecting the current for lighting the locomotive is employed. This was designed by the Westinghouse engineers and involves bringing the leads up through the center bearings to collector rings, thus obviating the use of third-rail shoes or trolleys. The locomotive is arranged and lighted to permit visitors to pass through it and inspect the equipment. It is clamped to the turntable by means of steel bands to prevent any possibility of its becoming dislodged.

This locomotive is said to be the largest in the world in passenger service. It consists of two units and weighs 156 tons, and is the first side-rod gearless locomotive ever placed in service. It has two motors having a total capacity of 4000 hp, and Westinghouse unit switch control equipment of the HBF type, which has made the phenomenal record of 99,549 miles per train minute delay due to power control failure. Locomotives of this type haul 12,000,000 passengers annually over the electrified terminal of the Pennsylvania Railroad from Harrison, N. J., to Pennsylvania Station, New York City. These locomotives are capable of attaining a speed of 60 m.p.h. with full load.

OTHER EXHIBITS

In addition to the locomotive, the newly-developed Types PK and HL control for railway motors will be shown in operation. These control equipments will operate motor racks equipped with 40-hp motors. The PK control operating head can be applied to any standard Type K controller.

A complete line of commutating-pole railway motors, including box and split frame types for various voltages from 600 to 1500, will also be shown, and in addition a preliminary sample of the new pressed steel railway motor.



PENNSYLVANIA LOCOMOTIVE EXHIBIT AT PANAMA-PACIFIC EXPOSITION UNDER WAY

Portable Fault Localizer

A portable fault localizer, for quickly locating a ground on a power cable, is now being marketed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The position of a ground is read directly off the dial in terms of per cent of length of defective cable. It is an application of the wheatstone bridge with all the necessary apparatus contained in one portable case wired for connection to the circuit to be tested. Its use assumes that the cable is grounded at only one point and that a parallel conductor of the same length and resistance as the faulty cable is available.

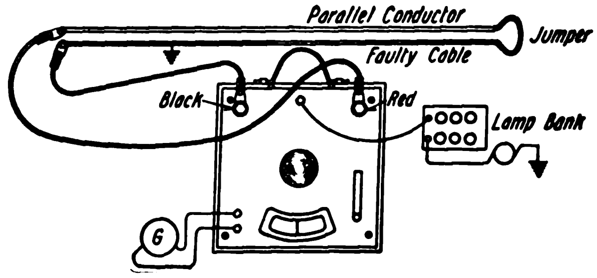


DIAGRAM OF CONNECTIONS FOR PORTABLE FAULT LOCALIZER

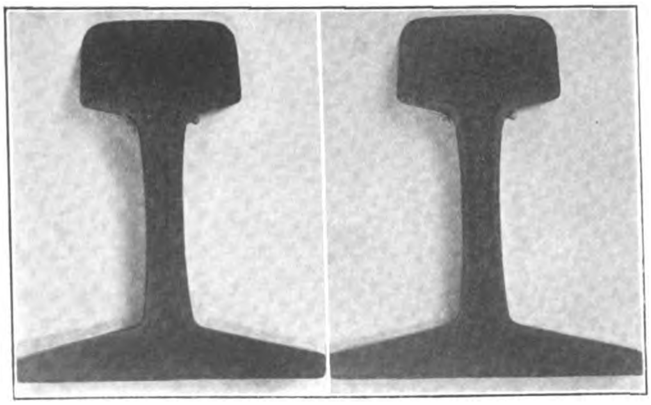
After proper connections are made, a dial on the instrument is revolved by means of a knob in the middle of the localizer until the galvanometer shows no deflection when the key is closed. The reading of the meter then gives the percentage of length of the feeder from the point where the test is being made to the location of the ground, assuming the total length of the feeder to be 100 per cent; the red scale indicating that the ground is on the conductor connected to the binding post marked red, and the black scale indicating to the binding post marked "Black." Direct current only is used in these tests.

The fault localizer consists of a polished wooden case which contains all the parts necessary for the test except the source of direct-current supply and the leads to the cables. Two styles are furnished, one containing a galvanometer and the other for use with a separate galvanometer. The variable resistance arms consist of two loops of low resistance wire attached to the side of a revolving disk, upon which the dial is attached, so that contact is easily made from two brushes attached to the case and connected to the galvanometer terminals. As the disk is revolved the point of contact between the brushes and the resistance loops is thus varied, as in the slide-wire bridge. The dial is calibrated in percentage of the length of the conductor tested, so that the reading is direct.

The galvanometer is highly sensitive, having a "unipivot" bearing which does not have to be leveled to take readings. It can be used for general testing wherever a portable galvanometer of its sensibility is desirable, and can easily be removed from the case when this is desired. It has a resistance of 5 ohms, full scale reading 0.00036 amp, and sensibility 0.00001 amp per division.

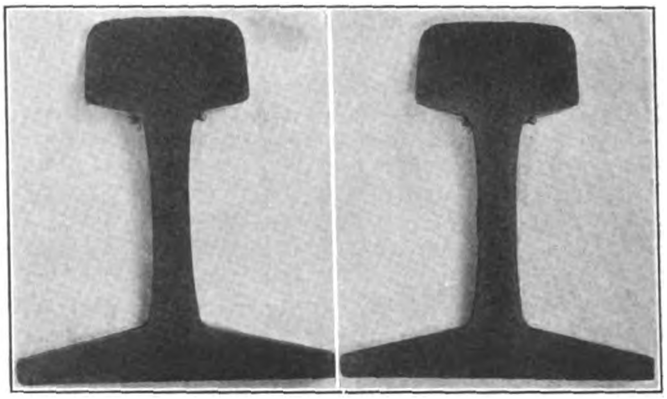
A Test of Vanadium Rails

Two 100-ton heats of vanadium steel for rails were recently made for the Delaware, Lackawanna & Western Railroad by the Pennsylvania Steel Company, the rails being rolled to the railroad's 105-lb. section. These heats were made according to the standard composition that was being regularly furnished to the railroad, excepting for the addition of vanadium and the reduction of from 0.10 per cent to 0.15 per cent in the carbon. The vanadium rails were required to meet the same drop test requirements as to deflection and ductility that are prescribed in the standard specifications of the Delaware, Lackawanna & Western Railroad, which call for a minimum and maximum deflection for the first blow.



RAIL TEST—ETCHED SECTIONS OF CARBON-STEEL RAILS FOR DELAWARE, LACKAWANNA & WESTERN RAILROAD

The tests showed that, although the vanadium rails were from 10 points to 15 points lower in carbon than the standard rails rolled by the Pennsylvania Steel Company, they had about 40 per cent higher elastic limit, or useful strength, combined with increased tensile or ultimate strength. The vanadium rails also showed greater hardness. With the increased strength and hardness, they showed the same deflection under the first blow of the drop test and slightly better ductility than the carbon-steel rails.



RAIL TEST—ETCHED SECTIONS OF VANADIUM RAILS FOR DELAWARE, LACKAWANNA & WESTERN RAILROAD

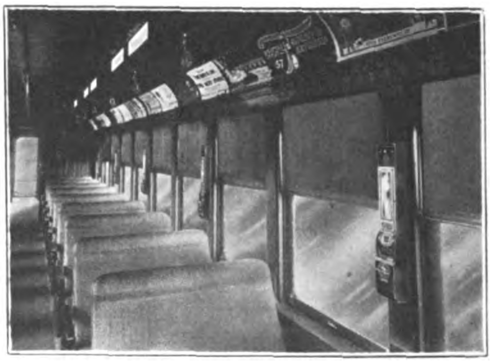
The following table gives minimum figures obtained from test pieces in eight different locations in the rails from each of the heats:

	Vanadium	Carbon
Elastic limit	80,000 lb.	56,000 lb.
Tensile strength	137,000 lb.	126,000 lb.
Elongation in 2 in.	9 per cent	9 per cent
Reduction in area	14 per cent	13 per cent
Hardness (Brinnell)	277	255

The drop tests were made with a 2240-lb. tup falling from a height of 19 ft. These showed deflection that were, in all cases except one, within 8 per cent of 1 in. after the first blow, and between 1.8 in. and 2.0 after the second blow. Two vanadium rails out of six in the drop test broke at the third blow.

Vending Machine for Cars of Two Pennsylvania Electric Lines

The Wilkes-Barre & Hazleton Electric Railway and the Lehigh Traction Company, Hazleton, Pa., have lately installed on their cars a penny-in-the-slot vending machine furnished by Scott E. Drum, Hazleton, Pa. These machines are of the compact design necessary for car service, their dimensions being only 24 in. high, 3 in. wide and 2¾ in. deep. To install, the back of the machine is first attached with four screws to panels between the windows. Then the front is locked on to this back. The front has an attractive French beveled plate mirror 7 in. long and 2 in. wide, set in a frame of German silver. The machine is of metal and the finish is in mahogany. The machine is arranged to return the coin in case the article desired is out of stock.



CAR VENDING MACHINES AS INSTALLED FOR PENNSYLVANIA ELECTRIC RAILWAYS

News of Electric Railways

NEW YORK COMMISSION INVESTIGATION

A Summary Is Presented of Testimony by Commissioners Wood, Cram and Williams

Both Robert Colgate Wood and J. Sergeant Cram of the Public Service Commission for the First District of New York were the witnesses before the Legislature's investigating committee on Feb. 10. Mr. Wood was examined first. He would want to consult the legal advisor of the commission before he could state finally whether or not he believed complaints against officers of public service corporations should be turned over to the District Attorney with prison sentences if convicted of misdemeanors. He did not know that the orders of the commission were being violated by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company until the transit bureau had brought them to his attention in December. He had spoken to Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, about the alleged violations in New York and Mr. Hedley had promised to remedy the matter.

Mr. Cram said he seldom used a city automobile before he hurt his leg, about a year ago. Thereafter the car was sent to bring him to commission meetings which otherwise he might not have been able to attend. In contradistinction to Chairman McCall of the commission Mr. Cram said three commissioners could do the work if competent men were secured. The sum of $15,000, the salary paid to each commissioner, was large, but New York was an expensive place in which to live, and really competent men could make much more money in private business. To have a really effective commission there should be a fixed tenure of office and the commission should not be made the buffet of politics. As to whether the commission was efficient Mr. Cram said that if he were asked questions he would answer. The committee could not compel him to express opinions. Mr. Cram, who is a lawyer, did not read the public service commission law the same as counsel for the committee. He kept no track of the time he spent at the commission meetings. He stayed until his work was done. The meetings of the commission were a joke. He said: "They called it a meeting of the committee of the whole. That consisted in passing judgment first and holding a hearing afterwards." He left the disposal of informal complaints to the staff, which he understood was efficient. The companies always tried to obey orders, but at times could not. The difficulty about penalty actions was that "intent" to disobey orders could seldom be shown. The companies were not "habitual lawbreakers."

At the session of the committee on Feb. 11, both Commissioners Williams and Wood were questioned in regard to the recent subway signal award. This contract was approved by Commissioners Williams, Cram and Wood. Three years ago Commissioner Wood and the president of one of the signal companies which had sought to retain him called on Chairman Willcox of the commission in regard to the signals, but they decided that it was too early to arrange details. Mr. Wood dropped the matter there and had not seen the president of the company for two and one-half years until he called regarding the new contract. Suits for infringement of patents had been threatened. He did not delay matters. At the end he was convinced by the attorneys for the Brooklyn Transit Company that a bond would cover any liability for patent litigation.

Commissioner Cram was questioned at length in regard to the operations of the New York & Queens County Railway. Colonel Hayward, counsel for the committee, read into the records a statement of the ownership of stock of the New York & Queens County Railway by the Interborough Rapid Transit Company and a comparison of the cost of operation of the power plant, cost of power purchased and yearly deficit of the New York & Queens County Railway for the years ended June 30, 1904, to June 30, 1913, inclusive.

On Feb. 13 Commissioner Williams entered an emphatic protest against the proposal to take from the commission the work of constructing the new subways and to hand it over to the Board of Estimate. Mr. Williams said that it was immaterial to him whether or not he stayed on the commission. He had done his duty, but he did not want to see a law destroyed that was so well thought of by Governor Hughes. It would be well if some means could be devised by which complaints could be disposed of more expeditiously than at present, but he denied that the informal complaints to which the committee had called attention were typical of those which were presented to the commission. Not enough had been said at the hearings about what the commission had accomplished. He intended to prepare a statement for the committee in which the work of the commission and its achievements would be set forth in detail. At the hearing on Feb. 15 Mr. Williams was questioned more particularly in regard to the adequacy of the service furnished by the Brooklyn Rapid Transit Company. The witness indulged his propensity to make speeches rather than to reply direct to questions, and the members of the committee criticised him for this. The question of more cars for the Brooklyn Rapid Transit Company was traced from its inception in July, 1911, in case No. 1438, which came up before Commissioner McCarroll. Colonel Haywood reviewed briefly the hearings, many of which were adjourned without any testimony having been taken.

The New York *Evening Post* of Feb. 12 contained an interview with Senator Thompson, chairman of the joint committee conducting the investigation, in which that gentleman was quoted as saying that the committee had made up its mind to give the State a law about the constitutionality of which there will be no question. He said the committee would be at work two weeks longer and that it would call members of the Interstate Commerce Commission.

FUTURE PLANS OF NEW HAVEN RAILROAD

The directors of the New York, New Haven & Hartford Railroad on Feb. 16 announced the plans for future operation as recently authorized by the board. These plans, which follow closely the decree of the United States Circuit Court entered last October, have been submitted to the Public Service Commission of Massachusetts for approval. They pledge the company to concentrate attention hereafter on the railroad property itself, to wind up as soon as practicable all its connections with subsidiaries not directly affecting the prosperity of the main line properties and not to acquire any new properties. The Housatonic Power Company will be sold with the exception of the undeveloped water rights of the Housatonic River, which will be necessary to provide power for the electrified division between New York and New Haven. The large real estate holdings along the New York, Westchester & Boston Railway held in the name of the Millbrook Company, will be sold as soon as proper prices can be obtained. The New York, Westchester & Boston Railway itself will continue to be under the operation of the New Haven company, the directors now intending to develop the territory in the belief that the line will become a paying investment. In the meantime, the company is to be consolidated with the Westchester Northern Railroad, a company which was formed in 1912 with the intention of building an extension to the New York, Westchester & Boston Railway from White Plains to Danbury, Conn. No construction work has yet been undertaken on this proposed extension.

THE CINCINNATI FRANCHISE

The Federated Improvement Association on Feb. 11 adopted a resolution to the effect that the organization will, under certain conditions, relinquish its opposition to the franchise granted the Cincinnati, Newport & Covington Street Railway by the city of Cincinnati. Three changes in the franchise are desired by this organization, namely, that the company agree to remove its tracks from any street in the city that may be wanted for the use of the interurban loop system, that it will never charge as fare between any two points in Cincinnati an amount greater than is charged by the Cincinnati Traction Company, and that if at any time the Cincinnati Traction Company decides to operate its cars by other means than the overhead trolley, it will adopt the same means. The ordinance would have to go back to Council for these amendments. This company has already accepted the franchise offered it and filed a bond of $25,000 to insure that its terms will be observed. In addition, it has notified the Council in writing that it will change its route to accommodate the interurban loop plan, if that becomes necessary.

On Feb. 17 Polk Lafoon, secretary of the Cincinnati, Newport & Covington Street Railway, sent a communication to the association in which he pointed out the unreasonableness of re-submitting the ordinance to the City Council in order to avoid the expense of an election, because the organization is not in position to prevent a referendum vote on the amendments, after they are made, and the expense would be incurred any way. The number of signatures this organization secured to its petitions was 714, while Mr. Bigelow's organizations secured 10,276, and the number filed for a special election was 30,960. He assured the organization that the city would have the right to use the streets on which the company's franchise is granted for the rapid transit interurban loop, if it so desired and that competition would keep the rate of fare as low as that charged by the Cincinnati Traction Company. As to the change in mechanical equipment, he said no determination could be reached without knowing what such a change involved, but he did not anticipate any trouble in that direction.

The Council at Dayton, Ky., has adopted a resolution asking the officials of Covington to take steps to appeal the case in which the United States District Court recently decided that the South Covington & Cincinnati Street Railway owns a perpetual franchise in the streets of Covington.

NEW YORK INSURANCE LEGISLATION

The votes cast by four Republican Senators, all from Brooklyn, prevented the passage in the Senate on Feb. 17 of the Sage bill making an emergency appropriation of $425,000 for the Workmen's Compensation Commission and carrying a provision which authorized the direct settlement of compensation claims between employers or insurance carriers and injured workmen.

Superintendent of Insurance Frank Hasbrouck in his report to the Legislature, speaking of workmen's compensation, indorses the main features of the New York law, but says that it should be amended in certain particulars. He advocates that the forty-two groups be eliminated and the benefits extended to cover practically all employments. Another feature which should be corrected, he says, is the cumbersome method prescribed for settling claims. The four methods of insurance provided by the law are indorsed as affording healthy competition based upon service to the public. It is sugested that all employers be required by law to keep accurate payroll records for insurance purposes.

ANOTHER BOND ORDINANCE AT TOLEDO

On the evening of Feb. 13, an ordinance was introduced into the City Council of Toledo, Ohio, providing for a bond issue of $4,000,000, the proceeds to be used in acquiring the light, power, heat and artificial gas properties of the Toledo Railways & Light Company, under the provisions of the initiated municipal ownership ordinance, passed on Aug. 4, 1914. The ordinance was prepared by City Solicitor Thurstin and is similar to the one he introduced some time ago relating to the railroad properties of the company. The bonds are to run for twenty years and draw 5 per cent interest. Under the ordinance the rate for service is to be fixed by the Public Utilities Commission of Ohio or any other body that may be empowered to look after such duties. A maximum of 6 cents per kw.-hr. is provided for energy and 65 cents per thousand feet for artificial gas. The measure has been referred to the committee of the whole.

The same evening a resolution was introduced fixing the rate to be charged by the Toledo, Bowling Green & Southern Traction Company at 5 cents for carrying passengers from all parks and boulevards into the city. This is meant to cover certain lands the city has purchased for park purposes about 1 mile south of the southern city limits.

NEW JERSEY UTILITIES LEAGUE

The New Jersey Utilities League has been formed for the purpose of keeping its members informed of the introduction and progress of legislation affecting them. The formation of the league was due primarily to the introduction of a recent bill providing for certain taxation of franchises of public utility corporations in addition to the franchise and other taxes which they now pay. Many representatives of public utilities appeared at a hearing on this bill scheduled for last week, and as a result the hearing was postponed to Feb. 23.

There are more than 225 public utilities in the State, few of which have taken interest in legislative matters. The result was that the utilities and the public failed to realize that there were so many varied interests and companies. The league will unify these interests and enable them to work together to furnish correct information to the public and the legislators. A permanent bureau with headquarters probably in Trenton, where the Public Utilities Commission has offices, may be provided in the near future. The Public Service Corporation has become a member of the league. The officers of the league for the coming year are: President, John A. Riggins, New Jersey Northern Gas Company, Camden; secretary, W. H. Roth, 112 North Broad Street, Philadelphia, Pa. An executive committee has been appointed to look after the details.

INDIANA LEGISLATURE

The following new bills have been introduced in the House: a bill providing that interurban or street railways place tracks in the middle of the highways for a distance of 1 mile from the corporate limits of towns having a population of from 30,000 to 58,000; a bill providing that the franchises of all public service corporations be submitted to the state board of tax commissioners for assessment for taxation; a bill providing a fine of $100 to $500 for railroads carrying into or from point to point in the state intoxicating liquors, when such are to be sold in "dry" territory, and providing that packages must be labeled to proper consignee and as to nature of contents; a bill providing that traction companies operating more than 18 miles of track must maintain two toilet rooms in each car; a bill providing that public service companies giving service by measured rates shall not fix any minimum charge; an amendment providing that where a railroad intersects a person's land and takes property by condemnation, the owner shall have the right to construct driveways across the right-of-way; amendment to the public utility commission law curtailing the powers of the public service commission by giving municipalities direct control of utilities, the right to order joint use of utility systems, city authorities the right to regulate mergers, leases and sales of public utilities, cities the right to issue franchises for duplication of public utility service, and further provides that cities may decide if indeterminate permits are to be issued; a bill providing a maximum fare of 1½ cents a mile for adult passengers and ½ cent for persons five to twelve years of age on interurban railways, with the right to carry 150 lb. of baggage.

The following new bills have been introduced in the Senate: a bill providing that all street cars in cities of the third class shall be equipped with double trucks and air brakes; a workmen's compensation bill making it optional whether the state insurance feature or other proposal for liability insurance is chosen by the employer; a bill amending the public utility commission law by more fully defining the terms "unjust discrimination" in service; a bill providing that no public service company shall receive a franchise unless a petition showing that public convenience and necessity demand such a franchise has been filed with the public service commission; a bill amending the public utility commission law by eliminating the clause which requires all officers of public service corporations to be bona fide residents of Indiana, and extending the time when indeterminate permits may be taken by public utilities; a bill amending the public utility commission act to permit railroad companies to give employees passes where such employees are holding public office.

The Fleming bill making certain provisions for the ventilation of street and interurban railway cars has been killed in the Senate.

RAPID TRANSIT PLANS IN PHILADELPHIA

A. Merritt Taylor, director of city transit, Philadelphia, submitted to the Select and Common Councils of that city on Feb. 11 a special report on rapid transit development for Philadelphia in accordance with the resolution adopted by Councils on Feb. 4. This report contained a complete list of the subway, elevated and surface lines contemplated to be constructed under plans recommended by the department of city transit, with the cost of each. In his communication to Councils, Mr. Taylor requested that the finance committee report out the ordinances provided for the holding of the special election to authorize an increase in the city's indebtedness to the extent of at least $6,000,000 to provide money for beginning the transit development, and that the ordinance be passed by Councils without delay in order that the election might be held and the $6,000,000 be appropriated and the designating ordinances passed before the summer adjournment, so that actual construction of the high-speed lines could be commenced on July 1. He said that it would not be necessary to vote more than $6,000,000 of the transit loan until after the constitutional amendment had been voted on by the people in November.

The matter came up before Councils on Feb. 18. On that day a transit ordinance was introduced by John P. Connelly, chairman of the committee on finance, differing from the plans proposed by Mr. Taylor. The Philadelphia *Public Ledger* said in its issue of Feb. 19 that the Connelly bill in part was based upon a "joker" ordinance introduced several months ago by Peter E. Costello, an organization leader. The report from Mr. Taylor in regard to the transit plan was meanwhile referred by Councils to the joint committee on street railways and finance.

The Philadelphia *Public Ledger* said editorially on Feb. 19: "The people of Philadelphia have yet to be heard from. They are in no mood to be trifled with, and this proposition is worse than trifling. They have a right to know under whose inspiration this scheme of the finance committee's was concocted, and what special interests it was intended to serve. This mutilated program would perpetuate conditions the escape from which is the whole purpose of the struggle for the last two years. Who inspired the change, and what are the ends sought to be accomplished by such a betrayal of the city's rights and needs?"

OHIO LEGISLATION

Electric and steam railway interests are opposing two bills introduced in the Ohio Legislature by Senator Pink, of Hamilton County, which make proof of an accident in which any one is injured or property damaged prima facie evidence that the car or train was improperly handled at the time. The railway men say that the bills rob the railways of any possible defense in case of accidents.

Somewhat akin to these bills is one introduced by Representative Terrell, of Cuyahoga County, which would establish the doctrine of comparative negligence in connection with cases in which street cars, automobiles, wagons and other vehicles are involved. This bill would make it mandatory that the degree of carelessness of all parties be established and that damages be awarded on that basis.

The Senate committee on public utilities heard arguments on Feb. 10 on the Winans bill, which gives the Public Utilities Commission the right to suspend railroad, railway and other public service rates for a certain time after their promulgation and places the burden of proof as to their reasonableness on the companies.

The Cleveland branch of the Amalgamated Association of Street & Electric Railway Employees arranged to send five members to Columbus on Feb. 18 to attend the hearing on the bill that defines the number of hours in each day that employees shall work and fixes other conditions. This bill, intended primarily to benefit the men in Cleveland, will apply to the entire state.

THE CINCINNATI APPRAISAL

The three members of the Ohio Public Utilities Commission went to Cincinnati on Feb. 12 to begin work on determining the value of the property of the Cincinnati Traction Company. They were accompanied by L. G. White, the electrical engineer of the department, and Lawrence K. Langdon, its attorney. Theodore Mayer and L. R. Smith, real estate experts, stated that they had already appraised the property at the request of the company and had filed their report in which the total value, irrespective of buildings, assemblage, continuity values, cost of acquiring and surveys, was $589,107. Mr. Mayer said the gross cost of the property including leases, commissions, percentage and surveys was $878,613. The "Somers system" was used in reaching the valuation placed on the property. Walter Draper, vice-president of the company, testified as to the cost of the property and its present condition.

L. F. Huntington, another local real estate man, testified that the cost of consents secured from property owners along the various routes, in his opinion, was about 54 cents per front foot. On this basis the total cost of consents to the company would have been $609,609, as the trackage in the city is estimated at 1,111,000 ft. A. L. Drum, building expert, and Bert Baldwin, electrical engineer, testified as to the value of superceded property, much of which had been abandoned before its useful life was spent, due largely to improvements made in equipment for transportation. The total given for this item was $2,277,995. The most costly property to be thus abandoned were horse cars, cable cars, steel rails that were unfitted for electric cars, inclined planes, cost of street repairing due to changing rails, etc. Mr. Baldwin, who was engineer for the Cincinnati Street Railway when horse and cable cars were used, said that the practice of the city was to require the company to do much more in the way of repaving than it should have done and that this often worked a hardship.

The members of the commission visited the properties of the company on the following day in company with W. Kesley Schoepf, president, and Walter Draper, vice-president. They will take the information secured from the men who testified, experts employed by the company, and the statements that have been filed by the company, from which a tentative valuation will be fixed. Then there will be hearings during which disputed points will be argued and further detail added, if necessary.

New California Road Opened.—The Monticeto Railroad has placed its new line in Los Angeles in operation. The road is 2.4 miles long.

New Line in Alabama.—The line of the Birmingham-Tuscaloosa Railway & Utilities Company in Tuscaloosa has been placed in operation.

Municipal Railway Bonds for Pekin.—Arrangements have been concluded between the city of Pekin, Ill., and Counselman & Company, New York, N. Y., under which that company will take the $48,000 of bonds voted by the citizens of Pekin last year for the reconstruction and rehabilitation of the local railway line in Pekin as a municipal undertaking.

Need for Signals on New York Elevated.—Clifton W. Wilder, electrical engineer for the Public Service Commission for the First District of New York, has reported to the commission that the accident on the Ninth Avenue elevated line of the Manhattan Railway on Feb. 6 demonstrates the necessity for some form of protective signals on the local and the express tracks on all elevated structures.

Fender Test in Toronto.—As a result of the conference on safety devices, held by representatives of the Toronto Railway with the Ontario Railway Board on Feb. 12 instructions have been issued by the board for the company to try out a new style of fender on its new cars. Engineer Royce of the board and an engineer of the railway have been instructed to report later on the experiment.

Hearing on School Fare Bill.—The bill providing for a half-fare for school children in New York State was opposed at a hearing before the railroads committee of the Senate and Assembly on Feb. 16 by the Interborough Rapid Transit Company on the ground that such action would constitute an infringement of the franchise by the Legislature. Representatives of the Brooklyn Rapid Transit Company and of the International Railway, Buffalo, opposed the bill on the ground that it constituted discriminatory legislation in that it favored school children as against minors who were forced to work for a living.

Kansas City Extensions.—The board of control of Kansas City, Mo., has made formal recommendations for improvements of service, which are now in the hands of John M.

Egan, president of the Metropolitan Street Railway. Among the items was the suggestion that the $250,000 of improvements provided for in the franchise ordinance should be met by the building of 3 miles of single track, Prospect, 48 to 71; 1 mile of single track, along the south side of Swope Park; 1¾ miles of single track, Twelfth, eastward from Jackson. If the city wants these extensions now, and President Egan decides for them, the city will probably ask Judge Hook to authorize the issuance of certificates.

Bills Before Texas Legislature.—The interurban railway interests of Texas are opposing the bill which Senator Darwin has introduced in the Senate providing for placing interurban lines under the jurisdiction of the State Railroad Commission. At a hearing on the measure before the Senate committee on internal improvements representatives of practically all of the existing interurban railways as well as those which are in course of promotion appeared and argued against the proposition. The committee made a majority adverse report on the bill, but a minority report was also signed which will bring the measure upon the floor of the Senate for consideration. Senator Robbins has introduced a bill providing for the creation of a public utility commission which shall have jurisdiction over municipal public utility plants.

Toronto Improvement Order.—One Feb. 9 representatives of the city of Toronto, Ont., and the Toronto Railway appeared before the Ontario Railway & Municipal Board in connection with the issuing of a formal order by the board based upon the judgment rendered last fall. Mr. Osler, counsel for the company, urged inability on the part of the company to secure money to comply with the recommendations of the board and asked for an extension of time after July 1 for building the Ossington Avenue line, completing the fifty new cars and finishing the 13 miles of new track required. The appeal regarding the 13 miles of line was favorably received by Chairman McIntyre. By the board's order, the railway will have until July 1 to finish this work. No extension was granted for the other work. If the company finds that it cannot finish the cars and the Ossington Avenue line within the time fixed the board must be convinced of the company's inability to finance them.

Opposition to Full Crew Laws.—The railroads of the States of Pennsylvania and New Jersey have begun in the newspapers an advertising campaign to obtain the repeal of full crew acts in those States. Daniel Willard, the president of the Baltimore & Ohio Railroad; Samuel Rea, president of the Pennsylvania Railroad; Theodore Voorhees, president of the Philadelphia & Reading, and R. L. O'Donnell, chairman of the executive committee of the Associated Railroads of Pennsylvania and New Jersey, have issued "an open, square, above-board, direct appeal to the intelligence and judgment of the people." The advertisement says that the official figures show that for the three-year period prior to the enactment of the law in Pennsylvania the total number of employees and passengers killed was 10,186. Since the law became operative that figure has been increased to 10,372 persons. The extra man on each train, representing $3,000,000 yearly, means an expenditure that could have been spent for 200 steel coaches, 80 locomotives, 67,000 tons of rails, 65 grade crossings or 800 miles of track.

Labor Bills in Ohio.—Representative Bohm, Cleveland, is the author of a bill that makes it compulsory on employers to see that their employees work only six days out of each week. Representative Smith's bill, requiring that conductors and motormen on street and electric railway cars be provided with dust-proof compartments, has been approved for passage by the committee that considered it. The penalty for violation is from $25 to $100. Representative Ott, Hamilton, has introduced a new section to the statute that limits the hours of work for railroad men. It applies especially to street and interurban men and provides in the first place that no car shall be placed in the hands of a motorman and a conductor unless they shall have had an experience of at least fifteen days under the guidance of men who have had as much as two years' experience on the line on which they are students. The men shall not be permitted to work more than nine out of any consecutive eleven hours in any twenty-four-hour day and they must have thirteen hours off-duty. Fines for violation of this provision range from $100 to $500 for each car each day. A bill by Representative King, of Hocking County, makes an agreement between employers and laborers a personal and not a property right, and denies the right to issue an injunction in cases where labor contracts are violated but where no irreparable loss or damage is about to occur. An application for an injunction must contain a detailed statement of the property rights in jeopardy. Another bill by the same author provides that all street and interurban cars shall be provided with airbrakes, the rigging of the brakeshoe to be attached to the journal beam of the truck and, also, that an adequate sanding device be furnished. It is required that 50 per cent of the cars in the State be thus equipped before Jan. 1, 1916, and the remainder within twelve months after that date. No penalty is attached.

PROGRAMS OF ASSOCIATION MEETINGS

Arkansas Association of Public Utility Operators

At a meeting of the executive committee of the Arkansas Association of Public Utility Operators, held at the office of the Little Rock Railway & Electric Company on Feb. 9, May 11, 12 and 13 were fixed as the dates for the 1915 meeting of the association. The meeting will be at Little Rock, with headquarters at the Marion Hotel.

Central Electric Railway Association

The following program has been announced for the annual meeting of the Central Electric Railway Association to be held on Feb. 25 and 26 at the Hotel Severn, Indianapolis:

Feb. 25

Address by Joseph E. Bell, Mayor of Indianapolis.

Address by C. Loomis Allen, president of the American Electric Railway Association.

Paper, "Is the Handling of Free Baggage a Traffic Error," by C. J. Laney, traffic manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.

Address by Samuel M. Ralston, Governor of Indiana.

Address by Charles C. Peirce, vice-president of the American Electric Railway Manufacturers' Association.

Address by Thomas Duncan, chairman of the Public Service Commission of Indiana.

Feb. 26

Address, "Safety," by Dana Webster, inspector for the accident and liability department of the Ætna Life Insurance Company, Indianapolis, Ind.

Annual report of the secretary and treasurer.

Annual address of E. F. Schneider, president of the Central Electric Railway Association.

Report of the nominating committee and the election of officers.

New York Electric Railway Association

The New York Electric Railway Association will hold its twentieth quarterly meeting at the Fort William Henry Hotel, Lake George, N. Y., Tuesday and Wednesday, March 2 and 3. The meeting will be opened with an informal dinner at 8 o'clock on the evening of Tuesday, March 2, after which there will be several addresses by distinguished guests. There will be one business session of the association. This will be held at 10 a. m. on the following day, Wednesday, March 3. At this meeting the following program of subjects will be presented for discussion:

"What the New York Electric Railway Association Could Do for Me." This subject will be considered in three-minute written discussions by all members.

"Collection and Registration of City and Interurban Fares." Introductory paper by James E. Hewes, general manager of the Albany Southern Railroad, Albany, N. Y., followed by three-minute written discussions by the members.

"What Constitutes Good and Sufficient Maintenance?" Introductory paper by James P. Barnes, general manager of the Buffalo, Lockport & Rochester Railway, followed by three-minute written discussions by the members.

Applications for hotel accommodations should be made to Albert Thieriot, manager of the Fort William Henry Hotel, Lake George, N. Y.

Financial and Corporate

SECURITIES FOR NEW CONSTRUCTION

More Than $8,000,000 of New Securities Authorized for Electric Railway Construction Purposes in New York in 1914

According to information obtained through the Division of Capitalization of the Public Service Commission for the Second District of New York, the amounts of new securities authorized for steam and electric railway new construction in New York State during 1914 and for other purposes were as follows:

Purpose	Steam	Electric	Total
New construction	$14,739,767	$5,163,650	$19,903,417
Payment of current liabilities incurred for new construction	90,065,000	2,965,750	93,030,750
Total	$104,804,767	$8,129,400	$112,934,167
Refunding and acquisition of constructed properties	72,525,000	2,447,000	74,972,000
Acquisition of capital stock	....	888,000	888,000
Grand total	$177,329,767	$11,464,400	$188,794,167

The foregoing figures were difficult of compilation on account of the feature of discount on securities and the fact that not infrequently an amount of bonds is authorized, the proceeds of which are slightly more or considerably less than sufficient to cover the purposes toward which the proceeds are to be applied. With such complications eliminated as far as possible, the figures may be taken to show the amount of new money authorized for construction during the year. Of the total of $188,794,167 authorized for all purposes, an amount of $112,934,167 or 59.8 per cent was for new construction. Of this sum $19,903,417 or 17.6 per cent was purely for subsequent new construction, while $93,030,750 or 82.4 per cent was for the payment of current liabilities already incurred for new construction.

Of the total of $112,934,167 for all new construction, $8,129,400 or 7.2 per cent was authorized to electric railways and $104,804,767 or 92.8 per cent to steam railroads. As just between the steam and electric railway totals, the steam railroad securities for new construction were 12.9 times as large in amount as the similar electric railway securities, but it must be remembered that the previously existing steam railroad capitalization was about 13.4 times as great as the electric railway capitalization. On the basis of the approximate $3,124,511,870 of steam railroad capitalization, the rate of increase for new construction was 3.3 per cent, while on the $225,053,330 of electric railway capitalization the corresponding increase was 3.6 per cent. It is interesting to note, too, that of the $104,804,767 for steam railroads only 14.0 per cent was authorized for new construction not yet undertaken, while in the face of the depression of 1914 the electric railways secured the authorization of 63.5 per cent of all the construction securities for absolutely new work.

All the computations to which reference has been made do not contain any figures for securities authorized by the Public Service Commission for the First District in New York City. If these and the city's expenditures of $2.000,000 a month for the new subway system could be included, the new construction of electric railways in New York State during 1914 would appear even better.

ELECTRIC BOND & SHARE CAPITAL INCREASE

The stockholders of the Electric Bond & Share Company, New York, at the annual meeting on Feb. 17 elected William Darbee and G. E. Claflin as directors to succeed Benjamin Strong, Jr., and R. Treat Paine. A special meeting of stockholders was subsequently held and an increase in the company's capital stock from $10,000,000 to $16,000,000 was approved. Of the additional stock $3,000,000 is common and $3,000,000 6 per cent preferred. It was announced that part of the newly authorized preferred stock will soon be offered to stockholders for subscription at par, and also that at the same time the General Electric Company is expected to take an equal amount of the new common stock for cash at its par value.

ANNUAL REPORTS

British Columbia Electric Railway, Ltd.

The statement of income, profit and loss of the British Columbia Electric Railway, Ltd., Vancouver, B. C., for the year ended June 30, 1914, follows:

Income	£560,150
Registration fees, etc	424
Total	£560,574
Renewals, maintenance	£149,921
Office rent, salaries, etc	7,367
Directors' fees and percentage	5,994
Trustees fees	881
Capital amortization	2,455
Total	£166,618
Balance	£393,956
Add:	
Balance from previous year	9,519
Transferal from reserve	10,000
Total	£413,475
Deduct:	
Interest on debentures	£132,991
Dividends already paid	216,000
Total	£348,991
Balance available for distribution	£64,484
Dividend declared on deferred ordinary stock	57,600
Balance carried forward for year	£6,884

The report states that the showing in the fiscal year was not of such a satisfactory character as that made in the past, and that, in order to maintain the usual dividend, it was necessary to supplement the profit by a transfer of £10,000 from the reserve. The earnings in the early part of the year were adversely affected by the prevailing conditions, but the depression of trade in Canada became accentuated as the year advanced and rigid economy was necessary to achieve the results shown. The large employers of labor in British Columbia were temporarily forced to postpone all new work, and there was a decrease in the population of Vancouver and the neighboring districts of approximately 20,000 inhabitants and consequently a decrease of more than 8,500,000 in the number of passengers carried during the year. It is believed, however, that the halt in the development of the province will in the end result in more stable conditions. The amount expended for capital account during the year was £530,103, but until more prosperous times further expenditures will be limited to absolute necessities. The company paid 5 per cent on its cumulative perpetual preference stock for the year, 6 per cent on its preferred ordinary stock and 8 per cent on its deferred ordinary stock. The directors state, however, that on account of the European war the revival in trade may be greatly retarded and there may be a drastic reduction in future dividends.

The J. G. Brill Company

The total combined output of the five plants owned and operated by The J. G. Brill Company for the year ended Dec. 31, 1914, amounted in sales value to $4,903,511. In only two other years, 1908 and 1909, have the sales fallen below the $5,000,000 mark. In 1907 and 1913 they ran more than $9,000,000, and from 1910 to 1912 inclusive the amount ranged from about $5,871,000 to $7,842,000.

The combined profit from operations for the year was $313,106, after charging against current earnings $158,475 expended for repairs and maintenance. From this profit there was set aside in the reserve for depreciation $154,222, making the total reserve now $1,601,312. The net profit for the year was therefore $158,884. Instead of the regular quarterly 1¾ per cent preferred dividend in November, the company paid 1 per cent, making the dividend total for the year $286,250. This with sundry adjustments brought the accumulated surplus of the company down from $1,535,417 to $1,368,370.

During the year the company strengthened the position of its liquid assets in face of the depressed conditions and reports as of Dec. 31, 1914, as its only current liability $220,348 of accounts in course of payment. In other years this item has ranged from $700.000 to $900,000. On the asset side, cash stands at $633,893 as compared with about $400,000 one and two years ago. Material, raw and in process of manufacture, and bills and accounts receivable by their reduction in size indicate conversion into still more liquid assets. On Feb. 6, 1915, the combined orders of the plants in process of execution amounted to $1,147,100.

As regards the present outlook, the annual report of the company says:

"It is difficult at this time to form an estimate of the outlook for business in 1915. While general business conditions have improved and seem to be improving, it must be uncertain, in view of the extraordinary causes which brought about and which serve to continue the present depression, when a condition will be reached which will make it not only necessary, but possible as well, for the railways to purchase equipment, in what may be considered from past experience, normal amounts."

"BUY IT NOW" MOVEMENT

Various Steam Railroad Presidents Follow Out Principles of This Movement by Contributing Large Purchases

Advices received from C. C. Rosewater, chairman of the national "Buy It Now" campaign committee, indicate that tangible results most gratifying in character are being received by the committee. Steam railroads in particular have been sending news of large orders for equipment and supplies. D. Willard, president Baltimore & Ohio Railroad, states that his company recently placed an order for 2000 new freight cars, the first order for equipment in more than a year. This order was made in spite of the fact that the company has now more equipment than is needed under existing conditions. According to S. M. Felton, president Chicago Great Western Railroad, the company has already purchased $385,000 of material in anticipation of its requirements for the next six months and year, and is just about to enter into contracts for $200,000 of additional material covering the year's requirements. W. A. Gardner, president Chicago & Northwestern Railroad, states that the approval of the board of directors has been secured for the purchase of about $1,500,000 of material for which the company will solicit bids in the very near future. As an indication of what the New York Central Lines are doing, A. H. Smith, president, advises the committee that orders have been placed for 4500 tons of steel rails and that it is hoped to buy more shortly for use during 1915. The company recently bought eighteen engines and is now receiving 7000 freight cars purchased some time ago. W. H. Myers, vice-president Pennsylvania Railroad, states that the company has already asked for proposals for 150,000 tons of steel rails for 1915, and also for 17,000 tons of structural steel and 1200 tons of reinforcing steel. Communications from other railroad presidents contain no actual notices of material purchased but promises of co-operation.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—The Aurora, Elgin & Chicago Railroad has received authority from the Illinois Public Utilities Commission to issue $800,000 of collateral trust securities. It is reported that the collateral indenture has not yet been prepared, and no attempt has yet been made to sell the securities.

Binghamton (N. Y.) Railway.—At the annual meeting of the Binghamton Railway on Feb. 15, the following officers were elected: President, F. L. Fuller; vice-president, R. W. Day; vice-president and general manager, C. S. Banghart; secretary, W. H. Hecox; treasurer, E. M. White, and assistant treasurer, H. I. Jackson. The following members now constitute the board of directors: F. L. Fuller, R. W. Day, C. S. Banghart, A. J. Parsons, T. J. Keenan, W. H. Hecox, W. L. Connell, F. W. Ogden, C. R. Bedford, George E. Green and G. T. Rogers.

Chicago (Ill.) Elevated Railways.—The National City Bank, New York, is offering at the market price, to yield about 5.75 per cent, first mortgage 4½ per cent gold bonds of the South Side Elevated Railroad, dated July 1, 1904, and due on July 1, 1924. The amount of these bonds authorized and outstanding is $8,000,000. They are redeemable at 105 and interest on any interest date on three months' notice.

Federal Light & Traction Company, New York, N. Y.—John Dunhill has been elected a director of the Federal Light & Traction Company to succeed Samuel McRoberts.

Georgia Railway & Power Company, Atlanta, Ga.—Lewis Lillie, treasurer United Gas Improvement Company, has been elected a member of the board of directors of the Georgia Railway & Power Company.

Glendale & Montrose Railway, Los Angeles, Cal.—The Glendale & Montrose Railway Company has filed an application with the Railroad Commission of California requesting authority to increase its capital stock from $25,000 to $250,000. The company further asks for authority to issue to J. Frank Walters, its president and the owner of all the now outstanding stock, stock of the new issue in such amount as the commission shall find to represent the total cost of the railway's property at the time of the hearing of the application. The company proposes to use the balance of this stock for such additions and extensions and improvements as may be subsequently authorized by the commission. The company also filed a supplemental application asking that the authority previously granted to issue $200,000 of bonds be set aside, since it has found it impossible to sell these bonds now owing to the existing financial conditions.

Grand Rapids (Mich.) Railway.—Frank I. Silliman, Jr., Philadelphia, and Bert C. Cobb, New York, have been elected directors of the Grand Rapids Railway to succeed C. M. Clark and A. G. Hodenpyl. Louis J. De Lamarter was elected treasurer to succeed George L. Estabrook, resigned, the office of treasurer thus being added to that of secretary. S. E. Wolff was elected assistant secretary-treasurer.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—E. N. Sanderson, New York, has been elected president of the Gray's Harbor Railway & Light Company to succeed W. J. Patterson. F. G. Foster has been chosen a director of the company.

Humboldt Transit Company, Eureka, Cal.—The Railroad Commission of California has issued an order authorizing the Humboldt Transit Company to issue to the First National Bank of Eureka a promissory note for $20,000, to be secured by pledge of $40,000 of first mortgage 5 per cent bonds. This note, which will be executed by the Transit Company and William Butterworth as joint makers, is to take the place of a similar note of like amount previously issued by the company.

Interborough-Metropolitan Company, New York, N. Y.—The United States Circuit Court of Appeals on Feb. 10 affirmed the decision of Judge Hough of the Federal District Court, dismissing two suits brought by the Continental Securities Company, of which Clarence Venner is the head, to have the Interborough-Metropolitan Company declared an illegal monopoly and to set aside a mortgage covering $55,000,000 of bonds given to the Morton Trust Company as trustee. The court stated that even if the Interborough-Metropolitan Company were a monopoly, the Continental Securities Company had no cause of complaint about the condition of the Interborough Rapid Transit Company stock as a result of the merger. In the matter of the mortgage, the court stated that the questions involved had become academic by reason of the subsequent payment of the mortgage.

Interborough Rapid Transit Company, New York, N. Y.—The National City Bank, New York, is offering for sale at 97⅞ and interest, to yield 5.11 per cent, first and refunding mortgage 5 per cent gold bonds of the Interborough Rapid Transit Company, dated Jan. 1, 1913, and due on Jan. 1, 1966. Of the authorized amount of $300,000,000 of these bonds, $98,658,000 are outstanding. They are redeemable at 110 and interest on any interest date, as a whole or in blocks of not less than $500,000 or in any amount for the sinking fund. It is estimated that it will be necessary to issue about $160,000,000 of these bonds to provide for the commitments of the Interborough Rapid Transit Company under its subway contracts with the city.

Jacksonville (Fla.) Traction Company.—With reference to the recent passing of the usual Feb. 1 dividend on the $1,000,000 of common stock of the Jacksonville Traction Company, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 30, Hardy Croom, local manager of the company, states that the action is a result of the decrease in the company's earnings and the public improvements which the company has heretofore been required by law to put into effect, and also the large amount of work that it now has on hand and intends to complete during 1915. Mr. Croom states that the majority of the inhabitants of Jacksonville are entirely in accord with the company in its efforts to give service in proportion to the patronage it is receiving, and that as business continues to grow better, conditions will go back to what they were before the present period of depression.

London (Eng.) Underground Railways.—The secretary of the London Underground Railways has officially announced that subject to confirmation of the respective dividend announcements for owned stock and also to the final audit of its accounts, the revenues of the company will be sufficient to pay full interest to Dec. 31, 1914, on its 6 per cent first cumulative income debenture stock and on its 6 per cent income bonds and leave about £35,000 to carry forward.

Long Island Railroad, New York, N. Y.—Dick Brothers & Company, New York, have issued another circular to the stockholders of the Long Island Railroad requesting proxies for the annual meeting on April 13. They express dissatisfaction with the present management and say: "We are willing to conduct a campaign against the present management at our own expense as we are the largest minority stockholders, owning and controlling 11,000 shares which we have held for many years, and all we ask is your moral support." A previous reference to the call for proxies was made in the ELECTRIC RAILWAY JOURNAL of Feb. 6.

Massachusetts Electric Companies, Boston, Mass.—It is reported that the Massachusetts Electric Companies will proceed at this time with the refunding of $3,100,000 of 5 per cent notes maturing on May 1, and for this purpose will issue $300,000,000 of 5 per cent three-year notes to be dated April 1. The new notes, like the maturing obligations, will be a collateral issue, secured by a deposit of a majority of the common stock of the Bay State Street Railway.

Minneapolis & Northern Railway, Minneapolis, Minn.—W. C. Leary, judge of the District Court for the Fourth Judicial District of Minnesota, on Feb. 1 issued an order that the creditors of the Minneapolis & Northern Railway, the Minnesota Loan & Trust Company as former receiver and F. H. Hunter as present receiver, should all appear before the court on Feb. 6 and show cause why an order should not be granted requiring the receiver to surrender all the railway property to the trustees, W. P. Veitch, L. H. Bolduc, H. F. Balch, M. H. Coolidge and C. T. Bratnober. At the same time an order was issued for creditors to show reason why the receiver should not deliver to the McKeen Motor Car Company the locomotive and two motor cars now used by him in the operation of the railway. Mr. Hunter's application for the dissolution of the receivership was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

Municipal Tramways Trust, Adelaide, Australia.—According to the report of the Municipal Tramways Trust for the two years ended July 31, 1914, the revenue account for the electric traction system showed gross earnings for the year ended July 31, 1913, of £310,240 and for the year ended July 31, 1914, £328,809. For the first year the total operating expenses amounted to £207,318, giving an excess of income over expenses of £102,323. The operating ratio for the year was 66.82 per cent. The total operating expenses for the second year amounted to £202,503, the excess of income over expenses being £125,365. The operating ratio for this year amounted to 61.58 per cent. During the two years £150,899 was advanced by His Majesty's Treasury on construction account. A sum of £36,877 was added to the reserve for renewals, this sum being 2½ per cent on the capital cost of the renewable parts of the line already opened, plus interest. An amount of 1 per cent of the total receipts, or £6,713, was placed to the credit of the accident reserve. During the period 1993 third party accidents occurred, 697 affecting the general public and 1296 the passengers.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Eugene N. Foss was on Feb. 4 elected a director of the New York Municipal Railway Corporation to succeed A. N. Brady, deceased.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—At the recent annual meeting of the Oakland, Antioch & Eastern Railway, Henry T. Scott was elected a member of the board of directors to succeed H. J. Sutherland.

Pacific Power & Light Company, Astoria, Ore.—The Pacific Power & Light Company has sold to William A. Read & Company and White, Weld & Company, New York, $1,052,000 of first mortgage 5 per cent bonds, due 1930, and has sold to a syndicate headed by White, Weld & Company 5000 shares of 7 per cent cumulative preferred stock. The bonds have practically all been resold privately by the bankers. These sales bring the amount of bonds outstanding up to $7,001,000 and the amount of preferred stock up to $2,500,000. This company operates electric railways in Astoria and controls the Walla Walla Valley Railway.

Philadelphia (Pa.) Railways.—The gross earnings of the Philadelphia Railways for the year 1914 were $99,402 as compared to $100,157 for 1913, and the operating expenses $74,015 as compared to $82,694, giving net earnings $25,387 and $17,463, respectively. Bond interest remained the same at $20,000, other interest increased from $843 to $1,106 and taxes from $2,082 to $2,217. The result, therefore, was a surplus of $2,064 for 1914 as compared to a deficit of $5,462 for 1913. For 1914 a charge of $4,000 for depreciation was included in operating expenses.

Riverside, Rialto & Pacific Railroad, Riverside, Cal.—The Riverside, Rialto & Pacific Railroad has been authorized to issue 3000 shares of capital stock and $200,000 of 2½-year promissory notes bearing interest at 6½ per cent per annum in exchange for the property of the formerly sole-owned Crescent City Railway. The change in the legal form of the latter company was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 30. W. J. Bohon, general manager of the company, has issued a report denying that the Riverside, Rialto & Pacific Railroad will be taken over by the Pacific Electric Railway. According to Mr. Bohon, there may be a traffic agreement between the two companies, but the former company will continue to be operated separately.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The San Joaquin Light & Power Corporation recently filed an application with the Railroad Commission of California, requesting authority to issue a new series of first and refunding mortgage bonds, to be known as series "C" and to bear interest at 6 per cent per annum. The company now has outstanding $2,924,000 of series "B" 5 per cent bonds, and it is proposed to allow the holders to exchange these bonds for the new series "C" bonds upon payment of a premium of $100 per bond. The company also has $1,523,000 of series "B" bonds in its treasury, which it wishes to cancel and replace by bonds of the new series. In addition, the company requests authority to issue $136,000 of the series "C" bonds outright.

Springfield & Xenia Railway, Springfield, Ohio.—The gross and net earnings of the Springfield & Xenia Railway for 1914 were less than in 1913, on account of the fact that in 1913 the earnings were larger by virtue of the company with its connections at Xenia being the only line open between Springfield and Dayton during the flood. The net earnings for 1914, however, exceeded those of 1912 or any previous year by about 20 per cent. The company paid dividends of 5 per cent on its preferred stock and 3 per cent on its common stock.

United Traction Company, Pittsburgh, Pa.—The protective committee of preferred stockholders of the United Traction Company has received a letter from the Philadelphia Company, stating that the latter in connection with the Pittsburgh Railways will give due consideration to suggestions made by the committee's counsel regarding the non-payment of the semi-annual preferred dividends due in January. The Pittsburgh Railways, which is controlled by the Philadelphia Company, operates the United Traction Company by lease. The letter also said that for the purpose of considering the dividend question a special committee has been formed, consisting of James D. Callery, president United Traction Company and Pittsburgh Railways; Mason B. Starring, president United Railways Investment Company, and George S. Davison, a practical street railway man. The protective committee has received deposits of between 15,000 and 20,000 shares out of a total of 60,000 outstanding, in response to the call noted in the ELECTRIC RAILWAY JOURNAL of Feb. 13.

United Railways of St. Louis, St. Louis, Mo.—James Atkins, Breckenridge Jones and C. A. Tilles have been elected directors of the United Railways of St. Louis to succeed A. C. Einstein and Frederick J. Kinsella, and Robert McCulloch, deceased. Richard McCulloch has been elected president to succeed his father. The Mississippi Valley Trust Company and Altheimer & Rawlings Investment Company are offering for sale at 99 and interest, to yield 5.15 per cent, an unsold balance of $200,000 of first mortgage 5 per cent gold bonds of the St. Louis & Suburban Railway, a constituent company of the United Railways of St. Louis. The bonds are now a closed first mortgage on the main line of the former company.

Virginia Railway & Power Company, Richmond, Va.—The New York Stock Exchange has listed an additional $32,000 of first and refunding mortgage 5 per cent bonds of the Virginia Railway & Power Company, making the total amount listed $12,285,000.

Warren, Brookfield & Spencer Street Railway, Boston, Mass.—According to a direct communication from Thomas T. Robinson, receiver of the Warren, Brookfield & Spencer Street Railway, the Massachusetts Supreme Court on Feb. 10 issued a decree fixing $50,000 as the upset price for the property at the adjourned sale to be held on March 11. It is understood that the property will be purchased by a committee representing the bondholders, and that a new corporation will be organized in the interest of the bondholders to take over and operate the property. Previous items regarding the attempted foreclosure sale of this property for $150,000 appeared in the ELECTRIC RAILWAY JOURNAL of May 2, June 2, July 25, Aug. 15 and Sept. 12, 1914.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¼ per cent, common.

Columbus Railway & Light Company, Columbus, Ohio, 75 cents.

Middle West Utilities Company, Chicago, Ill., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Dec., '14	$152,658	*$143,817	$8,841	$2,989	$5,852
1 " " '13	168,957	*148,938	20,018	347	19,671
6 " " '14	1,097,376	*924,647	172,729	21,681	151,048
6 " " '13	1,137,190	*915,396	221,794	2,082	219,712
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., Dec., '14	$17,128	*$9,524	$7,604	$2,053	$5,551
1 " " '13	16,386	*9,541	6,845	2,100	4,745
12 " " '14	178,825	*114,279	64,546	25,024	39,522
12 " " '13	163,128	*102,342	60,747	24,775	35,972
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., Dec., '14	$8,071	*$8,091	$20	$1,145	†$1,165
1 " " '13	7,689	*7,836	147	1,079	†1,228
12 " " '14	121,757	*101,749	20,007	13,141	6,866
12 " " '13	124,403	*98,728	25,676	13,044	12,632
CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.					
1m., Dec., '14	$29,794	*$18,778	$11,017	$6,694	$4,323
1 " " '13	36,169	*17,633	18,537	6,367	12,170
12 " " '14	349,894	*211,119	138,774	76,779	61,195
12 " " '13	380,952	*209,953	170,999	72,913	98,086
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.					
1m., Dec., '14	$227,665	*$131,530	$96,135	$51,115	‡$49,069
1 " " '13	219,869	*151,702	68,167	46,110	‡20,420
3 " " '14	643,122	*373,798	269,324	152,687	‡121,540
3 " " '13	623,392	*401,288	222,104	138,703	‡79,800
HOUGHTON (MICH.) COUNTY TRACTION COMPANY					
1m., Dec., '14	$21,486	*$13,823	$7,663	$5,605	$2,058
1 " " '13	24,833	*15,450	9,383	5,610	3,773
12 " " '14	276,633	*178,857	97,776	67,063	30,713
12 " " '13	296,853	*180,260	116,593	67,592	43,001
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Dec., '14	$29,461	*$16,527	$12,934	$7,699	$5,235
1 " " '13	29,523	*16,630	12,893	7,707	5,186
12 " " '14	303,515	*194,084	109,431	91,431	18,000
12 " " '13	296,565	*194,091	102,474	89,964	12,510
TAMPA (FLA.) ELECTRIC COMPANY					
1m., Dec., '14	$85,501	*$42,327	$43,174	$4,423	$38,751
1 " " '13	83,107	*49,386	33,722	5,059	28,663
12 " " '14	981,000	*520,078	460,923	54,489	406,434
12 " " '13	844,941	*466,499	378,442	55,749	322,693

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

PORTLAND COMPANY ON "JITNEY" BUS

Statement Made Public at Portland, Ore., on Feb. 1 Published in Full

The full text of a statement in regard to the "jitney" bus made to its employees under date of Feb. 1 by the Portland Railway, Light & Power Company, Portland, Ore., follows:

"The advent of the 'jitney' bus in competition with our street car service has created a condition fraught with serious menace to the welfare of the company and its employees and, by reason of the important position occupied by the Portland Railway, Light & Power Company in the affairs of Portland, there are possibilities of far reaching consequences affecting disastrously the prosperity and progress of the city itself.

"For your information and also to assist you in meeting the arguments of others, this circular has been prepared for distribution among yourselves and others whom you believe are interested.

"First of all, it should be remembered that a distinction should be drawn between the auto bus and the 'jitney' car. The former, the name of which is self-explanatory, may have a legitimate field in urban or suburban transportation of both passengers and freight, but just what this field may be, we are not yet certain, but we do know that auto bus companies have failed in Philadelphia, Indianapolis, Pittsburgh, St. Louis, New Haven, Dallas, Los Angeles, and nearly all other American cities where they have been tried. So far, we know of but one auto bus company which has made a reasonable success in urban transportation, and that is the company charging a 10-cent fare operating on Fifth Avenue, New York, a street without a car line and of very dense and heavy traffic. The 'jitney' car service, however, by which is meant the transportation of passengers in small automobiles in direct competition with street car systems and with the auto bus, can never be organized into a systematic service even approximating reliability. Let us see why this is so.

"In the first place it probably needs no argument to demonstrate that new or nearly new automobiles cannot be profitably employed in this service. Indeed, those who are familiar with automobile costs and operating expenses know that even with the second-hand car, despite its small investment charge, the margin remaining above operating costs, exclusive of the driver's compensation, is generally so small except in the districts of dense population and short hauls, that it would constitute not a very attractive wage for the driver. The Seattle *Post-Intelligencer* of Jan. 24, 1915, published the report of the chief engineer of the Public Service Commission of Washington, certainly a disinterested body, showing that the average earnings of the 'jitney' driver is only 23 cents an hour.

"Unfortunately, alike for the 'jitney' operator, as well as for yourselves, for the company and indeed all concerned, excepting perhaps the vendors of second-hand automobiles and supplies, the 'jitney' in the beginning shows an apparent though fictitious profit, and it usually takes several months before the misled 'jitney' operator realizes that his fancied profits are, after all, only imaginary. Hence, much time may elapse before all the prospective 'jitney' operators realize, by sad experience, this phase of 'jitney' service, but in the meantime very considerable harm and damage may be done to the city, to the citizens, including yourselves, and to the street railway.

"Since the 'jitney' service must then be confined to very low priced or second-hand cars, it seems very doubtful that any responsible business man or group of business men, would put a considerable investment in apparatus bordering upon junk for so important a venture as a system of transportation, and even if a speculative individual or group were willing to provide the necessary equipment, they would be faced at once by the problems of how to collect and conserve the revenues. Manifestly, they would find it impossible to gather together a number of trained, reliable operatives such as are found in organized transportation service. Certainly, it would take a time approximating that of the street railways whose men have been years in acquiring their training and experience, which includes physical examination for which a high standard has been set, also extended training and instruction before the applicant is allowed to operate a car and thereafter, constant instruction by men long experienced and with considerable ability in transportation service.

"Assuming, however, that a number of 'jitney' operators had been secured, a little reflection will make clear that the system in vogue on street cars and auto busses of paying the operators a fixed hourly or daily wage and having them turn in their revenue checked by registers or other mechanical devices is out of the question in 'jitney' service. But one other method apparently is possible, and that is to allow the operators to retain the earnings of their 'jitney' cars but pay to the would-be organizer a flat sum daily, weekly, or at other periods as agreed, in consideration of the organizer's work of planning routes, schedules and perhaps supplying collective insurance.

"Having got that far and having assigned the 'jitney' operators to routes, let us consider the invidiual whose run is at hours not convenient to him or whose line is in thin territory with relatively much smaller revenue possible, or the combination of both, and figure for yourself how long he will stay there. As shown by the experience in all the cities where the service is operated, the 'jitneys' will inevitably gravitate to the thickly settled, short haul districts with the natural consequence of dissatisfaction on the part of the 'jitney' drivers already in that territory. And when to this is added a number of independent operators, responsible to no one but themselves as to choice of routes and time of operation, the inevitable result is confusion and irresponsibility and all efforts at organization must fail and each operator then becomes a free lance. Such has been the experience of all the cities at present afflicted with the 'jitney.'

"In Los Angeles, for example, nearly all the 'jitney' drivers aimed to be in the downtown district at the same time to pick up and carry away homeward-bound loads. This resulted in enormous traffic congestion against which have been recorded strong protests by the fire department, the police department, the Chamber of Commerce, the Merchants & Manufacturers Association, the Mayor, the improvement clubs, the realty board, and finally the mothers of the city have taken up the cudgels against the 'jitney.'

"The Los Angeles *Times*, under date of Dec. 29, 1914, makes the statement that accidents have increased 60 per cent since the advent of the 'jitney' in that city. The Seattle *Post-Intelligencer*, under date of Jan. 17, 1915, reported nine automobile accidents in that city, of which seven involved 'jitneys.'

"In some of the California cities the serious menace of the 'jitneys' from the standpoint of morality has aroused the women of those cities to take urgent action to safeguard girls and young children against the evils which have followed in their wake. Numerous items in the press cite instances of insult and mistreatment to girls in crowded 'jitneys.' In Los Angeles, fake 'jitneys' are held responsible for the disappearance of several young women, while in Berkeley two co-eds narrowly escaped such experience. Indeed, it is asserted that questionable resorts are sending out 'jitneys' operated by women as well as by men.

"Some of the above instances are specifically mentioned in the Los Angeles *Examiner*, Jan. 9, 1915; San Francisco *Chronicle*, Jan. 21, 1915; Los Angeles *Times*, Jan. 24, 1915.

"In the southern cities where the street car companies found it necessary to curtail the car service because of the 'jitney,' the adverse effect upon the patrons and the business interests of the outlying districts brought home to these people at once the serious result of the continuance of irresponsible 'jitney' service.

"The 'jitney' has but two things to offer as advantages. The first is novelty, which will soon wear off. The second is somewhat higher speed. As against these are so many disadvantages and evils, such as utter irresponsibility, increase of accidents, of serious menace to morality, lesser convenience, lesser service and lack of transfers as compared with the street car systems, depreciation of business and property interests, that there can be no valid objection to any reasonable and legitimate movement to subject the 'jitney' to proper municipal regulation.

"A number of California cities have enacted ordinances regulating the 'jitney,' among them Venice, Long Beach, Pasadena, Los Angeles, Oakland, Fresno.

"In Los Angeles, where a flat 5-cent fare, without commutation rates is charged, the railway cited statistics to the effect that

"'For every nickel collected in fares more than 3 cents is expended directly for labor in this city. On the remaining 2 cents at least 1 cent goes for taxes, license, street improvements and material, four-fifths of the whole is returned whence it came, to benefit the people of Los Angeles. The remaining fifth takes care of the interest charges on the bonded indebtedness, and as many of the bonds are owned in California, a share of this last fifth also remains here.

"'In contrast to this showing is the 5-cent fare paid to the 'jitney' bus driver. Four-fifths of this sum must go for gasoline, oil, rubber tires and to pay for the machines, for few of them are owned outright by the men operating them. It is a direct reversal of conditions. In the latter case 4 cents in 5 goes out of the city; in so far as the street cars are concerned, that same proportion in the nickel stays here.'

"The above quotation is from the Mayor's message to the City Council and will hold substantially true in nearly every American city of similar class."

EFFECTIVE "JITNEY" ORDINANCE

Full Text of "Jitney" Regulatory Ordinance Passed and Approved in Boise

An ordinance passed by the City Council of Boise, Idaho, regulating the "jitney" had up to Feb. 12 acted effectively as a deterrent to the starting of "jitney" service in that city previously planned. This ordinance as passed follows in full:

"An ordinance making it unlawful for any person, firm, association of persons, or corporation, either as principal, officer, agent or employee, to use or occupy any street, alley, or other public place in Boise City, Idaho, with any automobile or other vehicle whatever for the carriage of persons for hire, and operating for the purpose of affording a means of local street transportation similar to that ordinarily afforded by street railways by indiscriminately accepting and discharging such persons as may offer themselves for transportation along the way or course on which it is used or operated or may be running, without first obtaining a license from Boise City; providing for the giving of indemnity as security to the public; providing for the filing of the designation of the route intended to be traveled by such vehicles; providing regulations for the conducting of such business; prescribing a penalty for the violation thereof; and repealing all ordinances and parts of ordinances in conflict therewith. Be it ordained by the Mayor and Council of Boise City, Idaho:

"SEC. 1. It shall be unlawful for any person, firm, association of persons or corporation either as principal, agent or employee, to use or occupy any street, alley or other public place within the corporate limits of Boise City, Idaho, with any automobile or vehicle whatever for the carriage of persons for hire, and operating for the purpose of affording a means of local street transportation similar to that ordinarily afforded by street railways, by indiscriminately accepting and discharging such persons as may offer themselves for transportation along the way or course on which it is used or operated or may be running, without first obtaining a license from Boise City, Idaho.

"SEC. 2. Any person, firm, association of persons or corporation shall, before receiving a license for carrying on the business defined by this ordinance, file with the city clerk a map of its designated route, showing the streets, alleys and public places upon which it is intended to operate, together with the operating schedule or headway to be maintained, the number of cars or vehicles to be operated, with the tariff of fares to be charged for such service. Before granting a license the Council shall approve or modify, and approve as modified, any such route, operating schedule or headway, and tariff of fares; and the acceptance of such license shall be deemed an agreement by any such person, firm, association of persons or corporation to operate its cars over the route upon the schedule or headway, and for the fares; and for failure so to do the license which may be in force shall be subject to revocation.

"SEC. 3. Every person, firm, association of persons or corporation shall pay to the city clerk of said city the sum of $75 per annum in advance as a license for any automobile or vehicle carrying not to exceed five passengers; from five to ten passengers, the sum of $100, and from ten to twenty passengers, the sum of $150; before it shall be lawful for any such automobile or vehicle to engage in the business herein defined.

"SEC. 4. Every person, firm, association of persons or corporation shall provide and file with the city clerk an indemnity bond in the sum of ten thousand ($10,000) dollars for the operation of not to exceed two automobiles or vehicles, and when it is desired to operate more than two such vehicles an indemnity bond shall be filed in the sum of twenty thousand ($20,000) dollars; and it shall be the duty of the clerk to present such security to the Council at its first meeting, and such security shall be acceptable to and approved by the Council before it shall be lawful to operate any such automobile or vehicle in conducting the business herein defined; and it shall be and is hereby made the duty of any person, firm, association of persons or corporation engaging in the business herein defined to keep and maintain such indemnity bond at the amounts herein specified, during the whole time of their operation; and such bond or indemnity shall be conditioned to the effect that in the event of any person or property being injured or damaged by negligence or carelessness in the operation of any automobile or vehicle owned or operated by the person, firm, association of persons or corporation filing such indemnity, the person so injured in his person or property shall have a right of action thereon, and such bond shall not be void upon first recovery, but may be sued upon and recovered upon from time to time until the full penalty thereof is exhausted.

"SEC. 5. It shall be unlawful for any person, firm, association of persons, or corporation, to allow, permit or cause any automobile or other vehicle used in the business herein defined to be operated by any person other than one over twenty-one years of age, skilled in the art of driving automobiles, and having a sufficient knowledge of the English language to carry on an intelligent conversation. The names of such operators shall be registered with the chief of police, and he shall report to the Council the names of any operators who are not qualified under this section, or the operation of any such automobile or vehicle by any person whose name is not so registered, and any violations by any such operators of the traffic ordinance of Boise City; and the Council may, if they find any such operator unqualified, or that any such violation of the traffic ordinances has been committed by any such operator, take the action prescribed by the following section.

"SEC. 6. All applications for licenses required in the business defined by this ordinance shall be made to the Council of said city, and no license shall be granted unless in the opinion of the Council the applicants shall meet all the requirements of this ordinance; and it shall be deemed and considered a part of such license that the Council reserves the right to suspend, cancel or revoke the same for any infraction of the traffic ordinances of said city, or when in the judgment of the Council it shall be to the best interest of the public that such license be suspended, cancelled or revoked.

"SEC. 7. Any person violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof in the police court of Boise City, Idaho, shall be fined in any sum not less than $25 nor more than $100. And every day's violation of this ordinance by any one automobile or vehicle shall constitute a separate and distinct offense.

"SEC. 8. That all ordinances and party ordinances of the city of Boise in conflict herewith be and the same are hereby repealed.

"SEC. 9. This ordinance shall be in force and take effect within a period of ten days after its passage, approval and publication."

PRESIDENT LILIENTHAL TALKS

Describes His Experiences After Assuming Presidency of the United Railroads, San Francisco

An interview with Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., appeared in the New York *Evening Post* of Feb. 10. The interview was particularly interesting in the light that it shed on the conditions imposed by Mr. Lilienthal when he assumed office with the company. The work that Mr. Lilienthal has done for the company and men under him in connection with instituting pensions for them, arranging a plan under which they may own their own homes, releasing them from the machinations of the money lenders and otherwise bettering their conditions has been reviewed from time to time by the ELECTRIC RAILWAY JOURNAL. In connection with other matters Mr. Lilienthal said in part:

"One day about a year and a half ago I received a brief telegram from New York asking me if I would accept the presidency of the United Railroads. If you had received a message of somewhat the same nature from the Czar of Russia, and I presume you do not know him, you would not have been more surprised than I was. After realizing what it meant, I said to myself: 'I'll have to go off into a corner alone and think this thing over.'

"There wasn't any political or corporation position that I wanted then or that I want now. My income from my practice as a lawyer was sufficient for myself and my family, and I was satisfied with the quiet life I was leading. The offer, however, tempted me, for I saw the possibilities of running a public-service corporation that would stand as a pattern.

"After talking with my friends and naming certain conditions, I accepted the position. The conditions were that I was to have, without any question, a free hand in the management and operation of the company. Interests owning a majority of the stock actually turned their proxies over to me, and I selected and elected my own board of directors. The list is made up entirely of San Francisco men, who are generally recognized in their own city for character, intelligence, and experience.

"After electing my own board I immediately issued a public statement to the effect that I was going to try to give good service, that I was going to take care of my employees, and that it was up to the public to let me know when anything was wrong. I merely asked the public over my own name to give me a chance to correct anything that was wrong; to come to me and let me know, personally. In that same statement I announced that the United Railroads, as long as I remained president, would keep out of politics. It was stated further that if the company ever undertook to influence public opinion it would do so openly and over the name of the company.

"I made it my business to go to dances and sociables given by our men, and I come in contact with them daily while they are in service, and while they are using our recreation and reading-rooms, and to get in touch with them in another way we publish a magazine for employees only. What we are driving at there is to establish a kind of family relation. In articles I write for that magazine regularly I talk things over with the men, and ask them to come in to see me when they have anything of interest or importance to discuss. And when they come I do not turn them over to my secretary or some other official; I see them myself.

"I am not trying to become a railroad magnate, nor am I trying to make money. I am getting old. and all I am trying to do to polish off the end of my life is to set an example with labor that will be followed by some other public service corporations.

"While we are competitors with the municipal railway lines in San Francisco we do not have any trouble with the city. We told the city officials publicly long ago that we would build lines wherever they were needed, and we do. We do not build lines that will not pay; we said that while such lines are wanted, the work should be done by the city and charged to an account fund, much as would be done in maintaining or building a hospital in the interest of the general public."

THE BOSTON SAFETY RECORD

Boston Elevated Railway Advertises Its Award of the Brady Medal

The Boston (Mass.) Elevated Railway, to which was awarded the Anthony N. Brady gold medal by the American Museum of Safety, had a full-page advertisement in the Boston papers of Feb. 12 calling attention to its being awarded the medal and to the record made by the company in safeguarding the lives of its passengers and employees during the year ended June 30, 1914, in which not a single passenger was killed as a result of the negligence of the company or its employees and not a single fatal accident occurred on the elevated or subway trains. The entire passenger traffic during this period averaged more than 1,500,000 passengers a day. The company announced that the advertisement was prepared and paid for by it in the belief that it was the most effectual method of bringing to the attention of the public the facts related, in the expectation that it would lead to still better results for all. The company said that the remarkable record which had been established was made possible through the combined efforts of the company, the public, the safety campaign committee of the Chamber of Commerce, and, particularly, the splendid response made by the employees in their efforts toward the saving of life and preventing injury. In making its acknowledgment to the public the company said:

"For the distinction which comes to our community and the Boston Elevated Railway, the company desires to make pupblic and grateful acknowledgment to its patrons, school and all other public authorities, the Boston Chamber of Commerce, business concerns, parents, newspapers, and especially to its employees for their co-operation in making a reality the words 'Safety First.'"

M. C. Brush, second vice-president of the company, had the following notice posted in all the carhouses and power houses of the company:

"I wish to thank all the employees of the bureau of transportation for their sincere co-operation and efforts in helping to make such a record in the prevention of accidents as to have warranted the selection of this company for first place by the Brady Memorial Jury. It should be a thought of great satisfaction to each and every one who through his or her thoughtfulness has helped to prevent needless injury and suffering, and I sincerely trust that you will earnestly try to continue your efforts and so improve that our combined record may be still better the coming year."

CHICAGO LOOP TRACK CAPACITY REACHED

While a witness before the Illinois Public Utilities Commission, L. A. Busby, president of the Chicago Surface Lines, stated that the lack of track capacity rather than the lack of cars accounted for the congestion during the rush hours in the Chicago down-town loop. He stated that on occasions 20 per cent of the cars on a line entering the loop were idle during the rush hours, because they were unable to move more than a car length at a time owing to the interference of cross-traffic at street intersections. Summing up, Mr. Busby stated that it was impracticable to put any more cars into the loop on the existing tracks.

Mr. Busby also furnished other interesting information. He stated that the Chicago Surface Lines averaged 3,060,000 passengers a day, including cash, transfers and free rides. The ratio of cash fares to total rides was approximately 50 per cent. Fully 80 per cent of the local passenger traffic was on the surface lines. The number of cars operated varied from 2700 to 2740 each day. The surface lines operated 902 miles of track and employed approximately 7150 motormen and conductors, and about 4000 other employees. Mr. Busby offered as the most important suggestion for remedying the existing congested conditions during the rush-hour period an initial subway system built approximately along the lines suggested by Bion J. Arnold more than a year ago. Other suggestions included universal transfers, the elimination of team traffic from the street railway tracks, the turning back of cars outside of the congested district, the electrification and through routing of steam suburban lines and the adoption of trail-car operation. It would be feasible to use trailers now and they would help materially to reduce congestion.

Complaints in Legal Form.—The International Railway, Buffalo, N. Y., announces it will no longer consider complaints regarding service, etc., unless they are made in legal manner and sworn to before a notary public.

How to Avoid Catching Cold.—The Brooklyn (N. Y.) Rapid Transit Company has issued employees' bulletin No. 12, dated Jan. 15, in which advice in regard to how to avoid catching colds is given by Edward T. Gibson, physician in charge of the medical inspection bureau of the company.

Service in Dayton.—On Jan. 20 the public utilities commission of the Greater Dayton Association decided to forward suggestions submitted to it for the improvement of the street railway service to the Presidents' & Managers' Association, composed of the heads of the various local electric railways.

One-Man Operation on New York Road.—The Putnam & Westchester Traction Company, Peekskill, N. Y., has adapted the one-man principle to its line from Peekskill to Mohegan Lake. The cars are of single-truck design and no changes were made in them other than the erection of a stanchion to hold a fare box.

Fare Change of New York State Railways.—The Fonda, Johnstown & Gloversville Railroad has been eliminated from the list of carriers over whose lines interchangeable coupon ticket books, sold by the New York State Railways, will be accepted for transportation. The change is effective on March 1, 1915, and applies only to books sold on and after that date.

"Car Full" Signs for Toronto.—The Ontario Railway & Municipal Board has approved the plan of the Toronto Railway for limiting the capacity of its cars. When the company's by-law becomes effective, probably in the spring, the accommodation of each car will be limited to its seating capacity and a number standing equal to 50 per cent of the seating capacity. When that point is reached the conductor will post a sign declaring the car full.

I. C. C. Indianapolis-Louisville Case.—The Interstate Commerce Commission has fixed Feb. 23 as the date for hearing the case of the Board of Trade of Louisville, Ky., against the Indianapolis, Columbus & Southern Traction Company and other lines, concerning the division of earnings on through business among the electric railways operating between Louisville and Indianapolis. The hearing will take place in Indianapolis before Examiner Fleming.

Matters Before Maine Commission.—Several petitions regarding electric railway service have been filed with the newly formed Maine Public Utilities Commission. The citizens of Saco ask for an extension of the 5-cent fare on the Saco Division of the Portland Railroad, from Saco to the Scarboro line. Employees of the car shops of the Maine Central Railroad at Waterville have petitioned the commission for better electric railway service between Waterville and Fairfield.

New Pittsburgh Transfers.—A new transfer system will soon be placed in operation by the Pittsburgh Railways in exchange for rights and privileges to be granted by Council, such as use of the new Point bridge, turnouts and switches in downtown streets, it is unofficially announced. The report followed numerous conferences between J. D. Callery, president, and P. N. Jones, general manager of the company, with Mayor Joseph G. Armstrong, members of Council and the city's legal department.

Wireless an Aid to Traffic.—On February 13 the Cleveland & Buffalo Transit Company completed arrangements with the Cleveland Railway through which the railway will be notified by wireless each morning of the number of passengers on the steamer bound for Cleveland. The steamer company will use the new East Ninth Street piers during the coming summer and cars will always be parked on the loop at the foot of that street to take care of the traffic when the boat lands.

Freight Ordinance in Pittsburgh.—The Pittsburgh Chamber of Commerce has adopted a resolution directing its municipal affairs committee to prepare an ordinance to legalize the hauling of light freight by street railways. Dr. J. P. Shaw, who made the motion, asserted that this is now being done illegally. The Legislature in 1907 passed an act permitting street railways to haul light freight, but provided that an acceptance ordinance must be adopted by the Councils. Dr. Shaw claimed that this has never been done.

Plan to Suppress "Jay Walkers" in New York.—The Mayor's central committee on street traffic and safety at its session at Police Headquarters in New York on Feb. 15 indorsed the plan to forbid persons on foot to cross congested streets except at corners and at street crossings in the middle of long blocks. The crossing in the middle of long blocks will be designated by painted lines, according to this plan. Whether the regulation must be enacted by the Aldermen or by the Legislature was left for the Police Commissioner to decide.

Discussion on Massachusetts Workmen's Compensation Act.—At the regular monthly meeting of the Massachusetts Street Railway Association in Boston on Feb. 10, H. R. Bygrave, of the Frankford General Insurance Company, discussed the effect of the Massachusetts Workman's Compensation Act since its passage about three years ago. The cost of this compensation has risen from $1,500,000 for 1913 to an estimated total of $3,500,000 for 1915. The Industrial Accident Board has found in the employee's favor in 80 per cent of the cases brought before it.

B. R. T. Objects to a New Line Order.—The Brooklyn (N. Y.) Rapid Transit Company has served notice on the Public Service Commission for the First District of New York that it will not obey the commission's order of Feb. 9 calling for the operation of a new surface car route from Meeker Avenue across Newtown Creek and over the Williamsburg Bridge to Manhattan, with suitable connections with the Lorimer Street line to provide for transfers. The company contends that the commission has no power to make the order; that it has no authority to order changes in the Lorimer Street line which will necessitate abandoning cars; that there is no demand by the public for the change, and that the extension is unreasonable because of the expense it would involve.

Chicago Questions Authority of Utilities Body.—A demand by Berwyn, a suburb of Chicago, for a 5-cent fare to Chicago with all transfer privileges, in a hearing before the Illinois Public Utilities Commission, raised for the first time the question of the authority of the commission to regulate contract ordinances with transportation companies. The commission's authority was questioned by an attorney representing the Chicago City Railway in enumerating his objections to granting the demands of Berwyn. Assistant corporation counsel for the city of Chicago objected that as the constitution of the State gave the city exclusive control over the operation of its street railways, neither the Legislature nor any agency created by the Legislature could impair or contravene such rights.

Campaigning for Increased Passenger Rates.—Application has been made in Illinois by the Middle West steam railroads for an increase in the passenger rates from 2 cents to 2½ cents a mile. Presidents and other officials of eleven railroads operating in this State have called upon Governor Dunne and requested his co-operation. The Governor favors a full and fair hearing before the Legislature, but has warned that in view of the fact that the 2-cent rate has been in force eight years without a protest, the representatives of the steam roads will have to satisfy the Legislature that the present 2-cent rate is unfair and unremunerative. In the meantime the railroad officials are requesting the public through commercial organizations or at public hearings to express themselves favorably on the question of increased passenger rates.

Kentucky "Jim Crow" Law Upheld.—Violation of the "Jim Crow" law by the Louisville & Interurban Railroad was made basis of a suit for damages just heard in the Circuit Court at Louisville, Ky., and resulted in peremptory instructions that the jury find for the plaintiff. Judge W. H. Field, before whom the case was brought, held that the "Jim Crow" law is applicable to interurban railroads with a mileage greater than 29 miles, saying that the Interstate Commerce Commission had upheld the validity of the State act requiring separate compartments for the white and the colored passengers, and that under the law the plaintiff was entitled to damages. He so instructed the jury, pointing out that the award must not be in excess of $2,500 and the jury returned a verdict of $30 in favor of the plaintiff.

Personal Mention

Mr. S. E. Wolff has been elected assistant secretary-treasurer of the Grand Rapids (Mich.) Railway.

Mr. E. N. Sanderson, New York, has been elected president of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., to succeed Mr. W. J. Patterson.

Mr. Howard Walker has been appointed district superintendent of District "C" of the Ohio Service Company, with office at Cambridge, Ohio, to succeed Mr. W. S. Hayes.

Mr. L. J. DeLamarter, secretary of the Grand Rapids (Mich.) Railway, has been elected to the additional office of treasurer of the company to succeed Mr. G. L. Estabrook, resigned.

Mr. Daniel W. Reese, formerly in the mechanical department of the Philadelphia & Reading Railroad, has been appointed as master mechanic of the Reading Transit & Light Company, Reading, Pa., succeeding Mr. John L. Gould, recently resigned.

Mr. G. L. Estabrook has resigned as treasurer and assistant secretary of the Grand Rapids (Mich.) Railway. He is succeeded as treasurer by Mr. L. J. DeLamarter, secretary of the company, and as assistant secretary by Mr. S. E. Wolff.

Mr. Edward J. Carroll, who is in charge of the electric railway operated in Shanghai, China, is on a visit to the United States. He was in Berlin when war was declared. He expects to leave from San Francisco shortly for Nagasaki, Japan.

Mr. W. L. Palmer, who resigned recently as claim agent for the Illinois Northern Utilities Company at Dixon, Ill., will not become connected with the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., as announced previously.

Mr. W. H. Hazlitt has resigned as purchasing agent of the British Columbia Electric Railway, Vancouver, B. C., after a service of fifteen years, and Mr. C. A. Lee, formerly connected with the engineering staff of the company, has been appointed to fill the vacancy.

Mr. A. E. Beck, who has been connected with the legal department of the British Columbia Electric Railway, Vancouver, B. C., for seven years as claim agent, has resigned. The duties of the office will hereafter be carried out under the direction of Mr. V. Laursen, the company's permanent counsel.

Mr. Allen Purvis, manager of the interurban lines of the British Columbia Electric Railway, Vancouver, B. C., has resigned. The interurban lines will hereafter be operated under the direction of Mr. W. G. Murrin, general superintendent. The work of the various divisions will be carried out by division superintendents as heretofore.

Mr. Robert M. Feustel, chief engineer of the State Public Utilities Commission of Illinois, has tendered his resignation to the commission to take effect on March 1. Mr. Feustel is a member of the firm of Sloan, Huddle, Feustel & Freeman, consulting engineers of Madison, Wis., and was formerly assisting chief engineer of the Railroad Commission of Wisconsin. His withdrawal at this time is for the purpose of resuming his consulting engineering practice with the above firm, which practice he temporarily relinquished in order to organize the engineering department for the Illinois Commission. During the last year the organization of the engineering staff has been effected, rules establishing standards of service for various types of utility properties have been prepared for the commission's adoption, and the general method of collecting data for rate making cases has been outlined, which latter information the commission will issue in pamphlet form in the near future. It is understood that the commission has not as yet determined upon the successor to Mr. Feustel.

Mr. Walter N. Cargill, for the last four years a member of the engineering staff of the Stone & Webster Engineering Corporation, Boston, Mass., will sever his connection with the Stone & Webster organization on April 1, 1915, to become superintendent of power and lines of the Rhode Island Company, with headquarters at Providence, R. I. Mr. Cargill is a native of Liberty, Maine, and was graduated in

1900 from the University of Maine in the electrical engineering course. He immediately joined the staff of the Lynn & Boston Street Railway, with duties in the motive power department. In 1903 he was appointed superintendent of power stations, with headquarters at Lynn, Mass., and for eight years was in charge of the design, construction and operating features of the ten generating plants of what is now the northern portion of the Bay State Street Railway system. Joining the Stone & Webster forces in 1911, Mr. Cargill devoted his attention chiefly to the mechanical side of power plant work, including reports and appraisals. He is a member of the New England Street Railway Club, the American Society of Mechanical Engineers, and is an associate member of the American Institute of Electrical Engineers.

OBITUARY

George W. Risser, associated with former Governor Haskell of Oklahoma in the promotion of the People's Electric Railway at Muskogee, is dead.

Robert A. Balfour, banker, broker, and who, with his brother, James G. Balfour, held much stock of the Union Traction Company, Philadelphia, Pa., died on Feb. 11 at his home in Germantown. He was forty-eight years old. Mr. Balfour was born in Rockdale, Delaware County, and came to Philadelphia with his father, Alexander Balfour, when a child. The elder Balfour died twelve years ago, and following his death Robert A. was elected a director in the Union Company to fill his father's place.

Charles H. Ladd, who for the last three years had charge, as superintendent, of the work done by the Stone & Webster Engineering Corporation, Boston, Mass., in El Paso, Tex., is dead. Mr. Ladd was graduated from Harvard University, in a scientific course, in 1900. After serving with various steam railroads, he entered the employ of the Houston (Tex.) Electric Company in 1905 as engineer of track and overhead lines. In 1906 he entered the service of the Stone & Webster Engineering Corporation and spent about a year as engineer of construction in connection with the rebuilding of track for the city lines in Houston. In 1907 he was transferred to Fort Worth as superintendent of construction. After two years spent in Arizona Mr. Ladd returned to the Stone & Webster organization at El Paso in the capacity previously mentioned.

D. G. Hamilton, for more than ten years president of the Chicago (Ill.) City Railway, now included in the system of the Chicago Surface Lines, died on Feb. 16 at his home in Chicago. Mr. Hamilton was born in Chicago seventy-three years ago. He received the degrees of A.B. and A.M. from De Pauw University and was graduated from Douglas University in 1867. He was president of the Anglo-American Land & Claim Association in Texas in 1890, and from 1889 to 1899 was president of the National Railway Company, the predecessor of the present United Railways of St. Louis. He was also president of the Texas & Central Mexican Railway. At the time of his death, he was resident director in Chicago of the Union Mutual Life Insurance Company of Maine, a member of the Chicago Historical Society, trustee of De Pauw University, a member of the Knights Templar and a Thirty-second Degree Mason. He belonged to the Chicago and the Union League Clubs.

H. Ward Leonard, electrical engineer and inventor, died suddenly of apoplexy on Feb. 18 as he was about to attend the annual banquet of the American Institute of Electrical Engineers. After graduation from the Massachusetts Institute of Technology in the early eighties, Mr. Leonard at the age of twenty-three became associated with the Edison interests, first with Mr. Edison personally and then in the installation and operation of Edison plants. In 1889 he was appointed general manager of the light and power department of the Edison Electric Manufacturing Company in New York and later of the Edison General Electric Company. In 1891 he established an independent manufacturing business, still operating as the Ward-Leonard Electric Company at Bronxville, N. Y. Mr. Leonard's inventions have been principally in the direction of systems of motor control, which were designed first for elevator service but later were adapted to railway locomotive use. Several electric locomotives in Switzerland and France have been equipped with this system.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Riverside, Rialto & Pacific Railroad, Riverside, Cal.**—Incorporated in California as a successor company to the Crescent City Railway Company. This incorporation means nothing more than that the Crescent City Railway has changed its name. There is no change in the management. This line, when it was built from Riverside to Crestmore, was incorporated. Since it was extended to Bloomington and Rialto it has operated without being incorporated. Capital stock, $500,000. Directors: William G. Henshaw, Tyler Henshaw, Henry Chickering and William Lees, Oakland, and William Metcalf, Piedmont, San Francisco. Headquarters of the company are at San Francisco.

***West Sacramento Electric Company, Sacramento, Cal.**—Incorporated in California to build electric railways and other public utilities in Sacramento. Capital stock, $100,000. Incorporators: Benjamin P. Lilienthal, San Francisco; Herbert W. Furlong, Pleasanton; William Berlitz, San Francisco, and T. T. C. Gregory, Suisun.

FRANCHISES

Pocatello, Idaho.—J. D. Browning has given the certificate of necessity and convenience for an electric railway in Pocatello over to J. R. Munn, who is asking for a franchise to build this line. The proposition is now before the Council. [E. R. J., Oct. 24, '15.]

Henderson, Ky.—The Henderson Traction Company has asked the Council for a franchise in Henderson. This is part of a plan to build an extension from Henderson to Owensboro.

Henderson, Ky.—The Evansville, Henderson & Owensboro Traction Company has asked the Council for a franchise in Henderson.

Greenfield, Mass.—The Connecticut Valley Street Railway has asked the Council for a franchise to extend its tracks along Silver Street in Greenfield.

Leominster, Mass.—The Worcester Consolidated Street Railway has asked the Council for a franchise in Leominster.

Salem, Mass.—Officials of the Bay State Street Railway have assured Mayor O'Keefe of Salem that they will soon build a loop line through the Castle Hill district. A franchise for the line was secured twenty years ago.

Kansas City, Mo.—The Metropolitan Street Railway has received a franchise from the Council to double-track its line on Sixty-seventh Street from Swope Parkway to Elmwood Avenue in Kansas City.

Geneva, N. Y.—The Geneva & Auburn Railway has asked the Council for a franchise to double-track its line on Exchange Street from Seneca Street to Lewis Street in Geneva.

Toronto, Ont.—The Humber Valley Electric Railway has asked the Ontario Legislature for an indefinite extension of time on its franchise in which to begin to build its electric railway through the Humber Valley from Lambton to the mouth of the Humber River and along the shore to Sunnyside. [E. R. J., Mar. 29, '13.]

Portland, Ore.—The City Dock Commission has approved the amended franchise of the United Railways, permitting the company to establish its electric lines in Stark Street and in Twelfth Street, between Burnside and Stark Streets, in Portland. The City Commissioners have approved the ordinance.

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has received the approval of the Public Service Commission for a franchise granted by the Philadelphia Council for the right to extend its tracks on Leland Street in Philadelphia.

Marshall, Tex.—The Texas-Louisiana Traction Company has asked the Council for a franchise in Marshall. A. B. Blevins, Jefferson, president. [E. R. J., Jan. 23, '15.]

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—The extension to Corona has been completed by this company and will be placed in operation at once.

San Francisco (Cal.) Municipal Railway.—The Utilities Committee has advised the city engineer to proceed with the preparation of plans for the municipal railway across Golden Gate Park, the cost of which is estimated at $200,000. This amount is to be taken out of Geary Street Railway earnings. The line across the park is to be sunken and the crossings will be bridged over. The cost will be $50,000 more than for level construction.

San Rafael & San Anselmo Valley Railway, San Rafael, Cal.—This railway project has been abandoned by order of the Railroad Commission. About 5 miles of the line between San Rafael and Fairfax had been surveyed. E. S. Rake, San Rafael, president. [E. R. J., Nov. 21, '15.]

Connecticut Company, Bridgeport, Conn.—Plans are being made to begin work within the next few weeks on an extension from Stratford Avenue down Hollister Avenue and along the Lordship road to a point at Lordship Manor near the Stratford lighthouse. Arrangements for the construction of five bridges along the right-of-way have been completed and work on the structures will begin at once.

Palm Beach & Everglades Railway, West Palm Beach, Fla.—The 40-mile railway to be constructed between West Palm Beach and Lake Okeechobee will be operated by steam and not by electricity. H. G. Geer, West Palm Beach, vice-president. [E. R. J., Feb. 13, '15.]

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—It is announced that this company has awarded contracts for the construction of electric lines to connect Harrisburg, Marion, West Frankfort and Benton. Work will soon be begun. [E. R. J., Nov. 21, '14.]

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Contracts for grading have been awarded and work has been begun by this company on its line from Bonner Springs to Lawrence.

Union Traction Company, Coffeyville, Kan.—Plans are being considered by this company for an extension to Pryor, Okla. It would probably follow the old Oklahoma and Cherokee Central grade from Nowata to Pryor.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to build at once the extension on the viaduct from Summer Street to Commonwealth Pier, then branch off to the Fish Pier in Boston.

Connecticut Valley Street Railway, Greenfield, Mass.—Plans are being made by this company to extend its tracks in Greenfield.

Detroit (Mich.) Railway.—This company has placed in operation its extension of the Crosstown line to Thirty-fourth Street and West Warren Avenue in Detroit. This line will connect the Crosstown line and Junction Avenue belt lines in Detroit.

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—Plans are being considered by this company to build a line between Little Falls and Pierz. E. G. Potter, 433 Andrews Building, Minneapolis, president. [E. R. J., Jan. 2, '15.]

United Railways Company of St. Louis, St. Louis, Mo.—Plans are being contemplated by this company for an extension of its Fourth Street line in St. Louis through the Lafayette Park district.

International Railway, Buffalo, N. Y.—E. G. Connette, president of this company, has announced that plans are being made to double-track the West Utica Street line on Ferry Street in Buffalo.

Yonkers (N. Y.) Railroad.—Early in the spring this company will complete the double tracking of the Park Avenue line in Yonkers by laying a double track from Ashburton Avenue to the terminal at Roberts Avenue, a distance of about 1½ miles. At the same time the company will double track the Mount Vernon line on Yonkers Avenue from Sherwood Park to Wilbur Street. A special layout is also to be laid at Nepperhan Avenue and New Main Street. According to general manager Leslie Sutherland the remaining single track portion of the railway will be double tracked as rapidly as the company's finances will admit.

Newbern-Ghent Street Railway, Newbern, N. C.—Plans are being made by this company to extend its lines in Newbern. Among the improvements planned will be a line from the Union Depot along Queen Street and Metcalf Street to New Street where it will connect with its present track which extends to the Norfolk Southern Railroad tracks in Riverside. It is also planned to extend the line in Riverside to Duffytown and through Reizenstein. These improvements will mean an expenditure of about $40,000.

Ohio Electric Railway, Cincinnati, Ohio.—This company has awarded a contract to H. C. Wolff, Chillicothe, Ohio, for 200,000 ties.

Cleveland (Ohio) Railway.—Plans have been made by this company for the renewal of 21 miles of track this year. It is said that 5 miles of track in addition should be re-surfaced. Within a short time this will be brought to the attention of the City Council. The largest section of track renewal contemplated is on Cedar Avenue between East Seventieth Street and Fairmont Boulevard. Short sections on many of the other lines have been selected for improvement.

Youngstown & Southern Railway, Youngstown, Ohio.—David Tod, receiver for this railway, states that the line will be double-tracked from Youngstown to Southern Park. He will petition the court to this effect soon and expects the request to be granted. A complete plan of reorganization for Youngstown & Southern Railway affairs is also under way.

***Tulsa, Okla.**—Surveys and preliminary arrangements for an electric interurban line between Collinsville and Tulsa are being made. The line will connect a number of towns between Nowata and Tulsa. No names are yet given of those interested in the project.

Aylmer, Ont.—A by-law will be submitted to the ratepayers to guarantee the bonds of the proposed hydro-radial line from Tillsonburg to London, by way of Brownsville, Springfield, Aylmer, Lyons, Belmont, Westminster and the London & Port Stanley line to London.

Wentworth Street Incline Railway, Hamilton, Ont.—The steam system of operation of this railway has been replaced by hydro-electric power supplied by the municipality of Hamilton. A storage battery has also been installed for emergency purposes. [E. R. J., Dec. 26, '14.]

Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.—Work on the Perth to Smith's Falls section of this railway will be begun in the spring.

West Stayton Power & Railway Company, Stayton, Ore.—Plans are being considered by this company to begin work in the spring on this proposed electric railway between Salem and East Stayton. E. O. Stafter is interested. [E. R. J., Aug. 30, '13.]

Lehigh Valley Transit Company, Allentown, Pa.—It is reported that this company expects to lay a new double-track between South Bethlehem and Hellertown, Pa. Surveyors are at work laying out a proposed electric line between Richlandtown and Hellertown. It is rumored that this company is behind the project. It is also reported that the company plans to build a short route for a fast line between Bethlehem and Philadelphia. Resurveys are now being made over what is known as the old North Pennsylvania route.

Lansdowne, Pa.—It is announced that plans are under way for the construction of an electric railway from Lansdowne Avenue and Baltimore Avenue in Lansdowne to East Lansdowne and Cardington, connecting with the Sixty-second Street and Spruce Street line of the Philadelphia Rapid Transit. It is reported that this line is to be leased by the Philadelphia Rapid Transit Company.

Pittsburgh, Pa.—John W. Reid, Colona, Pa., Edward Thomas and others, of Monaca, Pa., have incorporated with $250.000 capital and will soon ask for a franchise to build an electric line to make direct connections between East Liverpool, Ohio, and Pittsburgh. They propose to construct a line from Monaca to Aliquippa, where a connection will be made with the Woodlawn & Southern Railway and from another connection, near South Heights, on through to Coraopolis, Pa., where the Pittsburgh Railways system will be met.

Kingsport, Tenn.—It is reported that work is to begin at an early date on the proposed electric railway from Kingsport to Newport. An office building has been rented in Greenville by those interested in the project. [E. R. J., Jan. 2, '15.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—This company is asked to consider plans for an extension of Third Street from Buford Avenue to Starr Street in Corpus Christi.

Gulf & Pecos Valley Railway, Lufkin, Tex.—As soon as financial arrangements can be arranged this company plans to build its 120-mile railway from Sabine Lake to Lufkin. R. B. Bledsoe, Lufkin, president, and the P. A. McCarthy & Sons Company, Lufkin, Tex., chief engineers. [E. R. J., Dec. 27, '13.]

Pier Railway, Port Arthur, Tex.—Work will be begun by this company about March 1 on its proposed line from the center of the city of Port Arthur at Procter Street and Austin Avenue to the end of the causeway on the pleasure piers in Port Arthur. [E. R. J., Oct. 5, '14.]

Southwestern Traction Company, Temple, Tex.—An extension between Cleburne and Ballinger is being contemplated by this company in the near future. There is a possibility of the proposed line being extended as far as San Angelo.

Ogden, Logan & Idaho Railway, Ogden, Utah.—After considering the matter for several months, directors of this company have definitely decided to build the Brigham City-Wellsville extension of the Idaho line by way of Collinston, Utah. The proposed route of the electric line extension follows closely the old route of the Utah Northern Railroad, crossing the divide into Cache County at Summit. Much of the material for this link of the railway, as well as that portion from Smithfield north to Preston, Idaho, has already been ordered and work on both portions of the extension will be rushed during the coming summer. It is believed by the officials of the company that the entire line from Ogden to Preston will be ready for operation by next fall. This will mean a continuous electric line between Provo, Utah and Preston, Idaho.

***Radford, Va.**—Plans are being made to build an electric railway between Floyd, Willis and Radford. About $500 has been subscribed by citizens of Radford. Among those interested are T. W. Simpson, John L. Vaughan, Shawsville, and W. J. Phillips, Willis.

Marietta-Parkersburg Interurban Company, Parkersburg, W. Va.—Within the next few months this company plans to begin work on its proposed 14-mile electric line to connect Parkersburg, Belpre and Marietta via the new bridge over the Ohio River between Parkersburg and Belpre. It is planned to use 90-lb. T rails. H. H. Archer, Parkersburg, is interested. [E. R. J., Jan. 19, '15.]

Sheboygan Railway & Electric Company, Sheboygan, Wis.—An extension to Elkhart Lake, Kiel, New Holstein and Chilton will soon be built by this company.

SHOPS AND BUILDINGS

Little Rock Railway & Electric Company, Little Rock, Ark.—Work has been begun by this company remodeling the building at 417 Main Street, Little Rock, to be occupied by the company's commercial department and salesrooms. The general office will remain at the present quarters, 115 West Fourth Street, Little Rock.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—Plans are being made by this company to move its offices from the present location in the Hicks Building to the corner of Eighth Street and K Street in Hoquiam.

POWER HOUSES AND SUBSTATIONS

Quincy (Ill.) Railway.—A new circulating pump, of 2400 gallons per minute capacity, is being installed in the power house of this company in Quincy.

Cleveland (Ohio) Railway.—The purchase of turbine generators for utilizing exhaust steam is under consideration by this company. A contract for supplying steam with the Cleveland Salt Works expires on July 1 and the question as to renewal must be decided soon.

Manufactures and Supplies

ROLLING STOCK

Columbia (S. C.) Railway, Gas & Electric Company is building six double-truck cars in its own shops.

Caldwell (Idaho) Traction Company will probably purchase during 1915 one passenger car and one substation.

Scranton & Binghamton Traction Company, Scranton, Pa., expects to purchase four new cars for its new extension.

Willapa Electric Company, Raymond, Wash., will order in 1915 one motor express car about 30 ft. in length, single-truck and of wood construction.

Metropolitan Street Railway, Kansas City Mo., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1915, as expecting to purchase fifty new cars, has ordered this equipment from the American Car Company. Brill trucks are specified.

TRADE NOTES

Westinghouse Traction Brake Company, New York, N. Y., has received an order to equip with automatic air brakes the interurban cars recently ordered by the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.

Lee H. Parker, for several years electric railway engineer with the Stone & Webster Engineering Corporation, Boston, Mass., has become president of the Spray Engineering Company, with headquarters at 93 Federal Street, Boston.

Union Switch & Signal Company, Swissvale, Pa., has received an order from the Northern Texas Traction Company to install six miles of T. D. B. signals on its Fort Worth-Dallas line between Boundary and Mountain Creek Spur.

C. W. Rhoades, formerly assistant sales manager in the railway department of Valentine & Company, Chicago, Ill., has been appointed railway representative of the Kay & Ess Company, Dayton, Ohio, in the territory included in the Mississippi River Valley.

Railway Appliances Company, Chicago, Ill., of which the entire capital stock was owned by Percival Manchester, has been sold to C. F. Quincy, president of the Q & C Company, Chicago, Ill. The business of the Railway Appliances Company will in the future be operated by, and in the name of, the Q & C Company.

Louis O. Duclos, for fifteen years sales manager of the Massachusetts Chemical Company, is about to enter into business for himself with headquarters in Boston. Mr. Duclos has developed a full line of insulating varnishes and friction tape, which he will market to electric railway repair shops, dealers and electrical contractors.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces the removal of the offices of its newly organized automobile equipment department from East Pittsburgh to Shadyside Station, Pittsburgh, Pa., where they will be located in the works devoted exclusively to the manufacture of Westinghouse automobile equipments.

Wasson Engineering & Supply Company, Milwaukee, Wis., has received an order to equip with its air-retrieving trolley bases all the cars on the new Kalamazoo-Grand Rapids line of the Michigan Railway, as well as the Grand Rapids, Holland & Chicago Railway, the former being a 2400-volt third-rail and trolley line and the latter a 1200-volt trolley line.

Coil Manufacturing & Repair Company, Cleveland, Ohio, which recently purchased the plant of the Cleveland Coil & Manufacturing Company, has enlisted the services of R. P. Pascoe, formerly manager of the latter company, succeeding Mr. Kuehle, recently resigned. Mr. Pascoe was formerly connected with the Van Dorn & Dutton interests as superintendent of their electric department.

Standard Underground Cable Company, Pittsburgh, Pa., has appointed A. B. Saurman, for the past twelve years Pacific Coast manager for this company, as southeastern manager, succeeding the late T. E. Hughes, with headquarters in Philadelphia. John P. Bell, for the past eight years assistant secretary and treasurer of the company, will succeed Mr. Saurman as Pacific Coast manager.

Prepayment Car Sales Company, New York, N. Y., has instructed its attorneys to carry its case against the Orange County Traction Company to the United States Supreme Court for review. The decision in this case in the United States Circuit Court of Appeals for the Second Circuit was mentioned on page 195 of the issue of this paper for Jan. 23. The company's case against Douglas Robinson as receiver of the Metropolitan Street Railway, mentioned in the same article, is handed down for retrial.

Cole, Ives & Davidson, New York, N. Y., is the name of a new engineering firm with offices at 61 Broadway, formed by the partnership of William W. Cole, 43 Exchange Place, and Arthur S. Ives and Rolland A. Davidson, composing the firm of Ives & Davidson, 84 William Street. Especial attention will be given to investigations and reports for financial interests, inventories and valuations of public utility or industrial properties and design. Installation or management of power plants of all descriptions.

O. C. Hirtzel severed his connection with the Westinghouse Electric & Manufacturing Company, February 1, and is now engaged in forming a corporation at North East, Pa., with a capital of $100,000, for the manufacture of street railway supplies, repair parts, drop forgings, etc. Mr. Hirtzel has been with the Westinghouse Company since 1912 as railway supply specialist of the detail and supply department at East Pittsburgh. Prior to that he was treasurer and manager of the Eureka Company, formerly the Eureka Tempered Copper Works, since the formation of that corporation nearly twenty years ago. The factory site has been selected at North East and as soon as the new organization is perfected up-to-date new buildings will be constructed. The new plant is expected to be in operation about July 1, 1915. The name of the new company has not yet been decided upon, but it is expected that an announcement regarding this will be made shortly.

Anthony J. Bemis, who has opened an office as consulting engineer in electric railway and lighting work at 39 South LaSalle Street, Chicago, has had a varied experience in the field of utility engineering, construction and operation. In 1898 Mr. Bemis joined the Stone & Webster organization as manager of their Maine properties, later becoming manager of the Breton & Plymouth Railway for two years. Another years was spent as manager of the Cape Breton Electric Company. From 1903 to 1905 Mr. Bemis represented the Stone & Webster properties at Savannah, Ga.; Jacksonville, Fla.; Columbus, Ga., and Tampa, Fla. In 1905 he was appointed general manager of the Grand Rapids-Muskegon Power Company, Grand Rapids, Mich., in charge of construction and operation. In 1909 Mr. Bemis joined the staff of the J. G. White & Company, acting for a time as general manager of the Oklahoma (Okla.) Railway. In 1912 he became engineer in charge of construction and operation for Elston, Clifford & Company, utility operators, Chicago, supervising construction of plants at Vicksburg, Miss., and Mineral Point, Wis. Mr. Bemis will retain his present connection with the Elston-Clifford company, but will devote his consulting engineering practice to reports, investigations and valuations of utility properties and advice on operating and commercial problems in connection with electric utilities.

Harry M. Hope, assistant engineering manager, Stone & Webster Engineering Corporation, Boston, Mass., will open an office for consulting electrical and mechanical engineering on March 1, 1915, in the Oliver Building, 141 Milk Street, Boston. Mr. Hope was educated in the grammar and manual training schools of Muskegon, Mich., and at Northwestern University and the Lewis Institute of Technology. During his grammar school course he had about one and one-half years' experience with the Muskegon Traction & Lighting Company. After installing a number of small electric lighting plants in Michigan he entered the testing laboratory of the Chicago Edison Company in 1902, being transferred in 1903 to the engineering department as draftsman in charge of the high-tension features of the Fisk Street station. During about five months of this time Mr. Hope also operated substations of the company. From 1904 to 1907 he was electrical engineer of the North Shore Electric Company, Chicago, and in June of the latter year he joined the staff of the Stone & Webster Engineering Corporation at Boston, becoming assistant engineering manager in 1911. Since taking up his duties with Stone & Webster Mr. Hope has been in charge of the design of transmission lines, substations and the electrical equipment of generating plants in many parts of the country and has made many investigations and reports on electric lighting, railway, hydroelectric and industrial properties.

ADVERTISING LITERATURE

Union Electric Company, Pittsburgh, Pa., has issued a price list of its Washington fir cross-arms for shipment from Pittsburgh stock.

American Oil Pump & Tank Company, Cincinnati, Ohio, issued a catalog describing its self-measuring and non-measuring oil pumps and tank outfits for paint, oil, varnishes, turpentine, lubricating oils, etc. Bulletins Nos. 201, 202 and 203 describe storage systems for these oils.

Esterline Company, Indianapolis, Ind., has issued a reprint of a description which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 16, 1915, of successful tests of the penetrating yet non-blinding qualities of this company's "Golden Glow" lamps, held on the lines of the Mobile Light & Railroad Company, which resulted in an order for ninety-two SM-95 headlights.

Ohmer Fare Register Company, Dayton, Ohio, has issued a reprint of an article written by B. F. Williams, a well-known educator of Des Moines, Iowa, entitled "Elements that Build for Better Business." The principles of correct relations between employer and employee laid down in the article are said by the company to be especially applicable to its fare register system.

Henry L. Doherty & Company, New York, N. Y., has issued a 14-page booklet calling attention to the present opportunity for investment and unusually attractive rates of income. It is stated that bonds and notes of public utility properties with stable and increasing earnings may be acquired at prices to yield from 4½ to 7¾ per cent. Among the specific issues described are included the first mortgage 5 per cent bonds of the St. Joseph & Savannah Interurban Railway, St. Joseph, Mo., the first mortgage 5 per cent bonds of the City Light & Traction Company, Sedalia, Mo., and the five-year 7 per cent convertible notes of the Cities Service Company, New York.

Bowman, Cost & Company, St. Louis, Mo., have issued "The Investor's Almanac" for 1915. The book contains more than 150 pages and is handsomely illustrated. "The Bluebook of American Investment," as the almanac has been called, treats of every feature of business economics and finance, with particular relation to the safety of American securities. This year's edition contains specially contributed articles from such financial authorities as Lawrence Chamberlain, Festus J. Wade and Louis Guenther. The tenor of these articles is optimistic. Mr. Chamberlain looks for an appreciation in security prices in the ensuing six months, Mr. Wade expects beneficial results from the Federal reserve system and advocates greater consideration for the railroads, and Mr. Guenther concludes that the wheels of industry will soon start to whirr with unwonted regularity.

NEW PUBLICATION

The Future of the Working Classes. By Roger W. Babson; Babson's Statistical Organization, Boston. 76 pages. $1.

This little book is really a treatise on the subject of the value of education to the working classes. The first section treats of the relations of labor and capital, and the second discusses the economic strife between three nations now at war—England, France and Germany. The writer's conclusions in the latter section, however, were based on peace conditions. The closing section offers the evidence which has led Mr. Babson to conclude that the working classes can become prosperous only through education. He deplores the fact that no part of the nation's educational system is devoted to alleviating strikes through training youths in the fundamentals of character and economic intelligence. It is recommended that those interested in the future of the working classes look to education rather than to arbitration and the courts.

Electric Railway Journal

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PROPOSED CHARGE FOR BAGGAGE

At the annual meeting of the Central Electric Railway Association, Mr. Laney, traffic manager Cleveland, Southwestern & Columbus Railway, called attention to the discrimination in fares involved when passengers are allowed to carry 150 lb. of baggage free if they desire. This practice has been followed on the electric roads largely because of its use on steam railroads, but it is illogical because it probably costs the railway company as much, if not more, to carry a trunk as to carry a passenger, yet it gets full fare for the one and nothing for the other. As is well known, the steam railroads abroad make a charge for baggage, and we believe that there is no reform which is more logical in the transportation business than this. Of course, a change in the steam railroad practice in the matter would help enormously. But, while it may not come for a long time, the tendency of the steam railroads, with the authority of the Interstate Commerce Commission, is to increase their passenger fares, and a charge for baggage by them would seem to be the natural sequence of this condition, especially if this particular change has been approved in principle by the Interstate Commerce Commission as stated by Mr. Laney.

METERS AND MEN

Without questioning the worth of car meters for furthering the correct and economical use of energy, a word of caution is due with regard to the use of meter records for comparisons of individual motormen in city service. The stumbling block in all such comparisons lies in the fact that the number of slowdowns and stops for a trip over a given route may vary extremely even for runs which are made during the same hour of successive week days. For example, on a dozen lines tested by one city company, variations of two to three stops per mile were common, and in one instance the stops, because of exceptional conditions, ranged from five to thirteen for almost similar loads. Therefore, it was no surprise that the energy used, as registered by car meters, showed from 120 to 180 watt-hours per ton-mile. Now it is evident that while interurban motormen can be safely checked on a ton-mile basis for like schedules and grades of equipment, motormen in most city services cannot, since the number of slowdowns and stops is beyond their control. The law of averages can be applied, and has been applied, where meters are in use, but this demands a detail study of conditions on the different lines in order to allow for all classes of equipment schedule and weather. Yet such a survey is a necessity if the company does not want to make the error of punishing the honest man who obeys all signals to stop and who coasts cautiously, while rewarding the dishonest man who skips stops and coasts recklessly. We repeat, therefore, that while meters should be of much value to a railway system as a whole, they should be used very conservatively as a gage for comparing the motormen until somebody invents a simple means for registering the number of stops included in each run and reading.

RELATION OF THEORY AND PRACTICE

In the debate on the subject of starting resistances for railway motors which has been going on in our columns for a few weeks past, one of the writers defends the use of analytical methods as far as they are applicable. This gives us the occasion for expressing an idea or two along the same line by way of explaining our attitude toward articles like those under discussion. In the first place calculation should be employed in place of "cut and try," whenever possible, because in general it is cheaper. This is obvious, but the rub comes in defining "whenever possible." No one who wants to design a cubical or cylindrical measure just large enough to contain a cubic foot or a bushel would apply the cut-and-try method. If the formula does not immediately come to mind recourse may be had to a hand book or text-book on mensuration. A simple sketch will help out the memory. The same principle should apply, whether the problem is one most easily solved by arithmetic or calculus. Again, an enormous amount of time is spent in most schools and colleges on mathematics, the whole purpose being to give the student facility in making calculations. For some reason, however, in the desire to be practical most students, after leaving school or college, fail to use their calculating ability and often resort to wasteful methods of accomplishing results. They "shy" at a technical article because it contains a little algebra or geometry. The same thing is true in the use of the so-called "higher mathematics," which is only a more highly-developed calculating device. The state of affairs described is partly due to the way in which mathematics has been taught, but nothing is to be gained for the present generation by criticizing the faults of early training. The thing to do is to overcome the results of those faults by practice in reading and interpreting equations. This can be done, if necessary, by putting them into the form of graphs. Further, the practical man should acquire a respect for theory, if he hasn't it already, for there can be no progress without it. Neither can there be any conflict between theory and practice. If there seems to be such, one or the other is false.

THE COMITY OF BUSINESS

That electric railway department heads are less mindful of the amenities of business life than men in other lines of business we will not admit. Nevertheless, incidents like the following tend to give, to those affected, the impression that in cases where friction has developed between a railway company and a manufacturer the former is not always as considerate as it might be.

The general manager of an electric interurban railway is reported to have requested a manufacturer some time ago to ship him certain material guaranteed to produce certain results within a year. The year elapsed, when, in answer to an inquiry from the manufacturer, the reply was that the material had not produced the guaranteed results, and, therefore, that payment was not in order. The salesman, however, refused to be convinced and personally visited the line, where, to his amazement, he discovered his material stored away and absolutely untouched since its arrival. The failure of another interurban railway to pay for goods shipped under contract blackened the reputation of traction managers in general in the same manufacturer's opinion and caused him in future dealings with electric railways to refuse the guarantee privileges previously offered. The dread of incurring heavy litigation expenses in enforcing payment made him unwilling to risk the guarantee chance except with steam roads, which in his words, were "either more honest as a class, or if dishonest, could afford to be dishonest only on a large scale."

Somewhat different in detail but involving the same general principle is the case where a city railway is said to have requested detailed prints of a repair-shop device from another manufacturer and to have told him later that the device was unsuited to the conditions existing in its shops. Subsequent investigation on his part showed the device to be in use there, having been manufactured in the company's shops without the permission of the owner of the original drawings.

In the minds of the manufacturers concerned in these three cases each represented deliberate, dishonest action on the part of the railway company concerned. We would be unwilling to agree to this without hearing the railways' side of the story, although we admit that if the allegations are true, each exhibits a careless disregard of business courtesy, if nothing worse. Where a company requests a service from a manufacturer or accepts a service from him, such as goods on consignment for trial, it is in duty bound within a reasonable time to report to him upon the general performance of these goods, irrespective of whether it desires to order any for regular use or not. As to the first case, the most charitable excuse which can be made for the statement that the material had proved unsatisfactory, although it had never been tested, is poor management.

This business obligation on the part of the railway company, however, does not relieve the manufacturer from a corresponding obligation, namely, to show proper diligence in following up the performance of his material when on trial. There is a legal maxim and a sound one that everyone should make reasonable efforts to protect himself if he expects consideration from others. This applies not only to business transactions where material is under test, as in the first and second examples mentioned, but also to the third case, where the manufacturer submitted detailed prints of a repair shop device. In this case the device may have been independently invented by one of the engineers of the company and, unless it had previously been patented by the manufacturer, he would have little legal redress. If it had been patented his duty was to bring suit promptly and press the suit to a conclusion, not only for his own benefit but for the benefit of other inventors.

The technical newspaper occupies a sort of "neutral" position between the manufacturing and operating sides of the field in which it circulates, and, like neutral countries during a war, it is often the recipient of complaints from one belligerent that the other is violating the rules of international law or else the more subtle regulations of the Hague tribunal. Like the neutral country the newspaper has the duty of pointing out the causes of friction. We do so in this case not primarily to show reprehensible practice on the part of the buyers or lax methods on the part of the seller but to assist to a better understanding between both. Where a case of seeming injustice occurs, the best way is for the person who considers himself injured to state his position clearly to the other but to lay no great stress on any supposed "rights" except those which can be enforced at law. On the other hand the buyer who recognizes only legal "rights" and ignores the reciprocal values of comity and fair dealing is a pretty poor buyer.

THE MODERN SINGLE-TRUCK CAR

Mr. Leonhauser's intensely practical article on "Reducing Maintenance Costs," published in our Equipment Department last week, suggests three different ways for attaining that end: First, better handling of the car equipment; second, co-operation with other departments, and, third, the use of single-truck cars. As the author himself has ably expatiated on the first two ways it is necessary to elaborate here only his comparison of the double-truck versus the single-truck car.

As an experienced maintenance man, Mr. Leonhauser advocates the single-truck car unreservedly for city service. His main reasons are not only its lower first cost ($64.30 as against $123.80 per seat, according to a comparison of some recent cars) but also because of the simplified maintenance which fewer parts assure. Since neither this lower first cost nor lower maintenance charge are disputed by any one, it is pertinent to ask: Why is the double-truck car? In the past the answer has been three-fold: Fewer physical limitations in negotiating curves; superior riding quality and, most important, greater capacity or less platform cost.

We believe, however, that the development of the radial axle truck has greatly cut down the superiority of the double-truck car along the three lines noted. With the new truck the play of the axles is enough to take care of long cars on short curves, better-placed springs assure good riding at moderate city speeds, say 15 m.p.h., while the long wheelbase permits a carbody of appreciably larger capacity. The practicability of the radial axle single-truck car is clearly shown by the installation of the Third Avenue Railway System, New York. Since 1914 that company has been operating fifty such cars, each 35 ft. over all and seating forty-five passengers, chiefly in cross seats. Furthermore, these cars are of modern low-floor design, and they have produced excellent results in reduction of accidents and other operating costs.

While Mr. Loenhauser's figures are not based on the use of radial axle trucks, a car of the Third Avenue type should prove more economical for the car equipment department than any double-truck car of equivalent capacity. It is therefore incumbent upon the operating department to prove that the capacity of the biggest available double-truck car still exceeds that of the biggest single-truck car by so much that the platform savings of the first will offset the general savings of the second.

GRADE CROSSING ACCIDENTS

Many investigations have been made to determine the extent to which it is possible to influence the public to exercise care in crossing railway tracks. These indicate an appalling degree of heedlessness which can be reduced by systematic effort. It cannot be inferred, however, that every person who crosses a track without looking either way is unaware of the condition of the track, otherwise there would be many more deaths than there are. It must be remembered that the eyes are wide angle lenses and can take in a great deal without moving. They can be turned in their sockets through another wide angle without movement of the head. The ears, too, are invaluable aids to safety.

An interurban car, travelling at say 35 m.p.h. consumes about a second in passing a given point. If we assume that two cars pass the point in an hour there would be one chance in 1800 that a perfectly heedless person would run into a moving car. It happens also that, at ordinary walking speed, about one second is required to cross a single track, hence there is the same chance that a car would run into the individual. Obviously, the number of accidents, great as it is, is not great enough to indicate 100 per cent heedlessness in any considerable number of individuals. The fact is that there is some heedlessness in every person which is but crudely indicated by the lack of tangible precautions taken to insure safety.

The last report of the committee on grade crossings and trespassing on railroads of the Association of Railroad Commissioners directs attention to "that class (of our population) which seem to have little regard for law or custom and are a law unto themselves"; to the "increased use of motorcycles and automobiles in cities and villages by those having little regard for safety devices installed for their protection," and to the "driving of this same class of vehicles over grade crossings in the country where no protection has been installed and in many instances where the view of approaching trains is such that it would be a challenge to one's sanity to suggest that warning signals of any kind are necessary." All of which goes to emphasize the fact that, try as we may, we cannot make a grade crossing fool-proof. The eye, the ear, the sense of touch if necessary, and above all the common sense must be appealed to if crossing accidents are to be cut down.

THE RE-EXAMINATION

The ever-advancing standards in the car and signal equipment of high-speed interurban railways demand a parallel improvement in the trainmen. It is natural enough to make the new men show their fitness to handle the latest control and to respond to the indications of modern block signal systems but the manager is less inclined to set the same stringent standards for the veterans. The latter are willing enough to go to the schoolroom for lessons in the operation of new car equipment, but they fear to submit to an examination for heart action and color perception. In fact, the feeling against recurring physical examinations is so strong that it has often led to threats of a strike. Yet the management can do its duty to the riding public only by insisting that it is just as necessary to check men against deterioration as it is to check material. If an accident occurred the company would probably be penalized more severely for retaining a color-blind motorman than for using a defective axle, since the former often may be detected more readily than the latter. As no humane and sensible management would willingly dismiss a man who had proved able and worthy in the past it should be prepared to handle the delicate question of re-examinations along these lines: First, see that the re-examination is absolutely fair; second, place the retired man in a position of less responsibility but without decreasing the rate of pay.

The need of the first requirement is illustrated by a case where a motorman of seven years' unblemished service on a high speed line was rejected by the company physician because of a weak heart. Although pronounced sound later by a leading heart specialist, the discharged motorman could get no redress because the company permits no appeal from its doctor's decisions. There was more than a surmise in this case that the opinion of the company physician could have been revised with the aid of a $10 bill. As to the second requirement, it is clear that if the company had selected its men carefully in the past the number of deteriorated men would be much less and too few to affect the cost of less responsible labor appreciably. In any event the company is under a moral obligation to keep its faithful men at work and, if possible, at the old rates.

With these two just practices in force the management will find the older men far more willing to submit to physical examination from year to year, while the sense of fairness shown by the company will have a happy effect throughout the entire organization.

Signaling on the Illinois Traction System

A Description of the New Installations Made by the Company During the Past Year, Including Three Special Cases Where Complicated Track Arrangements Required the Use of Intermediate Signals Instead of Preliminaries, as Well as Individual Treatment in Locating the Signals

BY JOHN LEISENRING, SIGNAL ENGINEER ILLINOIS TRACTION SYSTEM

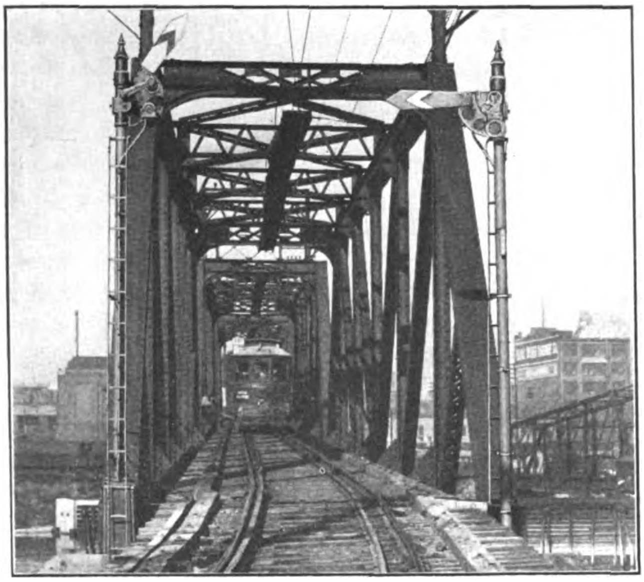
The Illinois Traction System has recently completed and put into service a new section of signaled territory covering a distance of 36.5 miles between Springfield and St. Louis. This completes this entire division of 99 miles, continuous signal protection being provided except for a 12-mile stretch between Staunton and Edwardsville, for which material is now on order. This installation follows the standard arrangement of signals that is generally used on the Illinois Traction System, a description of which was given in the ELECTRIC RAILWAY JOURNAL of May 16, 1914.

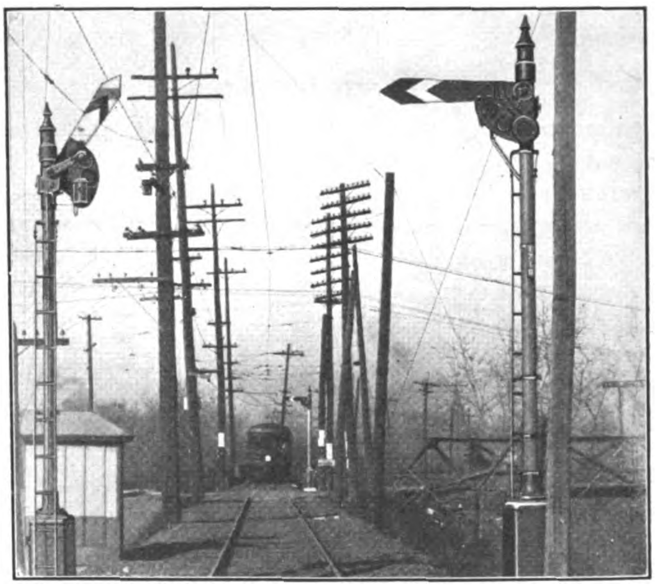
In addition to the above section, there have been installed three other sections in which marked departures from the customary arrangement have been necessary on account of local conditions. In these three cases the conditions differed enough, one from the other, to make each one a study in itself, and in none of them could the standard arrangement have been applied.

PROTECTING PEORIA BRIDGE

Of the three, perhaps the most interesting one was that made near Peoria, where it was desired to protect operation on a single track bridge over the Illinois River. This bridge extends from Peoria to East Peoria and is used jointly by the cars of the Illinois Traction System and the Peoria City Railway. Fifty regular interurban trains cross this bridge in twenty-four hours, the majority of these movements being made between 5 a. m. and 12.30 a.m. In addition to the passenger trains, all freight and power-house coal entering Peoria over the system must use this bridge, and as a classification yard is located on the East Peoria side of the river a large number of switching movements also are necessary. The city service operates on a ten-minute schedule during the morning and evening, this headway being changed to twenty minutes in the off-peak hours.

The bridge, including approaches, is approximately 1600 ft. long and is made up of four through-truss spans, four through-girder spans, six deck-girder spans and one double-leaf, lift span, 141 ft. long, that extends over the river channel. As an added complication to the use of track circuits, there is a 50-ft. section of track, near the Peoria end of the bridge, in which the rails are attached directly to longitudinal steel girders, no cross-ties being used. The purpose of this is to allow coal to be dumped during the night from hopper-bottom coal cars into a pit below the bridge superstructure. From this the coal is conveyed into the power house as needed. It was out of the question to insulate one rail from the other across this section, and the length was sufficient to allow a car to come wholly within its limits. Therefore, special arrangements of circuits had to be used so that the signals would not clear while a car was standing on the dead section.


ILLINOIS TRACTION SIGNALS—SIGNALS AT SOUTH END OF PEORIA BRIDGE


ILLINOIS TRACTION SIGNALS—SIGNALS AT EAST PEORIA WHERE CITY AND INTERURBAN TRACKS CONNECT

The diagram on page 409 shows a general layout of the tracks adjacent to the bridge, and from this it will be noticed that the double-end siding of Farm Creek, the entrance to the classification and carload delivery yard, and the turn-outs at the point where the city cars diverge, are all within signaled territory and had to be protected. The new section of signals shown in the diagram immediately adjoins a section that had been previously signaled, signal 1713 being part of the installation from East Peoria to Mackinaw Junction that was made about three years ago.

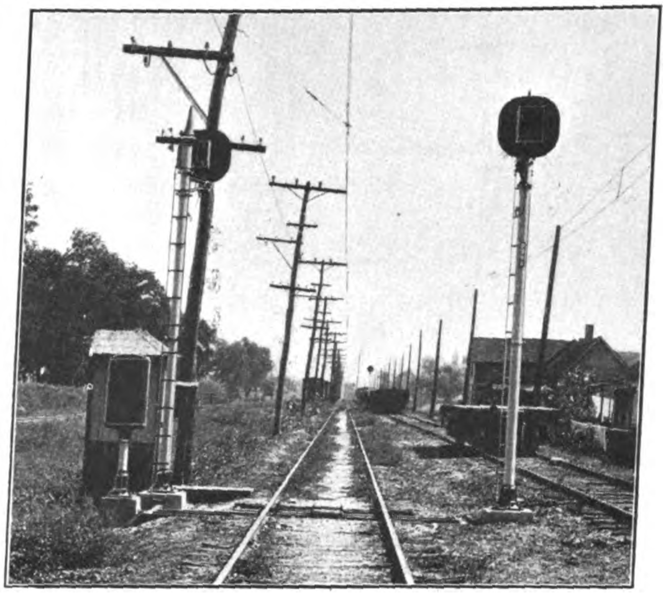
In order that following movements could be made with as little delay as possible, it was decided to divide the section into two blocks for following movements, but to maintain a single block for opposing movements, as it was impossible to use the Farm Creek Siding for meeting or passing trains, because this siding is intended for freight service only. It was also decided that no permissive movements should be allowed and that the signaled section must be self-contained and must not overlap or extend into the territory beyond signal 1713. This, of course, made it impossible to have a preliminary section at the south end of the block without leaving an unprotected piece of track between signals 1713 and 1710. It was also impossible to install a preliminary at the Peoria end, on account of the numerous switches and paved streets. Therefore, it seemed practically necessary to adopt the scheme of using auxiliary home signals instead of a preliminary section.

All signals installed in the new section are of the semaphore type except those used to control the movement of the city cars on the main track. With the arrangement as installed the operation is as follows: A south-bound train, passing signal 1723, will set signals 1720, 1712, 1710, 1710-A and 1710-B in stop position. If an opposing train passes either semaphore signal 1710 or the light signals 1710-A or 1710-B at the same instant that the south-bound train passes signal 1723, signal 1712 will stop the north-bound train and the south-bound movement can continue as far as signal 1721. Orders are in effect that any train which finds signal 1712 against it, after passing signal 1710 at proceed, must back up at once beyond signal 1710, so that the opposing train may proceed without delay at signal 1721. When the south-bound train passes signal 1712, signal 1723 will clear and a second train may follow into the section.

A north-bound train passing any one of the signals 1710, 1710-A or 1710-B sets signals 1723 and 1721, as well as the signals behind it. All three signals at Farm Creek clear after this train passes signal 1720. The switch indicators at Farm Creek Siding have been controlled only to the point marked "1" on the diagram, and to signals 1710, 1710-A and 1710-B, as it was considered to be desirable to reduce the control section to the minimum safe distance. This decision was made because of the cutting down of the time available for switching work on account of the frequent service.

In the illustration on page 408 is shown the double signal location at the south end of the bridge. These signals are mounted on the bridge pier considerably below the track level. The wires leaving the trunking and attached to the bridge structure would normally be carried over the bridge in trunking laid next to the wooden guard rail, but on account of redecking work these had to be temporarily removed. The right-hand illustration shows signals 1710, 1713 and 1712, also the turnouts used on the Peoria cars.

This installation cost approximately $6,000. It replaces an installation of trolley-contact signals which did not give complete satisfaction under the peculiar conditions involved.



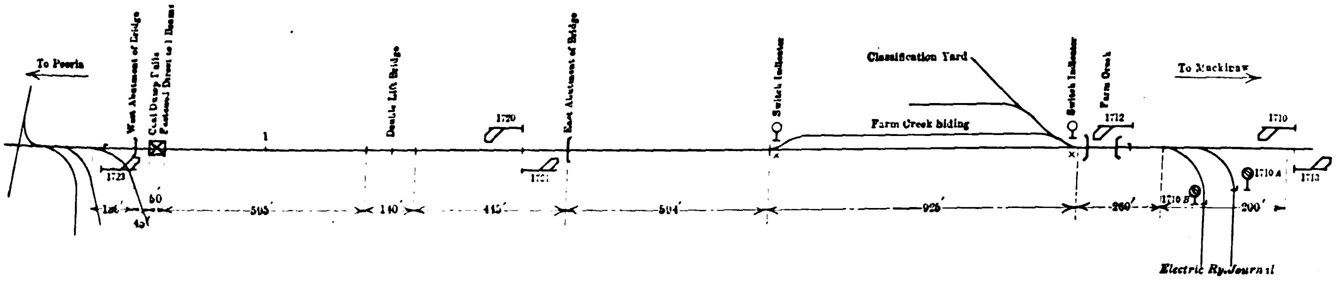
ILLINOIS TRACTION SIGNALS—VIEW OF SIGNALS AT TORRENCE SIDING ON THE DECATUR BELT LINE

LIGHT SIGNALS WITH SELF-CONTAINED BLOCKS

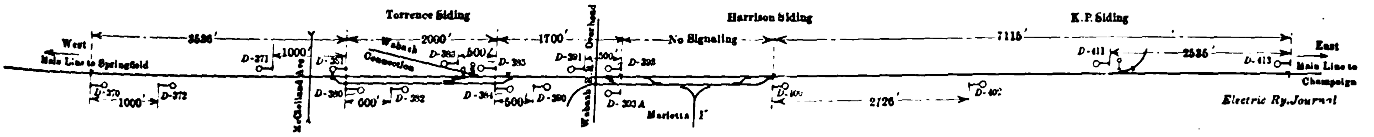
The two other special installations that were made last year are of the light signals only, one being on the freight belt-line around the city of Decatur and the other protecting a single-track bridge on a suburban line that runs south from Danville to Ridge Farm.

The general layout of the Decatur Belt installation is shown in the accompanying diagram. There are seventeen signals of the Union Switch & Signal Company's light type with 5⅜-in. lenses, and these protect four blocks which vary in length from 1700 ft. to 7100 ft. Each block has a single-track circuit, and auxiliary signals in advance of those at the ends of the blocks are used. This scheme was adopted partly because it eliminated the necessity for a preliminary section, which was not considered desirable under the conditions encountered, and partly because it could be installed at much less expense than the standard arrangement used on the main line.

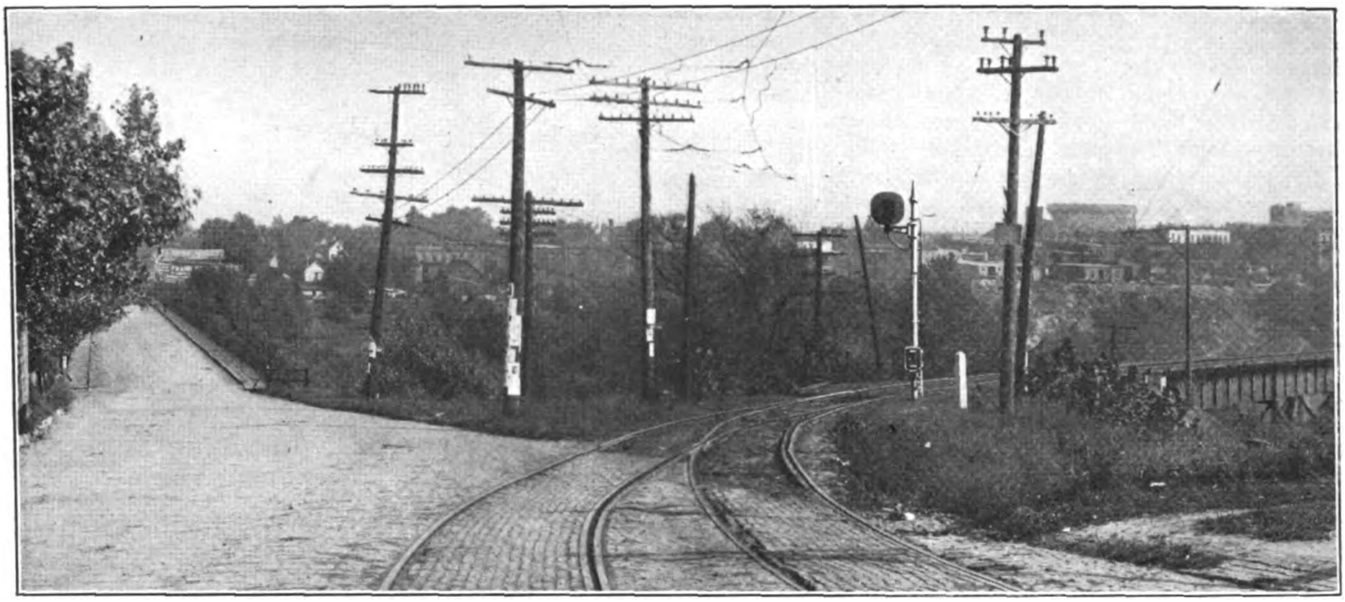
The traffic controlled by these signals is of the most widely different class imaginable, a light single-truck city car being one extreme and the heavy interurban freight trains being the other. The freight trains often exceed twenty cars, of which a part, at least, are of 100,000-lb. capacity. Trains are quite infrequent when


To Peoria
West Abutment of Bridge
Coal Dump Rails Fastened Direct to I Beams
1723
1
Double Lift Bridge
1720
1721
East Abutment of Bridge
Switch Indicator
Classification Yard
Farm Creek Siding
Switch Indicator
Farm Creek
1712
To Mackinaw
1710
1710 A
1713
1710 B
60
45
505'
140'
415'
504'
925'
260'
200'
Electric Ry. Journal

ILLINOIS TRACTION SIGNALS—LAYOUT OF NEW SIGNAL SECTION AT PEORIA BRIDGE


West
Main Line to Springfield
Torrence Siding
3536'
D-371
1000'
D-370
1000'
D-372
McClelland Ave.
D-381
D-380
600'
D-382
Wabash Connection
2000'
D-383
600'
D-385
D-384
500'
1700'
D-391
D-390
Wabash
Overhead
500'
D-398
D-393 A
No Signaling
Harrison Siding
Marietta
D-400
2126'
D-402
7115'
K.P. Siding
D-411
2536'
D-413
East
Main Line to Champaign
Electric Ry. Journal

ILLINOIS TRACTION SIGNALS—LAYOUT OF NEW SIGNAL SECTION FOR DECATUR BELT LINE



ILLINOIS TRACTION SIGNALS—APPROACH TO BRIDGE OVER VERMILION RIVER AT DANVILLE

compared with the number at Peoria, the city cars operating in each direction from Marietta wye every half hour. The freight service varies according to traffic requirements and is confined to the early morning and after-dark hours.

The operations in all blocks are similar. When a train enters a block, as at signal D-380, the opposing signals D-383 and D-385 display stop indications. Signal D-382 continues to give a proceed indication until the train passes it, when the indication changes to "stop." This is accomplished by the use of center-fed track circuits with proper voltage adjustment and proper location of the auxiliary signals in relation to the transformer and relay locations. The intermediate or auxiliary-home signals are used to indicate to a motorman that no opposing train has entered the block at the same instant as his own train, which is possible because there are no preliminary sections. If such a thing does happen, both trains will receive stop indications at the auxiliary-home signals which in the block in question are D-382 and D-383.

All turn-outs at which high signals are not installed are protected by switch indicators that are controlled in each direction to the ends of the block in which the siding is located. The connection to the Wabash Railroad that is shown in the diagram is one over which all carload shipments are received from and delivered to that railroad.

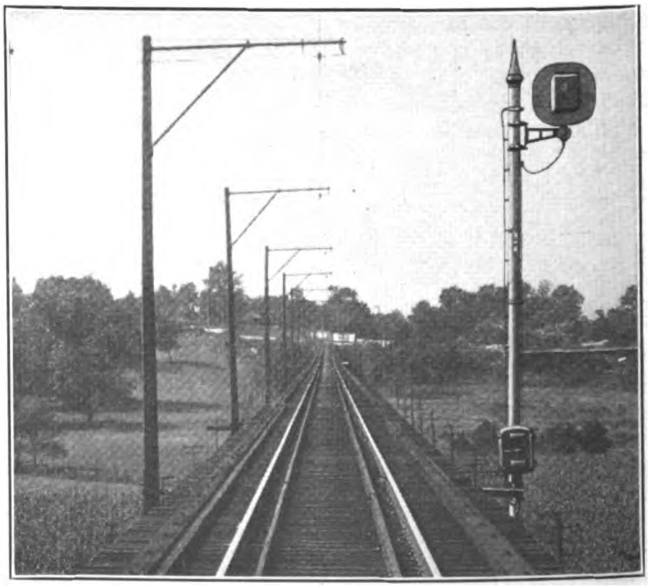
It should be noticed from the general layout that several of the track circuits are very short—so short, in fact, that in the design considerable doubt existed as to the possibility of working out the center-fed track circuits satisfactorily. Consequently, thorough tests were made, and special relays were used where necessary, the galvanometer type being installed in Sections B and D and the vane type in Sections A and C. Section C is the shortest circuit ever worked on the center-fed principle, but it has given perfect satisfaction in every way.

On page 409 is a view looking east in Section B, signals D-380 and D-381 being seen in the foreground and signals D-382 and D-384 in the distance. The signal transmission line is just above the trolley span wires. This is a 2300-volt, twenty-five-cycle, single-phase circuit having one source of supply at the Decatur power house and another at the Harrison substation. In both of these plants, step-up transformers are used for stepping up the 370-volt current supplied for the rotaries to 2300 volts. The low-tension, signal-control wires are carried on the alley arm opposite the d.c. feeder wire.

At Danville there is installed one block of the same arrangement of signals as described above. They protect a single-track bridge over a deep valley and the Vermillion River. Double track approaches lead to the bridge on both sides, and at one end of the bridge track circuits are carried for a considerable distance through the paved street. The bridge itself is 1700 ft. long, the section of track circuit in pavement 380 ft. long, and the entire block, from end to end, 2160 ft.

The end of the block in pavement is shown in one of the accompanying illustrations. The signal that appears in the middle distance is the auxiliary-home signal, as the block section extends several hundred feet back of the camera. The signal transmission line for this block is carried on a line of poles extending along the right-of-way beside the bridge, while the low-tension control wires are run in trunking laid alongside of the wooden guard rail on the bridge floor.

All of the installations described above were made during the summer of 1914, the company doing all the work with its own forces, the material having been purchased from the Union Switch & Signal Company.



ILLINOIS TRACTION SIGNALS—INTERMEDIATE SIGNALS ON DANVILLE BRIDGE

Annual Convention of C. E. R. A.

Letter from Governor of Indiana, and Addresses by Chairman of Public Service Commission, Mayor of Indianapolis, and Prominent Representatives of American Association Part of First Day's Proceedings—Paper on Baggage and Report on Standard Charges for Repairs on Foreign Equipment Also Presented

The spirit of helpfulness expressed in Governor Ralston's letter to the members of the Central Electric Railway Association assembled in its annual meeting at the Hotel Severin, Indianapolis, Ind., Feb. 25 and 26, was unquestionably the most pleasing part of the regular program. The encouragement also gained from the address of Chairman Thomas Duncan of the Public Service Commission of Indiana was significant of a change in public sentiment toward electric railways which should aid their future welfare.

The Governor stated that it was his intention to recommend to the legislature that it empower the Public Service Commission of Indiana to authorize an increase in passenger fares in the state to 2½ cents per mile. Chairman Duncan of the commission expressed himself as in sympathy with the proposed recommendations of the Governor. This same spirit of good will toward the electric railways of Indianapolis was expressed by Joseph E. Bell, mayor of Indianapolis.

More than 120 members of the association attended the meeting which was opened on Thursday morning, with President Schneider in the chair, with address of welcome by Mayor Bell of Indianapolis.

The mayor stated that it was a most regrettable condition when the railway managers must stand on guard each time the state legislature was in session, to prevent the confiscation of their property. He expressed himself as in hearty accord with the interests of the men who take care of the pay rolls. The open spirit of hostility on the part of the public through its regulative bodies toward the transportation companies has produced the great army of unemployed, in the opinion of the mayor. A few weeks or months of cessation of this hostility will solve the unemployment problem. In closing Mayor Bell stated that he believed it his duty to guard the business interests, and in so doing he hoped to see new electric railways constructed. He said they had done much for the state and were invaluable to Indianapolis.

STANDARD REPAIR CHARGES FOR FOREIGN EQUIPMENT

In the business session which followed, President Schneider announced that the first order of business was the report of the standards committee. R. N. Hemming, chairman of the committee, reported that this committee had under consideration the question of uniform charges for repairs to foreign equipment. At the last committee meeting S. W. Greenland, Fort Wayne & Northern Indiana Traction Company, had submitted a tentative form of report and emphasized the necessity of further and more detailed consideration of this subject. It was the concensus of opinion of the committee that the report should cover the conditions in a definite and comprehensive manner, not only as regards the subject specifically but as regards responsibility in case of damage to equipment. The committee recommended that the subject should be continued, and to this suggestion the association voted to give its approval.

CHARGE FOR BAGGAGE

President Schneider then announced that the next subject on the program would be the paper by Charles J. Laney, traffic manager Cleveland, Southwestern & Columbus Railway, entitled "Is Handling of Free Baggage a Traffic Error." This paper is published in abstract on another page of this issue.

The discussion of Mr. Laney's paper was opened by F. D. Norviel, general passenger and freight agent Union Traction Company of Indiana. Mr. Norviel took issue with the author regarding traffic errors of the past. He stated that low fares were necessary to create the business. Since then traffic had developed to a point where the character of service permitted an increase in rates without decreasing the business. Mr. Norviel doubted the advisability of charging for all baggage handled until the steam roads had set the example. If a baggage rate was applied at this time he felt quite certain that it would result in a loss of long haul business.

J. F. Starkey, general passenger agent Lake Shore Electric Railway, concurred in the suggestion made in Mr. Laney's paper. He believed that the traveling salesmen did not use the electric road because it was cheaper but because they could make more calls in a given time. Mr. Starkey also stated that he did not believe electric roads, so far as their passenger traffic was concerned, should consider the steam roads as serious competitors. It was the service that got and held the business.

F. I. Hardy, superintendent of transportation Chicago, South Bend & Northern Indiana Railway, recalled a case where a steam road had reduced rates and increased its service to meet electric railway competition, but it could not obtain any more business than at the old rate. Mr. Hardy also stated that he had found that the method of collecting 25 cents for each piece of baggage checked returned about the same revenue as that of carrying 150 lb. of baggage free and charging for excess baggage. He believed that it would be better policy to await similar action by the steam roads before charging a uniform rate for baggage.

R. A. Crume, general manager Dayton & Troy Electric Railway, believed that while a uniform charge for baggage might result in the loss of some business, it would enable his company to utilize to better advantage the 20 per cent of its car floor space which was now devoted to the transportation of baggage. Although his road charges more fare than its steam road competitors, it has never felt the competition. It was Mr. Crume's opinion that there would not be an appreciable loss in business if a uniform charge for all checked baggage was applied by electric roads.

ADDRESSES BY COMMISSIONER DUNCAN AND REPRESENTATIVES OF AMERICAN ASSOCIATION

President Schneider then announced that C. Loomis Allen, president American Electric Railway Association and president Newport News & Hampton Railway, Gas & Electric Company, had expected to be present at the meeting and deliver an address but was detained by illness. Mr. Allen has just undergone an operation on his throat. In his absence, Matthew C. Brush, second vice-president Boston Elevated Railway and president American Electric Railway Transportation & Traffic Association read a paper for him.

At the Thursday afternoon session, a letter addressed to the association from Governor Ralston was read by Charles L. Henry, Indianapolis & Cincinnati Traction Company. This was followed by an address by Thomas Duncan, chairman of the Public Service Commission of Indiana.

Continuing the regular program, C. C. Peirce, Boston, vice-president American Electric Railway Manufacturers' Association, addressed the meeting. He was followed by E. B. Burritt, secretary of the American Electric Railway Association. Mr. Burritt emphasized the good that could come from closer relations between the local associations and the parent association. At the conclusion of Mr. Burritt's address a vote of thanks was tendered the eastern representatives of the American Associations who had addressed the association. A congratulatory telegram was sent to C. Loomis Allen for having successfully passed through his operation and the association wished him "God Speed" toward complete recovery.

FRIDAY'S SESSION

At the session on Friday the report of A. L. Neereamer, secretary and treasurer of the association, was presented. An abstract of this report is published on page 413. A full report of the session on Friday and the trip taken in the afternoon to the plant of the Prest-O-Lite Company and to the Speedway will be published next week.

CENTRAL ELECTRIC RAILWAY TRAFFIC ASSOCIATION

The meeting of the Central Electric Railway Traffic Association as usual preceded the meeting of the Central Electric Railway Association, being held on Feb. 24. The report of A. L. Neereamer, chairman of this association, will appear in next week's issue.

IS THE HANDLING OF FREE BAGGAGE A TRAFFIC ERROR?

BY CHARLES J. LANEY, TRAFFIC MANAGER, CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

There is quite a difference of opinion among railway men whether there should not be a charge for handling baggage.

In discussing the recent 5 per cent freight rate increase, the Interstate Commerce Commission remarked that the railroads had overlooked a valuable earning power of its passenger departments in its handling of baggage. We are now in a general business depression and the 5 per cent rate increase does not as a whole materially affect our member companies. No interurban has yet a freight earning power as great as its passenger, and a depression in the passenger earnings disturbs the whole organization. Therefore, we must analyze the situation and find the errors of the traffic conditions.

We devote about 20 per cent of our trains to the transportation of baggage, most of which is carried free under our tariffs. We go to more trouble and expense to accommodate a passenger with a piece of free baggage, from whom we collect $1 in fare, than we do for two passengers without baggage traveling the same distance and from whom we collect $2 in fare. In the words of the railroad commissions, is that not a discrimination?

As an answer to this, you will say that we must carry free baggage in order to compete with the steam roads. Service has been the factor in making the interurban roads popular in our country to-day, and by this service traveling men have been able to visit two and three towns a day instead of one by the steam road way. Do you think that now that this service has been established this reasonable charge for baggage would tend to drive it back to the steam roads? I do not. We are operating at a loss when we carry a passenger and 150 lb. of baggage free at one fare, and why should we not change such conditions? If a reasonable charge was made for all baggage and the baggage was handled in a manner satisfactory to our patrons, such a service would have a tendency to increase the traffic and thereby create a profit, rather than the present method of carrying baggage free because some one else does it.

Being in the traffic end of the business, I realize that we are apt to hesitate in making any recommendations that would have a tendency to disturb the custom of our department or to eliminate one of our talking points, that of giving something for nothing. But we must be more progressive. We must present to the public a fair return for their investment in our service and, at the same time, not lose sight of the fact that our companies expect a fair return for their investments.

Some states make it compulsory for railroads to handle baggage free. This is a demoralizing condition. Any state that makes it compulsory for railroads to handle 150 lb. of baggage free for any distance on a 2 cent per mile maximum rate of fare is unreasonable in its demands on the railroads and discriminatory among its people.

The Interstate Commerce Commission is quoted as saying, during a recent hearing, that not a single railroad was able to present the actual cost of handling baggage. Such is the case with the interurbans. I have had letters from several of the large electric lines in reply to my inquiry for certain baggage data, but not one of these roads was able to give me the number of its baggage-carrying passengers or the average weight of baggage per passenger. But we all know this: We are handling more baggage every year. We are devoting 20 per cent of the space in our trains to baggage, which could be used at a profit if charging for baggage, or this space could be used for passengers. We are compelled to establish baggage agents and erect baggage rooms in most of our towns and also to pay misrepresented claims for baggage. We have to issue free baggage checks and establish a system of baggage records with no financial returns. When you figure up the cost, you will find that the baggage-carrying passengers do not represent a profit.

For an average month our road handled 2000 pieces of free baggage, and we only check free where the fare is 25 cents or more. If we count one piece of baggage per passenger, this is about 5 per cent of the total passengers carried on a fare of 25 cents or more; not a very large ratio, but a very strong argument in favor of charging for baggage. If we charged for baggage and should lose 50 per cent of the baggage carrying passengers, the 50 per cent that did pay would offset the other. But we should not lose 50 per cent by reason of such charge. I am safe in saying that 5 per cent would be a large allowance.

Now a word about baggage claims. When a piece of baggage is lost or stolen while in our possession it is wonderful how valuable the contents of a trunk are. Then, delay claims are continually coming to us, although we do not agree to transport a passenger and his baggage on the same train, nor do we agree to get his baggage to destination at a certain time.

The class of persons who are most strenuously fighting the proposed advance in passenger fares are the traveling men. These men get the benefit of less than 2 cents per mile on account of their free baggage and travel on mileage books, and 90 per cent of their transportation is not paid by them personally, yet they are a mighty factor in influencing our legislation. The saving to the traveller over the charge made by the express companies is not great, perhaps 25 cents, for which he has the bother of checking. Would it not be better for us to equalize this charge and get a revenue for all baggage handled?

We must get away from the notion that the only way to get business is to cut the rate and revenue. We have been guilty as electric lines in the past in making ourselves believe that we can transport passengers cheaper than the steam roads. We have created business that did not exist and cannot be maintained by the steam roads, yet we have been contented to adopt their methods in handling baggage and force ourselves to believe it is remunerative. If we continue to do this, when depression in business comes, we must cut our service, the only stock we have in trade, to make both ends meet. This would invite public criticism, which always results in more drastic legislation against us. Let us realize before it is too late that the handling of free baggage is a traffic error.

ANNUAL REPORT OF SECRETARY-TREASURER OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

By A. L. Neereamer

During the year ending Dec. 31, 1914, the association held three meetings as follows: Feb. 26 and 27, Cleveland, Ohio; June 25 and 26, Toledo, Ohio; Nov. 19 and 20, Fort Wayne, Ind. All of these meetings were very well attended, showing increased interest in the association.

The interurban membership of this association, as shown in the last annual report, was fifty-eight lines, covering 3859 miles. The membership on Dec. 31, 1914, covers sixty-six interurban lines aggregating 4166 miles, with two city lines. This is an increase of eight interurban lines, two city lines and 307 miles of interurban mileage. During the year 1913 we had 121 supply members and for the year just ended 125, an increase of four.

Receipts and Disbursements, Jan. 1 to Dec. 31, 1914

Cash on hand Jan. 1, 1914	$1,871.99	
Interurban lines	4,064.45	
City lines	158.33	
Supply men	1,000.00	
Sale of buttons	16.00	
Stationery and printing	1,908.18	
Central Electric Ry. Accts. Assn	26.00	
Supply men's special fund	174.40	
Miscellaneous	5.35	
Interest	57.37	
Payroll		$3,287.30
Traveling expenses		202.35
Stationery and printing		1,827.33
Postage		175.00
Telephone and telegraph		70.15
Office incidentals		10.50
Taxes and insurance		6.65
Freight and express		52.18
Office fixtures		14.00
Office rent		504.00
Legal expense		20.90
C. E. R. A. A		309.75
Checking account		729.88
Saving account		1,895.36
Supply men's special fund		176.72
	$9,282.07	$9,282.07

You will note from this report that there is a deposit of $2741.54, of which $1895.36 is invested in the Fletcher Savings & Trust Company drawing 3 per cent interest, and $176.72 belongs to the supply men department. This sum was placed in the hands of your treasurer as trustee.

Your attention is called to the following statement of accounts receivable and payable:

Accounts Receivable and Payable Dec. 31, 1914

Cash on deposit	$2,801.96	
Due from members	116.30	
Accounts payable		$0,000.00
Supply men's special fund		176.72
Cash on deposit		2,741.54
	$2,918.26	$2,918.26

During the past year every effort was made by your secretary, with the assistance of the officers of the association, to increase the membership, and the results given in the first part of this report show that this effort met with some success.

There are still in the territory, especially in Ohio, Illinois and Michigan, a number of lines that should affiliate with this association, and your secretary is of the opinion that if a concerted effort was made and the benefits of the association placed before these lines, that part of them at least would be glad to join in our work.

No printed report of the standards adopted was distributed this year for the reason that the reports already issued needed revision and being brought up to date. This is now in the hands of the standardization committee, being edited, and when this work is completed it will be issued in loose leaf form.

In closing, your secretary desires to extend to the officers, committees and members of your association his thanks and hearty appreciation for the valuable assistance and support given him during the past year.

Engineering Features of Proposed Cincinnati Rapid Transit Line

The printed report on the proposed rapid transit railway and interurban railway terminal for the city of Cincinnati by F. B. Edwards and Ward Baldwin, transmitted to Mayor Spiegel by F. N. Kruge, chief engineer of the city, has just been published. An outline of the plan was published on page 108 of the ELECTRIC RAILWAY JOURNAL for Jan. 9, 1915. A letter discussing the report from George F. Swain on the plan is also included. The report occupies some ninety-six pages and contains drawings of the elevated structure, subways, stations, track, cars, etc., proposed, as well as detailed estimates of cost, charts of current consumption for typical runs, schedules, etc.

The car suggested is similar in general design to the latest type of car on the Boston Elevated Railway as well as the kind recently adopted by the New York Municipal Railway Corporation. It contains three side doors and is 70 ft. long by 10 ft. wide. There are no vestibules. A standard gage of track is recommended. Certain of the interurban railways entering Cincinnati are equipped with a gage of 5 ft. 2½ in. The report considers the relative cost of laying an additional rail in the proposed belt line to care for these cars and also the cost of changing these interurban lines to standard gage. The figures are respectively $150,000 and $112,000, so that the change of the interurban lines to standard gage is recommended. In this conclusion Professor Swain coincides.

An American consular officer in Norway reports to the Bureau of Foreign and Domestic Commerce, Department of Commerce, at Washington, that a firm in his district is inviting bids for the construction of an electric mountain railway. When these plans and specifications arrive they may be examined at the Bureau of Foreign and Domestic Commerce.

A dispatch from Berlin announces that the management of the municipal street railway system there has forbidden the knitting of stockings by passengers while sitting in the cars. Conductors have been furnished with copies of the solemn "ukase" which requires them to ask women engaged in this occupation to stop it or "kindly step outside." The reason given by the street car management is that there is considerable danger of passengers falling into the needles.

The Cost of Bus Operation

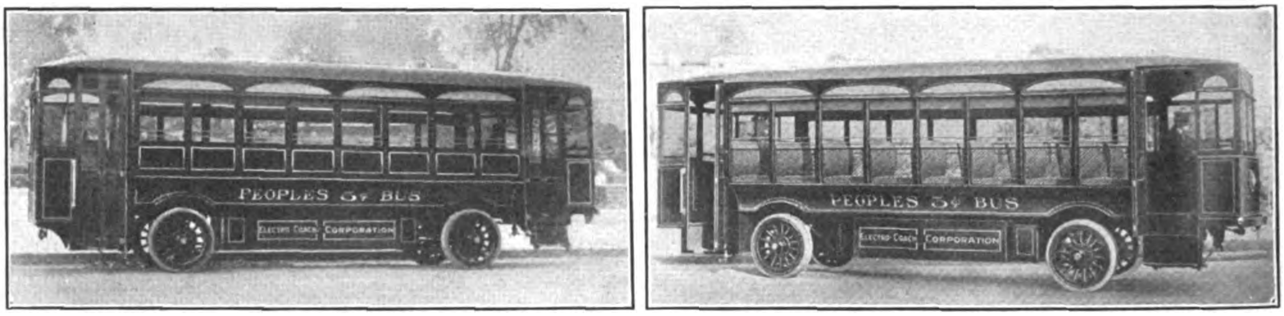
Figures Based on Actual Results Are Published Both for Auto Buses and Jitneys, as Well as Estimates of Cost Made by Representatives of Projected Bus Companies

The fact that the jitney bus has succeeded in operating at all with a 5-cent fare has, apparently, obscured one of the points that is vital to its ultimate success, namely, its real cost of operation. The idea has gone forth broadcast that the auto bus (if not the small jitney) can compete directly with the street car and that, in consequence, it will eventually displace the latter in urban transportation. This viewpoint was voiced by the Hon. A. W. Lafferty of Oregon in Congress on Feb. 10 in part as follows:

"Mr. Speaker, recently a young man in Oakland, Cal., owning an old automobile, and being without money or patronage, conceived the idea of competing with the electric street cars. This was a new idea to the young man and was born of his necessity, but it was not in fact new. For over ten years more passengers have been carried through the streets of London by the buses than have been carried by the trolley lines. The service is just as regular and just as cheap. And what happened in London when it was demonstrated that the motor bus was going to become more popular than the trolley car? The capitalists, owning surface trolley lines, promptly unloaded them on the city and got the city council to grant to them exclusive franchises to operate the motor-bus lines as a private corporation.

"It is amusing to watch the newspaper representatives of the capitalists in our Western cities fight the 'jitney bus.' They say the electric car line 'has helped to build up our beautiful city and is entitled to our patronage.' One Portland paper even claims that the street car company was responsible for paving a street to a suburb. Just at the present, when the jitney bus is owned by Tom, Dick and Harry, it is a bad thing and ought to be frowned on, according to these newspapers. But you just wait till the jitney bus grows to formidable proportions and becomes a dangerous competitor of the trolley lines, and then you will see these same newspapers favoring 'regulation' of the jitney bus. And in order to regulate it to the satisfaction of the money power these papers will favor granting an exclusive franchise to one big corporation to handle all the motor bus business of the city. They will say that we should have the latest and largest and most improved motor buses and that the interests of the service demand that the matter be placed in the hands of one company with 'sufficient capital' to handle the situation.

"When that time comes, these same corporation-controlled newspapers will favor unloading the surface lines onto the city and at such prices as to let the capitalists out at a big profit from a losing proposition. What every city should do is to own its own transportation facilities. These facilities constitute a monopoly, and if the cities owned them they could make a splendid profit, employ men at fair wages, and furnish every part of each city with good service. The latest and best vehicles could be adopted as fast as their practicability were established."



JITNEY BUS—VIEWS OF SEMI-CONVERTIBLE STORAGE-BATTERY BUS PROPOSED FOR NEW YORK

COST OF AUTO BUS OPERATION

In view of the remarkable amount of misinformation contained in the congressman's remarks it is interesting to consider the actual cost of motor bus operation as set forth in the *Commercial Vehicle*, the representative paper of the motor truck industry. In December, 1914, there was published a list of nineteen companies using auto trucks in passenger service of which seven operated in cities, six on suburban runs, and six in interurban service. The average bus capacity was twenty passengers, and the average daily mileage 91, or 33,200 miles per year. The average costs in cents per bus mile for the charges mentioned were as follows:

Tires	6.74 cents per bus mile
Gasoline at 18 cents per gal	4.0 cents per bus mile
Oil and grease	0.64 cents per bus mile
Repairs	1.92 cents per bus mile
Wages of chauffeur	3.36 cents per bus mile

A figure of $25 per bus per year for insurance was also given, but this was admitted to be low as a number of the companies did not insure, the proper figure being between $60 and $90. No housing or garage charges were included, these ranging from $100 per bus per year in country towns to $600 in the largest cities. The average truck was estimated to have cost $3000 and to weigh 7500 lb., and at the time to which the figures applied the average truck had an age of about two years. This comparatively short period of service would tend to reduce the repair cost, as given, below that which might be expected as a normal average, but opposed to this is the fact that nearly every one of the nineteen companies in question operated only a small fleet of buses.

As the expenses shown above constitute only part of the true operating cost estimated additional charges are appended:

Assuming a life of five years and a depreciation of 20 per cent, or $600, a housing charge of $300, an insurance charge of $70 and an interest charge of 6 per cent, or $180, there is an overhead charge of $1150 on each bus or 3.46 cents per mile. Also, assuming taxes, general expenses and damages to constitute the same percentage of operating expenses that they do in electric railway service, there should be added respective charges per bus mile of 2.2 cents, 1.2 cents and 1.3 cents. Summarizing all of these costs would give the following operating expense for a twenty-passenger bus:

Tires	6.74 cents per bus mile
Gasoline	4.0 cents per bus mile
Oil and grease	0.64 cents per bus mile
Repairs	1.92 cents per bus mile
Wages of chauffeurs	3.36 cents per bus mile
Int. dep'n, housing and insurance	3.46 cents per bus mile
Taxes	2.2 cents per bus mile
General	1.2 cents per bus mile
Damages	1.3 cents per bus mile
	24.82 cents per bus mile

On a seat-mile basis this involves a cost of 1.24 cents. According to estimates of those interested in bus operation the costs vary through a wide range.

AUTO BUS SERVICE AS A SUPPLEMENT TO SURFACE RAILWAYS

H. B. Weaver, vice-president, Manhattan & Queens Traction Corporation, and engineer for the New York Motor Bus Company, who has, as a consulting engineer, devoted a great deal of attention to auto bus operation, considers that the gasoline-driven vehicle cannot compete directly with the electric railway. It can, however, be used to advantage as a supplement to the street car by operating not on outlying lines but by giving a high grade parallel service at a higher fare. Mr. Weaver's opinions are in part as follows:

"The great problem of the auto bus is not the earning capacity or the abundance of traffic, but rather the operating cost, and it is well to consider in connection with this problem that the small, cheap jitney automobile carrying only about six passengers must operate at one-seventh the cost of a forty-two-seat auto bus in order to equal the passenger-seat cost, which after all is the real basis of computation.

"On the electric railway, the maintenance of rolling stock amounts to 11 per cent of the total cost of operation, exclusive of amortization. In the case of the bus line, the maintenance of rolling stock amounts to 30 per cent of the total cost of operation exclusive of amortization, and this 30 per cent does not include the item of tires which is, in itself, about one-quarter of the cost of maintenance. I have been informed by two of the managers of unsuccessful bus lines, that their buses were in the repair shops in one instance for two-thirds and the other instance for three-fourths of the time. This state of affairs was plainly due to inefficient management as well as to improperly designed vehicles, but it is a striking instance of the cause of failures in an industry which, if properly handled, can be successful.

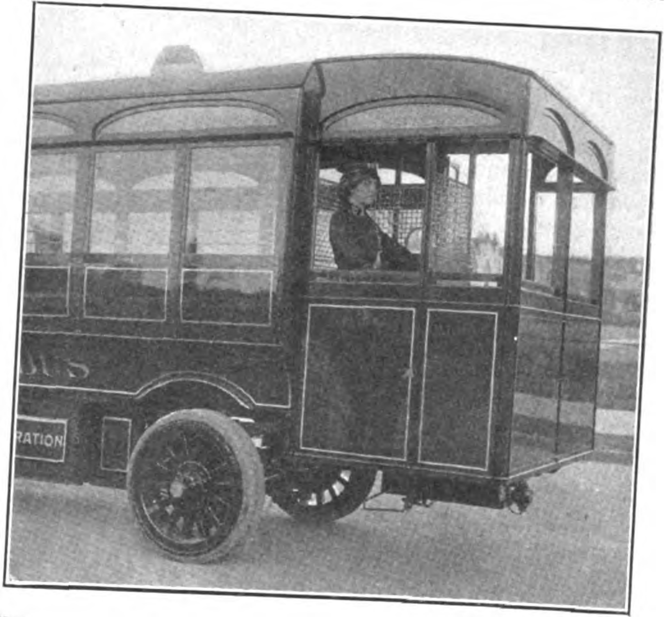
"I receive innumerable inquiries as to the cost of motor bus operation. There seems to be some vague impression, even in the railroad world, that not only can buses be bought to suit any purpose as readily as one would buy a row boat but that the cost of operation of these vehicles is a definite and predetermined amount. Let us remember that the car mile operating costs of various successful surface lines show variance as high as 100 per cent. Such is true with regard to motor buses.

"However, the following figures show the estimated cost of operation on a particular route of twenty vehicles of the double-deck type, each having a seating capacity of forty-two. These costs were compiled as a result of actual chassis tests over a considerable period of time and after the cost of garage rental, gasoline and other items had been definitely determined. The estimated daily mileage is 85, the schedule speed between 10 m.p.h. and 13 m.p.h., the stops per mile, 5, and the weight of bus without passengers 10,400 lb.

Platform time	4.00 cents per bus mile
Starters and inspectors	0.50 cents per bus mile
General	1.00 cents per bus mile
Lighting and heating of vehicles	0.20 cents per bus mile
Service	0.10 cents per bus mile
Dead mileage and layovers	0.33 cents per bus mile
Gasoline	4.00 cents per bus mile
Tires	3.00 cents per bus mile
Car cleaning, oiling and car moving	0.55 cents per bus mile
Repairs to bodies, motors, etc	3.00 cents per bus mile
Garage rent	0.33 cents per bus mile
Depreciation and obsolescence	3.50 cents per bus mile
Accidents	2.00 cents per bus mile
Taxes	2.00 cents per bus mile
Total	24.51 cents per bus mile

"The cost of tires is a variable factor depending largely on street surface conditions. As an illustration of the uncertainty of this item, I may say that the cost of tires is 2¼ cents per bus mile in the case of one of the largest bus lines in the country. In another instance it is nearly 7 cents per bus mile.

"It will be noted that the cost of operation shown above is approximately 0.6 cent per passenger seat mile, and I may say that the assumed conditions for bus operation are quite ideal. The proposed service is large enough to afford an economical operation and not too large to be cumbersome. Traffic conditions are such as to permit of a very high schedule speed, consequently reducing many of the costs and increasing the annual earnings of the vehicles.



JITNEY BUS—VIEW SHOWING PROPOSED PREPAYMENT BUS WITH LADY CONDUCTOR

"In general, the auto bus has several advantages over street cars. It is apparent, however, that the cost of operation per passenger seat mile, or passenger space mile of the bus, is so much greater than the same cost of surface car operation that the bus cannot hope to compete with the surface lines at the present time.

"However, one important factor must be seriously considered; namely, that the bus is in its infancy and that its efficiency is growing every day. In one large operation in this country the bus-mile cost of operation has been reduced 20 per cent in three years' time. In the City of London the cost of operation per bus mile was reduced in 1909 over the previous year 3.5 cents; in 1910, 1.1 cents; in 1911, 1.76 cents, and in 1912, 1.6 cents, making a total reduction of 8 cents per bus mile in the operating costs during four years.

"This is the situation as I see it. Four years ago the auto bus possessed a limited utility due to its excessive operating cost. During this time the art has progressed to such a degree that to-day its field of utility has become tremendously increased. This fact has been brought to the attention of the general public, strange to say, by the sporadic growth of the jitney companies or independent jitney operators. The jitneys have not yet proved their own value, but they have shown the practicability of motor buses.

"How shall the streeet railways deal with this problem? I wonder if street railway managers have ever attempted to figure the cost to them of the rush-hour with its over-crowded traffic, which many are prone to consider as their principal source of net profits. If we will be honest with ourselves for a moment, is it not apparent that these over-crowded periods, these unhealthy, dangerous and disagreeable conditions which have existed on almost all transportation lines at certain periods, have been the direct cause of the vicious legislation, unfair regulation, exorbitant taxes and fines initiated by the states, municipalities and courts, which have been imposed upon street surface lines. These conditions have produced a disgruntled, unhappy, bitter citizenry who have been in a mood to look with favor upon anything which "soaked" the cause of their discomfort in the shape of railroad companies. Is not this a prime reason for the jitney's success?

"The motor bus cannot compete with street surface lines in their entirety. It can afford a much better service in many ways, but only on the principle of a guaranteed seat to every passenger at a higher rate of fare than that prevailing on surface lines. There are already many instances in the country where a higher rate of fare is charged in the rush hour than in the non-rush hour. Many of us believe that this is a reasonable solution of the problem. A simpler solution is to operate two types of vehicles, a first class and a second class. The second class would be of large dimensions and would carry a greater number of people with a reasonable number of standing passengers, though free from overcrowding. The first class would furnish a guaranteed seat, and a higher speed, and of course, would have a higher rate of fare.

"There exists in every city a large proportion of the population which will be more than glad, in fact delighted, at the opportunity to ride under such conditions at a slightly increased cost. The motor bus, therefore, should take a position between the street car and the taxicab, and nearer to the street car. In this form it would actually benefit the railways. This is exemplified in New York where my study of the situation shows that there are thousands of cases of women riding to the shopping section under the pleasant conditions which buses provide, although they would not stir out of doors were they forced to use a street car or pay the exorbitant price of a taxicab.

"Aside from this, of course, traffic congestion of the street cars would be relieved to such an extent that I believe a greater harmony would exist between the people and the companies, and, furthermore, that in a few years the rolling stock equipment of a line could be better balanced. In other words, the great surplus of cars needed for the rush service over the normal service could be reduced. Or, to put it in another way, the annual mileage per car would be greatly increased. This would be obtained at no loss to the company because it would be obtained through an increased investment in another type of rolling stock from which a higher rate of fare could be obtained.

"It may be said that still the jitney exists. But we must not lose sight of the fact that after the first novelty has worn off no one would think of riding in an improvised small touring car, crowded in on a longitudinal seat under the most intimate relations with a few passengers, unprotected from the weather, severely jounced about, and disturbed by the boarding or alighting of every other passenger. Obviously one would prefer to ride in a modern, well designed, comfortable street car, provided that street car was not overcrowded.

"The street cars need not fear the operation of autobuses at this time. Their comparatively high operating cost limits their utility as 5-cent vehicles. What the street railway companies should do is to augment their service, even paralleling their own lines with bus lines at an increased fare, or if they do not desire to undertake this service or cannot because of unpopularity obtain reasonable franchise privileges, they should aid rather than obstruct responsible independent companies in the establishment of such lines properly regulated and at a rate of fare in excess of 5 cents.

"The weak point of bus operation is the high operating cost. The crux of the high operating cost deals not with the cost of power as is apparently generally assumed, but with the cost of maintenance, amortization and length of time out of service. There are, on the other hand, certain financial characteristics of motor-bus operation more attractive to the public than street railway operation, and there are many physical characteristics in which the bus excels the street car.

"The comparatively high seat-mile cost of the motor bus should no longer be considered as a prohibition to its use, but rather as a limitation to its utility. This limitation should be first appreciated. The advantages should be carefully appraised and the operation of a proper number of these vehicles at a reasonable fare in conjunction with the street surface lines may well be encouraged."

ELECTRIC STORAGE-BATTERY BUS COSTS

Mr. Weaver's novel conception of a supplementary bus service for electric railways is, of course, based upon the axiom that the bus is more costly to operate than the street car, but this view is combatted by the Peoples 5-Cent Bus Corporation which is endeavoring at the present time to establish a line of 5-cent storage battery buses in New York City. These buses are intended to compete directly with any of the existing means for surface transportation. The estimated costs of operation are shown in the following table, based on a yearly mileage of 30,000, a schedule speed of 8 m.p.h., a maximum of 18 m.p.h. and 10 stops per mile:

Tires	3.0	cents per bus mile
Power	2.25	cents per bus mile
Repairs to body and gear	0.75	cents per bus mile
Repairs to battery	1.5	cents per bus mile
Housing, washing, etc.	1.0	cents per bus mile
Platform wages	8.0	cents per bus mile
Interest	1.0	cents per bus mile
Depreciation	1.8	cents per bus mile
General and administrative	1.0	cents per bus mile
Supplies, licenses, insurance and taxes	1.5	cents per bus mile
Damage claims	..	
Total	21.8	cents per bus mile

These estimated figures apply to buses of the unusual type shown in the accompanying illustrations, two of which are being operated about New York City at the present time as a popular demonstration of what the company proposes to do. The bus seats 36 passengers, and weighs 11,000 lb. including the battery. A 2½-hp motor is geared to each of the four wheels. The proposed schedule will require an acceleration of 1.5 m.p.h.p.s. and the 10 hp of motors is expected to provide this.

The cost of tires as shown in the table has been guaranteed by a manufacturer, the low figure being said to be due to the nature of the drive. Power is figured at 1.5 kw-hr per bus mile and at 1.5 cents per kw-hr. The repair cost for the battery is guaranteed by the maker.

The obviously doubtful points in the estimate are the items of depreciation, insurance and taxes, and damage claims. Depreciation is based on a ten-year life for all parts of the bus except the gearing (which is given only five years) notwithstanding the fact that the racking strains of travel over city streets causes rapid deterioration, one large bus company that is actually in operation charging off 33 per cent annually for this purpose.

The item covering supplies, licenses, insurance and taxes provides only $450 per annum per bus, although the taxes alone, if equivalent to the average imposed upon electric railways, would be considerably in excess of this figure. Also the neglect of damage claims is open to question, as at least one bus-operating company has to set aside 3 cents per bus mile for this purpose, and because damages amount to more than 1 cent per car mile for the average electric railway according to census figures.

COST OF JITNEY BUS OPERATION

As the foregoing figures apply only to auto buses of the largest type it is interesting to consider the actual cost of jitney bus operation as outlined by a prominent automobile dealer of St. Louis, where the jitney has thrived owing to the refusal of the authorities to bring it under regulation. The automobile dealer estimates the tire expense to be $15 for each of the four wheels for 3000 miles, or a little less than $2 a day, the gasoline 20 gallons at 10 cents, or $2 a day and the driver's wages $2 a day, making the total expense of $6 a day. On the assumption that the income is $10 a day, the net receipts would be $4 a day, or $120 a month. Of this $60 per month is allowed for a sinking fund to provide against accidents, repairs and depreciation, and a net profit of $60 a month is left as a revenue for the owner of the car.

Aside from such minor items as the low price allowed for gasoline, the low wages for the driver and the unreasonably high receipts, this statement constitutes an excellent argument why no one should enter the jitney-bus business. Assuming an average trip of 2 miles, and also the extremely high average of three passengers per trip, it would be necessary for the jitney to make about 50,000 miles in a year if it is to have gross receipts of $10 per day. This mileage is about that which is obtained by the average private car in twelve years. It does not make the allowance of $60 per month for repairs, depreciation and accident look sufficiently large within about 100 per cent. In fact, one accident would wipe out the profit for a year.

The average cost of operating in jitney service a Ford car capable of seating five passengers was stated by representatives of one of the largest distributors in the country to be approximately as follows:

Tires	0.8 cent
Gasoline	1.0 cent
Oil and grease	0.2 cent
Repairs	0.8 cent
Depreciation	0.6 cent
Total	3.4 cents

On a seat-mile basis this would amount to 0.8 cent as the machine offers four revenue seats. If camp stools were put in for two more passengers the cost would be 0.6 cent. This figure, of course, does not take into consideration any such charges as taxes, housing, insurance and accident claims. If, as is indicated by actual records in Seattle, the car makes 100 miles per day and earns $6, there remains only $2.40 per day to pay these charges and to reimburse the driver.

The lack of real profit in the jitney bus is brought out also by the following remarks of M. C. Booth, organizer of the first jitney-bus company in Portland, Ore. The statement was made before the Portland Realty Board and covered actual figures based upon the speaker's experience:

Interest on investment at 6 per cent	$33 per year
Depreciation on car	150 per year
Current repairs	438 per year
Tires	350 per year
Gasoline and oil	430 per year
Personal liability insurance	200 per year
License	5 per year
Overhead charge	52 per year
Incidentals	36 per year
Total	$1694 per year

"Gross receipts," said Mr. Booth, "would be $2190 per year at $6 per day, and deducting $1694 for operating expenses leaves $495 from which must be subtracted $250 to cover fines, damage to other people's property and to the car in case of accident, as well as attorney's fees for services in the police court, leaving a balance of $245 for the operator's labor for the year.

"The reason why so many have engaged in this business is because they cannot find anything else to do."

RECEIPTS MUCH OVERESTIMATED

It is probable that the major part of the jitney craze has been due to the fact that receipts have been greatly overestimated, although the lack of appreciation of real operating cost also has undoubtedly been a material factor in inducing owners of cars to enter the business. As an example of the misconception of the real situation it might be said that in St. Louis the daily earnings of a jitney-bus driver have been reported in general at about $10. This fact has been given wide publicity in the daily papers.

However, on Feb. 20 the manager of the jitney-bus association stated with considerable pride that 4000 passengers had been carried on the day before. This number at 5 cents each would bring total receipts of $200 for the day. Reference to the daily papers shows that there were twenty-two motor cars in operation and two motor buses each with a carrying capacity of thirty. Assuming that the motor buses, with their large capacity, brought in a proper proportion of the receipts, or say $30 each, there would be left $140 to be divided among twenty-two cars. This indicates average receipts for each motor car of $6.40 a day. In addition, it is quite possible that the figure of 4000 passengers was somewhat exaggerated.

In Kansas City the same peculiar discrepancy between reported receipts and actual possible receipts may be noted. A newspaper report of Feb. 10 states that 35,000 passengers were carried on Feb. 9, bringing in a total of $1750. Two hundred jitneys were registered as belonging to the jitney operators' association, and the unregistered drivers were estimated at nearly a hundred more. Assuming that the actual number of jitney operators was 250, the receipts per car came to less than $7. Even neglecting the unregistered drivers the receipts divided among the two hundred registered cars amounted only to $8.75 each.

In Peoria, Illinois, one of the jitney operators estimated that his average day included 25 trips with an average of five passengers a trip, making $6.25 income for the day. This driver had a seven-passenger touring car and he estimated the expense of operating it at about $1 per day, thus making, as he expressed it, "an easy profit of $5 per day for the chauffeur." The length of this driver's route is not known, but if it was more than one mile, his alleged expenses of $1 included only gasoline and did not give any consideration to wear on tires, repairs, depreciation and the like. With such misapprehension of the real facts in the case, it is not difficult to see why numerous owners of cars have been induced to take up the jitney bus as a means of livelihood.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Reports of Meetings of New Motor Vehicle and Way Matters Committees, of Company Section Activities and of Joint Line Construction Committee Meeting

COMMITTEE ON MOTOR VEHICLES

President Allen has appointed a special committee to consider the subject of motor vehicles, consisting of B. I. Budd, president Chicago Elevated Railways, chairman; H. G. Bradlee, president Stone & Webster Management Association, Boston, Mass.; W. A. House, president United Railways & Electric Company, Baltimore, Md., and C. L. S. Tingley, vice-president American Railways Company, Philadelphia, Pa.

The committee met on Feb. 23 and went over a mass of data which had been collected and adjourned to meet on March 16, at which time a report will probably be completed.

JOINT COMMITTEE ON TRANSPORTATION-ENGINEERING

A meeting of the above committee was held in Cleveland on Feb. 12. As the name indicates, this committee comprises members of the Engineering Association and the Transportation & Traffic Association, all of whom, as follows, were present at the meeting: Engineering: R. N. Hemming, co-chairman, Anderson, Ind.; W. E. Rolston, Michigan City, Ind.; R. D. Beatty, Cleveland, Ohio; Transportation & Traffic: P. N. Jones, co-chairman, Pittsburgh, Pa.; J. B. Stewart, Jr., Youngstown, Ohio, and C. N. Wilcoxon, Michigan City, Ind.

After general discussion the committee decided to draw up data sheets covering details of matters pertinent to transportation and engineering. In this the entire membership of the committee will co-operate in order to cover the assignments of the executive committee. These assignments will be found on page 1302 of the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 12, 1914. The committee also hopes to make some interurban train tests with ball-bearings. The next meeting of the committee will be held late in April or early in May.

COMMITTEE ON WAY MATTERS

A meeting of the committee on way matters of the Engineering Association was held at the association headquarters in New York, Feb. 19 and 20. The following members attended: C. S. Kimball, Washington, D. C., chairman; H. F. Merker, East St. Louis, Ill.; E. H. Berry, Cincinnati, Ohio; E. P. Roundey, Syracuse, N. Y.; W. F. Graves, Montreal, Quebec; R. C. Cram, Brooklyn, N. Y.; C. W. Gennet, Jr., Chicago, Ill.; E. M. Haas, Chicago, Ill., and L. A. Mitchell, Anderson, Ind. The work of the various sub-committees for this year was considered by the committee as a whole. A sub-committee to consider further the proper foundations for track in paved streets was appointed and included Messrs. Cram, Haas, Berry and Mitchell. It will consider changes in the four designs of track foundations submitted at the 1914 convention, as well as endeavor to obtain the approval of the American Society of Municipal Improvements of the types finally adopted. The sub-committee considering pavements for use in connection with girder and high tee rails includes Messrs. Graves, Berry and Mitchell. Its work will be devoted principally to securing traffic counts in connection with the various types of pavements. The sub-committee considering specifications with definitions for sundry track materials includes Messrs. Gennet, Haas and Roundey. Standard specifications for special work will be considered by a sub-committee composed of Messrs. Roundey, Merker, Kimball and Graves, who will issue a request to engineers of special-work manufacturers for suggestions relating to specifications for the several types of special work now in use. Specifications will be prepared for the materials used in the various types of special work now generally used. The sub-committee considering the revision of the recommended designs of 7-in. and 9-in. joint plates with special reference to sizes of bolt holes and fits, includes Messrs. Merker, Gennet and Cram. The discussion of this subject was devoted to the advantages and disadvantages of the drive-fit as against the loose-fit bolts. In the review of all existing standards and recommendations originating with the committee on way matters, several sub-committees were appointed to consider the revision of some of the existing standards and recommendations.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY SECTION

The January and February meetings of this section were joint ones with the local company section of the N. E. L. A. The January meeting, held on Jan. 22, was a social affair attended by 700 persons, including members of the Wisconsin Gas and Electrical Associations which were in convention at the time. The feature of the evening was a musical skit planned and written by the local men, in which Secretary Abendroth appeared as the star performer. President W. W. Cook was also in the cast so could not read his preliminary address which was read for him by vice-president V. M. Dentz. The play was followed by a dance with a grand march led by the presidents of the two local company sections.

DENVER TRAMWAY SECTION

The regular February meeting of this section was held at the club rooms of the north division of the railway on Feb. 18. The subject was "Snow Work and Equipment," a continuation of the topic of discussion begun at the last meeting as described in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 6, page 293. As before, the discussion was opened by W. H. McAloney, superintendent rolling stock, whose remarks were followed by a lively discussion on snow fighting methods and the equipment necessary therefor. Members of the section rendered musical selections and a section photograph was taken. The attendance at the meeting was 150.

PUBLIC SERVICE COMPANY SECTION

At the last meeting of the section, described briefly on page 380 of the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 20, President P. F. Maguire announced that the present membership is 289, and that it has increased 13 per cent since the course in public service economics, described on page 337 of the issue for Feb. 13, was inaugurated. H. C. Donecker, for the program committee, announced that coming meetings will be addressed by Oscar T. Crosby, Warrenton, Va.; George J. Roberts, vice-president Public Service Railway; F. W. Doolittle, director of the fare research bureau of the association; J. S. Doyle, superintendent of car equipment Interborough Rapid Transit Company; R. E. Danforth, general manager Public Service

Railway; P. S. Young, treasurer Public Service Railway, and other prominent specialists in the electric railway work.

In addition to the more formal part of Mr. Donecker's lecture of Feb. 18, he pointed out how the company section plan is designed to benefit both the men and their employers, impelling the former to defend the latter. His impression is that the employees of public utilities do not stand together as they should, being passive or negative in the defence of the policy of the companies employing them. Electric railway employees should realize that the electric railway is only one of several utilities, and co-operation with other utilities is very desirable. Further, co-operation among the departments of one company is necessary. A company must help itself inside if outside help is desired. In order to please the public generally it is necessary to maintain good service and good dividends. The co-operation of all employees is necessary in both of these directions for permanent success.

WASHINGTON RAILWAY & ELECTRIC COMPANY SECTION

The feature of the meeting of this section held on Jan. 25 was the awarding of prizes for papers on "The Duties of a Trainman to the Traveling Public" prepared by starters, conductors, motormen and depot clerks. Thirty-six papers were submitted in the contest. The three prizes of $10, $5 and $2.50 respectively were awarded to Montgomery Davis, starter eastern division; James T. Trout, conductor southern division, and W. M. Rice, conductor eastern division, by H. C. Eddy, engineer District of Columbia Public Utilities Commission, and J. R. Putnam. After the prizes had been awarded brief addresses were given by T. T. Wong, director of the Chinese Government Bureau of Education, and Mr. Eddy. The serious part of the meeting was relieved by motion pictures, vocal music and refreshments. The attendance at the meeting was 48.

The meeting of Feb. 23 was held in conjunction with a meeting of the employees of the Potomac Electric Power Company and Wm. L. Clarke, assistant secretary of the companies, presided. The program was of a non-technical character, comprising musical numbers, motion pictures and an address on "Real Aristocracy." A buffet luncheon was served after adjournment.

ASSOCIATION OF TECHNICAL SOCIETY SECRETARIES

A meeting of the above association, in which the American Association is officially represented by Secretary Burritt, is being held to-day in New York. The purpose of this association, as outlined on pages 917, 991 and 1061 of the last volume of this paper, is to provide for occasional meetings of the secretaries of national societies to consider overlapping interests, the avoidance of conflicts in convention dates and the methods of administration found most effective. In the absence of Secretary Burritt on account of the C. E. R. A. convention, he is being represented by H. H. Norris, associate editor, ELECTRIC RAILWAY JOURNAL.

COMMITTEE ON OVERHEAD AND UNDERGROUND LINE CONSTRUCTION

A meeting of this committee was held in New York on Wednesday, Feb. 24. The minutes will be available in time for the next issue of the ELECTRIC RAILWAY JOURNAL.

COMMUNICATIONS

Corrosion of Metals in Natural Soils

NATIONAL BUREAU OF STANDARDS
WASHINGTON, D. C., Feb. 20, 1915.

To the Editors:—

As a contribution to discussion of the article appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 14, 1914, entitled "Corrosion of Metals in Natural Soils" by E. H. Scofield and L. A. Stenger, we submit the following comments:

We have read the article with much interest and regard it as a valuable experimental demonstration of self-corrosion of iron and lead in soils. The paper deals with a phenomenon long recognized but too often overlooked by engineers or not given sufficient consideration. In connection with our electrolysis investigation we have frequently had occasion to call attention to the fact that in certain cases corrosion is due to soil conditions and not to stray currents. Such cases often occur, and this fact renders it important that careful investigations be made to determine the cause of corrosion in any given case. Work of the kind done by Messrs. Scofield and Stenger is of great value and serves to emphasize the need for giving more attention to soil conditions and the physical properties of pipes than is generally done.

It is well to point out in this connection that although soil corrosion usually exists in greater or less degree and under certain conditions may in itself become very serious, such coil corrosion is in general accelerated by the presence of stray currents. This fact is shown in Technologic Paper No. 25 of the Bureau of Standards dealing with the subject of electrolytic corrosion of iron in soils, and some of the principal causes of this accelerated soil corrosion are there pointed out. Because of this tendency, whenever stray currents are being discharged from the pipes, not only will there be more or less electrolytic corrosion, but the soil corrosion proper will be greater than if such stray currents did not exist. Where soil conditions, therefore, are such as to give rise to considerable self-corrosion it is more important that stray currents be reduced to low values than where the tendency toward soil corrosion is small.

It would be interesting to know the chemical analyses of the soils used by Scofield and Stenger, since they were undoubtedly of an unusually corrosive character.

The corrosion due to the presence of two or more electrolytic soils is interesting, but it is probable that soil corrosion in practice is caused in this way only to a slight extent since natural diffusion of dissolved substances in the soil would soon eliminate potential differences due to this cause. Soil corrosion usually is probably due either to a direct chemical attack or to the galvanic action resulting from inhomogeneity of the surface of the metal, although unquestionably there are cases of serious corrosion due to the presence of different soils in contact with adjacent portions of the metal.

These experiments are in accord with a great deal of data previously published which show that it is impossible to establish beyond question that certain cases of corrosion have been caused by electrolysis unless electrical conditions favorable to such corrosion are actually found. On the other hand, it is important to bear in mind that the absence of such electrical conditions at any particular time is not sufficient indication that corrosion that has already taken place was not caused by electrolysis, since electrical conditions may have changed greatly since corrosion occurred. In a case where serious corrosion has been caused by stray currents and the cause of these stray currents has been removed, the only certain way of determining whether the previous corrosion was caused by stray currents or by local influences is by making active corrosion tests in the same soil under the same average conditions of moisture and using the same kind of iron as that previously found corroded. In the absence of a test of this kind, it is not possible to fix with certainty the cause of corrosion.

It would be interesting to know whether the specimens shown in Figs. 1 and 7, which are stated to have been corroded by the action of the soil, have ever been exposed to conditions that might give rise to electrolysis corrosion.

E. P. ROSA, Chief Physicist, and
BURTON MCCOLLUM, Electrical Engineer.

STEVENS INSTITUTE OF TECHNOLOGY
HOBOKEN, N. J., Feb. 15, 1915.

To the Editors:—

I have read with interest the article entitled "Corrosion of Metals in Natural Soils," by E. H. Scofield and L. A. Stenger, published in the Nov. 14, 1914, issue of your valued journal.

The authors state that iron and lead in street soils corrode both in the form of "uniform rusting or oxidation," and in the form of "the more destructive pitting"; and that the uniform rusting is generally recognized as a "simple chemical action," while pitting "is usually attributed to electrolysis, and when found in localities where electric railways operate the damage is charged to the action of electrical current originating from the return circuits of such railways." I do not believe that this is a fair statement, as it has long been understood that pitting is caused by rapid localized corrosion which may result from what has been called "simple chemical action," as well as from electrolysis due to stray railway or other external currents. It is nevertheless the fact that the very rapid corrosion of underground pipes and cable sheaths resulting in pitting in a relatively short time is in most cases in practice caused by electrolysis from stray railway currents leaving the pipes or cable sheaths to flow to surrounding earth.

It has repeatedly been pointed out that the appearance of a corroded pipe or cable sheath alone does not suffice to determine whether or not the corrosion has been caused by electrolysis from stray electric current. I stated this in the discussion of a paper on electrolysis before the New England Association of Gas Engineers, Boston, Feb. 19, 1913, and I quote the following from this discussion published in the 1913-1914 *Proceedings* of this Association, pages 66 and 67:

"I believe that I can give a satisfactory answer, namely, that you cannot tell from the appearance of a corroded wrought-iron or steel pipe whether the corrosion and destruction was caused by electrolysis. In the case of cast-iron a graphitic material left as the result of the corrosion usually but not always indicates electrolysis. If corrosion from electrolysis is going on, it is perfectly possible, however, to make a suitable electrical test which will show conclusively whether or not stray electric current is leaving the pipe and is causing the corrosion. For this purpose we use an instrument known as an earth ammeter; we place this next to the pipe and connect it to a recording instrument, and obtain a 24-hr. record of the current flowing from the pipe to the surrounding soil. This record will not only show the presence of current but will also indicate whether it has railway characteristics. If such current is found leaving the pipe it is certain proof that it must produce a corresponding amount of electrolysis. A test of this kind, together with the corroded pipe, affords in my opinion the best possible evidence that we can have of corrosion by electrolysis. The corroded pipe by itself without any connecting electrical measurements will not ordinarily serve as complete evidence."

Wherever a metal in earth is found to be corroded and electric current is found flowing from this metal to earth, this is conclusive evidence that the corrosion is in part due to electrolysis from this current. From a measurement of this current an estimate of the amount of corrosion produced by electrolysis due to this current in a given time can be formed by applying Faraday's law, and it can frequently be shown that the corrosion found is practically wholly accounted for by this electrolysis. Where this current can be shown to be stray current from an electric railway, this is therefore good evidence that this railway current is partly and sometimes practically wholly responsible for the corrosion found.

The article is summarized by the statement "The authors show that electrolytic corrosion can and does occur without stray railway currents, and that two sets of conditions may cause it. Experimental data are given to prove the contentions." The word "electrolytic" in the above quotation appears to me to be used in a sense which is likely to be misleading. What the authors have found is that corrosion and pitting of iron and lead in soil may take place without the presence of stray railway currents, and that the appearance of the corroded metal is the same as the appearance of metal corroded by electrolysis from stray railway currents. In my opinion tthe expression "electrolytic corrosion" should at least in engineering literature be confined to cases where the corrosion is caused by electrolysis from external electric currents and should not be used for cases where the corrosion is due to chemical action in soil.

ALBERT F. GANZ, Professor of Electrical Engineering.

NEW YORK, N. Y., Feb. 3, 1915.

To the Editors:—

The article by Scofield and Stenger on "Corrosion of Metals in Natural Soils," in your issue of Nov. 14th, was one of special interest. It seems, however, particularly unfortunate that both the article itself and your editorial comment should convey the impression that the main facts set forth are essentially new and that they call for revision of our ideas regarding the effects of stray currents.

Nothing could be farther from the truth, for, except possibly as to the methods of experiment, there is nothing in the article not well known to those who keep informed upon this subject. It has been known for a generation, at least, that iron pipes have a limited life in soil, depending upon the character of the pipes and the soil in which they are placed, and that they corroded by deep pitting, by scaling, by general graphitic degeneration and by general exfoliation, prior to the existence of electric railways. It has been known, since prior to 1884, that pipes containing free manganese were subject to rapid destruction by pitting similar to that found where electrolysis, due to stray currents, is active at the present time.

Pipe owners are also familiar with the fact that there are localities where lead service pipes are rapidly destroyed by purely natural soil corrosion, particularly when laid in a substratum of clay and the trench filled with the mixture of soils resulting from the excavation through the surface loam into the clay substratum.

All this has been known and is always considered by qualified engineers making electrolysis investigations.

It is probably true that when the dangers of electrolysis were first recognized, there were some engineers unfamiliar with the subject of corrosion who thought that the very vigorous attacks, which they observed in the presence of stray current, were phenomena peculiar to stray-current corrosion. These erroneous views were, however, soon dissipated as experienced investigators gave attention to the subject, and there exists at the present time an extended literature giving results of carefully conducted tests, showing the relative rates of corrosion which may be expected in various soils and electrolytes in the presence of current leaving the pipes through a wide range of current densities, the tests with extraneous current being carefully checked against like tests in the absence of extraneous current.

Even as to the Twin Cities we find natural corrosion recognized by C. H. Stone and H. C. Forbes, writing in 1894 as follows:

"We have made careful inspections of pipes taken from a large number of cities, and in most cases we find as stated before that the specimens have the appearance of being acted upon by natural causes, the rate of decay simply being accelerated by the electric current. A few instances, however, have been brought to our attention where no natural decay whatever is apparent; this example, for instance, is one which was taken from the ground in the vicinity of the power station at Minneapolis." (N. E. W. W. Association, Vol. 9, page 26.)

In 1899 Hambuechen studied the comparative rates of corrosion of a large number of samples of iron and steel, using electrolytic corrosion for the purpose of obtaining accelerated tests. He says:

"By use of a suitable electrolyte the iron may be corroded as much by this means (electrolysis) in a few hours as it would be corroded in as many years by exposure to the weather, the resultant surfaces being practically the same in each case. By this method the character of the corrosion in different qualities of iron was studied and from the results obtained by these tests, it is noted that the effects produced by ordinary corrosion and by electrolytic corrosion are similar." (*The Electrochemist and Metallurgist*, Vol. 1, page 79.)

Probably the best exposition of the electrochemical features of stray current electrolysis is found in a classical series of papers which Haber began to publish some eight years ago. Almost in the beginning of his text, we find relative to this problem the following:

"Similar changes have already been observed for twenty-five years past occurring upon cast-iron pipes when electric street railways were not yet in existence, and one finds them also to-day often enough at places where no stray current can be demonstrated or even assumed to be present in case the pipes are located in ground of unfavorable properties." (*Zeitschrift für Electrochemie*, Vol. 12, page 50.)

Any one familiar with the controversial literature bearing upon the choice between iron and steel as material for pipes, knows that pitting is continually referred to as a measure for the rate of corrosion in exposures to the action of steam, acid waters, etc.

In so far, therefore, as the interesting paper of Messrs. Scofield and Stenger undertakes to prove that "pitting" is not necessarily an evidence of electrolysis, it is "love's labor lost," for no one conversant with the subject so contends. In so far as it conveys the impression that hereafter any new or different view of corrosion or electrolysis phenomena must be taken it is distinctly misleading, because both the fact of natural pitting, and its acceleration by stray current are well established and it has been clearly proved that the corrosion due to the current may be expected to occur at substantially the rate indicated by Faraday's law. Laboratory investigations indicate that only in exceptional instances will conditions exist modifying this rate.

While, therefore, it is true that absence of current is no proof of safety to a pipe, it is equally true that the presence of current flowing from the pipe to surrounding soil is a substantially certain indication that corrosion, in excess of natural corrosion, is taking place at a rate determined by the ordinary laws of electrolytic action. Whether the stray current which is found endangering a pipe or other underground structure comes from an electric railway is determined by ascertaining whether the current flowing from pipe to soil varies with the operation of the railway, or, in other words, whether the current-time curve of pipe current follows the load curve of the railway.

F. N. WATERMAN, Consulting Engineer.

The Jitney Situation

MOBILE LIGHT AND RAILROAD COMPANY
MOBILE, ALA., Feb. 15, 1915.

To the Editors:

I have been studying the jitney situation for several weeks and have visited Texas in order to ride on the jitneys and talk with the men operating the cars. I found they were not earning living wages and depreciation on the car, to say nothing of a reserve for injuries and damages. How long they can last is hard to say. The *San Francisco Chronicle* says there were 1400 jitneys in Los Angeles in October and November, 1914, and only 700 in February, 1915. Of this latter number few were engaged in the business last October and November, nearly all of the 1400 having dropped out and new ones to the extent of 700 taking their places.

Although this statement may be true, I believe we shall have jitneys for some time to come, and I think we may look for automobiles seating eight to sixteen passengers with exit and entrance at the front and near the driver. This is the class of jitney I fear more than the other when it comes to permanency. We shall also have the small jitney run by the son of the owner who will make eight or ten trips in the morning and ten or twenty trips in the evening, going to school between times.

Strict regulation and the requirement that the jitneys carry liability insurance to guarantee payment for injuries and damages caused by the negligence of the driver will do more to put them out of business than anything else, other than high operating expense.

It seems strange that so few data have been obtained showing the cost of operating a jitney. Mr. Phipps, engineer of the Public Service Commission of the State of Washington has made a report to the commission in which he placed the average receipts per car at $6.69 per ten-hour day and says that the lowest priced car to operate cost $4.36 per day, including 20 per cent depreciation. The balance, or amount of wages for driver, is $2.33. He gives the average passengers per trip at 3.60. Mr. Phipps makes a mistake I think, in figuring depreciation at only 20 per cent per year, it would be nearer 50 per cent on a new car, and on a second-hand car, which is the kind usually in service, it is nearer 100 per cent. The manager of the Kansas City Association says it is 50 per cent, and he tries to make it appear bright for the car owner, in order to get more in the game. Inclosed is a list of questions showing desirable data if we are to obtain a comprehensive view of the jitney bus situation.

We had five jitneys in Mobile. We have only two now, but the operator says he expects to put on six more. Those in use are running over routes 2½ miles long, making three round trips per hour, or six single trips, running the round trip of 5 miles in twenty minutes. Being a novelty, they are attracting passengers.

The jitneys run about fifteen hours per day, which makes 225 miles per day and, if this rate is maintained, 82,125 miles per year. This is as much as an ordinary pleasure vehicle will run in nine or ten years, so it is plain that the depreciation, even on a new car would be 100 per cent and on second-hand cars such as are used, it will be 100 per cent in a few months.

I believe the JOURNAL can do a great deal of good in furthering the campaign for regulation and especially the carrying of insurance, and also in the gathering of operating costs of jitneys where they are in operation, including cost per mile for gasoline (lower grade), tires, miscellaneous repairs, garage expense, fire insurance, depreciation, interest on the investment, licenses, taxes and accident insurance.

The guarantee of tire makers and of the automobile manufacturer as to consumption of gasoline and life of car would be interesting.

I inclose an advertisement which we have inserted in one of our daily papers calling the attention of the public and the jitney owners to the facts about the business.

The rapidity with which a passenger is taken to his destination and the frequency of headway are the chief attractions of the jitneys. I have always believed in the single truck cars and in putting on more cars when the traffic required it thereby reducing the headway, and I sometimes think we may have to come to small one-man cars in order to give rapid and frequent service.

J. H. WILSON, President.

[NOTE.—The following are the inclosures referred to in Mr. Wilson's letter.—EDS.]

ADVERTISEMENT OF COMPANY

TEAR UP THE STREET CAR TRACKS

The *Mobile Register* says the tearing up of the street railroad tracks in Des Moines is urged. Suppose that was really done here in Mobile, who would be affected?

First, the fifty-one stockholders, mostly Mobilians. Second, bondholders in Mobile would lose $2,000,000. Among the bondholders are widows, orphans, estates, charitable institutions, benefit associations, persons of small means whose savings are so invested, small merchants, school teachers, professional men, capitalists and banks.

Third, several hundred employes who receive good wages, who would give way to boys at 10 to 15 cents per hour.

Fourth, all persons now paying 5 and 10 cent fares.

Fifth, all school children and persons using transfers. School tickets and transfers would not be practical where there were so many jitney owners.

Sixth, the state, county and city would lose heavily in revenue.

Seventh, property owners who would hereafter have to pave the entire street.

Eighth, persons injured could collect no damage claims, jitney owners not being financially responsible.

Why would the citizens suffer? Because the street cars now charge only 5 cents anywhere in the city and to Crichton, Toulminville and Prichard and only 10 cents to Spring Hill and Whistler, but with the doing away of street cars the jitneys would make no rate lower than 10 cents and 15 or 20 cents to Crichton, Toulminville or Prichard and 40 cents or more to Spring Hill or Whistler. Some streets, like Michigan Ave., Cedar, Franklin, etc., would have no service.

What would the sixty jitneys necessary to supply the profitable service pay the city, state and county? Why, just $1,500 as against $50,000 now paid by the street car company. Yes, *by all means* tear up the tracks.

QUESTIONS ON JITNEY BUS TRAFFIC

The following questions are intended to cover five-passenger and seven-passenger cars and the different sizes of buses used.

Name of company? Name of city? State? Population of city? Jitney cars began to operate? Number owned and operated by owner? Number operated by firms or companies? Number in jitney association? Length of one-way trip? Time of one-way trip? Hours operated per day? Fare? Revenue per car hour? Revenue per car mile? Operating cost per mile? Gasoline? Oil? Tires? Repairs and supplies? Garage expense? Chauffeur's wages? Superintendency? Taxes and licenses? Depreciation? Fire insurance? Liability insurance? Total?

When owner runs car (no charge for chauffeur or superintendent) net earnings for owner? State and county licenses per car? City license per car? Chauffeur's license? Percentage of gross receipts paid? Intangible or franchise tax? Paving tax? Ad-valorem tax per car? Excess number carried above seating capacity? Are passengers carried on running board? Are tickets sold? If so, give price. Are school tickets sold? If so, give price. Are children's tickets sold? If so, give price. Are transfers issued? Are policemen and firemen carried free? Are Sisters of Charity carried free? Are waiting rooms provided? Are white and black passengers separated? Are separate cars run for the whites and blacks?

Do jitneys run in bad weather? Is interior of jitney lighted? Are jitneys classed as common carriers? Is a franchise required? Are jitneys regulated by city ordinance If so, please send copy of ordinance. Do jitneys follow specified routes? Are routes specified by ordinance? Do jitneys operate only in paved streets? What rate of wages per hour is paid to chauffeur?

The following questions are of a general nature.

If an association directs the operation of jitneys, what are its functions? Does the association provide terminals, schedules, starters and other facilities? What are the charges of the association?

Are jitneys permitted to parallel street railway lines of same streets? Are jitneys confined by ordinance or other regulations to streets other than those occupied by street railway lines? Do ordinances require all other vehicles, including automobiles, to stop when approaching street cars taking on or discharging passengers? Are jitneys required to draw up to curb to take on or discharge passengers?

Are jitney owners required by statute or ordinance to carry liability insurance against the public? If so, what are the maximum amount covered by policy for any one person, the maximum for any one accident, and the date? What other important points are covered by policy? Do you know if application for such insurance has been made by an individual or by a company and same refused? What are the reasons for such refusal?

Have any serious accidents been caused by jitney buses? What were the causes of some of these accidents which indicate to you excessive public liability due to improper operating methods, or by condition of streets and street traffic? Have persons injured in such accidents been compensated therefor without suit? Will you give specific instances? In case of verdict have any been able to collect the award? Please give specific instances. What is the general attitude of persons injured by jitneys toward the owners thereof?

Do jitneys make public subscriptions? Do jitneys operate to city parks, and to the ball park? Have you curtailed street car service? Have you decreased number of conductors and motormen, wages of conductors and motormen, number of men in shops, wages in shops, office force, wages of office force, number of heads of departments, salaries of heads of departments and salaries of general officers?

Have you attempted to meet competition by increased car service? Do you operate single or double-truck cars on lines that have competition with jitneys? How many seats per 100 passengers on your cars per entire day and how many seats per 100 passengers during rush hours? Have you considered the operation of smaller cars on more frequent headway?

Are you considering the operation of any one-man operated cars? What is the average fare per revenue passenger, per revenue and transferred passengers, and per revenue transferred and free passenger? Could you abandon the giving of transfers? If buses parallel any of your lines do they confine their activities to your short-haul traffic? How many lines do you operate? How many lines are operated that do not pay cost of operation, taxes and fixed charges?

By what per cent of gross income have jitneys cut into your receipts? What per cent of short-haul passengers do you estimate are now carried by jitneys? Do you contemplate abandoning any lines? Do you contemplate going ahead with improvements and extensions, while the jitney business is affecting you? If you have abandoned improvements or extensions, state estimated cost of abandoned work? Have the operation of jitneys affected the value of your stock and bonds?

Do you think the operation of jitneys will be permanent? If so, what kind of five and seven-passenger cars, or busses? If your employes are organized, has their organization undertaken to combat the jitneys? If so, how? Please give your views on the general subject.

Report on Manila Electric Lines

Results of operation of the Manila Electric Railway, including suburban lines, for the first ten months of 1914 show a decrease in net earnings of approximately 23.4 per cent, as compared with the same months in the previous year. The actual decrease in receipts was $48,882, or approximately 7 per cent; the increase in actual cash expenditures for operation amounted to $36,607, or approximately 11 per cent; the outlay for maintenance of track and roadway, overhead trolley system, etc., increased for the period $4,239, or approximately 10 per cent; the maintenance of cars, shop machinery and tools increased $9,185.91, or approximately 21.3 per cent; the net earnings from operation decreased $85,490, or approximately 23.4 per cent. During the period mentioned the company spent $39,571.90 in improvements over and above those mentioned.

The number of passengers carried during the first eleven months of 1914 was 24,867,641, and for the same period in 1913 it was 25,680,546, a decrease for 1914 of 812,905. During 1914 the company erected four public waiting stations along its line costing about $1,000, and added to its equipment six modern, center-entrance, steel cars of latest design and construction, costing $33,000, and rebuilt twenty of its old cars at a cost of $20,000.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Chemical Department of the Illinois Traction System

BY N. R. BEAGLE, CHIEF CHEMIST ILLINOIS TRACTION SYSTEM

The idea of establishing a chemical laboratory for the Illinois Traction System took definite form during the latter part of 1912, when a chemist was engaged, whose first duty was to design and equip a laboratory where all kinds of chemical testing might be conducted. This laboratory was to be available at all times for testing purposes, to the Illinois Traction System, the Chicago, Ottawa & Peoria Railway and all properties of the Western Railways & Light Company, which are different branches of properties constituting the McKinley System.

The entire McKinley System comprises about 600 miles of interurban railway in Illinois, with shops and power houses, also some twenty-five local utility properties in cities varying in size from 25,000 to 250,000 inhabitants, situated in Illinois, Iowa, Missouri and Kansas. Some of them furnish street railway, gas, electric lighting and steam heating service to the cities in which they are located, while others supply only one or more of these branches of service mentioned. Also from some of these properties, transmission lines furnish power and lighting service to scores of the smaller towns and villages in the surrounding territories.

At the outset, the work to be undertaken was mainly to include those problems of the power houses in which chemistry plays a part, that is to say, the selection of fuels and the provision for efficient combustion through flue gas analyses. The problems with which this department is continually confronted, however, cover a much wider field, involving not only chemical but physical problems as well. With this in mind, the chemical department was made a branch of the operating engineering department under the supervision of R. F. Carley, chief operating engineer. The headquarters were located in Peoria in temporary offices, a permanent location having been designed for it in the new terminal building which is now under construction in Peoria.

FUEL TESTING

There are about twenty-five city power plants in operation upon the system, also four large interurban power plants. These require an enormous tonnage of coal each year, and the laboratory work here has been to obtain all possible information concerning the fields and mines from which coal can be secured for these stations. The kinds of coals used are principally the lower grades, or screenings. At present some of this coal is being purchased on contract, namely, it is bought for the heat units contained and not because of the trade name it bears or the locality from which it comes. The quality of these screenings from a given locality very often is far inferior to what might be expected, especially when the mine run coal coming from this same district has the reputation of being high grade. The ultimate aim of this work is toward the discovery of that quality of coal which gives the best results when burned under the conditions existing at the various power plants. This fuel will then be purchased under contract for the heat units contained, or in other words, quantity buying of a definite product from a limited territory will be attempted, rather than the scattered buying of coal, the heat-producing value of which is unknown.

FEED WATER TESTING

Each of the generating stations require millions of gallons of boiler-feed water. At many of the plants this water contains a certain percentage of minerals in solution which are deposited in the form of scale in the boiler tubes and drums. It is estimated that a layer of scale 1/16 in. in thickness will cause a loss of at least 10 per cent in the amount of water evaporated by a given amount of coal in the furnace. There are innumerable boiler compounds on the market which are fed into the boilers along with the feed water to prevent the formation of scale. These compounds necessarily must be varied with each station and from day to day, hence it will be the duty of the chemical department to furnish the proper water softener. On the other hand, expensive boiler installations were designed not as water softeners, but as water evaporators, and to that end the problem leans toward the classification of all feed-water supplies. Later water softening systems will be installed to remove these scale-forming minerals. At present two water softening plants are in operation, with excellent results. If for any reason the installation of a water softening plant is not practicable, the chemist selects or supplies a compound which is most effective toward alleviating the scale trouble in the boilers.

LUBRICATION, ETC.

Lubrication problems form the principal study for the street railways and 600 miles of electric interurban lines. The chemist determines the proper lubricants for the best results and defines their correct use. The question of bearing metals and their proper use is also being studied. An analysis of paints to determine those which give the best service on street interurban and freight cars, and on the interurban bridges is also handled by this department. In this latter work the desirability of having standard paints for use throughout the whole system is being considered.

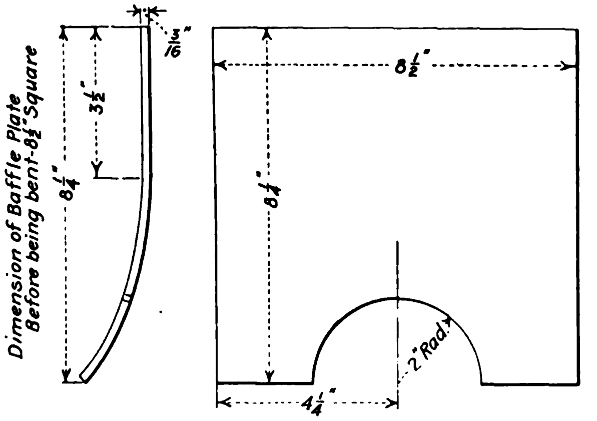
There are also about a dozen gas plants in operation on the Illinois Traction System, the problems of which include the testing of gas coals and the illuminating gas for purity, heating value and candlepower. Methods also are devised by which the largest possible amounts of the by-products are recovered. When these by-products are sold, tests are made to ascertain their percentage purity.

The foregoing are only a few of the problems which have come before the chemical department. Besides these, there are innumerable ways in which the department has been useful, not always in a strict chemical sense. Until recently the laboratory has been in charge of one man. Now an assistant has been added, which allows the chemist more time to devote to the investigation of special problems and to study conditions at the local properties where changes might mean added efficiency and saving.

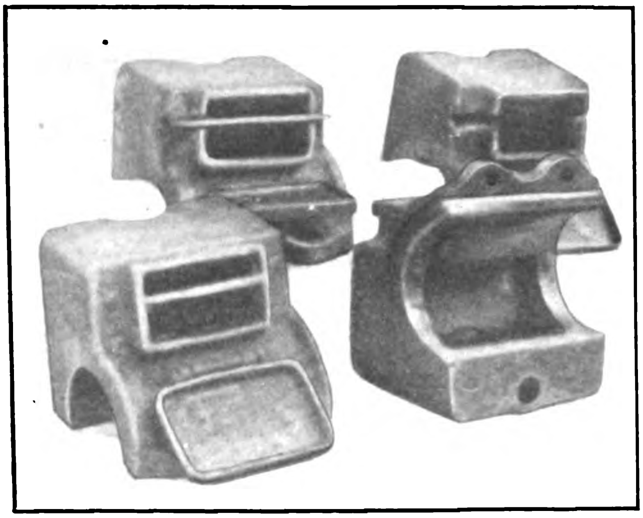
Baffle Plate for Motor Axle Bearing Caps of GE-73 Motors

BY RALPH FOX, GENERAL FOREMAN OHIO ELECTRIC RAILWAY, COLUMBUS, OHIO

The mechanical department of the Ohio Electric Railway has made several attempts to devise an appliance that would serve as a baffle plate for the motor axle bearing caps of the GE-73 motors. Until recently nothing had been found that proved satisfactory. A short time ago, however, we hit upon a scheme which can be quickly and easily applied. An iron plate 3/16 in. thick and 8½ in. square with an indenture in one side, as shown in the accompanying sketch, is the only thing required aside from an electric welding outfit. The operation is very simple. With the welding outfit, cut two slots in the casting, one on each side of the opening to the oil chamber, as shown in the upper right-hand corner of the accompanying halftone. When this is done, slip the plate into these slots, as shown in the upper left-hand view. Again using the welding outfit, heat the top of the plate which projects above the casting and at the same time heat the casting until the plate and casting are welded together and the original shape of the bearing cap is obtained. The lower views in the halftone show the completed job.



SKETCH SHOWING SHAPE AND DIMENSIONS OF BAFFLE PLATE FOR MOTOR AXLE BEARING CAPS



BEARING CAPS WITH AND WITHOUT BAFFLE PLATE

When completed, this bearing cap is in every way equivalent, from the point of service, to the modern caps in which the baffle plates are integral with the remainder of the casting. The cost is very small. The plates can be secured from any boiler shop, cut to proper size and shape, for a few cents each. One man with a helper will complete about two bearing caps per hour.

This baffle plate serves the same purpose as the "filler" described on page 66 in the article on "Oil-Saving Filler for Motor Axle Cap" published in the Jan. 2, 1915, issue of the ELECTRIC RAILWAY JOURNAL. Our plan was worked out and many applications had been made before the article mentioned appeared.

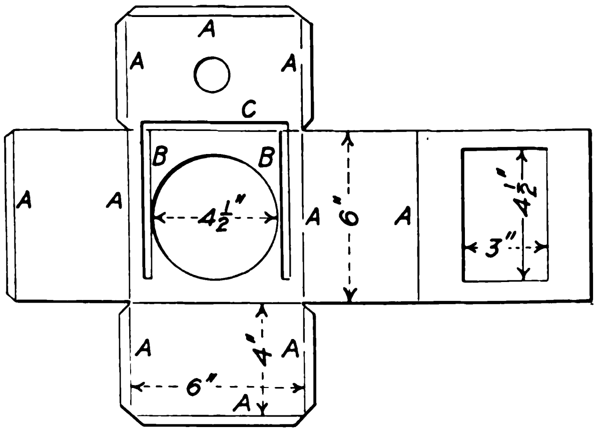
One of the most important results secured by this arrangement is that the jolting that the motor gets tends to bring the packing waste up against the axle instead of forcing it away from the axle, as is the case when no baffle plate is used with this style of bearing. Another important point in the construction shown is that there is left over the oil pocket an opening about 1 in. wide and the full length of the oil box through which an oil gage may be inserted. This opening also permits the oil cellar to be cleared without removing the baffle plate. We have tried gage pipes but find them unsatisfactory.

We have also found the present device an oil saver and good insurance against hot bearings. The GE-73 motor axle cap is much like that of the GE-66 motor.

Tail-Light or Classification Light Box

BY J. N. GRAHAM, MASTER MECHANIC ROCKFORD & INTERURBAN RAILWAY, ROCKFORD, ILL.

Many of the older interurban cars have sign panels that are too narrow to allow for electric markers and tail-lights. The Rockford & Interurban Railway has overcome this difficulty by using a small tin box of the design illustrated. The box is cut from a single piece of tin or galvanized iron. If cut according to the sketch no trouble will be experienced in making one. All of the lines marked *A* are bent at right angles, and this can be done in any machinist's vise. The small round hole is for the lamp socket, one of Federal type being the best. The large round hole is for the lens. We use an ordinary lens holder which is soldered to the outside of the box. White lenses are used, but we carry on the car pieces of red and green glass which, when needed, are dropped through the opening *C* into the slides *B* back of the white lens. In this way the boxes can be used on double-end cars for either tail-lights or classification lights. The rectangular hole 3 in. x 4½ in. is for the door whereby access is obtained to the lamp when it needs change. Two U-shaped slides are provided to hold the door. The door is made of a piece of tin with a loop by which it can be handled. Each box is provided with two tin lugs, one at the top and one at the bottom, by which it is fastened to the inside of the corner posts of the cab close to the inside of the window.



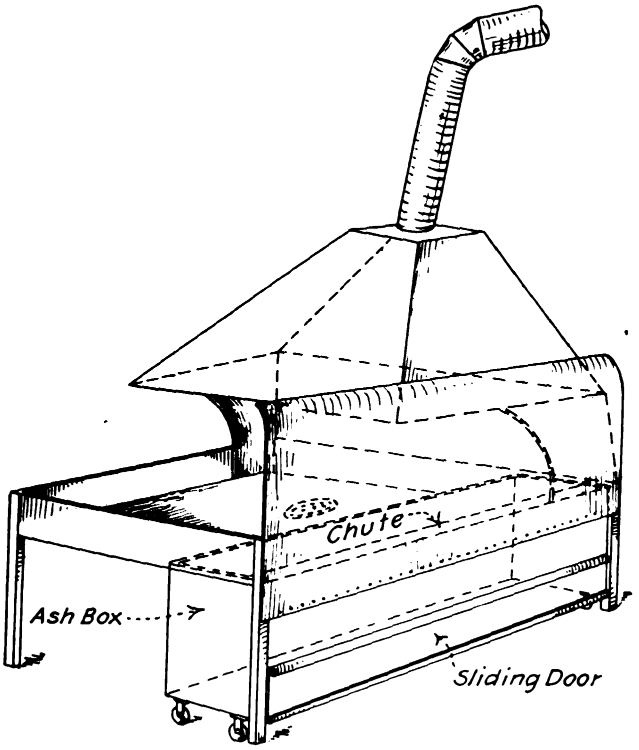
SKETCH SHOWING CUTTING PATTERN FOR TAIL-LIGHT BOX

Removable Ashpit for Blacksmith Forges

BY J. R. JENKINS, GENERAL SHOP FOREMAN THIRD AVENUE RAILWAY SYSTEM, NEW YORK

Various appliances such as blowers and fans have been installed in shops for the comfort of the employees, but with all these improvements one who enters many blacksmith shops cannot fail to notice that the room is filled with dust while the faces of the workmen are covered with grime. This condition is due principally to the fact that, while cleaning their fires to apply fresh coal, the attendants are invariably more occupied in turning out work than in paying much attention to the disposition of the refuse ashes. In so doing they are very likely to push the ashes off the forge onto the floor, thereby causing the dust to rise and settle on their hands and faces as well as on all parts of the tools and shop. Naturally, some ashes find their way to the lungs of the men.

Always alert for the health of its employees, the Third Avenue Railway System has tried to correct this evil by devising a forge attachment which consists of a box as long as the forge and arranged to fit immediately under the same. This box is made of sheet iron and is set on wheels to permit its removal and also its use under one forge while another is being cleaned. To the outer edge of this box is attached a galvanized iron hood. This hood tends to revert to the draft pipe above, all dust which rises as the fire is cleaned, while the ashes are pushed over to the chute and down into the box. A door, arranged to slide up and down, is attached on the outer side of the box for the purpose of removing the ashes when the box is filled.



REMOVABLE ASH PIT FOR BLACKSMITH FORGE

This removable ashpit in no way interferes with the heating of long pieces of iron as it can be easily removed and replaced.

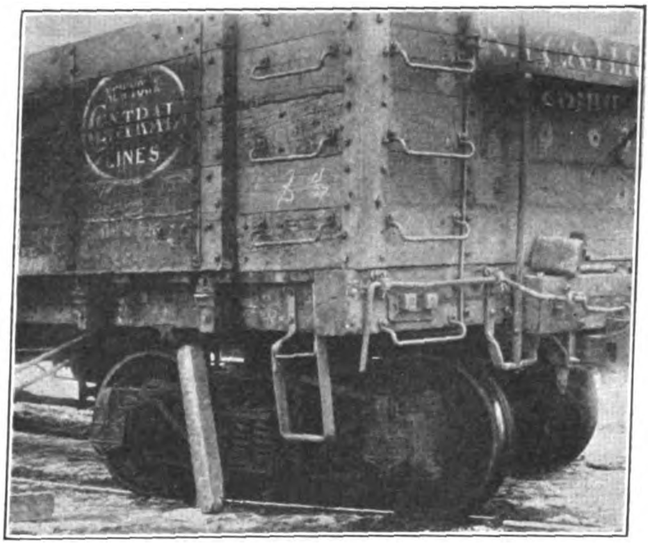
The Karachi (India) Tramway has received a franchise to extend its tramway lines. American firms desiring to secure details of the new work should write to the manager Karachi Electric Tramway, Karachi, Sind, Northwest India.

Restoring Loaded Freight Cars to Side Bearings in Rounding Short Curves

BY F. L. HINMAN, MASTER MECHANIC NEW YORK STATE RAILWAYS—SYRACUSE AND ONEIDA LINES

Occasions arise when it is found necessary to move steam railroad freight cars over electric railway tracks which were not originally intended to handle cars of this class. In such cases a great deal of trouble is often met in rounding the short radius curves used in street railway work, due to the turning of the freight car trucks to such an extent that the body bolster bearing is allowed to drop off from the truck side bearings.

A simple device for lifting the body back on to the side bearings, and one not known to many electric railway men, is by means of two hardwood props measuring about 4 in. x 6 in., and approximately 3 ft. 6 in. long, with the ends slightly rounded. The method of application is as follows:



ONE OF TWO PROPS USED TO RESTORE A FREIGHT CAR TO THE TRUCK SIDE BEARINGS

When the truck starts to straighten about as it is leaving the curve, stop the car and place one prop on each side of the car with the top end as near to the bolster as possible and with the other end resting on a block, or on the ground if the latter is hard enough to support the weight of that end of the car.

The props should receive a slight inclination so that as the car is started forward they pivot at the lower end, thereby raising the car body sufficiently to allow the truck side bearings to swing back to their normal position without catching on the body bolster bearings.

A little practice with this device will render the operator very adept at restoring cars to the side bearings, thus saving a great deal of trouble in getting cars around short radius curves.

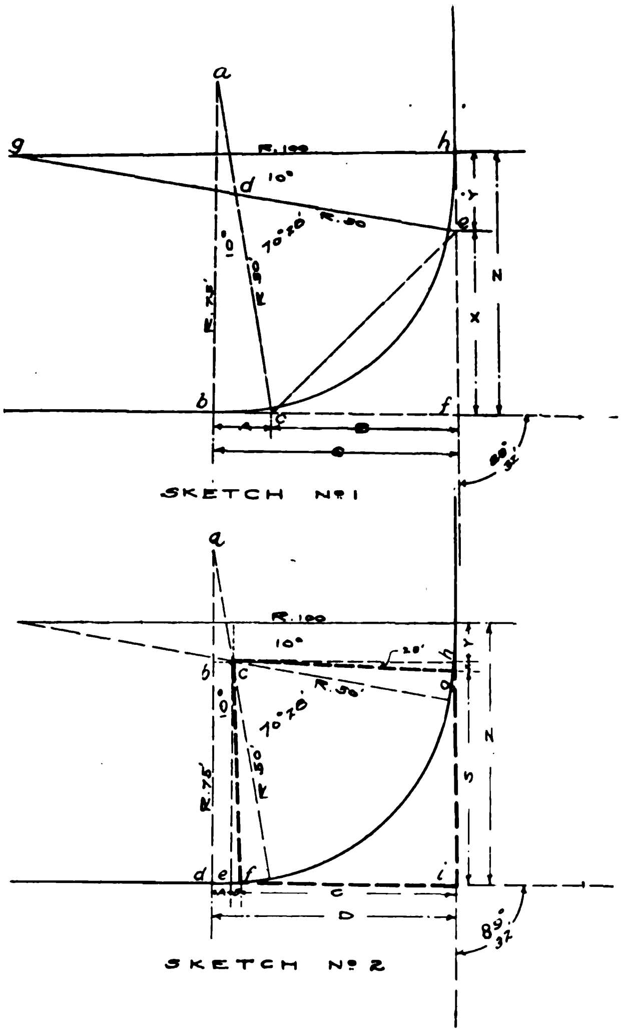
On Jan. 28 the tramway officials of Hull, England, received notice from the military authorities that the whole town must be in complete darkness all night. At first the tramway management was uncertain whether to conduct a service or not but finally decided to do so although it meant no car lights and no street lights and the house lights reduced to a minimum. Our English contemporary, which described this instance, says that fortunately the moon was shining so that the darkness was not absolute. The experience must have been trying although no accident occurred. On the following night the military authorities gave word that lighting could be resumed.

Two Ways of Laying Out a Compound Curve

BY S. STRIEZHEFF, WAY AND STRUCTURE DEPARTMENT
BROOKLYN RAPID TRANSIT SYSTEM

In the routine of his daily task a man gets accustomed to doing his work in a way more or less efficient and according to methods sanctioned by general usage. But occasionally he finds that others go about it in a way which is unusual enough to disturb him somewhat rudely.

The writer recently had occasion to lay out a compound curve for a single-track branch-off and in figuring the tangents made use of the method shown in the accompanying Sketch 2—the so-called right-triangle method commonly used in this kind of work, which affords an easy self-check. He then asked a co-worker, who usually does different engineering work, to check his figures. This he did by the method shown in Sketch 1. This method, as may be seen from the sketch, was rather clumsy and involved a formula for two sides and included angle, and another for one side and angles at its ends. While the result obtained was the same, this instance shows the divergent means that may be used in track work calculations.



LONG AND SHORT WAYS OF LAYING OUT A COMPOUND CURVE

The trigonometrical problem before us is this:

Given two lines making a known angle with each other, to draw tangent to them a compound curve made up of arcs of circles of known radii and arc lengths. In Sketch 1 it is seen that the problem resolves itself into determining C and Z, the distances from the intersection of the tangents to the points of tangency.

The radii of the curves and the easement angles are chosen from experience. In this case 100 ft. was considered the proper value of the radius for one end of the curve on account of a piece of special work to be installed there. Similarly 75 ft. was chosen for the other end, 50 ft. for the intermediate curve and 10 deg. for each of the easement angles.

When C and Z are known they can be laid off from the intersection f, perpendiculars can be laid off from b and h, the intersecting point d can be determined by laying off ac and ge, giving the centers for the three arcs.

METHOD NO. 1

In the construction shown in Sketch 1

$$C = A + B$$

A can be found from the right triangle abc, i. e.,

$$A = 75 \text{ ft.} \tan 10°.$$

B is one side of triangle ecf of which angle cfe is known, 89° 32′ in this case, and side ce is easily found from triangle dce, thus:

$$dc = ac - ad$$

but $ac = 75 \text{ ft.} \div \cos 10°$,

and $ad = 75 \text{ ft.} - 50 \text{ ft.} = 25 \text{ ft.}$

Similarly

$$de = ge - gd$$

but $ge = 100 \text{ ft.} \div \cos 10°$,

and $gd = 100 \text{ ft.} - 50 \text{ ft.} = 50 \text{ ft.}$

The angle cde is 70° 28′, and the remaining side of the triangle is

$$ce = \sqrt{cd^2 + de^2 - 2cd \cdot de \cdot \cos 70° 28'}$$

The other angles are:

$$\text{angle } dce = \frac{de}{ce} \cdot \sin 70° 28'$$

$$\text{angle } dec = 180 - 70° 28' - dce \text{ (just found)}$$

Having solved triangle cde, triangle cfe follows as a matter of course.

side ce is known

angle $ecf = 180 - 80 - dce$ (just found)

angle $cef = 180 - 80 - dec$ (just found)

angle $cfe = 89° 32'$.

One side and three angles are known. Then

$$cf = B = ce \frac{\sin cef}{\sin 89° 32'}$$

Then $C = A + B$.

Z can be found in a similar manner.

Q. E. D.

METHOD NO. 2

Referring to sketch No. 2, the distance D can be obtained from three right triangles, abc, cef and cgh, and the parallelogram $cgif$ indicated by heavy lines, as follows:

Draw bc parallel to di. The right triangle abc is known because, as explained in method No. 1,

$$ac = 75 \text{ ft.} - 50 \text{ ft.} = 25 \text{ ft.}$$

As angle $bac = 10°$, $bc = de = A = 25 \text{ ft.} \sin 10°$ and $ab = 25 \text{ ft.} \cos 10°$.

Draw cf parallel to hi. But angle $ecf = 90° - 89° 32' = 28'$, and $ce = bd = 75 \text{ ft.} - ab$ (just found).

Hence

$$ef = B = ce \cdot \tan 28'.$$

To find $fi = C = cg$, we find cg from the right triangle gch. Thus $ch = 100 \text{ ft.} - (50 \text{ ft.} \cos 10°)$, and $cg = ch \div \cos 28'$.

We thus have A, B and C, the sum of which is D. Similarly Z can be found as the sum of Y, X and S.

Q. E. D.

Corrections of Volt-Meter Measurements of Direct Current

G. H. McKelway, distribution engineer Brooklyn Rapid Transit System, advises that a number of errors crept into the calculations in his article entitled "Voltmeter Measurements of Direct Current," as published on page 341 of the ELECTRIC RAILWAY JOURNAL for Feb. 13. The figures which require correction are as follows: 2 ft. of 5,000,000 circular mil wire should be 238 instead of 268 amp per millivolt; 4 ft. of 5,000,000 circular mil wire should be 119 instead of 134 amp per millivolt; 2 ft. of 2,500,000 circular mil wire should be 119 instead of 134 amp per millivolt, and 4 ft. of 2,500,000 circular mils copper wire should be 59.5 instead of 67 amp per millivolt.

In the table referring to length of wire the length under constant "10" relative to 5,000,000 circular mil wire should be 47 ft. 7¼ in. instead of 47 ft. 7 in.; the length of 2,000,000 circular mil wire for the same constant should be 19 ft. 0½ in. instead of 19 ft. 9½ in. The length of 1,000,000 circular mil wire under constant "1" should be 95 ft. 2½ in. instead of 95 ft. 3 in.

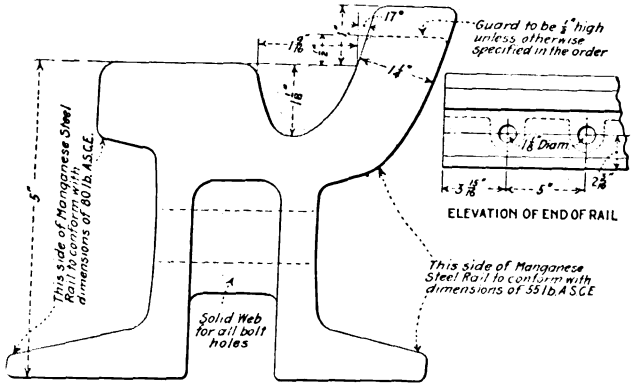
Equipment Cost Data

The following data are from the expenditures of the Worcester (Mass.) Consolidated Street Railway and are printed for the convenience of engineers making estimates. They are drawn from the exhibits filed by the company with the Massachusetts Public Service Commission.

POWER BUILDINGS AND EQUIPMENT	Total	Unit Cost
Erection of substation building and installation of two 1500-kw rotary converters, complete with transformers, lightning arresters, switchboard, etc., Madison Sq., Worcester	$103,582.05	$34.52
Addition to brick and concrete building Millbury power station and installation of one 5000-kw turbo generator, four Edgemoor boilers, four stoker equipments, condenser, heater, feed pumps, etc	272,539.11	54.50
Four Vigilant Safety water columns and fixtures for Millbury power station	118.55	29.64
Thirty-eight Pyrene fire extinguishers for power and substations	207.22	5.45
Installation of 2.5-kw. engine and generator at Charlton City power station, for plant lighting	269.58	107.50
New ogee expansion ring for 200-hp Manning vertical boiler	510.00	510.00
One steam tube cleaner for Fremont Street power station	318.50	318.50
LINE AND WAY		
0.5 mile No. 0000 weatherproof feed wire	492.45	984.90
One Duntley track drill	226.25	226.25
One rail bender	16.00	16.00
Eleven electric track switches, Worcester	2,090.52	190.94
One 8-ft. x 10-ft. waiting station, West Boyleston	64.75	64.75
16-ft. x 50-ft. addition to Uxbridge car house lobby, heating	674.21	674.21
ROLLING STOCK		
Two double-truck snow plows complete with four GE-80 motors	9,370.62	4,685.31
Three 40-ft. gondola trailer cars, with air brakes, trucks, etc	2,971.48	990.49
Two 30-ft. Wason closed cars, each two Westinghouse 101-B four-motor equipments complete with air brakes	7,831.70	3,915.85
Five new 45-ft. express cars, 4 GE motors, each complete	29,066.42	5,813.28
ROLLING STOCK DETAILS		
Replacing thirty-two cast-iron 34-in. wheels with steel-tired wheels on four open cars	1,174.00	36.70
Three sets Taylor trucks, complete for GE-67 motors	1,370.43	456.81
112 34-in. steel-tired wheels 4¼-in, rough bore, from National Car Wheel Company	3,619.13	32.30
One four-motor GE-80 equipment, complete for supply car	2,197.98	2,197.98
Two GE-80 four-motor equipments	5,286.08	2,643.04
Fifteen sets Allis-Chalmers AA1 motor-driven air compressors, complete with engineer's valves, gages, etc	3,238.95	216.00
Twenty-four Titan axle gears for GE-80 motors	715.20	29.80
Equipping 130 cars with Murphy sand boxes	2,089.44	16.10
Equipping 250 cars with 15-ton jacks with compartments	3,611.03	14.50
Three Crouse-Hinds arc headlights	36.06	12.02
Six Neal electric headlights	33.60	5.60
Fifty Knutson trolley retrievers	682.82	13.65
Installation of motormen's seats in sixty-five cars	208.50	3.21
Installation of side guards on 102 single truck open cars	2,674.46	26.20
SHOP EQUIPMENT		
One 27-in. engine lathe for Market St. carhouse	986.72	986.72
One Bay State compressed air vacuum cleaner and equipment	1,200.00	1,200.00

Manganese Double-Web Guard Rail

In Mr. Bernard's article on "Car Life of Plain Curves," published on page 383 of the ELECTRIC RAILWAY JOURNAL, reference was made to a manganese steel double-web section for inner rail employed for the renewal of the eastbound plain curve. The accompanying sketch shows details of the rail mentioned. Mr. Bernard, who is assistant engineer way and structure department, Brooklyn Rapid Transit System, advises that this section has given satisfactory results in all shallow special work where solid manganese steel construction was used. It has proved quite an advance over the former practice of using a T-rail section with a bolted-on guard.


17°
Guard to be ⅛" high unless otherwise specified in the order
1 9/16"
1¼"
5"
This side of Manganese Steel Rail to conform with dimensions of 80 lb. A.S.C.E.
This side of Manganese Steel Rail to conform with dimensions of 55 lb. A.S.C.E
Solid Web for all bolt holes
1⅛" Diam.
3 15/16"
5"
2 3/16"
ELEVATION OF END OF RAIL

MANGANESE STEEL DOUBLE-WEB GUARD RAIL, 80 LB. A.S.C.E. SECTION

Steam-Electric Tunnel Crane

A combination wrecking crane built for either steam or electric operation has recently been received by the Michigan Central Railroad for use in and about the Detroit River tunnel. It is hoped, of course, that an accident may never occur in the tunnel itself, and in order that the crane need not be idle under normal every-day conditions, it is adapted for ordinary uses outside the tunnel as well as for special use underground. To this end, energy for operation may be taken from the third-rail or from a flexible cable carried on the crane, but if outside the limits of the electric zone and beyond the reach of the power cable the crane can be operated by steam from any outside sources, such as an accompanying locomotive. It is then available for regular wrecking duty, or for construction and yard work.

In general the construction is like the 120-ton capacity steam wrecking cranes which are standard on American railroads. The car body is 26 ft. long and 9 ft. 6 in. wide, and the weight of the crane is distributed over a wheelbase of 19 ft. 8 in. Telescopic outriggers are provided for adding stability during heavy lifting. Air and hand brakes are furnished with provision for both automatic and straight air. The complete air-brake system is under the control of the operator, with engineer's valve, electric air compressor, etc.

No boiler is furnished with the crane, but when desired steam is taken from an outside source through suitable piping. This is so arranged by means of a steam-tight slip joint at the center of revolution that the crane will slew more than 180 deg. in either direction beneath the pipe without interference. When the crane is operated by electricity this piping revolves with the crane.

For electric operation there is provided a motor wound for 600 volts d.c. and having a capacity varying from 200 hp for a short period, to 115 hp for one hour's continuous service. This motor will operate on fluctuations of line voltage ranging from 300 to 700 volts. The controller is of the street railway type with cast-grid resistors. Current is taken from the third rail shoes through a collector ring. It is delivered to a switchboard that is furnished with all necessary switches and instruments for operating the electric air compressor, cable reel, third-rail shoes, lights, etc.

An interesting feature is the automatic cable reel for paying out and reeling in the main power cable. This reel has capacity for 500 ft. of insulated power cable. It is operated by a motor and the automatic control is obtained by the action of the motor alone, without the use of any intermediate or external mechanical devices, such as friction clutches, etc. This motor has current on at all times the crane is in service and taking current through the cable, so that practically constant torque is exerted by the motor with consequent practically constant pull on the cable. Any change in the pull on the cable, such as would be produced by the crane moving forward or back, results automatically in the desired paying out or reeling in of the cable. The motor is capable of standing stalled continuously without danger to its parts from over-heating.

The motions of hoisting with either the main or auxiliary hoist, varying the boom radius and slewing, are independent of each other and, with loads up to the limit of its power, these motions can be performed simultaneously. With its maximum load of 120 tons the crane is capable of slewing at the rate of a complete revolution in one minute if deemed a safe speed. The boom may be raised or lowered under full load. There is provided a special drag or pulling line connection attached to the underside of the boom. When self-propelled by either steam or electricity the crane has a speed of about 4 m.p.h., but it may be safely hauled in regular trains over main line tracks at a speed of 60 m.p.h. This large crane was constructed by the Industrial Works of Bay City, Mich.

The maximum radius of the main block is 25 ft. and the minimum is 16 ft. Capacities of the crane are as presented at the top of the next column as follows:

With outriggers in position.
Main hoist, 240,000 lb. at 17-ft. radius.
160,000 lb. at 20-ft. radius.

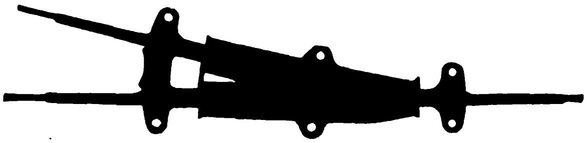
With end outriggers only
Main hoist, 140,000 lb. at 16-ft. radius.
Auxiliary hoist, 30,000 lb. at 25-ft. radius.

Without outriggers
Main hoist at right angles, 44,000 lb. at 16-ft. radius.
32,000 lb. at 20-ft. radius.

Auxiliary hoist, 24,000 lb. at 25-ft. radius.

Trolley Frogs for One Degree of Angle

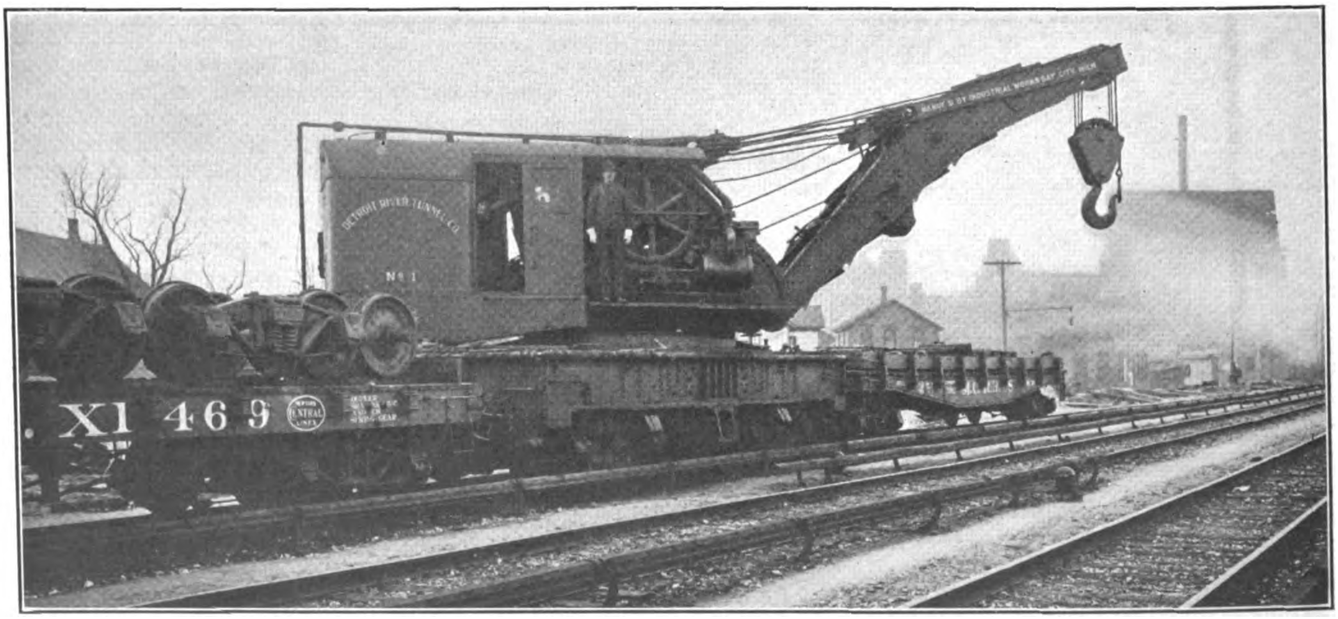
An addition to trolley frogs designed in only one degree of angle regardless of the degree of track curvature, necessitating the carrying of only one right-hand and one left-hand style, is the Westinghouse type BR. This is a trolley frog without movable parts that can be used at points where high speeds are obtained, the design being such that the trolley wheel does not travel on its flanges. Therefore no bump, and consequent displacement, occurs when the bearing of the wheel is transferred from the groove to the flange. The type BR is asserted to be the only trolley frog that will prevent a wheel from traveling on its flanges without using mechanical or electrical devices in connection with a movable tongue. The illustrations show this frog for a 15 deg. angle designed for city service, though the company is prepared to furnish this type of frog in either an 8 deg. or 10 deg. angle for high-speed interurban service.



FROG DESIGNED FOR 15 DEG. ANGLE

The malleable iron frog has recently become popular on account of its long life as compared with the bronze frog, although a great many operating men prefer the latter on account of the longer life obtained from the trolley wheels. This argument does not apply to the present malleable iron frog, as the resistance to the passage of the trolley wheel is asserted to be less than with any design of bronze frog.

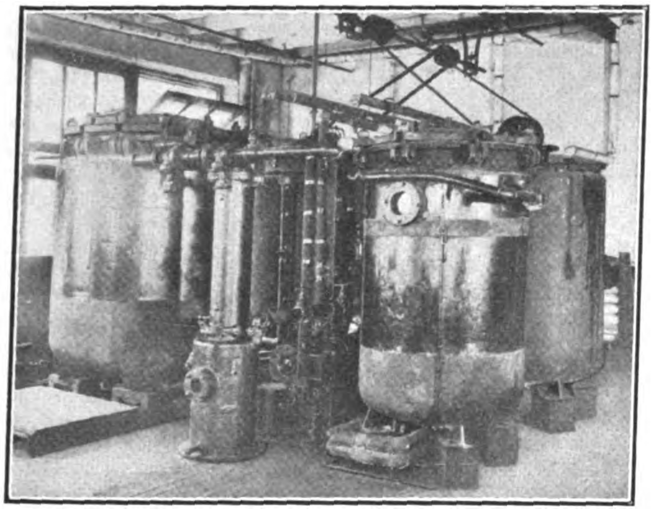
This type can be placed almost directly over the track switch point, preventing the side wear of the wire caused by the angular riding of the wheel before it enters the frog. When the frog is placed in its proper



STEAM-ELECTRIC WRECKING AND CONSTRUCTION CRANE FOR MICHIGAN CENTRAL RAILROAD DETROIT RIVER TUNNEL location the wheel will be in a position to engage the turnout runner before it commences to grind the side of the wire. Due to the over-lapping of the runners, as shown in the illustration, practically continuous contact of the tread of the wheel is afforded during the period of transition.

Hints on the Impregnation of Railway Motor Coils

The reinsulation of formed wire by impregnation, especially for field coils of traction motors, has become a regular feature of electric railway practice, for with proper workmanship a saving up to 25 per cent of the cost of a new coil is attainable. Many of the early attempts at impregnation were not successful, because both railways and manufacturers lacked experience and proper equipment. In recent years these drawbacks have been overcome by organizations which make the impregnation of field coils either their sole business or a logical part of their other electrical work. The Electric Operations Company, Brooklyn, N. Y., is a concern of this character, and the following explanation of its impregnating practice, as given by A. M. Leacock, manager of the electric railway department, should therefore be of value.



QUADRUPLE TANK EQUIPMENT FOR VACUUM IMPREGNATION OF COILS

The company uses steam-jacketed tanks, one being the liquid (compound) tank and the other the vacuum tank. To the latter tank is connected a compressor for supplying compressed air or vacuum as desired. The two tanks are connected at the base with a valve intermediate. Coils to be treated are placed in the vacuum tank after they have been covered with one layer of tape. In this tank they are allowed to dry while the compound is liquefying in the liquid tank. After the highest possible vacuum has been maintained, say, for four consecutive hours, the intermediate valve is opened and compound is admitted to the interior of the vacuum tank until the coils are submerged. Then the compressor is reversed and air pressure at 80 lb. per square inch is applied for four hours more, after which the compound is drawn back into the liquid tank at low pressure, the valve is closed and the coils are allowed to drain for one hour.

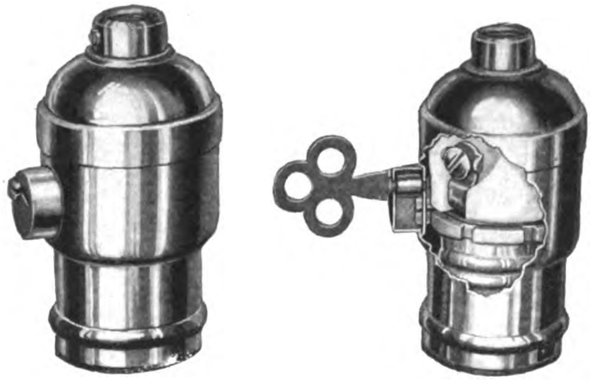
The compound used on railway work should have a dropping point of at least 215 Fahr., and the heat should be sufficient to make it perfectly liquid. When the dropping point is assured as correct it is well to unwind a coil periodically to make certain that the penetration is perfect. A compound of high dropping point with insufficient heat is always followed by poor results in penetration, and a compound of low dropping point should be detected by the ordinary use of a test tube and thermometer. To have these two features exactly right is most essential.

In preparing old coils for impregnation it is wrong to assume that any coil reading O.K. in resistance may be successfully treated. Aside from the fact that the wires may be distorted from mechanical strain under vibration, the accumulation of decayed insulation forms a barrier against the compound under air pressure which prevents the impregnation of the interior of the coil. Most coils, possibly 90 per cent, require rewinding and reinsulation of the wire before treatment. Such rehabilitation demands much skill based on long experience in order that each turn may be replaced correctly and the coil made to assume the proper weight and resistance. When the coil is completed for service it should receive a final test for mechanical strength. This may be done by placing it under a pressure of approximately 2 tons with a resistance reading instrument in circuit. Any weaknesses of insulation or mechanical errors will thus be easily detected.

Locking Sockets and Receptacles to Prevent Lamp Thefts

The General Electric Company has recently marketed an improved design of locking sockets and receptacles of both the key and keyless types. These sockets and receptacles afford positive protection to lamps in cars and waiting rooms where losses of lamp bulbs often occur. They also prevent the theft of current.

The locking device on the sockets effectually prevents the removal of lamps by unauthorized persons. Lamps can be inserted and removed only by aid of the key, and the improved principle of the design also provides against breakage from tampering. When the key is removed, the screw shell of the socket swivels freely, thereby avoiding injury either to the lamp base or socket if a sudden attempt is made to twist and remove the lamp bulb without the key.



LOCKING SOCKET AND RECEPTACLE; CONSTRUCTION OF THE LOCKING SOCKET

The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., reports that during the year 1914, 92.25 per cent of its trains were on time. Summarizing the averages of delays to train service and comparing them with the previous year, the following figures are of interest: Total number of trains operated, 1912; total number of minutes delayed, 4120. A comparison of the per cent of trains on time during 1913 and 1914 shows 89.9 per cent and 92.25 per cent respectively.

News of Electric Railways

NEW YORK COMMISSION INVESTIGATION

Commissioner Maltbie, on Commission Since Its Organization, Before Investigating Committee.

At the hearing on Feb. 24 before the legislative committee which is conducting the investigation into the Public Service Commissions of the First and the Second Districts of New York, Milo Roy Maltbie, a member of the First District Commission since it was formed in 1907, who had been the witness for several days, resented the attitude of the committee, dealt with his conferences with the Mayor and other city officials, referred to steam-roller tactics by the commission and said he shocked certain people by asking for a bill for gasoline used on the one private trip that he took in a commission automobile. Mr. Maltbie is quoted as saying:

"References have been made here to conferences I have had with the Mayor, Mr. McAneny and Mr. Polk. I have had such conferences and they have come about in this way: It has been necessary to confer with them in matters requiring the city's approval. I have done my best. When I have seen the steam roller of the commission start I have gone to the Mayor and to Mr. McAneny and asked them to help me prevent things from going through that ought not to go through. Together we have kept things from being approved that would have been detrimental to the city. It was the only way I had. I tell you when a man works as a minority of one and knows he does not hear of things until a week after they are under way he has to do the best he can. I haven't a word of apology to offer for my conferences with the Mayor, Mr. McAneny, Polk and others.

"This committee has set so high a standard that it cannot be lived up to. A new commission of five would delay the new subways while they are studying the many subjects involved just as the addition of each new commissioner has tended to do. If you have archangel standards you are bound to fail. If you get men whose hindsight is no better than their foresight they will be so far up in the clouds the city will not be able to see them.

"In regard to the trip that I made to Tuxedo in April, 1914, in the automobile I consider that under the circumstances I did what I ought to do. I paid for the gasoline, and I tell you when I went to the auditor and asked him for the bill some people were shocked over there. I have been on the commission seven or eight years and I think this is the only instance of a personal trip out of town in a commission car. I say there was nothing wrong in what I did. Everybody knows the cars are used by public officials to take them home. A man ought not to abide by just what the law requires, something he must do to escape from going to jail. It is a matter of conscience with a keen edge. A man ought to have one and live by it. Produce all the cards, and I declare here and now that the difference between the cards of any other public official in New York and mine will be so striking it will attract attention. I tell you they were shocked over there when I wanted to pay for my one pleasure trip. I am not going to repeat parrot-like what's been said here about the use of the cars. I have often called for a car to come to my home when all the commission's cars were in use, and I have paid for those cars out of my own pocket when I have gone on public business. I tell you that if the balance was struck I would get a dividend."

William M. Ivins was the other witness on Feb. 24. He expressed himself as theoretically in favor of one seven-men commission for the whole State, three of the members of which would be selected from up-state, three from New York City and one from any part of the State to act as chairman. It would be an economic waste to dispense with the present law, which had been in a large measure interpreted and determined. He favored careful amendment and consolidation of certain sections of the law. He sounded a warning concerning too great regulation and said that if the Board of Estimate of New York adopted the policy of its Bureau of Franchises, private capital would be driven away from public utilities and the city would be confronted with the necessity of adopting municipal ownership and providing for all utilities out of taxation. He attacked the provision of the law which made men connected with public utilities ineligible for appointment to the commission.

On Feb. 18 evidence in the shape of pictures of fused cables and of drilling holes was presented to bear out the assertion made on the previous day by William Hayward, counsel to the committee, that the real cause of the subway accident at Broadway and Fifty-first Street was the drilling by contractor's employees into a feed cable, in a cable duct, which was short-circuited by the contact of the steel-pointed drill with the charged wires. The members of the investigating committee and Colonel Hayward went into conference to determine whether or not it was best for the committee to carry its investigation into the relation of the man-hole accident to the accident at Fifty-third Street. It was finally decided that it would be outside of the scope of the committee's work. Meanwhile the Public Service Commission was conducting an inquiry into the causes of the accident simultaneously with the inquiry by the committee. Reference to the inquiry by the commission is made on page 432 of this issue.

Considerable time was spent on Feb. 18 in going over the details of the previous day's testimony. Commissioner Maltbie was called as the witness. He favored the extension of the jurisdiction of the commission for the First District to include all of Long Island and Westchester County. He had never found any difficulty in securing the co-operation of the commission for the second district whenever the interests of the commissions had over-lapped. Five men had all they could do to cope with the work of the commission. The question as to whether or not the present salaries were sufficient was an academic one. He agreed with the other commissioners, all of whom had testified, that the commission for the first district should have jurisdiction over the telephones.

On Feb. 19 Mr. Maltbie asked permission to amend his testimony of the previous day in regard to the length of time needed to complete the plans and specifications for the dual system. He had previously thought it would take a year, but consultation with the commission engineers had led him to cut that time in half. Mr. Maltbie thought it would be advisable to give the city entire control over its own property. He said, however, that he had no objection to the Governor appointing a Public Service Commission since every member of the commission must be a resident of the city. He did not think the Board of Estimate should take over rapid transit work. He did not agree with Senator Foley, who suggested that the work of the commission should be undertaken by commissioners elected by the people. An ideal arrangement would be a consolidation of the present Municipal Department of Bridges and Docks and the transfer to it of the rapid transit work of the Public Service Commission. Latterly there had been frequent informal conferences at which Commissioners McCall, Wood and Williams had participated. A year ago stock and bond cases were under his jurisdiction. They were then taken from him and assigned to Commissioner Williams.

The precedents established by Mr. Maltbie in capitalization cases were: a dollar of property for a dollar of security except in the case of amortized bonds; no issue of security except for actual expenses checked by the commission's engineers; no approval of an issue of bonds unless it could be demonstrated that the interest could be earned; bonds refunded must represent property in existence; all expenditures to be checked by the commission's engineers to show whether or not they were capital expenditures. Since the transfer of supervision over capitalization from him to Mr. Williams four cases had arisen in which Mr. Maltbie had contested Mr. Williams' report. In one of them he had been sustained. In the others he had been overruled. Every commissioner was responsible, of course, for his action on the board, but the primary responsibility of each commissioner was for his own work. Division of responsibility destroyed responsibility. According to Mr. Maltbie, the Brooklyn Rapid Transit had been more evasive than defiant. The Interborough Rapid Transit Company showed a persistent determination in disregarding orders.

Mr. Maltbie presented a table showing the number of cases heard and opinions written. During the last six months of 1914 there had been 220 hearings. He presided over 115, with the balance divided as follows: McCall, two; Williams, forty-two; Cram, forty-nine; Wood, thirty-two. The record of opinions in the year 1914 was Maltbie, twenty-eight; McCall, two; Williams, six; Cram, four; Wood, two; Eustis, seven. Colonel Hayward presented a table showing that from 1907 to 1914 inclusive, Mr. Maltbie had 204 out of 1,286. Mr. Maltbie replied that it was not the number of cases, but the hearings and opinions that counted.

Commissioner Williams objected on Feb. 20 to Mr. Maltbie's testimony in regard to secret conferences. The committee promised to afford him an opportunity to appear before it again, and this he said he would probably do after the testimony of Mr. Maltbie had been transcribed.

There is a great deal of speculation in regard to the outcome of the investigation. Rumor had it on Feb. 22 that so far as the commission for the first district was concerned Messrs. McCall, Cram, Wood and Williams would probably be replaced by Col. William Hayward, counsel for the legislative committee; Travis H. Whitney, now secretary to the commission; William R. Willcox, formerly chairman of the commission, and possibly Prof. Edwin R. A. Seligman of Columbia University. It was thought that Mr. Maltbie would be continued with the commission.

DETROIT MUNICIPAL OWNERSHIP PROPOSAL

Text of Proposition to Detroit United Railway Looking to Municipal Ownership in That City

The Detroit Street Railway Commission has proposed to the Detroit United Railway that it will submit to the electors at an early date a proposition to have the city assume the bonded indebtedness of the lines, amounting to $24,900,000, and if approved by a three-fifths vote of the electors the city will take over the lines within the one-fare zone. The commission has given the company ten days in which to accept the proposition and states that if it is not accepted other means will be taken to secure municipal lines. The commission's proposition for the acquisition of the lines, as sent to J. C. Hutchins, president of the Detroit United Railway, is as follows:

"1. For all of your property, real, personal and mixed, including franchises and franchise rights, except cash, accounts receivable and securities, called, of the city of Detroit, as of this date, the city, to the extent of its power, will assume the payment of the mortgage debt of the Detroit United Railway not exceeding $24,900,000.

"2. The title to the property to be absolutely free and clear on the date the transfer is effected from the Detroit United Railway to the city of Detroit, except the mortgage debt aforesaid.

"3. The board of street railway commissioners, in the name of the city of Detroit, to take possession of the property immediately upon the ratification of the proposition by the requisite number of electors of said city voting thereon at an election at which the proposition may be submitted, and shall be enabled to operate the same as a railway system for the accommodation of public travel.

"4. Your company to keep and maintain the property in its present physical efficiency until the date upon which the property passes from the possession of the Detroit United Railway to the possession of the city of Detroit.

"The board is moved to make this proposition in the belief that this method will afford an opportunity for the city of Detroit to acquire a street railway at the earliest possible date. Time is the essence of this proposition, and the board expects a reply within ten days from the date hereof. If your company fails within that time to indicate in writing its willingness to enter into a contract on the terms substantially as stated in the proposition herein outlined, then the city of Detroit will proceed to secure a street railway system by other ways and means."

The figure named by the commission is about $3,000,000 in excess of the appraisal total compiled by Prof. E. W. Bemis for the city and about $5,000,000 less than the amount asked by the company for its lines within the one-fare zone.

No official statement has been given out by the commission as to its plans for meeting the mortgage obligations which it proposes that the city shall assume, but unofficial information is to the effect that the commissioners believe the earnings of the lines will pay the interest on the bonds and provide a sufficient sinking fund to pay the mortgage which expires in 1932. The commission will not make any statement of its ideas until it has received an answer from the company on the proposition submitted to it.

MUNICIPAL OWNERSHIP IN SEATTLE

Communication from Mayor Gill Dealing with the Question of the Deficit of the Municipal Railways

With only $127 left of the original $9,000 appropriated from the general fund last March to the credit of the Seattle Municipal Railway, Division "A" and possibly Division "C" of the city-owned system may cease to be operated unless the Council takes immediate steps to finance the utilities. Approximately $36,000 was provided in this year's tax levy for the operation of the two divisions. As the lines were expected to earn their own way it was figured that the revenues from the lines would be equal to the amount expended. As this does not seem possible, the Council is expected to make an appropriation from the general fund as a loan against the street railway fund to insure continued operation. This loan can be repaid through earnings of the roads above operating expenses if they attain a paying basis or absorbed in the tax levy of 1916 as a 1915 deficit. Mayor Gill recently served notice on the Council to the effect that after the remaining $127 is exhausted an appropriation must be authorized by ordinance to operate the lines before additional indebtedness is incurred. Councilman Fitzgerald, chairman of the finance committee, and Councilman Erickson, chairman of the city utilities committee, say that a deficit ordinance is not necessary to appropriate money to operate the road. Five votes are required to pass a bill making a loan from the general fund. Writing to the Council, Mayor Gill said:

"On March 18, 1914, you appropriated $9,000 from the general fund to the credit of the municipal street railway fund. I presume it was supposed that with this sum and the earnings of the street railway the lines could be operated without further city aid. To this sum the earnings of the lines and your appropriations from month to month have been added to keep up the operation of the lines, and such amounts have been charged against this fund. I am advised by the superintendent of public utilities that the balance of this fund on Feb. 1, 1915, was $127. This shows that since beginning operation the lines have fallen behind the entire $9,000. In May, 1914, I addressed a letter to the heads of each department of the city over which I have control, forbidding in the future the expenditures of any funds, without an appropriation by the Council covering the expenditures, and while that communication might not entirely cover this instance, I wish it to apply in this case as well as any other. If a deficit is to be created in order to keep these lines in operation, it can only be done when you have placed sufficient money in this fund to cover such deficit.

"Possibly this is not the proper time to discuss this matter, but the future operation of these lines, or at least of Division 'A,' until such time as it has been connected up with something is one that is entitled to very serious consideration, and I suggest that if it is your desire to continue operation, you immediately pass an ordinance placing money in the city railway fund. In case you do not make such appropriation I shall instruct Superintendent Valentine, of the municipal railways, to cease operation on Division "A" when it becomes apparent that the amount appropriated for the street railway fund has been exhausted. In the meantime I shall be glad to take up the matter of these lines with you at your convenience."

Mayor Gill said further:

"People bought homes in the Lake Burien District, served by Division 'C,' and made improvements with the expectation that the city would continue to operate a railway system there. It would not be fair to them, in case no money is directly available for the Lake Burien Railway fund, to close down the line. There is no such moral obligation, however, as regards the operation of Division 'A,' which line is a financial burden."

DES MOINES FRANCHISE MATTER

The Des Moines (Ia.) City Railway has been granted an extension of time until June 22 in which to negotiate a franchise with the city. The date first set by the State Supreme Court was March 22 and on account of the failure of the recent franchise election effort the company asked for an extension of time, which was granted by the court.

After the company had secured a petition for a franchise election and the City Council had fixed the date for the election the same was invalidated because of illegal election notices published by Mayor James R. Hanna. When the mistake was discovered it was too late to publish correct notices.

The City Council has been drafting a new franchise for submission to the company. This has been characterized by Emil G. Schmidt, president of the company, as less acceptable to the company than the first draft by Mayor Hanna. Mr. Schmidt is expected to return to Des Moines within a short time and a move toward a final settlement may then be made. The Greater Des Moines Committee and officers of the Harris Trust & Savings Bank, Chicago, have conferred recently regarding the settlement of the franchise question.

PORTLAND VALUATION FIGURES

The valuation of the entire property of the Portland Railway, Light & Power Company, Portland, Ore., as shown in the examination of W. J. Hegenah, who made an inventory of the holdings of the company, is placed at $56,942,464, according to information given out by the Railroad Commission of Oregon. The estimate includes:

Roadway and tracks	$8,694,866
Buildings, fixtures and grounds	4,357,145
Land	9,076,326
Rolling stock and float equipment	4,557,736
Hydraulic power works	6,046,033
Lighting equipment	222,311
Distribution system, underground	985,844
Distribution system, overhead	638,903
Telephone system	49,003
Equipment	4,987,100
Shop equipment	149,059
Construction equipment	150,015
Utility equipment	88,140
Furniture and fixtures	82,631
Miscellaneous equipment	40,003
Salem gas utility	238,866
Working capital	1,850,000
Water powers	4,767,750
Development cost	9,962,726

The reproduction cost new, including overhead, is placed at $40,361,988; and working capital for the development of waterpower at $16,580,476.

INDIANA LEGISLATURE

The following new bills have been introduced in the house: a bill amending the public utility law, providing that firemen in uniform may ride free on street cars; a bill providing a penalty of from $5 to $10, to which may be added ten days' imprisonment, for requiring stationary engineers to work more than fifty-six hours a week or more than eight hours a day unless to shorten the working hours of some other day; a bill requiring railroad and interurban railroads to cut weeds along the right-of-way; a bill providing that upon petition of ten freeholders boards of public works shall compel the fulfillment of franchise requirements as to extensions and improvements, and that on failure of the board to act the matter may be taken to court and the board of works and the corporation made joint defendants; a bill providing for a board of mediation and conciliation and for a board of arbitration in controversies between employers and employees.

House bill 346, requiring that street or interurban railroads place their tracks in the middle of the highways for a distance of 1 mile from the corporate limits of towns of 30,000 to 58,000 population, was killed in committee. House bill 110, providing a penalty for the destruction or interference with any fixed railroad signals or equipment, has passed the House.

The following new bills have been introduced in the Senate: a bill making it unlawful for any person to trespass upon the right-of-way of a railroad; a bill providing that any person, firm or corporation engaged in the business of transporting passengers for hire by automobile shall constitute a "public utility" and be subject to all the provisions of the utility commission act, and that such person, firm or corporation shall not engage in or continue in such business except under a license granted pursuant to an ordinance which must be passed by the municipality wherein such utility is operating, fixing the terms and conditions and providing for a satisfactory bond, the public service commission to have the right, on petition, to review and modify the terms of any such ordinance ("jitney bus" bill).

The following bills have passed the Senate: S. B. 329, giving the Public Service Commission the power to order separation of grade crossings in cities of 20,000 population or less; S.B. 316 amending the public utility commission act by extending the time for the taking of indeterminate permits by public service corporations; S.B. 318, amending the public utility commission act by permitting railroads to give passes to employees where such employees are holding public office.

CLEVELAND PROPERTY HOLDINGS

Replying to a resolution introduced in the City Council at Cleveland, Ohio, on Feb. 8, to the effect that the Cleveland Railway sell all its surplus lands, J. J. Stanley, president of the company, a day or two later said the company has no surplus lands. All the real estate now owned by it was being used. Later the land used for a carhouse and yards at Superior Avenue and East 105th Street would be placed on the market, but at present the property was being used. The new station at the end of the Superior Avenue line has not yet been completed.

This resolution followed the decision of the street railway committee to give its approval to the purchase of a tract of land at Denison Avenue and West Seventy-third Street, where the company will build an operating station. The negotiations for this land, about eighteen acres, were closed late in the week. The purchase price is $53,168. When the station has been completed at this point the Holmden Avenue carhouse will be abandoned and the land will probably be sold.

The arrangement proposed for West Madison Avenue, within the boundaries of Lakewood, is 3 cents within the boundaries of Lakewood and 5 cents from any point in Lakewood to any point within the city. It is argued that another step will bring the company to the zone system.

SUBWAY SHORT CIRCUITS

The Public Service Commission for the First District of New York continued during the week ended Feb. 20 its investigation into the subway accident of Jan. 6, when fire from a short circuit of the electric cables caused a serious interruption to traffic and the overcoming of many passengers by smoke, resulting in the death of one. A new phase was given the inquiry by testimony produced before the legislative investigating committee to the effect that workman employed by contractors for the new subway at Forty-second Street and Broadway had accidently driven a drill into the subway cable duct early in the morning of Jan. 6, when the short circuit and fire occurred. The inference drawn was that this act was responsible for the short-circuit which followed. The workmen in question were employed by the Holbrook, Cabot & Rollins Corporation, which has the contract for the connection between the existing subway and the new Seventh Avenue subway at Times Square. The commission took the testimony of these workmen, who described the manner in which the cable duct was penetrated by the drill. Engineers for the commission also gave testimony, which tended to show that the accident as described by these workmen could not have occurred, for the reason that the cable at the point in question was found to be intact after the accident of Jan. 6.

Another short circuit occurred in one of the electric cables of the subway in the tunnel under the East River on Feb. 15. Power was shut off and traffic to Brooklyn interrupted for a half hour from 10:50 p. m. There was no fire, but some smoke resulted and penetrated into the tunnel. As a matter of precaution the company shut off the power. The accident occurred in the eastbound tube, and there were no trains in it at the time or if any were passing when the short circuit occurred, they reached the Brooklyn side without interference. The cause of the short circuit has not been learned.

BAY STATE ARBITRATION

Arbitration hearings in the Bay State Street Railway wages case during the week ended Feb. 20 were occupied largely by testimony regarding living conditions in the homes of employees, features of daily routine and details of car operation. On Feb. 17 an adjournment of one day took place as a result of falsification of testimony by Daniel W. Cahill, a motorman. Upon being recalled to the stand the witness admitted prevarication, and Chairman Pelletier of the arbitration board administered a severe rebuke, declaring that the witness should be discharged from the company and expelled from the union. Mr. Pelletier pointed out that false evidence submitted relative to the underclothing of the witness' children in material made from flour bags had abused the sympathies of the public and had nullified the value of the testimony by the witness, who also failed to give accurate evidence in other particulars. Another witness was caught falsifying a few days ago. A meeting of the union conference committee was held at Boston on Feb. 18 to consider the situation.

The arbitration hearings were resumed on Feb. 24. Counsel James M. Swift read a statement from the company to the effect that it had decided to reinstate Conductor Henry A. Swartz on the ground that his discharge had tended to frighten other employees from giving testimony before the board, and that in order to preserve to the utmost the spirit of fair play the company had concluded to forego its undoubted right of discharge. Swartz had been reprimanded by Chairman Pelletier for falsification of testimony at a preceding hearing and had subsequently been discharged, following the expression of opinion by the chairman that such an employee was unfit to remain a member of the company's organization and ought to be dropped from the union. Chairman Pelletier also presented a statement pointing out the absolute necessity of good faith and serious effort in such arbitrations to the successful solution of labor problems and stated that every man from the highest labor leader to the most insignificant employee appearing as a witness should strive to carry on the proceedings in good faith and with all the seriousness of a trial before the highest court. Charles F. Bancroft, superintendent of motive power and machinery, testified that most shop employees had received wage increases of 17 per cent since 1910.

LEGISLATION IN NEW YORK

The Senate of New York on Feb. 22 passed the workmen's compensation commission appropriation bill, with its amendment providing for direct settlement of compensation claims between employers or their insurance carriers and injured workmen. The measure reached the Assembly on Feb. 24. After a discussion of two hours in caucus it was voted unanimously by the Republicans to strike out everything in the bill except the enacting clause and the section containing the provision for the appropriation to carry the commission through the fiscal year.

Among the bills introduced into the Legislature recently are the following: an act to amend the transportation corporations law in relation to motor vehicles carrying passengers for hire in certain cities of the first class; an act to amend the railroad law in relation to duty to furnish refrigerated cars for the shipment of perishable property; to amend the railroad law in relation to crews for engines in yard and terminal service; to extend the time for the completion of the New York Connecting Railroad bridge over the East River; to extend the time of the Westchester Northern Railroad to begin and finish the construction of its road and put it in operation and extending the corporate existence and powers of the company; to extend the time of the New York, Westchester & Boston Railway to finish the construction of its road and put it all in operation and extending the corporate existence and powers of the company; to amend the penal law in relation to certain railroad employees, including telephone operators, signalmen and towermen; to amend the railroad law in relation to powers of electric light and power corporations.

At the request of the Public Service Commission for the First District, the Legislature has passed an act amending the civil service law so as to permit the continuance of provisional appointments pending the establishment of eligible lists until July 1, 1915. The civil service law contemplates that provisional appointments, which are made in the absence of eligible lists, shall last for only two months, but the Public Service Commission has been compelled to make a number of such appointments in order to keep the rapid transit work going and on account of its failure to get eligible lists such appointments have lasted longer than the time mentioned. It is expected that eligible lists for various classes of employees will be provided in the near future, and the amendment will permit provisional appointees to serve until such lists are available.

PRESIDENT BANCROFT ON BOSTON TRANSPORTATION BILLS

Before the committee on metropolitan affairs of the Massachusetts Legislature on Feb. 19, William A. Bancroft, president of the Boston Elevated Railway, appeared in opposition to a group of about a dozen bills extending or altering the existing system of rapid transit. Several of the measures provided for the construction of a subway station at Arlington and Boylston Streets; others proposed the removal of the elevated structure in southern Washington Street and the construction of an equivalent subway, and the extension of the Dorchester tunnel to Codman Square from the terminus authorized at Andrew Square. General Bancroft discussed the growth of the system, its investment and earnings during the past eighteen years along lines which have been published in this journal and showed the need of the company's being given a financial breathing spell before undertaking any new rapid transit lines. He pointed out that probably no other city in the world had received so comprehensive a rapid transit development in the period from 1897 to 1915 as has Boston and said that the rapid transit lines in themselves were unprofitable, with the exception of the Tremont Street Subway and East Boston tunnel, which about "break even." The wages increase of two years ago was costing the company $500,000 a year more than before and the public was not paying the proper cost of transportation. General Bancroft quoted numerous figures showing that a substantial service was already rendered the Arlington Street district and stated that the institution of a new station would be of doubtful value to the community, apart from costing the company $46,000 a year to maintain, carry and operate with escalators. Closing, he urged that the rapid transit facilities authorized in 1911 and now under construction be completed and tested before further extensions of the system were added to the company's burdens. The hearing was closed.

EXTENSION OF SAN FRANCISCO MUNICIPAL RAILWAYS

The Church Street extension of the San Francisco (Cal.) Municipal Railway system has been approved after a fight between opposing factions that extended over many months and earned for the Church Street hill the name of "Battle Mountain." On Feb. 17 Mayor Rolph signed an order to start the construction of this branch according to the scheme known as plan No. 9 prepared by the city engineer. This plan provides for a deviation from Church Street through 2700 ft. of private right-of-way so as to avoid the heaviest grade, and is estimated to cost a total of about $505,000 if the city builds its own tracks parallel to the United Railroads' tracks on the Market Street portion of the line. It is not yet decided whether to parallel the United Railroads' tracks or to arrange for joint use. Of the total cost $305,000 is to cover all construction work exclusive of acquiring private right-of-way and making necessary excavation thereon. The total length of the branch from Van Ness Avenue to Thirtieth Street will be 13000-ft. (double track) of which 1135 ft. (double track) will have to be over United Railroads line regardless of whether their lines or new trackage is used on Market Street. The initial cost is to be lessened somewhat by the use of T-rail construction from Eighteenth to Twenty-second Streets. Of the original bond issue there is now available $325,000 which was set aside for the building of the Church Street branch. This is to be supplemented by other funds.

FEDERAL TRADE COMMISSION APPOINTMENTS

President Wilson on Feb. 22 sent to the Senate the nominations of the five members of the new Federal Trade Commission, as follows: Joseph E. Davies of Wisconsin, now Commissioner of Corporations, whose bureau the new commission will absorb, to serve seven years; Edward N. Hurley, president of the Illinois Manufacturers Association, to serve six years; William J. Harris of Georgia, now director of the Census, to serve five years; William H. Parry of Washington, treasurer of the Seattle Chamber of Commerce, to serve four years; George Rublee, a lawyer of New Hampshire, to serve three years. Mr. Davies, Mr. Hurley, and Mr. Harris are Democrats; Mr. Rublee is a Progressive, and Mr. Parry, while nominally a Republican, is regarded as a Progressive. The law creating the Federal Trade Commission was enacted five months ago. It requires that not more than three members of the commission shall be of any one political party.

Utility Bill Hearings Concluded.—The judiciary committee of the Utah Senate concluded on Feb. 14 the hearings on the bill to establish a public utility commission in that State. The committee is expected to report before March 1.

Mayor Harrison Defeated at Primaries.—At the mayoral primaries held in Chicago, Ill., on Feb. 23, Mayor Harrison was overwhelmingly defeated by Robert M. Sweitzer, another Democratic aspirant. An admitted factor in his defeat was his failure to put into effect his promises to improve transportation conditions.

Case Against Directors Dismissed.—The February Grand Jury at New York has dismissed without finding indictments the cases against T. P. Shonts, August Belmont and other members of the board of the Interborough Rapid Transit Company in connection with the accident on the elevated railway on Dec. 9. The cases were carried to the Grand Jury following the finding of the coroner's jury.

Decision Against Seattle Purchase.—The proposition for the purchase of the Seattle, Renton & Southern Railway by the city of Seattle, Wash., will not go on the ballot to be voted upon at the general municipal election to be held on March 2, the question of purchase having been indefinitely postponed at a recent meeting of the City Council Both the City Council and the receivers of the company declare that a favorable vote would bind neither the city nor the receivers, except in an advisory way.

The Lexington Dispute.—The Kentucky Traction & Terminal Company, Lexington, Ky., has declined to reinstate Robert Walker, the discharged motorman over whom the controversy with its men arose, and share the expense of the arbitration proceedings. The proposition was made by the union, which is said to be anxious to have the dispute settled. The complaint charges the company with discrimination, though the company insists Walker's accident record was sufficient to justify dismissal.

J. J. Sullivan on Advice Brokers.—Jeremiah J. Sullivan, president of the American Railways, Philadelphia, Pa., drew up on Feb. 22 a list of six "don'ts" for Secretary of State W. J. Bryan, to match the seven "don'ts" for bankers which Secretary Bryan advocated on Saturday night in a speech at a dinner in Washington of the American Institute of Banking. Mr. Sullivan said that everybody these days is offering advice and everybody seems to be a sort of an advice broker.

Utility Bills in Arkansas.—Bills are pending before the Legislature of Arkansas to extend the powers of the Railroad Commission to other public utilities and to abolish that commission and create a public service commission. At a recent hearing on the measures held before the judiciary committee of the Senate opposition to the bills was entered by the companies affected on the ground that both are detrimental to the best interests of the companies. The committee is expected to report by March 1.

New Franchise Desired in Henderson, Ky.—The Henderson (Ky.) Street Railway has asked the City Council for a new franchise, covering a period of twenty years from Oct. 16, 1916, when the present franchise will expire, and for which the company may be permitted to bid. It is set forth that the only way funds may be secured for repairs is through a bond issue, which could not be floated unless a new franchise was granted. The Mayor has appointed a committee to draw up a franchise and submit it to the Council.

Hatters Want Government to Pay.—Before the House committee on appropriations on Feb. 20, Judge Alton B. Parker, Samuel Gompers, and Frank Morrison, representing organized labor, asked that the item of $290,000 be placed in the general deficiency appropriation bill for the relief of the Danbury Hatters Union, which was held liable under a decision of the United States Supreme Court for heavy damages, caused by their violation of the Sherman anti-trust law. The committee postponed further consideration of the question.

Bills in Michigan.—A bill introduced in the Michigan Legislature to provide that motormen and conductors on street and electric railways shall not work in excess of ten hours in twelve is now before the committee on State affairs, which has heard representatives of the employees. A formal statement in reply to the claims of the union representatives is being prepared by the street railways for presentation to the committee. A bill has been introduced to provide for voluntary mediation and arbitration in labor disputes. It follows closely the voluntary arbitration act in force in Canada.

Access to Private Correspondence Denied to I. C. C.—The United States Supreme Court on Feb. 23 put strict limits upon the power of the Interstate Commerce Commission to search the private papers of railroads. The case arose in connection with the Louisville & Northern Railroad when the commission, in order to secure evidence regarding the alleged illegal use of passes, desired to examine the private correspondence and particularly the communications with counsel. The decision of the court holds that it was the expressed intention of the framers of the Interstate Commerce act to authorize examiners to call for only accounting records and memoranda.

Carhouse Destroyed. — The Westboro (Mass.) carhouse of the Boston & Worcester Street Railway was destroyed by fire on Feb. 18. The company lost ten modern double-truck cars valued at about $90,000, the total loss being about $140,000. According to E. P. Shaw, Jr., general manager, the fire started in a car heater and spread to adjacent rolling stock before the arrival of the Westboro fire department after a 3-mile run. A motorman who was in the building at the time succeeded in getting out a box car and a snow plow. The carhouse was a 300-ft. by 100-ft. brick building with an adjoining substation. The latter was saved and service on the Worcester-Westboro end of the line was well maintained.

Steel for Brooklyn Third Tracking.—The Public Service Commission for the First District of New York has approved plans and form of contract submitted by the New York Municipal Railway Corporation for the furnishing of structural steel to strengthen and widen the existing elevated structure to provide for a third-track on the Broadway line, Brooklyn, from a point near Myrtle Avenue to a point near Aberdeen Street. The company was directed to submit the contract to open competitive bidding. The contract calls for the delivery of the steel to begin sixty days from the date of the contract and to be completed within six months from that date. The company has already purchased the steel and let the contract for the third-track on the Broadway line from Havemeyer Street to Myrtle Avenue.

Legislative Trend in Maine.—Among the measures introduced in the Maine Legislature is one compelling electric cars to be equipped with fenders; fixing the hours of motormen and conductors as nine within eleven consecutive hours; compelling every electric car to come to a full stop at least once in every mile to allow the passenger to board or leave the car; authorizing the Norway & Paris Street Railway to purchase or lease the property of the Mechanic Falls Electric Light Company; extending the charter of the Rockland, South Thomaston & St. George Railway for two years. Edward Clark has asked for an extension of the charter of the Skowhegan & Fairfield Electric Railroad, it being the intention to complete the line from Skowhegan to connect with another system at Shawmut. The distance it is intended to build is about 10 miles.

Railway Number of Meco News.—The issue of *Meco News* for February, published by the Metropolitan Electric Company Section of Reading, Pa., of the National Electric Light Association and the Reading Transit & Light Company, is a special railway number, containing sixty-eight pages. The frontispiece is a likeness of Norman McD. Crawford, president of the companies. Among the features are an article "A Day in Court," by R. D. Billings, claim agent of the company; "Service Not First but Always," by S. E. Smith, general superintendent of railways; "Rail Joints and Bonds," by H. H. Kamm of the engineering department; "Retrospection," by Bessie Detweiler, in which the history of the constituent companies is traced briefly from the inception of railway work in Reading in April, 1873, by the Penn Street Passenger Railway; "Controllers," by William K. Loos, division superintendent.

Brooklyn Rapid Transit Insurance.—Rates on the $22,600,000 of Brooklyn (N. Y.) Rapid Transit Company insurance have been reached. The rate on the buildings and contents is 44.4 cents and on the rolling stock of the company 22 cents. This is an average rate of 76.15 cents for three years, while the previous average rate was 34.7 cents for one year, or an average three-year rate of 86.75 cents. The Brooklyn Rapid Transit insurance has been carried on open binders by the insurance companies since early in December, awaiting the determination of a rate. Lloyds of London, it is believed, got the Brooklyn Rapid Transit insurance at the rate of 34.7 cents per annum, and through a special arrangement the rate was slightly shaded below this figure. The reason for giving the insurance to Lloyds of London was that the rate had been increased from 34.7 cents per annum to 63.2 cents per annum by the Fire Insurance Exchange. The latter has now, however, issued a rating as above, which is acceptable to the Brooklyn Rapid Transit Company.

National Electrical Week Plans.—At a meeting of the board of directors of the Society for Electrical Development, Inc., held in New York on Feb. 17, the principal matter under discussion was the plan for a national electrical week. The board unanimously approved the plans of the committee, and it was decided to go ahead with the plans for an electrical week. Many of those present were in favor of a week early in the spring of 1916, as it was felt that this would afford a good opportunity to reap a substantial benefit. The matter was referred to a committee to be appointed by the president. The general manager's and the treasurer's reports showed the society to be in a very satisfactory financial condition. A very small percentage of the membership had resigned while many members had paid their subscriptions for the first half of 1915, and new members were continually joining. The matter of employing a resident representative of the society on the Pacific Coast was referred to the president and the general manager of the society with power to act. James Smieton, Jr., who has been acting for the society as its secretary-treasurer for the past year, has been appointed to that office.

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

The fifteenth annual meeting and dinner of the New England Street Railway Club will be held at the Copley-Plaza Hotel, Boston, Mass., on March 25. The annual meeting will be at 3 p. m., the reception at 6 p. m., and the dinner at 6:30 p. m. Following the dinner there will be speeches, music and entertainment. The change to the Copley-Plaza Hotel will make it possible to accommodate a larger number of people and the arrangement which will be followed there as to seating will permit freer movement among the tables and it is believed will facilitate the social side of the meeting. The tickets are $4 each. The majority of the tables will seat ten persons. A limited number of tables each seating six persons has been provided and will be assigned to those especially requesting them in the order in which such applications are received. Members will be permitted to purchase as many tickets for guests as they may desire.

Financial and Corporate

CORPORATE CHANGES IN UTAH

Utah Securities Corporation Through Operating Subsidiary, the Utah Power & Light Company, Takes Over Properties in Salt Lake City and Ogden

Official announcement has been made by the Utah Securities Corporation that its subsidiary, the Utah Power & Light Company, has formally taken over the electric light and power and street-railway properties in Salt Lake City and the electric light and power and gas properties in Ogden, Utah, heretofore controlled by the Oregon Short Line Railroad and now owned by the Utah Light & Traction Company. The Utah Power & Light Company owns all the stock of the Utah Light & Traction Company, except directors shares. The process by which the Utah Light & Traction Company succeeded the former Utah Light & Railway Company was fully described in the ELECTRIC RAILWAY JOURNAL of Sept. 12, Sept. 26 and Oct. 10, 1914.

The Utah Power & Light Company, in addition to owning all the stock of the Utah Light & Traction Company, has leased for ninety-nine years from Jan. 1, 1915, the electric light and power and gas properties of that company, and, therefore, earnings of the Utah Power & Light Company from Jan. 1, 1915, will include income from these leased properties. The electric railway property of the Utah Light & Traction Company in Salt Lake City and vicinity will continue to be operated directly by it, and its surplus earnings will accrue to the Utah Power & Light Company through the stock ownership.

The gross earnings of the Utah Light & Traction Company for the year ended Dec. 31, 1914, were $2,769,835, and the net earnings, after depreciation and taxes, $868,190. The annual interest charge on all outstanding bonds is $762,670. It is expected that the consolidation of the electric light and power systems of the Utah Light & Traction Company with those of the Utah Power & Light Company will effect material economies.

C. W. Whitley has been elected president of the Utah Light & Traction Company, with H. L. Beach manager and Joseph S. Wells secretary and treasurer. The board of directors, as chosen at a recent stockholders meeting, is made up as follows: C. W. Whitley, Joseph Scowcroft, D. C. Jackling, O. J. Salisbury, C. E. Groesbeck, Lawrence Greene, J. Frank Judge, E. O. Howard, R. C. Gemmell, S. A. Whitney, J. M. Bidwell and Joseph S. Wells.

In connection with the present outlook confronting the new arrangement of companies, C. E. Groesbeck, vice-president and general manager Utah Power & Light Company, says:

"My observations of business conditions throughout the territory we serve in three states, Utah, Idaho and Colorado, impress me that the ensuing year will develop a substantial, steady gain in practically all lines of business. Salt Lake and Ogden are two of the best and livest cities in the entire country, and 1915 should bring a large share of prosperity to both."

NORTHERN ELECTRIC RAILWAY FINANCES

The chairman of the bankers' committee of the Northern Electric Railway has mailed a second circular letter to security holders, urging them to sign the several agreements for the refinancing of the company, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9. Four subsidiaries of the Northern Electric Railway on Feb. 16 filed a petition in the United States District Court asking to be included in the receivership. The purpose of the petition is to have the financial tangle worked out as one system, the management of all the concerns being the same. The corporations joining in the petition are the Northern Realty Company, Sacramento & Woodland Railway, Sacramento Terminal Company, and Northern Electric Railway, Marysville and Colusa branch. The reorganization plan of the company is said to be progressing smoothly, and the subsidiary receiverships would only save a multiplicity of proceedings that would defer a final complete settlement.

ANNUAL REPORTS

California Railway & Power Company

The statement of income, profit and loss of the California Railway & Power Company, San Francisco, Cal., for the period from Dec. 18, 1912, to June 30, 1914, follows:

Income:	
Dividends on stocks owned	$605,000
Interest on notes and accounts receivable, etc	220,419
Interest on bank balances	4,482
Total	$829,901
Expenses:	
Salaries	$2,355
Taxes	7,741
Transfer agent's, registrar's fees, etc	2,301
Directors' fees and expenses	1,602
Legal	529
Stationery, printing and postage	488
Traveling	1,982
Organization—portion charged off	937
General	3,232
Total	$21,167
Net income	$808,734
Dividends:	
On prior preference stock	$314,705
On preferred stock	378,092
Total	$692,797
Profit and loss surplus, June 30, 1914	$115,937

The foregoing statement is taken from the first annual report of the company since its incorporation on Dec. 18, 1912. This holding company controls the United Railroads of San Francisco, the Sierra & San Francisco Power Company, the Coast Valleys Gas & Electric Company and the San Francisco Electric Railway, and is itself controlled by the United Railways Investment Company. A comparison between the company's income for the twelve months ended June 30, 1914, and any subsequent similar period can be made by deducting from the figures given above the amounts for the period from Dec. 18, 1912, to June 30, 1913, as follows: Income, $129,909; expenses, $1,884; net income, $128,025; dividends on prior preference stock, $108,205, and surplus on June 30, 1913, $19,819.

The statement of income, profit and loss of the United Railroads of San Francisco for the year ended June 30, 1914, follows:

Gross earnings:	
Passenger	$8,450,725
Advertising	56,000
Total	$8,506,725
Operating expenses and taxes:	
Maintenance of way and structure	$624,097
Maintenance of equipment	454,222
Transportation expenses	3,042,640
General expenses	601,778
Total operating expenses	$4,722,737
Taxes	503,800
Total operating expenses and taxes	$5,226,537
Net earnings	$3,280,188
Other income:	
Sinking fund earnings	$116,851
Interest and discount	26,477
Interest bond investments	29,608
Rentals	3,232
Miscellaneous earnings	9,469
Total	$185,637
Gross income	$3,465,825
Current income charges	422,824
Net income before bond interest charges	$3,043,001
Bond interest:	
United Railroads' bonds	$954,160
Underlying bonds	690,550
Total	$1,644,710
Net income	$1,398,291
Surplus at beginning of period	462,139
Profit and loss credits	306,403
Total	$2,166,833
Profit and loss charges	1,148,200
Profit and loss—surplus June 30, 1914	$1,018,633

Jesse W. Lilienthal, president of the company, states that while the general dullness of trade and some competition on the part of the municipal lines in San Francisco temporarily affected the earnings of the United Railroads, it is expected that these will be materially stimulated by the attendance at the Panama-Pacific Exposition and by the growth of the city following the completion of the Panama Canal. The operating ratio for the fiscal year was 55.52 per cent. The ratio of taxes to gross earnings was 5.92 per cent. The ratio of operating expenses and taxes to gross earnings was 61.44 per cent. The company now has 260.02 miles of electric track and 14.7 miles of cable track, or a total of 274.72 miles. It has 760 revenue cars and a total of 836 cars. During the last year the company purchased and put into operation sixty-five new cars and reconstructed twenty-five more. Every revenue car is thoroughly overhauled once every thirteen months. A statement of income, profit and loss of the United Railroads for the period of approximately nine years from Jan. 1, 1906, to June 30, 1914, was printed in the ELECTRIC RAILWAY JOURNAL of Sept. 5, 1914.

The Sierra & San Francisco Power Company showed an increase of 13.2 per cent in gross earnings for the year and an increase of 13.4 per cent in operating expenses and taxes, including depreciation, giving an increase of 13 per cent in net earnings. Bond interest and uncollectible accounts increased 4.3 per cent, so that the net income applicable to investment increased 29 per cent. The rate of growth of the company's business reflects largely the growth of the business outside of San Francisco, this having increased for the year 23.4 per cent as compared to an increase of 8.56 per cent within San Francisco. The gross earnings of the Coast Valleys Gas & Electric Company increased 16.8 per cent., while the operating expenses, including taxes and depreciation, increased 20.6 per cent. The net earnings, therefore, increased 11.1 per cent, which with increased deductions of 18.9 per cent made a decrease in net income of 2.3 per cent.

Detroit United Railway

The statement of income, profit and loss of the Detroit (Mich.) United Railway for the fiscal year ended Dec. 31, 1914, follows:

	1914	1913
Passenger earnings	$11,464,626	$11,952,286
Express earnings	717,129	708,473
Mail earnings	11,979	12,031
Special car earnings	46,270	51,038
Gross earnings from operation	$12,240,004	$12,723,828
Operating expenses	8,702,660	8,694,230
Net earnings from operation	$3,537,344	$4,029,598
Income from other sources	273,728	251,937
Gross income less operating expenses	$3,811,072	$4,281,535
Deductions:		
Interest on funded and floating debt and taxes:		
Detroit United Railway	$1,525,954	$1,553,133
Rapid Railway System	178,648	168,098
Sandwich, Windsor & Amherstburg Railway	37,942	37,534
Detroit, Monroe & Toledo Short Line Railway	199,130	168,633
Detroit, Jackson & Chicago Railway	224,397	233,660
Total interest and taxes	$2,166,072	$2,151,058
Credited to depreciation reserve	294,000	500,000
Credited to contingent liability reserve	50,000	100,000
Dividends	750,000	750,000
Total deductions	$3,260,072	$3,501,058
Net income to surplus	$551,000	$780,477

During the year the gross earnings from operation decreased $483,824, or 3.9 per cent. This decrease was made up of a slight decrease in mail and special car earnings, an increase of $8,656, or 1.2 per cent, in express earnings, and a decrease of $487,630, or 4.08 per cent, in passenger earnings. The operating expenses increased $8,430, or 0.09 per cent, but the income from other sources also increased, to the amount of $21,791, or 8.6 per cent, so that the gross income decreased $470,463, or 10.9 per cent. The interest charges and taxes increased $15,014, or 0.69 per cent, but only $294,000 and $50,000 were credited to the depreciation and contingent liability reserves, respectively, as compared to $500,000 and $100,000 for the previous year. The total deductions, therefore, decreased $240,986, or 6.8 per cent, and the net income to surplus decreased $229,477.

The record of passengers carried during the year showed the following figures: Revenue passengers, 252,961,221; transfer passengers, 85,354,131; employees, 7,865,048; total passengers carried, 346,180,400. This was slightly less than a 7 per cent increase, as compared to an increase of more than 16 per cent in 1913 over 1912. Within the one-fare zone the decrease in revenue from fares amounted to $585,741, although within the same zone there was an increase of nearly 21,000,000 in the number of passengers carried. The receipts per revenue passenger were $0.0453 and per passenger $0.0331. The total car mileage was 44,882,720 car miles, the earnings per car mile $0.2727, the expenses per car mile $0.1939, and the net earnings per car mile $0.0788.

The depreciation reserve on Dec. 31, 1914, was credited with $2,703,627 as compared to $2,483,627 at the beginning of the year. During the twelve months the company spent the following amounts on capital account: Detroit United Railway, $917,597; Rapid Railway, $87,071; Detroit, Monroe & Toledo Short Line Railway, $48,926; Detroit, Jackson & Chicago Railway, $3,982, and Sandwich, Windsor & Amherstburg Railway, $110,577. The company also expended $103,432 in connection with the State and city appraisals, of which amount $61,000 was charged to the contingent liability reserve and the balance to the operation account. The balance in this reserve on Dec. 31, 1914, was $589,000.

The total mileage of the company, including side and yard tracks, was on Dec. 31, 1914, 820.63 miles, 18 miles having been added during the last year. The company's rolling stock consists of 1403 closed passenger cars, 263 open passenger cars, 247 freight and construction cars, 36 line cars, 84 express cars, 16 miscellaneous cars, 2 locomotives, 3862 motors and 3057 trucks. There are eleven power houses with a combined capacity of 67,290 hp, two storage batteries with a combined capacity of 4500 amperes, and eighteen substations with a combined capacity of 18,900 kw.

CO-RECEIVERSHIP IN BIRMINGHAM

Independent Bondholders' Committee Through Court Decision Wins Fight for Appointment of Co-Receiver

S. H. Cunningham, chairman of the independent bondholders' committee for the first mortgage thirty-year 5 per cent bonds of the Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala., has announced that the Federal Court for the Northern District of Alabama has entered a decree appointing Augustus Benners, a Birmingham attorney, as co-receiver for the company to act with I. W. Ross.

Mr. Cunningham, with certain stockholders, recently petitioned the court for the appointment of a co-receiver to bring suit for an accounting from Morris Brothers, Philadelphia, who promoted the railway, expecting such minority stockholders as might take part to bear the expense of such proceedings if necessary. The co-receiver, however, was empowered by the court to examine the facts and report as to the prosecution of this suit at the expense of the estate. If he should not so recommend, the court has intimated that the suit may be carried on for the benefit of the railway at the expense of the stockholders.

Mr. Cunningham states that the contemplated action will probably call on promoters for the return of bonds or funds in excess of $500,000, together with such damages as have accrued to the railway through the failure of the promoters to complete the property. The independent bondholders' committee will offer every aid to the new receiver in investigating this claim, including the reports of its experts.

Foreclosure proceedings were recently instituted at the expense of the majority committee and the co-receivership is extended over the foreclosure suit. Previous references to the finances of this company were made in the ELECTRIC RAILWAY JOURNAL of Sept. 12 and 26, Oct. 3 and 24, Nov. 14, and Dec. 5 and 19, 1914.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—As a result of the announcement that the Barcelona Traction, Light & Power Company would be unable to meet on Dec. 1 the half-yearly coupons on its £7,500,000 of 5 per cent first mortgage bonds, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 12, a committee has been formed in the interests of the bondholders to confer with the company in respect to a financial readjustment. At the time of deferring the interest, the directors stated that they had under consideration a plan for providing the company with the necessary funds for continuing construction and for the adjustment of the maturing interest. The new committee is expected to arrange for a meeting of the bondholders, at which it is hoped the directors will be able to present proposals for the refinancing.

Cape Electric Tramways, Ltd., Cape Town, South Africa.—The report of the Cape Electric Tramways, Ltd., shows that during the year ended June 30, 1914, the company made a profit of £78,866, and after providing for debenture interest, redemption of debentures, and the balance from the previous year, there was a net credit balance of £32,617. From this amount the reserve fund was credited with £8,000, leaving a balance of £24,617. In Cape Town the tramways carried 16,576,992 passengers, earning £155,472, as compared to 14,779,709 passengers, earning £144,221, in 1913. In Port Elizabeth the result of the operations showed 4,309,154 passengers, earning £44,936, as compared to 4,155,711 passengers, earning £43,035, in 1913. The report states that the tramway receipts showed satisfactory advances, but on account of increased maintenance cost and taxes the net profits decreased. On account of serious financial and trading conditions brought about by the European war, the directors decided to recommend the declaration of a dividend of only 2½ per cent.

Columbus Railway & Light Company, Columbus, Ohio.—The directors of the Columbus Railway & Light Company have declared a dividend of 75 cents a share on the capital stock, payable Feb. 25. No dividend, however, will be paid to holders of stock who are in default of assessments due on Dec. 30, 1913, or on June 30, 1914, but the dividend instead will be applied on the assessments as of Feb. 25.

Dallas Electric Company, Dallas, Tex.—Perry, Coffin & Burr, New York, are offering at 97½ and interest, to yield more than 5.4 per cent, $150,000 of first mortgage (closed) collateral trust 5 per cent bonds of the Dallas Electric Corporation, due on April 1, 1922. The Dallas Electric Company, which is the successor of the Dallas Electric Corporation, controls practically all the street railway, lighting and power business in Dallas.

Fairmount Park Transportation Company, Philadelphia, Pa.—Under the present plan of reorganization for the Fairmount Park Transportation Company, an assessment of $3.50 per share is proposed to provide $70,000 required to meet the floating debt of $26,149, improvements to plant to cost $7,000, interest and sinking fund payments on the first mortgage bonds of $31,750 and about $5,000 of organization expenses for the new company to be formed. The present capital stock will be reduced from $2,000,000, of which $1,750,000 is now outstanding, to $500,000 in the new company. Of the new stock, $100,000 will be 7 per cent preferred, cumulative after Jan. 1, 1916, and $400,000 common, par value $10. The first mortgage bonds will not be disturbed. Those who subscribe to the new company will receive one share of preferred stock and five shares of common stock, a total of $60 par value, for each $10 paid. At present holders of about 24,500 shares of stock, out of 40,000, have notified the committee that they would agree to the plan. The reorganization committee consists of P. E. Foerderer, C. J. Jones, A. C. Gibson, W. L. Chrisman and S. M. Clements, Jr. A preliminary reference to the reorganization of this company appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 16.

Fresno (Cal.) Interurban Railway.—The Railroad Commission of California has denied the application of the Fresno Interurban Railway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, to issue twenty shares of capital stock to be sold at 80 and $14,700 of ten-year 6 per cent bonds to be sold at 90 for the purpose of providing funds for the purchase of equipment and for the payment of certain engineering, administration, legal and contingent costs. It appears on examination that such items were properly taken care of in the original authorization of securities and that an additional issue is not necessary at present.

Humboldt Transit Company, Eureka, Cal.—The Railroad Commission of California has authorized the Humboldt Transit Company to issue and pledge $18,000 of first mortgage 5 per cent sinking fund thirty-year gold bonds to the Pacific Coast Casualty Company as surety for a bond covering a stay of execution in a damage case. Previous reference to this application was made in the ELECTRIC RAILWAY JOURNAL of Jan. 30.

International Railway, Buffalo, N. Y.—Harris, Forbes & Company, New York; N. W. Harris & Company, Boston, and Harris Trust & Savings Bank, Chicago, are offering at 92½ and interest a block of $600,000 of refunding and improvement 5 per cent gold bonds of the International Railway, dated Nov. 1, 1912, and due on Nov. 1, 1962. These bonds are coupon in type for $1,000 denomination and registered for $1,000 and multiple denominations, and are callable at 110 and interest on any interest date. Including the present block, there are now outstanding $11,156,000 of an authorized issue of $60,000,000, of which $11,662,500 are reserved to retire divisional bonds. The bonds are secured by a direct mortgage on the entire property of the company, subject to the divisional bonds. The mortgage contains provision for a sinking fund whereby, commencing with 1912, annual sums will be set aside sufficient by July, 1949, to retire all except $640,500 of the divisional bonds. The refunding and improvement bonds will then be secured by a first mortgage on the entire property of the company, except a small amount of suburban mileage covered by the $640,500 of divisional bonds before mentioned. For the year ended Dec. 31, 1914, net earnings were more than twice the bond interest.

Middle West Utilities Company, Chicago, Ill.—The Illinois Trust & Savings Bank, Russell, Brewster & Company and others in Chicago and a syndicate formed by A. H. Bickmore and associates in New York are offering an issue of $500,000 of 6 per cent ten-year collateral gold bonds of the Middle West Utilities Company, dated Jan. 1, 1915. The bonds are sold to yield 6.75 per cent. These bonds are secured by the pledge of mortgage bonds on property of subsidiary companies owned entirely or controlled by the Middle West Utilities Company. President Insull states that companies whose bonds are pledged for this issue show an average ratio of net earnings to bond interest of 1.6.

Montreal Tramways & Power Company, Montreal, Que.—It is announced that Potter, Choate & Prentice have purchased $7,000,000 of two-year 6 per cent collateral trust gold notes, to be dated April 1, from the Montreal Tramways & Power Company. These notes are issued to refund $1,350,000 of notes which came due on Jan. 1, and which were secured by bonds of the Canadian Light & Power Company, and also to refund $5,000,000 of 6 per cent notes coming due on April 1, the additional amount of new notes being issued for various corporate purposes. It is reported that a large portion of the notes has already been placed privately, and that any offer of exchange to the old holders must be limited in amount. The notes will be callable in one year, April 1, 1916, at the option of the company at par and interest, on sitxy days' notice.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The committee selected to prepare a new financial plan for the Oakland, Antioch & Eastern Railway consists of Osgood Hooker, A. Christeson, J. J. Mahony, Philip Bancroft, John Lawson, L. S. Bachman and Fred H. Beaver.

Pacific Gas & Electric Company, San Francisco, Cal.—The Railroad Commission of California has authorized the Pacific Gas & Electric Company to issue $4,000,000 of 5 per cent one-year gold notes dated Dec. 15, 1914, these bonds being covered by a trust agreement to F. N. B. Close, trustee, and secured by collateral consisting of $5,000,000 of convertible general lien bonds, series A, and $5,000,000 of general and refunding mortgage gold bonds, series A. The application for these notes and the sale thereof were noted in the ELECTRIC RAILWAY JOURNAL of Jan. 16, Jan. 23 and Jan. 30.

Stockton Terminal & Eastern Railroad, Stockton, Cal.—The Stockton Terminal & Eastern Railroad, operating between Stockton and Bolleta, San Joaquin County, on Feb. 18, filed an application with the Railroad Commission of California requesting authority to issue $319,500 of bonds to be used in completing its line to Jenny Lind, Calaveras County.

Stockton (Cal.) Electric Railroad.—The official headquarters of the Stockton Electric Railroad have been moved from Los Angeles to San Francisco.

Third Avenue Railway, New York, N. Y.—At a meeting of the directors of the Third Avenue Railway on Feb. 23, Lyon F. Strauss and Edwin M. Burghart were elected directors to succeed F. L. Babcock and M. Furgeson, resigned. Mr. Strauss represents the committee of stockholders which recently investigated the affairs of the company and recommended a dividend payment, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 6. Mr. Burghart represents the George Ehret Estate. It is reported that the question of the dividend was not raised at the meeting of the directors, and that no dividend will be thought of for at least six months.

DIVIDENDS DECLARED

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec.,	'14	$65,509	*$29,753	$35,756	$17,462	$18,294
1 " "	'13	65,645	*30,726	34,919	17,354	17,565
12 " "	'14	777,752	*375,219	402,533	209,118	193,415
12 " "	'13	764,085	*346,512	417,573	207,584	209,989

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Dec.,	'14	$89,012	*$66,141	$22,871	$29,337	$6,466
1 " "	'13	100,378	*60,774	39,604	26,114	13,490
12 " "	'14	1,085,096	*699,723	385,373	339,409	45,964
12 " "	'13	1,204,928	*717,625	487,303	298,082	189,221

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Dec.,	'14	$1,341,385	*$666,266	$675,119	$372,263	$302,856
1 " "	'13	1,349,191	*726,726	622,465	336,308	286,157
12 " "	'14	14,006,484	*7,549,898	6,456,586	4,212,852	2,243,734
12 " "	'13	13,669,321	*7,678,891	5,990,430	3,864,853	2,125,577

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE.

1m., Dec.,	'14	$203,510	*$124,269	$79,241	$62,523	$16,718
1 " "	'13	205,547	*116,063	89,484	63,576	25,908
12 " "	'14	2,513,620	$1,457,020	1,056,600	758,859	297,741
12 " "	'13	2,354,797	*1,312,873	1,041,924	714,273	327,651

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Dec.,	'14	$213,997	*$108,860	$105,137	$71,748	$33,389
1 " "	'13	238,628	*142,954	95,674	46,652	49,022
12 " "	'14	2,623,827	*1,616,214	1,007,613	701,949	305,664
12 " "	'13	2,700,966	*1,604,403	1,096,563	589,134	507,429

GRAND RAPIDS (MICH.) RAILWAY.

1m., Dec.,	'14	$125,913	*$64,732	$61,181	$12,162	$49,019
1 " "	'13	122,461	*72,321	50,140	12,421	37,719
12 " "	'14	1,286,568	*829,637	456,931	161,778	295,153
12 " "	'13	1,301,403	*803,607	497,796	166,633	331,163

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE.

1m., Dec.,	'14	$50,073	*$38,657	$11,416	$15,634	†$4,218
1 " "	'13	50,420	*37,118	13,302	15,338	†2,036
12 " "	'14	676,922	*467,809	209,113	186,417	22,696
12 " "	'13	675,554	*427,715	247,839	179,575	68,264

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Dec.,	'14	$197,278	*$109,647	$87,631	$31,079	$56,552
1 " "	'13	197,893	*110,183	87,710	39,928	47,782
12 " "	'14	2,240,308	*1,352,324	887,984	499,671	388,313
12 " "	'13	2,207,246	*1,339,019	868,227	464,235	403,992

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY.

1m., Jan.,	'15	$1,998,396	$1,173,758	$824,637	$812,414	$12,224
1 " "	'14	2,006,527	1,202,056	804,471	802,682	1,789
7 " "	'15	13,943,518	8,072,479	5,871,040	5,660,369	210,671
7 " "	'14	14,246,065	8,338,091	5,907,974	5,598,842	309,132

PORTLAND (MAINE) RAILROAD.

1m., Dec.,	'14	$81,058	*$53,318	$27,740	$21,332	$6,408
1 " "	'13	79,867	*51,057	28,810	23,498	5,312
12 " "	'14	1,044,842	*647,241	397,601	250,604	146,997
12 " "	'13	1,036,316	*689,476	346,840	180,881	165,959

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Dec.,	'14	$514,493	*$255,483	$259,010	$182,974	$76,036
1 " "	'13	607,476	*275,872	331,604	175,483	156,121
12 " "	'14	6,273,171	*3,263,883	3,009,288	2,172,678	836,610
12 " "	'13	6,723,742	*3,298,310	3,425,432	2,008,602	1,416,830

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*Includes taxes. †Deficit.

Traffic and Transportation

DECISION IN ROCHESTER FARE CASE

Three-Cent Fare in Rush Hours Denied by Public Service Commission

The Public Service Commission of the Second District of New York in an opinion by Commissioner Martin S. Decker holds that on the case as submitted it is bound by law to dismiss the complaint of the city of Rochester asking for a 3-cent fare during rush hours on the New York State Railways lines in the Rochester 5-cent fare zone. For this case both parties agreed to accept the tax valuation of $10,791,124 as the amount on which the company is entitled to return in the Rochester 5-cent fare zone, and the commission finds that a fare reduction to 3 cents during rush hours would bring the company a return of only 4.55 per cent. This rate of return is held, in accordance with ruling cases in the courts, to be below the fair rate which the company is entitled to earn.

It was argued that increased business resulting from the 3-cent fare would reimburse the company for the cut from 5 cents. The commission finds that such an increase would have to amount to 20 per cent of the business of the last year. This increase would have to take place at the time of day when the system is already taxed to its capacity, and the opinion of Commissioner Decker says that it is "far beyond any increased net revenue which can upon any broad estimate be safely contemplated." The case is the first application that the commission has had for a 3-cent fare. The grounds of the complaint were that the reduction, which it was alleged the company could afford to make, would encourage the large working population of Rochester to establish homes away from the congested business centers.

The commission says that it must assume that the rate complained of is not unreasonable unless it shall appear that the company's revenue from Rochester traffic is so greatly in excess of a fair return that the reduction as demanded in the complaint would be fair and reasonable and is required in the public interest. It appears from the opinion of Commissioner Decker that the proposed reduction would reduce the company's revenue as for the year ended June 30, 1914, $434,459, and that the company would have left a remainder of revenue, after paying operating expenses and taxes of $491,660. Such remaining revenue applied to the valuation of $10,791,124, which was accepted by agreement of the parties, would give the company a return of 4.55 per cent. This rate of return is held, in accordance with ruling cases, to be below the fair rate which the respondent company is entitled to earn.

The company claimed that certain large amounts should be deducted from its revenue from operation in the Rochester 5-cent fare zone for that year, which were first stated in the case to be $1,033,658. The items so claimed to have been omitted by the company were: first, $19,031, for rental of subway containing wires carrying current to its lines; second, accrued accident and damage liabilities for the year $108,209; third, wages increased as the result of an arbitration award made while the hearings were in progress and which dates back to part of the year ended June 30, 1914, $48,506. The commission allows the first and third items, and reduces the second item to $40,000. The company also claimed a reduction for extraordinary renewals and replacements, the claim amounting in the maximum to $218,194. The commission does not pass upon this item and excludes it in its determination. The total reduction from income on account of the above stated omitted expense item is $107,537.

The commission also finds that if the increase of wages is excluded from consideration the net operating income would be $974,626, and after deducting the reduction which would be caused by lowering the fare in the rush hours from 5 cents to 3 cents the amount remaining would be $540,167, and that this sum would be 5 per cent upon the agreed valuation. It is found by the commission upon report of its electrical engineer that the company's expense for electric power in Rochester is not excessive as compared with the price paid for street railway power in Buffalo or Syracuse.

The commission discusses the question whether there would be such an increase of net revenue from the operation of the reduced rate as would cause the net revenue to reach a fair return upon the agreed valuation. Assuming the increase of net revenue must be 2 per cent in order to reach a fair return upon the agreed valuation the commission holds that this would be equal to $215,822, this being more than a 20 per cent increase on the entire net revenue for the year ended June 30, 1914, exclusive of any deductions for omitted items. The commission say that such 20 per cent increase in net revenue must come from an increase of persons riding due to the 3-cent fare during the busiest hours of the day when the present car capacity is most heavily taxed, and new travel to bring in such net revenue increase must be sufficient to pay for the operation of the required additional cars properly to accommodate all passengers during the rush hours. Of this Mr. Decker's opinion says:

"In all cases the effect of a reduced passenger rate upon traffic is largely speculative. In this case the reduced fare would not fill empty or partly empty operated cars, for it is within our general knowledge that Rochester cars during the rush hour periods, as in most of the large cities, are all fairly and we think fully required to meet present demands. We cannot assume from these considerations that the 3-cent fare as applied to rush hour travel would bring up the net revenue to any such extent as under the figures guiding us here must result in order to warrant the reduction sought upon this complaint. If the difference were small we might find that some increase of net revenue would result. This large deficit, amounting to as much as 20 per cent of the 1914 revenue from operation and 2 per cent of the agreed valuation, is far beyond any increased net revenue which can upon any broad estimate be safely contemplated as a probable result of the proposed decrease of fare."

Referring to the valuation of $10,791,124 as having been agreed upon by the parties themselves for the purpose of the case the commission says:

"It follows that we have here, as covering valuation of property, an 'agreed case,' as by and between the parties, and therefore one, concerning that branch of the case, in which there is no room for further inquiry and no basis for stating objections concerning any part of such valuation, however pertinent and forceful in an open case involving valuations such objections might be."

The commission points out that, unlike most other carriers' rate cases, there were no preliminary considerations by which to determine whether the 5-cent rate of fare was in and of itself or as applied to the community in general unreasonable or unjust, and calls attention to the following facts: The rate complained of has not been advanced; the rate has been long in force; it applies throughout the whole city and takes in all line extensions which may be made from time to time throughout the city; the 5-cent rate itself is a maximum charge fixed by the Legislature; it is the common street car rate of fare throughout the entire State and all cities and other municipalities; there have not been shown to exist in Rochester any special or peculiar conditions affecting actual travel which do not obtain in other large cities such as Buffalo, Syracuse, Utica or Albany, certainly none that create any sharp distinctions.

The real question for determination in this case was whether the respondent's total revenue from its operations within the Rochester 5-cent fare zone was excessive to the extent that the proposed reduction in fare from 5 cents to 3 cents during the week day rush hours was fairly justified and required. For the reasons above stated the commission found that the reduction asked for in the complaint would reduce the company's return upon the agreed valuation below the rate of return which is justified in law, and therefore that the relief sought by the complainant could not be granted. In conclusion the commission said:

"If the valuation is not too high, and that is a matter which can not be discussed under the agreement to use the valuation, then the return of 4½ to 5 per cent is too low to permit the reduction demanded. There is no escape from that conclusion. In so holding we are controlled by the law, with no room in any sense for the exercise of discretion. A 6 per cent return upon capital employed in the public service has been deemed to be a minimum fair return, and this after all other allowances necessary to the conduct of the business shall have been made. In many cases a considerably higher rate of return has been held to be required. There may arise here and there cases of over installation of property or over extension of lines where, the general rate being involved, peculiar conditions would justify the conclusion that a lower return than has been ordinarily allowed would be fair. But we have no such peculiar conditions in this case where a special rate is demanded and all of respondent's property and lines are fully required for the public service in Rochester. Since we find that the proposed reduction would reduce respondent's net revenue from operation on the basis of the traffic for the year ended June 30, 1914, to as low as 4½ or 5 per cent upon the valuation agreed upon by the parties herein it is idle to speculate upon what would be a fair return upon such valuation to the respondent."

ANOTHER COMPANY PUBLICATION

The *Southern Public Utilities Company Magazine* has been established by the Southern Public Utilities Company, Charlotte, N. C., "in the interests of the company and for the pleasure and profit of the employees and the public they serve." The first issue is dated Feb. 10. It contains twenty-eight pages and cover. The size is 6 by 9 in. Z. V. Taylor, president of the company, in announcing the publication said:

"For its own interests, and the pleasure and benefit of its officers and employees, the Southern Public Utilities Company has created a publicity department, the chief activity of which is the publication of this magazine, a copy of which goes to every officer and employee of the company. The publicity department has been created for the sole purpose of bringing the men in the various departments into closer relation with the management and with themselves, and in this way developing a higher degree of efficiency, the ultimate aim being to make every patron of the utilities operated by Southern Public Utilities Company a satisfied customer. In charge of this department, the company has placed Leake Carraway, a newspaper man of long years of training, competent and efficient, and for him the company asks the co-operation of every officer and employee, so that this department may at once begin performing its proper function. The purpose of the department and the magazine will be gone into more in detail by the editor."

Mr. Carraway said in part:

"This publication will be used to tell from time to time of especial achievements of individuals, departments, and branches, giving credit where credit is due. The management desires the employees to consider this magazine their own personal property, and suggestions concerning its contents will always be gladly received, the object being to print herein such matter as may be of value to them. The hearty co-operation of the men is asked by the editor, without which the publication will fail to perform its proper function. He invites personal letters and visits from the men at their convenience and pleasure, and believes that with their assistance the magazine may be made of great benefit and pleasure to them, and incidentally of value to the public through service rendered."

TRANSFER SUIT DECISION

Judge A. J. Murphy, of the Wayne Circuit Court, handed down an important and interesting opinion in a suit for damages against the Detroit (Mich.) United Railway over a transfer dispute when he held that it is not proper for a passenger so to conduct himself as to interrupt the continuity of street railway service. In directing a verdict for the defendant company, Judge Murphy laid down the principle that the inconvenience of the individual must be subordinated to the convenience of the public. He outlined that the passenger could have paid another fare or left the car, and it was his legal duty to do one or the other. Failing in either, and holding up the service in an altercation with the conductor to the inconvenience of the traveling public, the plaintiff was without redress, the judge decided.

INDIANAPOLIS TRAFFIC

Official Statement of Passenger Traffic and Interurban Statistics at the Indianapolis Traction Terminal

The following tables relating to the interurban passenger traffic handled through the traction terminal station at Indianapolis, just made public by E. B. Peck, vice-president of the Indianapolis Traction & Terminal Company, who has the direct management of the terminal stations and building, show an increase of nearly 500,000 passengers for the year 1914 as compared with 1913. The population of Indianapolis in 1900, when the first interurbans entered the city, was 169,164. It is now estimated as slightly in excess of 250,000, and a great deal of the growth of the city is attributed to the rapid development of the interurban systems. In considering the 7,012,763 passengers actually handled in and out of Indianapolis in 1914, each person is theoretically considered as making a round trip, and on this basis the actual number of visitors to Indianapolis during the year is estimated at 3,506,281.

DATES WHEN INTERURBAN LINES COMMENCED OPERATING INTO INDIANAPOLIS

Indianapolis, Columbus & Southern Traction Co.	Jan. 1, 1900
T. H. I. & E.—Eastern Division	June 17, 1900
Indiana Union Traction—Muncie Division	Jan. 1, 1901
T. H. I. & E.—Martinsville Division	Aug. 2, 1902
T. H. I. & E.—Brazil Division	Sept. 15, 1902
Indianapolis & Cincinnati—Shelbyville Division	Sept. 12, 1902
T. H. I. & E.—Northwestern Division	Oct. 9, 1903
Indiana Union Traction—Logansport Division	Dec. 3, 1903
Indianapolis & Cincinnati—Rushville Division	July, 1905
T. H. I. & E.—Danville Division	Sept. 1, 1906
Indianapolis, Crawfordsville & Western	July 4, 1907
Indianapolis, Newcastle & Toledo	June 29, 1910
Beech Grove Traction Company	March, 1911

The total number of passengers carried since 1900 was as follows: 1900, 377,761; 1901, 955,554; 1902, 1,523,411; 1903, 2,347,936; 1904, 3,274,654; 1905, 3,881,332; 1906, 4,469,982; 1907, 5,032,677; 1908, 4,979,371; 1909, 5,156,906; 1910, 5,736,272; 1911, 6,279,822; 1912, 6,431,714; 1913, 6,524,366; 1914, 7,012,763.

INDIANAPOLIS TRACTION & TERMINAL COMPANY, TOTAL NUMBER INTERURBAN AND SUBURBAN PASSENGERS ARRIVING AND DEPARTING—INDIANAPOLIS

Month	Passengers, 1914	Passengers, 1913
January	478,863	479,855
February	401,591	448,686
March	509,399	411,531
April	538,348	438,073
May	715,284	645,432
June	666,108	672,562
July	735,369	710,220
August	683,369	659,443
September	618,406	584,804
October	594,270	555,272
November	527,556	381,853
December	544,200	536,635
Totals	7,012,763	6,524,366
Average per day	19,213	17,875

INDIANAPOLIS TRACTION & TERMINAL COMPANY, TOTAL NUMBER INTERURBAN AND SUBURBAN CARS ARRIVING AND DEPARTING—INDIANAPOLIS

	1914		1913	
Month	Passenger Cars	Freight Cars	Passenger Cars	Freight Cars
January	20,149	2,036	20,058	2,057
February	17,315	1,692	18,434	1,832
March	20,832	2,021	†16,442	1,554
April	20,584	2,085	16,260	1,503
May	24,243	2,113	22,499	2,107
June	23,078	2,191	22,683	2,182
July	24,896	2,266	24,120	2,302
August	23,984	2,347	‡23,506	2,058
September	22,364	2,260	22,742	2,155
October	21,230	2,296	22,053	2,320
November	20,069	2,051	•15,692	1,480
December	21,062	2,130	22,064	1,951
Totals	259,806	25,488	246,823	23,501
Average per day	712	70	676	65

†Flood March 25, 1913. ‡Interurban strike Aug. 25, 1913. •Indianapolis strike Oct. 31, 1913.

THROUGH LIMITED TRAINS ARE OPERATED BETWEEN INDIANAPOLIS AND

	Miles	Time	No. Trains Daily Each Way
Ft. Wayne, Ind.	136	4 hours 55 min.	10
Goshen, Ind.	160	5 hours 27 min.	2
Louisville, Ky.	117	4 hours	6
Terre Haute, Ind.	72	2 hours 25 min.	7
Marion, Ind.	72	2 hours 40 min.	2
Lafayette, Ind.	70	2 hours 10 min.	5
Richmond, Ind.	70	2 hours 35 min.	7
Muncie, Ind.	57	1 hour 50 min.	10
Connersville, Ind.	58	1 hour 55 min.	4
Greensburg, Ind.	49	1 hour 45 min.	6

FARES IN LETHBRIDGE

The *Canadian Railway and Marine World* prints the following report made to the City Council of Lethbridge, Can., by Commissioner A. Reid, who recommended the raising of fares on the municipally operated street railway line:

"From Jan. 1 to Oct. 31, 1914, the number of street railway fares paid by regular tickets (six for 25 cents) was 396,737; number paid by limited tickets (8 for 25 cents) was 144,194, or nearly 31 per cent of that paid by regular tickets; number paid by cash was 289,907, or 73 per cent of that paid by regular tickets; number of fares paid by limited tickets was about 26 per cent of that paid by cash and regular tickets; returns from children's tickets amount to $786.39; from limited tickets, $4,506.08; from regular tickets, $16,530.70, and from cash fares, $14,495.34.

"If the number of passengers carried remained the same up to Oct. 31, 1914, and we had charged 5 cents instead of giving six tickets for 25 cents the revenue would have been increased $3,300, and if six tickets for 25 cents had been given instead of eight for 25 cents the revenue would have been increased $1,500, making a total of $4,800.

"After a careful study of the above, and considering the small percentage of passengers using limited tickets, I would recommend the following changes, to go into effect on Dec. 1: That the use of the present limited tickets be discontinued, and the regular tickets (six for 25 cents) be substituted; these tickets to be good for the following hours: 6 to 8 a. m., 12 noon to 2 p. m., and 5 to 7 p. m. The regular fare to be 5 cents and 10 cents after midnight. Children's tickets (ten for 25 cents) to be continued. Two children to travel on one 5-cent fare, but not on one ticket. If children's tickets are used, each child must have a ticket, and the age limit be from five to fourteen years. Children under five to travel free.

"The present employees' tickets to be discontinued and books of blue tickets substituted (twenty-five for $1). The carrying of policemen and firemen free to be discontinued, and these departments to purchase blue tickets as required."

Report on Subway Air.—Commissioner of Health Goldwater of New York proposes to report to the Public Service Commission of the First District the result of tests of air taken from the subway and examined under his supervision to determine the degree of germ saturation.

Street Flushing in Columbus.—The city officials of Columbus, Ohio, are negotiating with the Columbus Railway, Power & Light Company to flush the streets. Figures already secured indicate that the expense will be less than half what it has been with wagons. If the arrangements are completed the company will purchase a tank car with a capacity of 4000 gal.

Interurban Brings Farmer and Laborer Together.—J. F. Strickland, president of the Texas Traction Company, Dallas, Tex., announced recently that a "labor special" would be run between Dallas and Sherman to afford farmers in Dallas, Collin and Grayson Counties an opportunity to get into touch with prospective farm hands aboard the train recruited among the unemployed in Dallas.

Hearing on Trailers.—At the hearing before the District Electric Railway Commission on Feb. 16 representatives of the Washington Railway & Electric Company and the Capital Traction Company urged the commission to rescind the order against the operation of trail cars except when separate conductors are used. They contended that a single conductor made for safety. The commission reserved decision.

Report on Montreal Traffic.—G. R. Macleod, railway engineer of the City Council of Montreal, Que., has made a special report on the tramway system. He states that additional and improved facilities are needed, both for the satisfactory handling of street railway traffic and general street traffic, particularly in the more central thoroughfares of the city. Mr. Macleod is against the opertion of motor buses. He suggests the building of several subways.

Prepayment System in Suburban New York.—The Westchester Electric Railroad, operating in Mount Vernon and New Rochelle, N. Y., has equipped all its cars with fare boxes and hereafter will use the pay-as-you-enter system of fare collection. The company also plans to rebuild its closed cars and install a prepayment vestibule with a door closing and step lifting mechanism similar to that recently developed by the Third Avenue Railway, New York, of which it is a subsidiary.

Seattle Fare Hearing.—The Public Service Commission of Washington has set March 1 as the date for hearing the case of the city of Seattle against the Puget Sound Traction, Light & Power Company relative to a complaint alleging that the company is charging more than a 5-cent fare within the city limits. It appears that there are some small stations where stops are made by interurban trains inside of what was formerly Georgetown, now South Seattle, where the fares are 6 and 8 cents.

Change in Fares on International Railway.—The International Railway, Buffalo, N. Y., has filed with the Public Service Commission of the Second District the following changes in local round trip fares effective on March 1: Between Buffalo and Lockport 60 cents, advance of 10 cents; between Buffalo and Niagara Falls 60 cents, reduction in unlimited fare 5 cents; fare of 50 cents for ticket limited to within ten days from date of sale is canceled; between Lockport and Niagara Falls 60 cents, an advance of 10 cents.

Through Service Discontinued.—On account of the withdrawal of the Dayton & Troy Electric Railway, the through service between Toledo and Dayton over the lines of the Toledo, Bowling Green & Southern Traction Company, the Western Ohio Railway and the Dayton & Troy Electric Railway by way of Lima will be discontinued on March 1. This service was established five years ago. The route is 162 miles in length. The Toledo, Bowling Green & Southern Traction Company and the Western Ohio Railway will continue the service over their lines, the terminals being Toledo and Piqua, 131 miles distant.

Fare Suit Dismissed.—The suit to compel the Portland Railway, Light & Power Company, Portland, Ore., to charge a 5-cent fare to all points on the Cazadero Line west of Lents Junction and to issue transfers between Lents Junction on the Mt. Scott line and Watson Station on the Cazadero Division has been dismissed by Circuit Judge Cavanaugh on demurrers filed by the company. The court held that the State law prohibiting a charge of more than 5 cents for any continuous ride within city limits had been repealed by implication by the public utility law and that the suit, brought by the District Attorney for the State, should have originated with the State Railroad Commission.

Change in Passenger Rates.—The Newark & Marion Railway, Newark, N. Y., has filed with the Public Service Commission of the Second District of New York, effective on March 17, the following changes in rates: Local cash fares advanced 5 cents between Newark and Mills, East Palmyra, Jaggers, Manders, Rich and Marion; 10 cents between Newark and Mill street; 5 cents between Town Line and Manders, Mill Street, and Marion, and 5 cents between Fishers and Mill Street and Marion; reduction of 5 cents between Mills and Fishers. Ticket fares between Newark and Marion advanced 5 cents one way and 10 cents round-trip. Fare for weekly ticket, good for six round-trips between Newark and Marion within seven days including date of sale, advanced from $1.50 to $1.80.

Mr. Whitridge's Snow Pictures.—As a result of a notice posted by Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., in all the surface cars of the system, offering prizes of $5 and $10 for the best photographic evidence of the extent to which surface cars are delayed and blocked by wagons of all descriptions following snow falls the offices of the company have been swamped with offerings from competitors. From the photographs submitted it was not difficult, according to the New York *Sun* of Feb. 21, to select more than twenty to which the awards were allotted. Very few of the pictures needed explanation, although, of one, which showed a Third Avenue car shoving a loaded coal wagon up the hill on Amsterdam avenue, Mr. Whitridge remarked: "I venture to say that there is not a pound of coal goes up that hill that isn't pushed up by our surface cars." The *Sun* published five of the photographs.

Fares in Edmonton.—The item regarding fares in Edmonton published in the ELECTRIC RAILWAY JOURNAL of Feb. 6, page 311, was in error through a mistake made by the Canadian correspondent of this paper in dating the item. According to J. H. Larmonth, superintendent of the Edmonton (Alta.) Radial Railway, there has been no change in the rate of fare at Edmonton since last May, when practically a straight 5-cent fare was adopted. The rates of fare in Edmonton now are for adults, good at all times of the day, 5 cents or five tickets for 25 cents; limited tickets, during the hours of 5:30 a.m. and 8 a.m., six tickets for 25 cents; children under fourteen years old, twelve tickets for 25 cents. The item as originally published referred presumably to changes at Lethbridge of which mention is made elsewhere in this issue.

Restoration of Through Service Ordered at Boston.—The Massachusetts Public Service Commission has ordered the Boston Elevated Railway to restore through service between Oak Square, Brighton and Central Square, Cambridge, via River Street, covering both normal and rush hours. In a petition to the board the Faneuil Improvement Association objected to the requirement of transferring at either of two points in the Brighton district in the intersuburban trip between Central and Oak Squares, which is afforded by the River Street and the Western Avenue lines radial to the Cambridge subway from Central Square. In its finding the board holds that the company should maintain through service on one of these virtually parallel routes at all hours, but does not require a dual through service in view of the transfer facilities available upon a single fare.

Commission Approves Boston Transfer Facilities. — The Public Service Commission of the State of Massachusetts has approved the establishment of free transfer privileges by the Boston Elevated Railway in connection with the opening for service of the westerly section of the Dorchester tunnel. The Washington Street and Dorchester tunnels cross at different grades at Washington, Winter and Summer Streets and the transfer facilities in general provide for interchange between north and southbound, east and westbound surface and tunnel cars and trains. The board has ordered the establishment of free transfer privileges at Dewey Square, Boston, between southbound Atlantic Avenue and Washington Street-Dudley Street surface cars, and between northbound cars boarded on Washington Street between Dover and Boyleston Streets and Powers Wharf-Atlantic Avenue cars.

Albany Traffic Figures.—C. F. Hewett, general manager of the United Traction Company, Albany, N. Y., has filed with the Public Service Commission of the Second District of New York the figures of the check which the company has made of the traffic during the last thirty days. In a letter accompanying the figures Mr. Hewitt says: "From our first analysis of these checks we are inclined to the belief that we are giving very satisfactory service on all the lines checked, with the exception of a few trips in the morning and evening on the Delaware Avenue and West Albany lines, and it would seem that a readjustment of the spacing of the cars should be made to more suitably conform to the flow of traffic. Before we take this step, however, and after your electric railroad inspector has had an opportunity of examining these checks, we would like to have a conference with him in reference to these readjustments."

Tobacco Shipments.—In view of the fact that incoming freight business on the Louisville & Interurban Railroad has been light in the last few weeks, C. H. Wyatt, general freight agent of the company, has been active in securing tobacco traffic between Shelbyville, which is an important loose-leaf market 30 miles out, and Louisville, where the shipments are concentrated. The steam roads heretofore have enjoyed this business, but by going after it vigorously Mr. Wyatt has been able to secure shipments to make the return trips to Louisville pay. In the six weeks of this year the company has hauled about 1,200 hogsheads, using extra cars only when quick deliveries were imperative. The Louisville & Interurban Railroad has a potential advantage over the steam roads in that it is able to run its cars to the very doors of the tobacco warehouses, thus eliminating the expense of drayage. The largest steam cars hold about fifteen or sixteen hogsheads, while the regular freight cars of the Louisville & Interurban accommodate about thirteen or fourteen hogsheads.

Personal Mention

Mr. H. L. Beach, Chicago, has been appointed manager of the Utah Light & Traction Company, Salt Lake City, Utah, to succeed Mr. Joseph S. Wells.

Mr. Joseph S. Wells, formerly manager of the Utah Light & Traction Company, Salt Lake City, Utah, has been elected secretary, treasurer and a director of the company.

Mr. C. S. Banghart, who became connected with the Binghamton (N. Y.) Railway in August, 1914, as general manager, has in addition been elected vice-president and a director of the company.

Mr. Will Clapper has been appointed traffic manager of the Interurban Railway, Des Moines, Ia., to succeed Mr. C. T. Chapman, whose appointment to the Dan Patch Air Line is referred to elsewhere in this column.

Mr. H. C. Snyder has been appointed general manager of the Wahpeton-Breckenridge Street Railway, Breckenridge, Minn., to succeed Mr. H. C. Hartung, whose appointment to the Lewiston-Clarkston Transit Company is noted elsewhere in this column.

Mr. David Daly, manager of the Houston (Tex.) Electric Company, has been appointed second vice-president of the Southwestern Electrical & Gas Association, succeeding Mr. C. W. Kellogg, Jr., who recently left the Southwest to become manager of the Mississippi River Power Company at Keokuk, Ia.

Mr. C. W. Whitley, Salt Lake, has been elected president of the Utah Light & Traction Company, Salt Lake City, Utah, which controls the electric railway properties in Salt Lake City and has leased the electric light and power properties in Salt Lake and Ogden and its gas business in Ogden to the Utah Power & Light Company.

Mr. H. C. Hartung has resigned as general manager of the Wahpeton-Breckenridge Street Railway, Breckenridge, Minn., effective on March 1 to become general manager of the Lewiston-Clarkston Transit Company at Lewiston, Idaho. The construction work of the Lewiston-Clarkston Transit Company's line is expected to commence about March 15.

Mr. Leake Carraway, a newspaper man of long experience, has been appointed to the head of the publicity department of the Southern Public Utilities Company, Charlotte, N. C., with direct charge of the *Southern Public Utilities Company Magazine*, established by the company in its own interest and for the pleasure and profit of the employees and the public.

Mr. C. T. Chapman, traffic manager of the Interurban Railway, Des Moines, Ia., has been appointed to the same post with the Dan Patch Air Line, Minneapolis and St. Paul, and will take up his new duties on March 1. Mr. Chapman became connected with the Interurban Railway with Mr. James R. Harrigan when the latter took charge of the Des Moines City Railway in the spring of 1911.

Mr. C. J. Griffith, general manager and treasurer of the Little Rock Railway & Electric Company, Little Rock, Ark., has been elected president of the Chamber of Commerce of that city. The nominating committee of the chamber named Mr. Griffith as candidate with a board of seventeen members representing the blue ticket and Mr. W. S. Brandon with a board of seventeen representing the red ticket. A campaign was conducted for two weeks, the result of which was the election of the entire blue ticket. Some 800 business men are members of the Chamber of Commerce and Mr. Griffith and the blue ticket carried the election two to one.

Mr. H. M. Byllesby was guest of honor at a dinner given by the employees of H. M. Byllesby & Company, Chicago, Ill., on Feb. 16 at the Congress Hotel in that city. The occasion was Mr. Byllesby's fifty-sixth birthday. Mr. M. A. Morrison was toastmaster. Among the speakers were: Messrs. J. J. O'Brien, R. J. Graf, E. C. Braun, R. G. Hunt, W. R. Thompson, H. W. Fuller, W. H. Hodge, B. W. Lynch, W. H. Clarke, F. H. Lane and W. C. McKenna. Mr. Byllesby replied in a delightful talk filled with suggestions, advice, optimism and reminiscences of some of the prominent men who influenced his work and ambitions, such as

Mr. Thomas A. Edison and Mr. C. A. Coffin and the late William C. Whitney and the late George Westinghouse.

Mr. W. W. Magoon, general manager of the Ohio Valley Electric Railway, Huntington, W. Va., has resigned, effective on May 1. Mr. Magoon became connected with the street railway properties at Huntington in 1893 when he accepted the position of bookkeeper for the Consolidated Light & Railway Company, which built the first railway in that city. In September of the same year he was made superintendent, and in 1894 was elected secretary and general manager to succeed Mr. F. L. Doolittle. He continued in that position until 1904 when he resigned to become connected with Cole & Crane in Cincinnati, where he remained for three years. Returning to Huntington in 1907, he resumed the position of general manager of the Ohio Valley Electric Railway. Mr. Magoon expects to take a vacation, but his plans for the future have not been definitely decided. The Huntington *Advertiser*, in commenting editorially on Mr. Magoon's resignation, said that his retirement from the company "marks the close of a long and honorable service rendered to the Ohio Valley Electric Railway and its predecessors." Another local paper said editorially it was the sincere wish of those who had so long known him and been associated with him that Mr. Magoon would continue to enjoy the privileges of Huntington citizenship.

Mr. Richard McCulloch, who has been elected president of the United Railways, St. Louis, Mo., was born in St. Louis County on June 3, 1869. Mr. McCulloch was educated in the St. Louis public schools and Washington University, where he was graduated from the engineering department in 1891. He was later (1905) given the honorary degree of Master of Arts by Washington University. After spending one season in the service of the United States Geological Survey and one year in Mexico in the mining business, he became chief engineer of the National Railway, St. Louis, which at that time owned the railways in the northwestern part of the city, which are now the Broadway, Lee, Cass, Natural Bridge, Wellston and Seventh Street lines. The Broadway and Wellston lines were cable roads, and the others were horse roads, which were converted to electric traction. Most of this work was done under the supervision of Mr. McCulloch. In 1899 Mr. McCulloch went abroad for two years. During this time he built and put in operation the electric railway system of Geneva, Switzerland, and also spent some time planning the construction of a network of interurban railways radiating from Lille, northern France, near the Belgian frontier. In 1901 Mr. McCulloch returned to America, where he became assistant general manager of the Chicago City Railway, which operated the lines on the South Side, comprising about one-half the mileage of the surface lines of Chicago. In 1904, the year of the World's Fair, Mr. McCulloch became connected with the United Railways, St. Louis, as assistant general manager, and in 1909 was made vice-president. Upon the death of Capt. Robert McCulloch, in the Fall of 1914, he was made general manager, and was elected president at the annual election on Feb. 9.

RICHARD M'CULLOCH

OBITUARY

A. Wissel, director of the Rheydt Municipal Railways, Rheydt, Germany, was killed in battle in Poland on Dec. 2, 1914.

Judge William M. Kavanaugh, ex-United States Senator from Arkansas, president of the Little Rock Railway & Electric Company, Little Rock, president of the Southern Trust Company, Little Rock, and president of the Southern Association of Baseball Clubs, died at his home in that city on Feb. 21 suddenly from acute indigestion. Judge Kavanaugh was fifty years old. He was a native of Kentucky.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Application for a charter has been made by this company in Idaho to build electric railways in the Lewiston-Clarkston Valley from Lewiston to the Orchard Tracts, to Asotin and through Clarkston and to the fair and stock grounds east of Lewiston. Capital stock, $500,000. Incorporators: A. G. Nortz, E. H. Nortz and G. W. Burrows, Breckenridge, Minn.; W. N. Nortz, Devil's Lake, N. D., and R. C. Dahlhjelm and Eugene A. Cox, Lewiston. [E. R. J., Jan. 31, '14.]

***Alva, Buffalo & Colorado Railroad, Buffalo, Okla.**—Chartered in Oklahoma to build a 20-mile interurban railway, the motive power to be either steam, electricity or gasoline, between Buffalo and Rosston. Capital stock, $10,000. Incorporators: J. H. Moran, L. A. Walton, George Stafford, L. L. Walton and I. M. Morgan, all of Alva, Okla.

FRANCHISES

***Los Angeles, Cal.**—A number of the improvements associations of the southern part of Los Angeles have formally petitioned the City Council to offer for sale an electric railway franchise on South Park Avenue from Thirtieth Street southerly to Manchester Avenue, a distance of several miles. The matter will be considered by the Board of Public Utilities within the next few days.

Stockton, Cal.—The Central California Traction Company has asked the Council for a franchise to extend its lines on North Sacramento Street in Stockton.

Chicago, Ill.—The Chicago & Northern Interurban Railway has asked the State Public Utilities Commission of Illinois for a certificate of convenience and necessity to build a 12-mile electric railway from the city limits of Chicago to Wheeling. Jordan E. Van Natta, Chicago, attorney for the company. [E. R. J., July 18, '14.]

Pocatello, Idaho.—J. R. Munn has received a franchise from the Council to build an electric railway in Pocatello. [E. R. J., Feb. 20, '15.]

Findlay, Ohio.—An ordinance giving the Toledo, Bowling Green & Southern Traction Company a twenty-five-year franchise in Findlay has had its first reading in Council. It requires that the company pay the city 2 per cent of its earnings on the local lines, after it has paid 6 per cent dividends on its investment. It is said that the company will accept the ordinance.

Lorain, Ohio.—A renewal of its franchise is being sought by the Lorain Street Railway and the city authorities have asked Street Railway Commissioner Witt of Cleveland to aid them in their negotiations with the company.

Massillon, Ohio.—A petition has been signed by residents of North Mill Street asking the City Council to confer with the Northern Ohio Traction Company in regard to building a line in North Mill Street from Cherry Street to the city limits of Massillon.

Hamilton, Ont.—Formal application will be made by the Council to the railway board to order the Hamilton Street Railway to relay its tracks on York Street, King West Street, Margaret Street and Herkimer Street in Hamilton.

Toronto, Ont.—The Forest Hill Electric Railway will ask for a franchise at the next session of the Ontario Legislature for an extension of time until 1917 in which to begin the construction of its line. [E. R. J., Feb. 13, '15.]

Toronto, Ont.—The Ontario Railway & Municipal Board has instructed the Toronto Railway to complete certain lines recently ordered by the board.

Milwaukee, Wis.—Residents on Green Bay Avenue and on Twenty-seventh Street in Milwaukee have petitioned the City Council for an extension of the electric railway on the Third Street and Twenty-seventh Street lines to the city limits of Milwaukee. Under the blanket franchise the Milwaukee Electric Railway & Light Company is obliged to develop its tracks as directed by the Council in Milwaukee.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Something more than $150,000 will be required to complete the work begun in 1914 in the various departments of this company. The largest item is for the completion of the First Avenue viaduct. Most of the expenditures will be for improvements and maintenance of the present system.

***Pratt Consolidated Coal & Iron Company, Birmingham, Ala.**—This company is building an electric line from its Maxime mine to a point near the Warrior River, where the backwater from lock 17 will touch. Surveys have been made and work will soon be begun laying the rails.

North Alabama Traction Company, New Decatur, Ala.—This company has received permission from the Senate to build a new bridge over the Tennessee River near Decatur, Ala.

Argenta (Ark.) Railway.—During the next few weeks this company expects to complete 1,000 ft. of track reconstruction and 2,000 ft. of new track, extending its Washington Avenue line to the Rock Island station in Argenta.

Phœnix (Ariz.) Railway.—The Brill extension to Princeton Heights has been completed by this company and will soon be placed in operation.

Calico Rock, Ark.—As soon as financial arrangements can be made this company will begin work on its proposed electric railway to connect Hoxie and Calico Rock. J. W. Myers, Calico Rock, is interested. [E. R. J., Jan. 23, '15.]

***Eureka, Cal.**—Plans and specifications are being considered to build an electric railway to enter Eureka over a line to be built down the Klamath River from Klamath Falls to Requa, and thence down the coast by way of Trinidad. Power will be obtained at Ishi Pishi Falls, on the Klamath River, near the mouth of the Salmon River.

San Francisco (Cal.) Municipal Railway.—This company has placed in operation its California Street municipal line as far as Fourteenth Street in San Francisco. It will be built as far as Thirty-third Avenue. This new line connects with the Geary Street line at Second Avenue, its route being over Second Avenue and Cornwall Street and California Street.

Sausalito (Cal.) Incline Street Railway.—Plans and specifications for this proposed electric cable railway have been completed and the company will soon call for bids for winding machinery, rails, slot bars, cables, ties, pulleys, electric motors, cars and electric trolley equipment, etc. For further information address A. E. Roberts, Sausalito, chief engineer. [E. R. J., Jan. 2, '15.]

New Britain (Conn.) Street Railway.—Preliminary arrangements are being made by this company to complete the organization of this company to build an electric railway between Hartford and New Britain and between New Britain and Plainville. Capital stock, authorized, $500,000. Mortimer H. Camp, New Britain, is interested. [E. R. J., Feb. 13, '15.]

Jacksonville-Middleburg Electric Railway, Jacksonville, Fla.—Grading is under way on the section of this line from Jacksonville Heights to Jacksonville and will stop at the Seaboard Air Line Shops, and when this section is built the company will begin on the Middleburg end and close in the section between the two. Right-of-way along the entire 24 miles from Jacksonville to Middleburg has been secured. The first 10 miles have been financed and material and labor have been contracted for. Application for a charter will soon be made. A. W. Mackinlay, general manager. [E. R. J., Feb. 6, '15.]

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Plans are being made by this company to begin work about March 15 on its electric line between Lewiston and Clarkston. Orders will be placed at once for material, machinery and line material. H. C. Hartung, Lewiston, Idaho, general manager. [E. R. J., Jan. 31, '14.]

Murphysboro & Southern Illinois Railway, Murphysboro, Ill.—Preliminary arrangements are being made by this company to build its 8-mile line between Murphysboro and Carbondale. The work will include one 175-ft. span single-track bridge and a 60-ft. plate girder span. The date of the letting of contracts has not been decided. Edward Flad & Company, St. Louis, Mo., engineer. [E. R. J., Feb. 6, '15.]

Pekin & St. Petersburg Interurban Railway, Pekin, Ill.—Contracts will be awarded at once by this company for the proposed reconstruction and extension of its lines in Pekin.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—Preliminary surveys will be begun in Quincy the first week in April by this company on its line between Quincy and Peoria. Work has already been begun on the eastern section of this proposed line. J. L. Soebbing, president. [E. R. J., Feb. 13, '15.]

Peoria & Chillicothe Electric Railway, Peoria, Ill.—The stockholders of the proposed electric railway from Peoria, Ill., to Chillicothe, Ill., have held their first meeting and named an executive committee of five to engage an engineer and to begin the work. The executive committee consists of E. V. Mattice, Henry T. Mallen, W. V. Burroughs, E. A. Mitchell and Arthur C. Black. This committee was given full power in matters of organization. At an organization meeting of the committee Mr. Mitchell was elected chairman and Mr. Black secretary. It is expected that work will begin upon this route shortly after March 1. The line will run from Peoria through Mossville, Rome and Chillicothe and will terminate at the Santa Fé depot in North Chillicothe.

Quincy (Ill.) Railway.—Plans are being considered by this company to reconstruct and improve some of its lines in Quincy.

Springfield & Central Illinois Traction Company, Springfield, Ill.—Plans are being considered by this company to begin work soon on its electric line through southern Illinois and Indiana, with St. Louis as the western terminus. The right-of-way has been obtained from Terre Haute, Ind., to St. Louis, and also for an intersecting line from Springfield to Duquoin, Ill. The necessary franchises have been granted. Isaac A. Smith, St. Louis, Mo., president. [E. R. J., Jan. 9, '15.]

Trenton & Mercer County Traction Corporation, Trenton, N. J.—An extension of the Warren Street and Fair Street division in Trenton, making a belt line to parallel the municipal docks, is being contemplated by this company.

Brooklyn (N. Y.) Rapid Transit Company.—The new Lutheran Cemetery Elevated Line, extending from Ridgewood depot to Fresh Pond station, has been placed in operation at once by this company.

Manhattan & Queens Traction Corporation, New York, N. Y.—Plans are under way for the extension of this company's tracks from Archer Street and Jamaica Avenue down Archer Street to Sutphin Road and through Sutphin Road to Pacific Street in Jamaica.

Cleveland (Ohio) Railway.—This company will soon ask the Council to authorize an expenditure of approximately $840,000, mainly to be used in renewing and resurfacing track in Cleveland. About 21 miles of tracks are to be renewed, 5 miles resurfaced and a $200,000 turbine installed, according to plans recently announced.

Oklahoma Union Traction Company, Tulsa, Okla.—Plans are being considered for improvements of this company's lines in Tulsa.

Berlin & Northern Railway, Berlin, Ont.—During the next few weeks this company plans to complete its ½-mile extension in Berlin.

London (Ont.) Street Railway.—Plans are being made by this company to extend, double-track and install switches on some of its lines in London.

Toronto (Ont.) Civic Railway.—Work on the civic car line on Lansdowne Avenue south from St. Clair Avenue in Toronto will be begun soon. The work will involve an expenditure of $105,000.

Toronto, Ont.—Representatives of Whitchurch Township waited on the Hydro-Electric Power Commission of Ontario Feb. 17 at Toronto, requesting that a survey and estimates be prepared of a proposed new radial railway starting in Whitchurch and extending northerly to Georgian Bay. The suggested route of the new line begins at the northern trunk of the Hydro radial proposed to run to Vandorf, along the Concession of East Gwillimbury and thence on to Queensville and Sharon, and northerly to Collingwood, via Barrie and Innisfail.

McKinney, Bonham & Paris Interurban Railway, McKinney, Tex.—Preliminary arrangements are being made by this company to begin work soon on its line between Bonham, McKinney, Paris and Blue Ridge. This line will reach Dallas by way of the Texas Traction Company's line from McKinney to Dallas. L. A. Scott, president. [E. R. J., Nov. 21, '14.]

Dallas (Tex.) Northwestern Traction Company.—At a recent meeting of the stockholders of this company directors were named who selected the following officers: E. P. Turner, president; L. M. Dabney, vice-president; Benjamin B. Cain, treasurer; George Williams, secretary, and John T. Witt, chief engineer. [E. R. J., May 30, '14.]

Dallas (Tex.) Southwestern Traction Company.—Work will soon be begun by this company on its extension from Dallas to Brownwood via Mansfield, Venus, Alvarado, Cleburne, Glen Rose, Hico and other towns. Eventually it will be extended west from Brownwood to San Angelo. At a recent meeting of the directors of this company the following officers were elected: E. P. Turner, president; S. P. Cockran, vice-president; George Williams, secretary and treasurer, and John T. Witt, chief engineer.

Ridgeley & Millerdale Electric Railway, Ridgeley, W. Va.—Work will be begun within the next few weeks by this company on the unfinished electric line in Ridgeley. John L. Miller, president of the company, has purchased a large amount of steel rails and a heavy bridge is to be placed over the Western Maryland Railway tracks near Knobley tunnel. The work on this electric line has been going on intermittently for two years. [E. R. J., Nov. 11, '11.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company has opened its new depot in Culver City.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—During the next few weeks this company expects to build a new carhouse with an addition to be used as a power house and office building in Lewiston.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has opened headquarters in the Rorabaugh-Wiley building in Hutchinson.

Boston & Worcester Street Railway, Boston, Mass.—This company's carhouse in Westboro was destroyed by fire on Feb. 18. The loss, which includes ten cars, is estimated to be about $100,000.

Detroit (Mich.) United Railway.—The building at Jefferson Street and Bates Street in Detroit is being remodeled by this company for use as an interurban station and general offices. It is expected to have this structure completed within the next four months. To make use of the new building a re-routing of interurban cars will be necessary.

POWER HOUSES AND SUBSTATIONS

Mobile Light & Railroad, Mobile, Ala.—This company will add to its equipment a two-unit, two-bearing, 150-kw generator booster set ordered from the General Electric Company.

San Joaquin Light & Power Company, Bakersfield, Cal.—New machinery is being installed by this company at its substation in Madera.

Lewiston-Clarkston Transit Company, Lewiston, Idaho—During the next few weeks this company expects to purchase one 125 motor-generator set for its power house in Lewiston.

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.—This company has ordered from the General Electric Company three substation equipments for the electrification of its second locomotive division between Three Forks and Harlowton, Mont., each equipment consisting of two 2000-kw motor generator sets with transformers and switchboard apparatus. These sets are to be duplicates of those covered by the previous order.

Norfolk & Bristol Street Railway, Foxboro, Mass.—This company has bought sixteen General Electric 200 C motors for its power house.

Texas Traction Company, Dallas, Tex.—This company will place in operation in substations seven 200-kw and four 300-kw synchronous converters with switchboards and accessories, the contract for all the apparatus having been awarded the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Montoursville, (Pa.) Passenger Railway is rebuilding cars.

Grand Forks (S. D.) Street Railway expects to purchase shortly one motor and one trailer.

Buffalo & Depew Railway, Depew, N. Y., expects to purchase one second-hand double truck for a work car to be built in its own shops.

Ogdensburg (N. Y.) Street Railway expects to purchase within the next six weeks four one-man pay-as-you-enter cars with two-motor equipments.

Sausalito (Cal.) Incline Electric Cable Railway will soon call for bids on cars for its new incline railway. A. E. Roberts, Sausalito, Cal., is engineer.

Lewiston-Clarkston Transit Company, Lewiston, Idaho, expects shortly to purchase about three or four cars, probably double-truck, and very likely second-hand.

New York, Westchester & Boston Railway, New York, N. Y., has issued requests for bids on fifteen new cars of the same general type as those already in operation on this line.

Wilkesbarre & Hazleton Railway, Hazleton, Pa., will issue specifications next week for ten all-steel cars. The cars are designed by L. B. Stillwell, consulting engineer, 100 Broadway, New York.

Boston & Worcester Street Railway, South Framingham, Mass., at the recent fire which destroyed its carhouse on Feb. 18 lost ten of its modern double-truck cars, as noted in detail elsewhere in this issue.

Atlantic City & Shore Railroad, Atlantic City, N. J., is at the present time converting two of its open running-board cross-bench cars into open cars of the center-entrance type with the prepayment feature, at its own shops.

Hagerstown & Frederick Electric Railway, Frederick, Md., is reported as expecting to purchase two 50-ft. 50-passenger cars for operation between Hagerstown and Frederick and one pay-as-you-enter car to be used on the Hagerstown system.

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill., has ordered nine additional 260-ton electric locomotives from the General Electric Company, for operation on the second engine division of its new electrification, between Three Forks and Harlowton, Mont., a distance of 114 miles.

Southern Public Utilities Company, Charlotte, N. C., has ordered from the Southern Car Company six 40-ft. semi-steel closed passenger cars, to be delivered in 90 days. These cars will be mounted on 39-E Brill trucks with rolled steel wheels and equipped with two GE-80 motors and Westinghouse air brakes.

Toronto (Ont.) Suburban Railway is in the market for six steel 55-ft. motor cars. The company wants only the bodies and trucks, the equipment having been purchased and delivered some time ago. The company is also in the market for five steel 55-ft. trailers. All these cars are for use on the Guelph line extension which it is intended to open up this summer.

TRADE NOTES

The J. G. Brill Company, Philadelphia, Pa., its organization, history and growth, is the subject of a descriptive article in the *Philadelphia Public Ledger* of Feb. 17, 1915.

Ohio Brass Company, Mansfield, Ohio, has received an order for porcelain insulators for the secondary catenary insulation of the Chicago, Milwaukee & St. Paul Railroad's second electrified section between Three Forks and Harlowton.

Walpole Tire & Rubber Company, Walpole, Mass., will, by order of the court, offer its property for sale at Walpole on March 10, 1915. This company was placed in the hands of receivers on Aug. 2, 1913, on account of the failure of the Atlantic National Bank, Providence, R. I. During the period of receivership manufacturing and sales operations have been carried on at a profit for each month's operations. It is expected that the company will continue to carry on business in a vigorous manner after the sale. F. Y. Stewart is general sales manager. Branch offices are maintained at New York and Chicago.

H. C. Hopson, member of the District of Columbia Bar and certified public accountant, Wisconsin, formerly with the Wisconsin Tax Commission and the Interstate Commerce Commission, has severed his connection of upward of six years with the New York Public Service Commission, Second District, where he was in charge of all financial and accounting examinations relative to capitalization, rates and reorganization and has opened an office in Suite 2425, 61 Broadway. Mr. Hopson is prepared to advise about or undertake general supervision of financing, rates, reorganizations, accounting and valuations of public utilities and railways.

Ford, Bacon & Davis, New York, N. Y., have just issued in pamphlet form, an account of the large cotton-warehouses and terminals in New Orleans, built and operated by the Board of Commissioners of the port of New Orleans, of which they were the engineers. In addition to the large size of these warehouses, the principal feature is the method of internal transportation and handling of the cotton bales. For that work the engineers have introduced a liberal system of electric cranes and elevated railways as well as designed a method of withdrawing one or more bales from the bottom of a pile without disturbing the other cotton in the pile. The New Orleans papers speak of the installation as representing great originality and efficiency in its engineering.

Roller-Smith Company, New York, N. Y., has recently made an improvement in the sensibility of its galvanometer for its direct reading bond tester, which was described in illustrated articles which appeared in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, page 682, and Sept. 15, 1914, page 442. It is essential that the galvanometer in an instrument of this type be as sensitive as possible in order that the highest accuracy may be obtained, but at the same time it is not practical to increase sensibility to the point where ruggedness of design is impaired. An instrument of this type is necessarily subjected to more or less rough usage, and this company has incorporated into the instrument a galvanometer in which high sensibility, and therefore accuracy, and ruggedness of design have been unusually developed.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., reports the receipt of the following recent orders: Interborough Rapid Transit Company, six No. 302-F-2 field control motor equipments, equipped with automatic battery control, for the new Belmont Tunnel; Oakland, Antioch & Eastern Railway, equipments of quadruple No. 333-E, 100 hp motors and HL control, duplicating previous orders; Los Angeles & San Diego Beach Railway, Westinghouse No. 317 motors with automatic control, for a number of motor cars, locomotives and trailer cars which they will shortly place in service and operate in trains during the Exposition at San Diego; Hershey (Pa.) Transit Company, several quadruple equipments of No. 101-B-2 motors, duplicates of those purchased last year; Public Service Railway Corporation, thirty-five quadruple equipments of No. 307 motors with HL control, for use on city lines throughout the Newark district and arranged for train operation. This company has standardized on this type of control and has purchased to date 223 equipments for operation on both city and interurban lines.

ADVERTISING LITERATURE

Prepayment Car Sales Company, New York, N. Y., has issued a highly attractive-looking folder entitled "Might."

Electric Service Supplies Company, Philadelphia, Pa., has issued an attractive folder listing, describing and illustrating "Never-Creep" anchors. Some claims made for this new anchor are that it will not creep because the entire pull is made against undisturbed earth, and that it is easy to install. In this folder the illustrations compare the effectiveness of the different anchors now most popular with that of the "Never-Creep."

Williams, Dunbar & Coleman, New York, N. Y., have issued the second number of their four-part series entitled "Short Stories of Public Utilities." This pamphlet deals particularly with the growth of gas and electric light properties, but in describing the investment value of specific companies includes the following known to the electric railway industry: American Power & Light Company, Portland Railway, Light & Power Company and the Pacific Gas & Electric Company.

Newark Engineering Manufacturing Company, Newark, N. J., has issued a folder which contains illustrations and data on "Shaw" insulators, third rail and line suspension composition insulators. Illustrations are shown of different types of insulators, as installed on the following railways: New York Central & Hudson River Railroad, Third Avenue Railway, Pennsylvania Tunnel & Terminal Company, Long Island Railroad, Interborough Rapid Transit Company, Hudson & Manhattan Railroad.

Wm. B. Scaife & Sons, Pittsburgh, Pa., have issued a folder describing its "We-Fu-Go" water softening and purifying system for boiler feed water in power stations. Views are shown of installations of this system by the Harrisburg (Pa.) Railways and the Bay State Street Railway. Among other railways which have installed this system are: Dayton & Western Traction Company, Rochester (N. Y.) Railway & Light Company, Auburn & Syracuse Electric Railway, South Covington & Cincinnati Street Railway, East Liverpool (Ohio) Traction & Light Company, Rochester, Syracuse & Eastern Railway, Pittsburgh & Butler Railway.

Electric Railway & Tramway Journal, London, England, has issued a large bound diary for 1915. A preface to the diary contains a number of useful tables and data helpful to English and Continental electric railway practice, on such subjects as rails dimensions and weights, thicknesses and equivalent weight per foot for steel plates, town planning in relation to tramways and diameters, area, resistance and weight of aluminum conductors. In the diary section opposite each date of the year is given the proper lighting up time for English railway operators, which is one hour after sunset, Greenwich time. The greatest practical reference value of the diary consists in its directory section, which contains details of the personnel of British and foreign electric tramways.

Stone & Webster, Boston, Mass., have issued their 1915 analysis of electric railway, electric lighting, gas and water properties managed by the Stone & Webster Management Association. The book, which is leather-bound and eighty-four pages in length, contains information regarding the security issues of each one of the companies, the coupons, dividends, trustee and registrar of bonds, transfer agents, mileage, franchises, population, and earnings and expenses for the year ended Dec. 31, 1914. Maps of the leading properties are also inserted. At the back of the book there are placed tables showing coupons and dividends due, the earnings and expenses of all of the companies for the fiscal year, the approximate income from stocks paying from 4 to 10 per cent and 5 and 6 per cent bond interest yields.

Harrison Safety Boiler Works, Philadelphia, Pa., has issued a twenty-page pamphlet which describes the Sorge-Cochrane hot process system of softening boiler feed water. This process is based upon the fact that chemical reactions are more rapid and complete in hot water than in cold water, and the precipitate less soluble and coarser, so that it settles more rapidly. It is claimed that for these reasons more complete elimination of scale-forming matter is possible with an apparatus of a given size and with a given amount of excess reagent than if the water be treated cold, and that since the boiler feed water should be heated in any case, the hot process is the logical system to use for preventing scale in boilers. The fact, which has been deduced from reports by boiler inspection and insurance companies, that over fifty per cent of all boilers in use are defective by reason of the use of scale-forming water, should render this booklet of interest to owners and operators of steam power plants.

NEW PUBLICATION

Annuaire pour l'An 1915.—Published (in French) by Gauthier-Villars et Cie., for the Bureau des Longitudes, Paris, France; paper, 1 fr. 50c.

This French year-book, published as usual in pocket size, serves as an almanac for general scientific information and contains various tables on weights and measures and other statistical data.

Electric Railway Journal

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Consolidation of Street Railway Journal and Electric Railway Review

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AS TO HOLDING BRIEFS

Some good friends of the Journal have taken exception to the editorial—"A Brief for the Railways"—which appeared in a recent issue. The exception is taken on the ground that we should not hold a brief for any interest. This is on the theory that a brief in this sense means a one-sided presentation; that it means special pleading and in general a declaration of "My country (or its electric railways), right or wrong!" This, however, was not our idea. The Journal is the voice of the electric railway industry. When this industry is unfairly attacked the Journal seeks to defend; but when policies or individuals go wrong it is the Journal's business to point out the error. The principal aim to be accomplished is a better understanding of the problems of the electric railways both by themselves and others. In these problems we include questions in respect to their construction, equipment and operation and also those of public policy. Anything that will aid in bringing about this understanding—whether it is defense, criticism or merely exposition—is a part of the brief that we hold for the electric railway industry. Owing to the fact that misunderstanding is rife and attack not infrequent, it may occur that the Journal will often be placed in the attitude of defense, but always, it is to be hoped, defense of the right.

RATIONAL UNITS IN THE BOILER ROOM

The communication from H. G. Stott, published elsewhere in this issue, constitutes the strongest argument of which we can conceive for the abolition of the unit, "boiler horse-power." In this Mr. Stott points out that there are two uses for the term, one being to rate boilers in making purchases, and the other being to measure outputs of steam-generating apparatus. In both cases there are introduced material disadvantages, of which the imposition of unnecessary labor in engineering calculations (owing to the odd value of the unit) is certainly worth consideration by all engineers. The term has been perpetuated in part by its appearance in boiler-maker's catalogs, although its effect is modified by the practice of the best manufacturers in specifying the area of heating surface that applies to each rating. But in the main it is the use of the "boiler horse-power" in the standard boiler-testing code of the American Society of Mechanical Engineers that offers the real obstacle to the adoption of a rational unit. In the "short" code the term "boiler horse-power" appears twice, once as the "manufacturers' rating" and once to express the actual output of the boiler under test, and as the society has now completed the monumental work of standardizing a code for boiler construction, the time seems most opportune for a revision of the testing code as well. Even if opposition to the myriawatt (or some other rational unit) should prevent its use in such a revision, the testing code at least will be better off with the two references to boiler horse-power eliminated altogether.

NEW YORK ASSOCIATION MEETING

That the quarterly meeting of the New York Electric Railway Association held this week at Lake George was unusually successful was due in large part to the plan used in producing the program. That it was a profitable meeting was attested by all present, one long-time convention goer stating that he had never voluntarily sat so continuously at a meeting of the association before. The device employed by President J. F. Hamilton was as follows: Three topics of vital interest were selected for discussion and two of these were assigned to two members with the request that they prepare brief papers suitable for opening the discussion. Copies of these were distributed to all members with the request that three-minute contributions be prepared in advance and delivered at the meeting. The result was that the available time was not sufficient for the presentation of all of these and for the expression of ideas spontaneously developed during the discussion. The advantages of this plan are that it insures a considerable reading of the papers in advance, these being brief and calculated to bring out differences of opinion; it encourages members unaccustomed to speaking to venture on a small scale; it permits the prompt launching of discussion at the meeting, and it minimizes the amount of rambling discussion which always accompanies lack of preparation. The plan is especially well adapted to the smaller associations at whose meetings a large proportion can have the floor if they do not want to keep it too long.

ENCOURAGING SIGNS FOR THE RAILWAYS

It is encouraging to have such utterances from high officials as those presented at the Indianapolis meeting last week of the Central Electric Railway Association by Governor Ralston of Indiana and Chairman Duncan of the Public Service Commission. Both are evidences of a saner view of the functions of the railways, which is becoming, we believe, more general. Both of these gentlemen, in representing the public, spoke about the responsibility of the railways to give good service, and if this was done the willingness of the public to grant rates that would furnish a reasonable return on a fair capitalization. Requests from the railways for an increase in fares must be justified by a presentation of the facts, but Mr. Duncan, in his interesting analysis of the financial reports of the Indiana roads, showed that on the copper-zone basis the returns should be about 6 per cent on a capitalization per mile of track, which does not differ greatly from the actual capitalization of a considerable number of the interurban companies. Finally, Governor Ralston stated in unequivocal terms that it was his intention to recommend to the Legislature that it empower the Public Service Commission to authorize an increase in the passenger fares not to exceed ½ cent per mile. These expressions, coupled with the recent fare decisions in the cases of the Rochester and Schenectady railways in New York, the Middlesex & Boston fare decision in Massachusetts and the Manchester fare decision in New Hampshire indicate that the public is beginning to realize the importance to its general welfare of a prosperous condition of its transportation companies.

METERS AND MANAGERS

In the issue of Feb. 27 we discussed under the heading of "Meters and Men" the desirability of judging the men with due regard to the number of stops. Another and really fundamental aspect of the car-meter problem is found in the different attitudes of the managers who buy electrical energy and of the managers who make it. Talks with the class first mentioned bring out the fact that they appreciate the energy-saving possibilities of the meter, and if they are not enthusiastic meter users they are at least ripe for a demonstration. On the other hand, talks with the second class develop a certain degree of skepticism. After all it is not difficult to account on purely psychological grounds for these differences in opinion. The manager who buys energy gets a distinct shock once a month when the power bill is presented to him for payment. Writing big checks is painful exercise. Therefore, anything that promises an immediate reduction is examined at once and will usually get a chance to make good. But where the railway generates its own power the effect of the meters is not so direct, although the saving might be in the same ratio. A difference of a few dollars in each of the many accounts of the power department would hardly be noticed on the individual invoices, yet the aggregate for a year would be very large. The fuel saving is the one large and conspicuous item, but even this would not reach its maximum until the operation of the power machines had been adjusted to meet the new conditions. Thus it is that one manager sees waste in all its hideous nakedness while from the sight of the other it is screened by a maze of accounting detail. Let the meter question be faced with an open mind, no matter what the power situation is. As we said years ago in these columns, it is as absurd to allow a motorman the unchecked use of electricity as it would be for an electric lighting company to discard meters and charge all of its customers a uniform rate independent of the amount of energy which they used.

THE AUTOMOBILE AND THE INTERURBAN

One of our subscribers, in calling our attention to the astonishing growth of the automobile industry, asks whether the 1,735,000 motor cars reported by *The Automobile* as being registered in the United States do not constitute a disturbing factor of serious import in our economic life. The figures are, at least, worth consideration, for the cost of these machines is approximately $1,500,000,000. Last year's output alone is reported to have been 515,000 cars with a value of nearly half a billion dollars, and the expense of operating the cars in service during the same twelvemonth may be estimated at another half billion.

Undeniably, these are enormous sums to be turned into the very restricted channel of a single industry, especially when it is considered that only about 7 per cent of the total number of cars in service can be classed as commercial, or useful, vehicles. Indeed, the manufacture of motor cars has now reached first place among the great "non-productive" industries of the world, as it absorbs without bringing anything definite in return, a far greater sum annually than is spent for tobacco, confectionery, or the "movies." As a means for diverting surplus cash from the savings banks it even exceeds, by a 20 per cent margin, the cup that cheers and sometimes (if taken with sufficient frequency) inebriates.

We shall not attempt here to analyze the economic effect of this expenditure of such a large part of the wealth produced annually in this country, nor attempt to decide whether it has increased the general cost of living, as has been claimed, or whether the greater part of the money thus spent is not simply diverted from other non-productive channels. We are more interested in the effect on the electric railway industry, and here the outlook is not altogether reassuring.

Competition from automobiles can come, of course, from the commercial car or the private car. So far as the former is concerned, we have already expressed our opinion that the independent car cannot compete with the trolley car in cheapness of operation, where the traffic to be carried is sufficient to warrant the installation of an electric railway system. For this reason, in all places where the franchise conditions for the two classes of transportation are at all equal, there is no great danger from the automobile bus.

With private cars the situation is somewhat different. In their case the electric railway company not only loses the fare of the owner of the automobile and of his family, when they make business trips, but often even those of his friends, when they are traveling in the same direction and the owner places the unoccupied seats in his car at their disposal. Both city and interurban roads report that they have lost some fares from this cause, but probably the interurban lines have lost most, owing to the many indirect restrictions on the use of automobiles in city streets, especially when congestion is present.

Unfortunately there is no direct way of determining the extent to which the interurban roads have lost passenger travel from this competition of the private automobile. However, in the strictly farming states of North Dakota, Kansas and Iowa there are respectively 7.5, 8.3, and 4.8 families per motor car owned, while in New York, Massachusetts and Delaware, where the population is largely an urban one, the corresponding figures are 12.7,11 and 15. Manifestly this indicates that the farmers are buying automobiles, and if they once have them they are likely to use them even though they may be a costly means for transportation.

As to what can be done to meet this new form of competition, the most obvious procedure (and apparently the only one) is to explain the facts to the public. The automobile offers the one great advantage of convenience, but to offset this the interurban offers speed and cheapness. Between towns an electric car ought easily to outrun a motor car in the hands of anyone but an expert or a lunatic, and for the light, cheap cars so generally sold in rural districts a speed of 30 m.p.h. is about the maximum under any circumstances. In the matter of cost, even the light automobiles will average some 6 cents per mile, at least, against the 1.5 cents or 2 cents charged on the interurban. If the farmer realized this, as he could be made to do by a small amount of publicity consistently and continuously applied, it seems reasonable to expect that, after the novelty of the automobile has worn off, it will cease to be a competitor except for very short distances or in the almost impossible cases where four or more people were invariably carried. On the other hand, the conveniences of the automobile will cause many people to reside in the country, a fact which should ultimately be of benefit to the interurban electric railway in both its passenger and freight business.

CALCULATION AND JUDGMENT

Last week under the caption "Relation of Theory and Practice" we pointed out what we consider the relative positions of "cut-and-try" and mathematical solutions of every day problems. The argument therein set forth was that better use should be made of the skill in calculating, which a large part of our educational system is designed to develop. We can go farther in this direction and state that skill in calculation is essential to progress. Its relation to the exercise of judgment, however, must not be overlooked. When a designer makes a study for a bridge truss he first assumes certain conditions of loading and calculates the proportions of parts to exactly meet these conditions, at the same time allowing "factors of safety" which his trained judgment dictates to be prudent. Calculating skill and practical experience thus go hand in hand.

Another example may be quoted from the electric railway field. A certain company wished to secure capital for an important extension. Well-considered plans were laid before the bankers by the railway engineer of way. The proposed rail section appeared light to the bankers, who referred to the practice of certain other roads in using much heavier rail. The engineer asked the bankers how they knew that the heavier rail section was better and received an evasive reply. In his turn he protested that he knew what he was talking about because he had calculated accurately the necessary size of rail. Of course the bankers, being good bankers, deferred to the engineer's judgment because it, unlike theirs, was based upon calculation. His contention was that, in this case at least, the lighter rail was safe and economical if the track was properly maintained, and he proposed to see that it was so maintained. This indicated that he was not blindly following the results of calculation but had considered all factors involved.

The whole matter can be summed up thus: Calculation must be the basis of judgment and not a substitute for it. Again, calculation enables one to pioneer on the frontier of industrial progress on the basis of past experiences. It is only a question of time when rule-of-thumb methods must be relegated to the limbo of inefficiency.

SYNDICATED WELL-POISONING

Railway men will read with mixed emotions the article on another page describing the circulation by a newspaper syndicate of articles deliberately fabricated to create anti-railway agitation. It is to be noted that these articles were not written to describe or to hit any particular situation; they were not inspired by abuses or bad service. They are "canned" agitation, prepared with a view to pleasing any editor anywhere who may find that the war news is getting dull and who is on the look-out for something more exciting. So far as we have observed, this matter has not had wide-spread circulation but has been published sporadically.

The fact of primary interest in this connection is that a syndicate is found to be circulating libels almost as comprehensive as the declaration that "all men are liars." And for the light thrown on one method of poisoning the well-springs of public opinion we cannot be too grateful. We have here a fine exhibit of how an anti-railway campaign may be started. The syndicate or "press association" sees a prospect of making a few dollars by capitalizing a belief that it will be popular almost anywhere to "roast" the electric railway company. If the idea appeals to the editor in goes the syndicate's plates. And the "war of the strap hangers" is on—on paper. The syndicate has made a dollar a column, and the newspaper has filled its space, but what about the reader and the railway? One has been swindled by a stereotyped fake, and the other has been exploited and defamed for the profit of the syndicate and the newspaper.

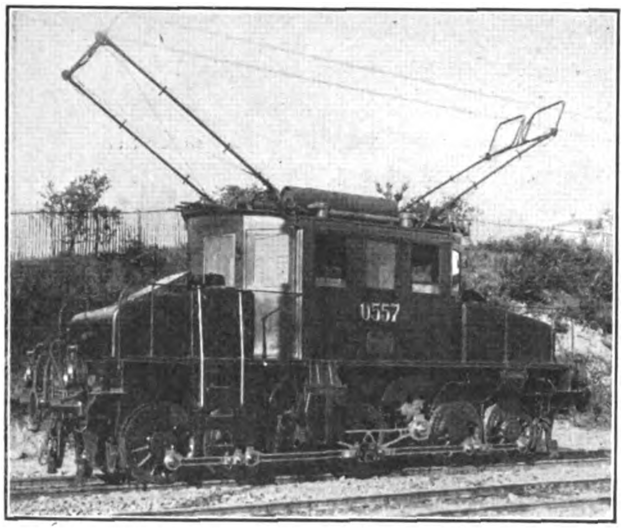
There is quite enough home-made agitation, with and without cause or reasonable basis. It is beyond toleration that agitation should be made to order and sold by the inch or the pound. The more important and influential dailies are not likely to print matter of this description, but wherever it appears it should be protested against and exposed. The typographical earmarks of ready-to-print agitation are not difficult to recognize. Wherever they are noted it will aid in exposing attacks of this nature to send newspapers containing them to the ELECTRIC RAILWAY JOURNAL.

Some Results of Italian Three-Phase Electrifications

The Writer Shows from Operating Curves and Statistics of the Original Giovi Three-Phase Electrification That Regeneration in Practice Has Saved $19,000 a Year at the Coal Pile Regardless of Brakeshoe and Other Savings

BY G. PONTECORVO, EAST PITTSBURGH, PA.

Some of the results of three-phase electrifications in Italy are already well known in this country, but some very interesting results and tests have recently been carried out by the Italian State Railway* and are worth a brief description. They were conducted on the old Giovi line, which is the most important of all the lines electrified by the Italian State Railways on account of its heavy traffic and steep grades.



THREE-PHASE IN PRACTICE—FIG. 1—STANDARD LOCOMOTIVE OF GIOVI LINE

The three-phase electrifications of the State Railways in Italy now aggregate approximately 417 miles of track, and approximately 300,000-hp capacity of three-phase locomotives are already in service or on order. The electrified portion of the Giovi line is 14.4 miles long with 38 miles of track. It has a maximum grade of 3.5 per cent on a curve and has seven tunnels, of which one is 2.02 miles long with a 3 per cent grade. The importance of the line and the traffic handled on it are indicated by the statement that the electric equipment was designed for trains every ten minutes. The line has a parallel subsidiary which is also double track. This line is also electrified with the same system of traction.

THREE-PHASE ELECTRIC RAILWAY LINES IN ITALY.

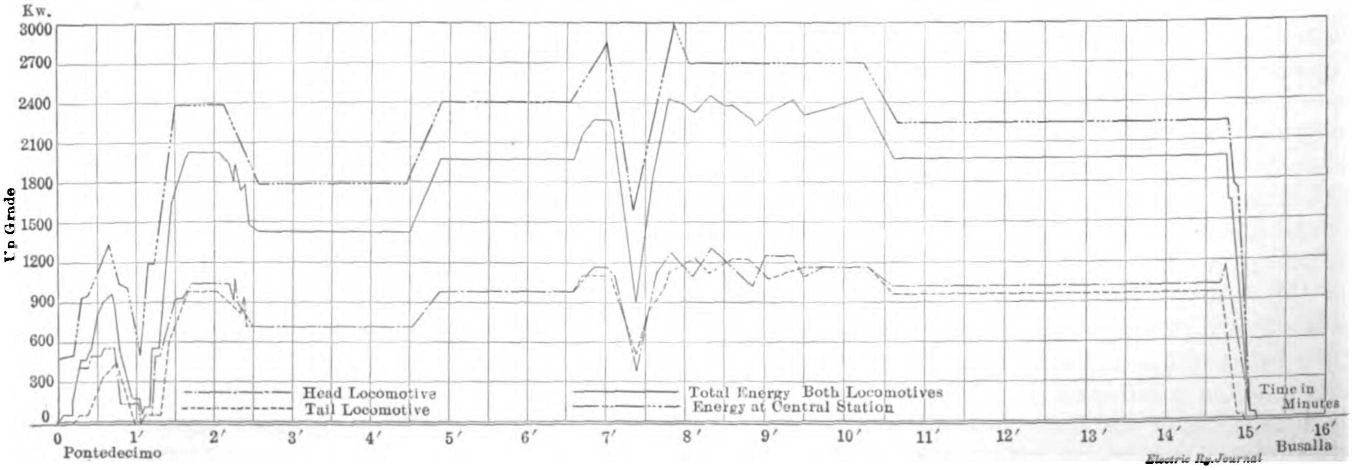
Lines.	Opened for traffic.	Length of Tracks in Miles. Single track.	Double track.	At stations.	Total.
Valtellina	1902	65.8	....	12.3	78.1
Giovi (old) including Branch Line	1910-1913	....	17.6	38.5	105.6
Giovi (subsidiary)..	1914	....	15.5		
Savona-Ceva	1914	28.3	....	15.1	43.4
Monza-Lecco	1914	19.3	4.3	12.4	40.4
Mt. Cenis:					
Bussoleno-Bardonecchia	1912	14.7	10.5	12.4	71.7
Bardonecchia-Modane	1914	....	11.8		
*Simplon Tunnel ..	1907	12.4	....	1.9	14.3
Turin-Pinerolo	Being Electrified	23.6	....	7.5	31.1
†Sampierdarena-Genoa	"	....	3.7	3.7	11.1
Sampierdarena-Savona	"	24.8	....	10	34.8
Total length of tracks					431.5

*This line runs on Italian territory for half of its length only and is operated by the Swiss Federal Railways.

†This line is the connection of the Giovi lines to Genoa Stations.

REGENERATION OF ENERGY

The principle of the regeneration of energy by a polyphase induction motor is very well known and is common to other types of electric motors, such as the d.c. shunt motor. However, the induction motor has the advantage of greater simplicity of construction, allows the use of higher voltages and is more automatic in its operation. When a polyphase motor is inserted on a line, it will absorb electric power and deliver mechanical energy. But as soon as by external means the speed of the rotating part is increased above the synchronous speed, without having to change the direction of the field the motor will pump current back into the



THREE-PHASE IN PRACTICE—FIG. 2—ENERGY REQUIREMEN TS OF TRAIN WITH TWO LOCOMOTIVES HAVING THE SAME WHEEL DIAMETER AND WITH RHEOSTAT SHORT-CIRCUITED line. This characteristic of the induction motor is playing a very important part in railway electrification, as shown by the results hereinafter described. The tests to which we shall refer have been made principally on the Pontedecimo-Busalla section, or the one with the steepest grades on the old Giovi line.

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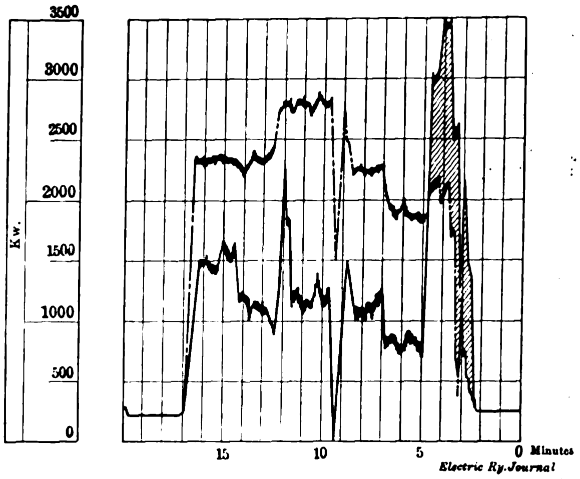
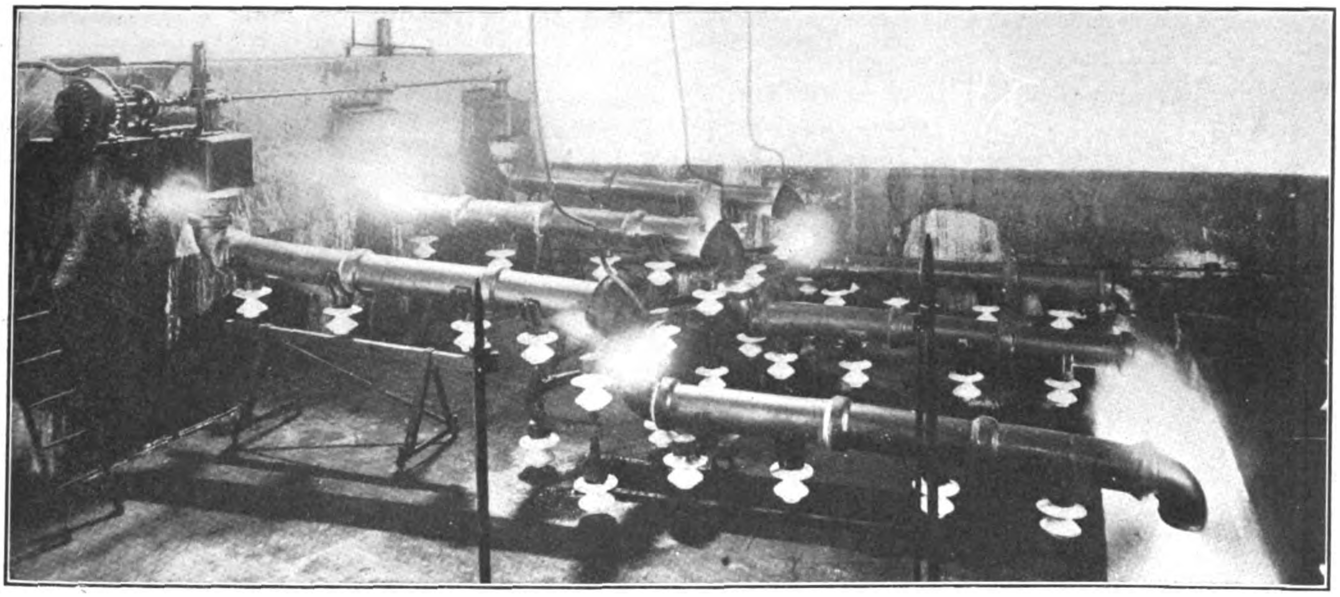
*Revista Tecnica delle Ferrovie Italiane, Anno III, Vol. 5, No. 1. "Operating Results on the Old Giovi Line," F. Santoro and L. Calzolari.

The locomotives, Fig. 1, used have the following characteristics: Five coupled axles; weight, 60 metric tons, all available for adhesion; two 3000-volt, fifteen-cycle, three-phase, 2000-hp motors; motors which can be connected in cascade or in parallel to obtain two speeds, namely 14 m.p.h. and 28 m.p.h. The contact line is at 3000 volts, and the motors are used direct on the line and without transformers. The main transmission line is three-phase, 13,000 volts, with four substations each equipped with four single-phase transformers, 13,000/3000 volts, of which one is a spare. The central station is near Genoa and has two 6000-kva turbo alternators.

If now we compare the energy absorbed and regenerated by a train of normal composition when running at 28 m.p.h. and at 14 m.p.h., we find from actual runs that the regenerated energy represents respectively 47 per cent and 46 per cent of that absorbed by the train when going up grade. For a train hauled up grade by two locomotives at a speed of 28 m.p.h., with the expenditure of energy shown in Fig. 2, the regenerated energy amounted to 54.5 per cent of the absorbed energy; that is to say, on this section of the line the trains coming down grade regenerate more than half of the energy they absorb when going up grade. If we assume only two trains on this section, one ascending and one descending, Fig. 3 shows respectively the energy absorbed, the energy regenerated and the difference between the two.



THREE-PHASE IN PRACTICE—FIG. 3—PROPORTION OF ENERGY ABSORBED AND REGENERATED

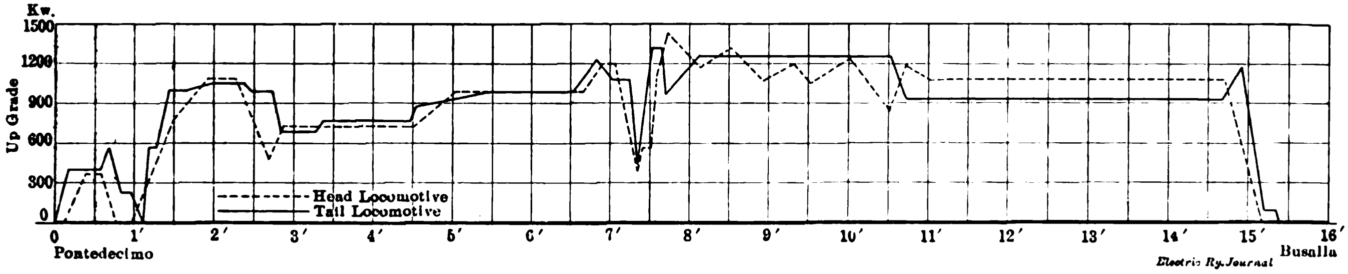


THREE-PHASE IN PRACTICE—FIG. 4—WATER RHEOSTAT AT CENTRAL STATION DISSIPATING REGENERATED ENERGY

But, as already mentioned, the really important figures are those which represent the saving effected by regeneration in the energy produced at the central station. This saving, of course, depends on the total traffic in both directions and on the way the schedule is arranged for a given service. The Giovi line is not particularly fortunate in this respect, as most of the traffic is in the up-grade direction, the trains on the down grade being composed mostly of empty cars. The energy generated at the central station for a train service according to schedule with and without regeneration of energy on the trains down grade shows a saving for the former of 3160 kw-hr., or 3160 ÷ 22,650 = 14 per cent of the generated energy. Although this energy is not a very large amount, yet the saving in actual money is fairly large as the electric energy is produced by a steam plant and the cost of coal in Italy is rather high, approximately $6 a ton. In this case the saving for a year was 3166 tons, or approximately $19,000. All this shows the distinct advantage of polyphase motors for this class of service as they are highly efficient, can develop very high torques and are very light.

Advantages of Regenerating Apparatus

There are many cases where a three-phase electrification, if properly arranged, can take care of an enormous traffic with a very small central station and a minimum expenditure of energy. We refer particularly to lines with steep grades where most of the heavy traffic is on the down grade. But regeneration has other advantages, of which one is a reduction in the size of the generator at the central station and a better load factor on it and on all of the auxiliary apparatus. Another is the saving in brakeshoes and in the wear of the rolling stock. Trains driven by a three-phase locomotive when going down grade and regenerating do not need to use any brake. Brakes are used only for coming to a dead stop quicky and for safety. When regenerating, the locomotive cannot exceed the synchronous

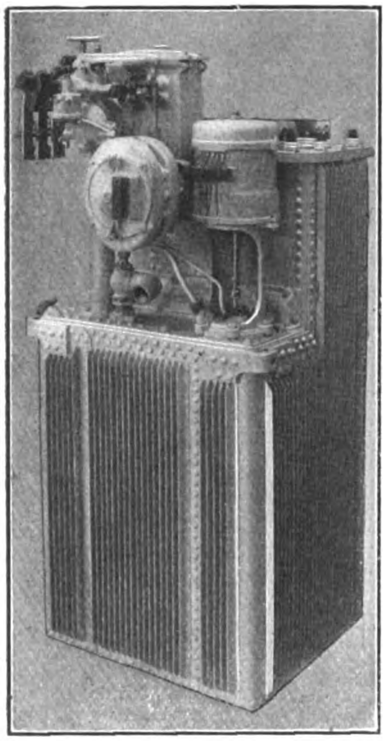


THREE-PHASE IN PRACTICE—FIG. 5—RHEOSTATIC REGULATION OF LOAD OBTAINED WHEN THE DIFFERENCE IN THE WHEEL DIAMETER OF THE TWO LOCOMOTIVES WAS 1.41 IN.

speed plus the slip, which is but 2 or 3 per cent, and the composition of the trains on the down grade is such as to regenerate an energy equivalent to that absorbed on the up grade.

For a short time the electric service on the Giovi line was operated without regeneration, as the safety water rheostat of the central station was not ready for operation, and during this time the average life of the locomotive brakeshoes was 7455 km, or 4620 miles. Since regeneration began the average life of brakeshoes has increased to 22,969 km (14,200 miles), or more than three times. The locomotive has twelve brakeshoes, and as the saving includes not only the cost of the shoes themselves but the cost of replacing them in labor and time saved by keeping the locomotive in commission the gain is considerable.

Under normal conditions the safety water rheostat of the central station is never in operation, but it is a kind of safety valve to take care of the regenerated energy at the central station should this energy be larger than that absorbed. Such a condition can occur through a disarrangement of the schedule by which more or heavier trains will be descending than those ascending.



THREE-PHASE IN PRACTICE—FIG. 6—LIQUID RHEOSTAT

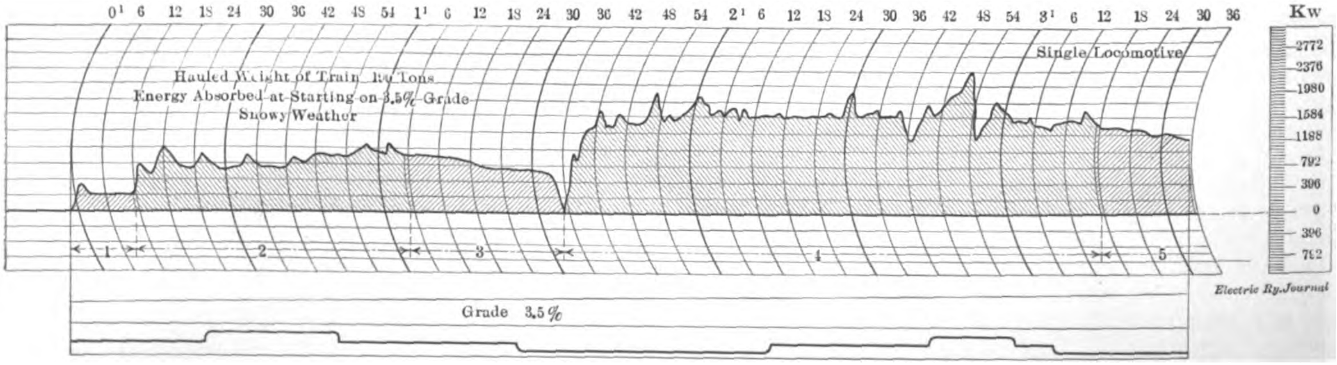
The rheostat consists of three clay tubes, through which condensing water can circulate. Three bare copper wires connected to the primary line at 13,000 volts are brought in contact with the water circulating in the rheostat. A small induction motor automatically opens the valve to admit the condensing water every time energy is sent back to the central station from the line, the rheostat being connected in parallel with the generators. This rheostat is situated in a pit in the central station, Fig. 4, but of course for most of the time is not in operation.

Other advantages of electric braking are the increased life of rolling stock, especially of couplings, due to the smooth running down grade at constant speed.

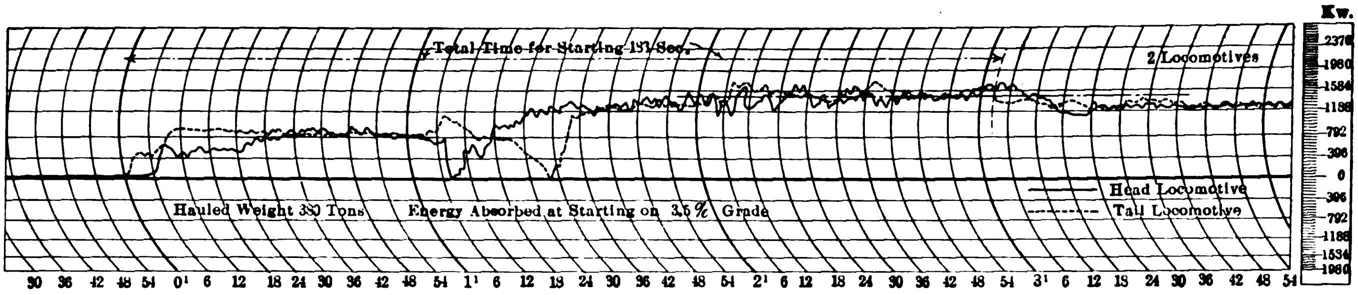
Last but not least is the record of interruptions. During the year 1911-1912 there were only five interruptions of supply in excess of ten minutes. Not one reached an hour, thus showing that the regeneration of energy gives better operating conditions because of the reduction effected in peak loads.

EQUALIZATION OF LOAD ON TRAINS WITH TWO LOCOMOTIVES

Some doubts have been expressed, even by electric traction engineers, as to the operation of three-phase locomotives in multiple, in case there should be a wide difference in the wheel diameters of the locomotives. It has been held that such a difference would distribute the load unequally. This problem has been solved by the employment of the liquid rheostat used to start the motors. When a train is being hauled up grade by more than one locomotive, the rheostat is not fully short-circuited in the locomotive with larger wheel diameter, and when two locomotives are operating on the down grade (and regenerating) the rheostat is not fully short-circuited on the locomotive with the smaller wheel diameter. How close it is possible to equalize the load on the locomotive by this method is shown by Fig. 5. Fig. 2 shows that the load is well equalized on two locomotives (one pulling and one pushing) of the same wheel diameter. The same applies when the locomotives are regenerating. Fig. 5 shows an extreme case, the two locomotives having 1.41 in. difference in wheel diameter. Even then the difference of load



THREE-PHASE IN PRACTICE—FIG. 7—REGULATION OBTAINED FOR SPEEDS UP TO 28 M.P.H.



THREE-PHASE IN PRACTICE—FIG. 8—OPERATING CHARACTERISTICS OF A TWO-LOCOMOTIVE TRAIN

(average) was less than 2 per cent with an instantaneous variation of 8 per cent. Of course this method of equalizing the load requires a small loss in the rheostat, but as in actual practice the difference between wheels is seldom very large, this loss is practically negligible. As this method does not require any complicated connection or difficult operation or a train line between the two locomotives, it can be considered very satisfactory.

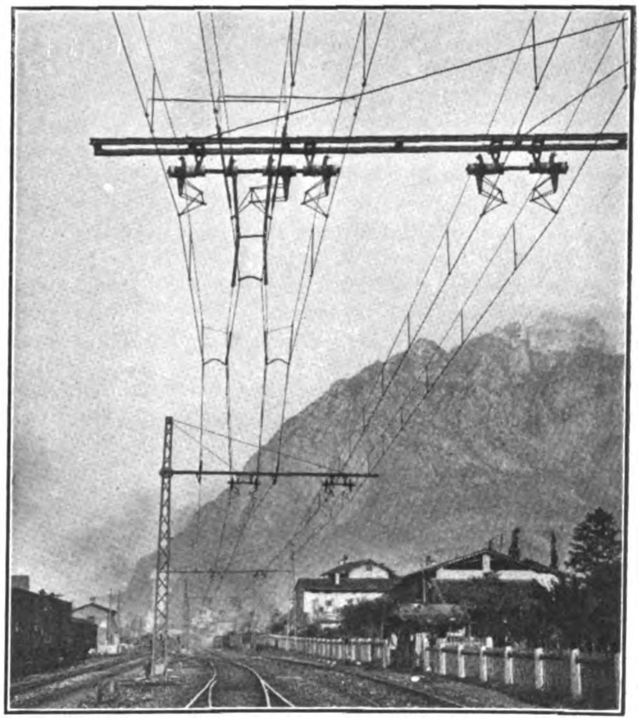
ANALYSIS OF STARTING CONDITIONS—USE OF LIQUID RHEOSTAT

The operation of a three-phase locomotive is extremely simple. Apart from the air brake, which, as noted, is never used except to bring the train to a stop or for safety in case the locomotive cannot regenerate on a down grade, the motorman has only two handles to operate. The first handle is used to insert the motors on the line and connects them in series or parallel. It operates the main controller for making motor connections by means of an electro-pneumatic relay, but the main controller never operates under load. The other handle operates the liquid rheostat, Fig. 6, and the automatic regulator connected with it. This regulator controls the level of the water in the rheostat in such a way that for each position of the handle the power absorbed from the line is kept constant at any desired value. Figs. 7 and 8 show the exactness of regulation maintained. Fig. 7 shows the starting condition up to 28 m.p.h. on the curve section of the Giovi line with a 3.5 per cent grade for a train of 190 tons hauled by one locomotive.

This test was taken with snow on the ground and, therefore, under unfavorable conditions for traction. An examination of Fig. 8 shows that to accelerate the train from zero up to full speed required 183 seconds, and in this diagram five different periods can be observed, as follows: (1) Insertion of motors on line and opening of brakes; (2) starting up with motor connected in cascade up to 14 m.p.h.; (3) running at 14 m.p.h.; (4) changing over to parallel connection of motors and acceleration up to 28 m.p.h.; (5) running at 28 m.p.h.

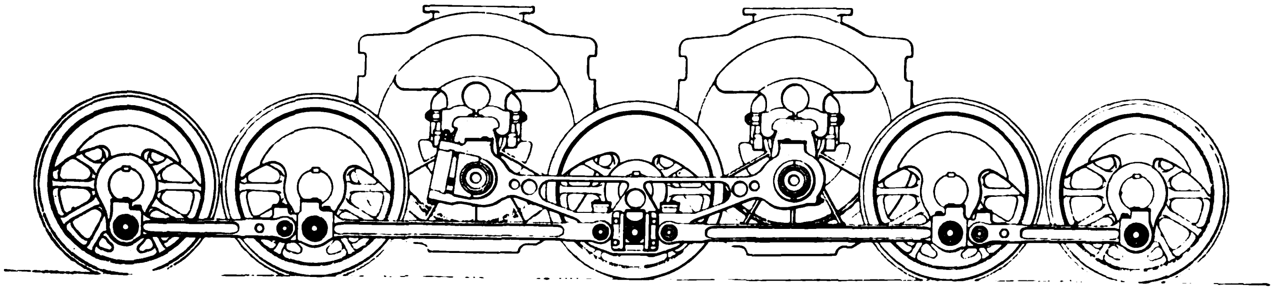
It will be seen that the time necessary for changing over from cascade to parallel connection is extremely small, so that the reduction in speed of the train is negligible. Again, the absorbed energy was kept nearly constant during the entire starting period by means of the automatic regulator in the liquid rheostat. This allowed the locomotive to keep safely near the limit of adhesion without causing high peaks in power demand.

Fig. 8, which is a curve for a train with two locomotives starting on the same section of the line, shows that the total time was 183 seconds. It will be noted that there is a good equalization of loads between the two locomotives and no sudden stresses in the train when either of the two locomotives changes over from cascade to parallel. The diagram also shows that for starting this train on such a heavy grade only 16.5 per cent more energy was required than was needed when running on the same grade. This is due chiefly to the automatic regulation by which the torque is kept below the point of slip.



THREE-PHASE IN PRACTICE—FIG. 10—OVERHEAD WORK ON THE LECCO-CALOLZIO LINE

Experiments on this section of 3.5 per cent grade with trains of increasing weight up to 450 tons with two locomotives, or a total weight of train of 570 tons,



THREE-PHASE IN PRACTICE—FIG. 9—CONNECTIONS OF MOTORS TO DRIVING WHEELS show a coefficient of traction of 1/4.5 = 0.222. The two speeds, 14 m.p.h. and 28 m.p.h., for this heavy freight service have shown themselves quite suitable for all operation. For yard switching, the speed of the locomotive can easily be regulated by means of the liquid rheostat.

OTHER DEVELOPMENTS

The results obtained on the Pontedecimo-Busalla line are more striking than those obtained on other railways but only in degree. On the Valtellina line, in operation since 1900, the three-phase locomotives, built by the Ganz Company and designed by K. de Kando, show the same advantages due to the regeneration of energy, etc., and electric traction has reduced the operating expenses on this line by 12 per cent.

During the last fourteen years the three-phase locomotive has had a notable development, and the two latest large locomotives built by the Società Italiana Westinghouse for the Italian State Railways are designed to solve the high-speed (62 m.p.h.) passenger service** as well as the heavy freight traffic.

The necessity for two overhead wires has not proved a serious objection in practice. The two Giovi lines, the Mt. Cenis, the Simplon, the Valtellina and the Savona Ceva, are all naturally unfavorable for overhead construction because of many tunnels, very sharp curves, reverse curves, heavy grades and stations with many sidings. Yet no inconvenience has been experienced because of these matters.

The line potential of 3000 to 4000 volts used in Italy seems to have proved very satisfactory. The winding for large motors for this voltage does not present any difficulty from the insulation point of view. The locomotive apparatus is of such simplicity that the voltage of 3000 is not dangerous, especially as no connections are made under load and the motorman does not handle any apparatus under line voltage. Again, the choice of this voltage allows the line current to be kept at about 400 amp, which can be easily collected by the trolley. The low frequency, 15 to 16 2/3 cycles, allows the motors to be wound for a low number of poles like four, six or eight, which gives a good power factor and permits direct-connection to the wheels without gears, as shown in Fig. 9. The connection is made through the very satisfactory means of a Scotch yoke. Another characteristic which is considered one of the weak points of the three-phase system is the limitation of speed. Yet the fact that the synchronous speed of the locomotive cannot be increased by the motorman has a great advantage. In the preparation of schedules the speed of the train is often made less than that permitted by the track, weight of trains, rolling stock and signal installations, so that the motorman may have opportunity to make up time when the train is behind schedule. As this cannot be done with three-phase locomotives it follows that the electrification can be designed with safety for the maximum speed and that the capacity of the line can thereby be increased.

A slight increase in the speed of all locomotives is then sometimes possible by increasing the frequency at the generating plant. This can be done, as in the Giovi locomotives, by designing the motors and generators for 15 and 16 2/3 cycles—a fairly easy undertaking, because the overload capacity of three-phase motors wound for a small number of poles is such as to allow the reduction in field strength due to the increase in frequency. The lightness of the locomotive due to the three-phase motors and to the absence of transformers, the motors being wound for high voltage, is also a very striking feature and makes the system especially valuable for mountain roads.

**See ELECTRIC RAILWAY JOURNAL, Feb. 6, 1915.

Employment on City Lines

New York City Board of Education Is Conducting a Series of Vocational Lectures in Which One Was Delivered Recently by H. A. Bullock

Under the title "Opportunities for Employment in a Great Urban Transportation Company" H. A. Bullock, secretary New York Municipal Railway Corporation, delivered a lecture on Feb. 15 in New York, under the auspices of the bureau of public lectures of the Board of Education. It was one of the vocational series.

He stated that a street railway is essentially a co-operative enterprise, two most essential conditions in the success of the management being the maintenance of a spirit of co-operation and the establishment of administrative methods to facilitate it. An illustration of the co-operative spirit was given last winter's snowstorm. The Brooklyn Rapid Transit Company had all of its eighty-three plows and sweepers in continuous service and, in addition to its regular force of track laborers, had a special snow-fighting force of 1500 men. These worked in shifts until through the turning of the snow to rain, and the rapid and deep formation of ice the difficulties became almost insurmountable. The men who manned the sweepers and those on the plows worked uncomplainingly and their fellows on the uniformed force at the depots volunteered by the score to shovel snow when the snow-fighting force finally succumbed to the elements. The superintendents in charge worked just as hard as the men until the storm was conquered after two days of fighting.

Mr. Bullock stated that when a candidate applies for employment with the company his personal record is inquired into, his references are investigated and he is subjected to a thorough physical examination. He is then sent to the schoolroom for a week's instruction followed by an instruction week on the road. He next goes on the extra list at a depot, continuing for three months as a probationer under the eyes of a force of specially selected men known as the line inspection force. At the end of the probational period his record is examined and he is either rejected or given permanent employment. After this a system of credits and demerits is used to determine eligibility for promotion in the ranks and to positions as starters, dispatchers or inspectors. The administration of the disciplinary system is keyed up to a standard of instruction and correction rather than to one of punishment.

For the benefit of the men the company maintains club rooms in the depots, in some of which are restaurants where food is offered at prices corresponding to those in dairy lunch rooms, a good meal being obtainable for 25 cents. These club rooms are operated by the Employees' Benefit Association, which is the principal medium through which the social activities of employees find expression. It operates a comprehensive sick and death benefit plan, paying out to its members more than it receives in dues, the difference being made up from the revenue of more than $17,000 per year from the pool tables and bowling alleys. There are about 8500 members in the Employees' Association out of about 14,000 employees in the service of the company. The company supplies baseball regalia to its men and last year a regular league containing fourteen teams was organized in the transportation department. The medical department is well organized and the company doctors are always on the lookout for incipient disorders which may become chronic. In the first year of its operation, 1913, the medical system produced a reduction of about 24 per cent in the number of days lost by the operating employees on account of illness, a saving of 18,000 days' time.

Annual Convention of C. E. R. A.

The Sessions on Friday Were Devoted to a Discussion on Safety and to Business Matters—Abstracts of Papers Read at Both Sessions Are Published

The Friday morning session of the Central Electric Railway Association's annual meeting, held at Indianapolis, Feb. 25 and 26, inclusive, was attended by more than 100 members. President Schneider opened the session with the announcement that applications for membership had been received from thirteen supply men and would be acted upon by the executive committee. The next order of business was a paper on "Safety" by Dana Webster, inspector accident and liability department Aetna Life Insurance Company, Indianapolis, Ind. This paper is published in abstract on another page. In introducing Mr. Webster, President Schneider said that his paper dealt with a subject which was very necessary to the electric railway business, since it offered a means of reducing expenses which were non-productive.

In the discussion which followed A. G. Olberding, American Brake Shoe & Foundry Company, emphasized the importance of obtaining the co-operation of employees in safety work. His experience had been that the employees' committee should be changed about every two months so as to bring as many into the safety work as possible. In closing he stated that the wave of safety which has swept over the country has resulted in the expenditure of many thousands of dollars which have eliminated a large percentage of common accidents. Unfortunately, however, the insurance rates for accident liability had not been reduced in proportion to the number of accidents.

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, continuing the discussion, said that one of the weak points in liability insurance was the practice of the insurance companies of paying for claims where the injured party was alone responsible for the accident. Mr. Henry was of the opinion that this practice encouraged the filing of claims which otherwise would not cost more than the fees paid to the attending physician.

H. A. Nicholl, general manager Union Traction Company of Indiana, outlined the safety organization and methods used by his company. His organization essentially consists of a general safety board made up of the heads of departments and executives, with a number of local safety committees at central points. He stated that frank criticisms of the acts of the different departments was encouraged among employees with good results. In order to promote esprit de corps banquets are held periodically, where addresses are made by company executives, department heads and the chairmen of the local safety committees. Mr. Nicholl said that these banquets had brought forth addresses by employees which were surprisingly good. During the summer months employees' picnics were held and baseball teams were organized among the employees at the various headquarters along the line. In conclusion he stated that his company felt that the results obtained justified the effort and expense.

W. A. Carson, general manager Evansville Railways, stated that his company had a safety committee organization similar to that described by Mr. Nicholl, but that one-half of each local committee were changed every six months. His experience had been that it was difficult to get the employees to send in safety suggestions, particularly at the beginning of the work. In order to have a complete understanding a meeting of all the employees was called, where the purpose of the campaign and the need of safety suggestions were explained, with the result that he now has the co-operation of all the employees. Despite this, interest lagged at times, and safety suggestions were few. It appears that the failure to adopt the suggestions of some discouraged them so that the plan has been adopted of explaining to each employee whose suggestion had been rejected why that decision was reached. Mr. Carson also stated that he made it a practice to pay the employees for the time during which they attend the safety committee meetings.

T. W. Ketteman, Ohmer Fare Register Company, said that his company had been able to increase the number of safety suggestions by eliminating the names of the employees until the suggestion had been approved. Safety suggestion boxes have been installed in the different shop departments. The names of the employees offering suggestions were not known to the board or committee passing on the suggestion until the award was made. The secretary of the safety board opened the safety suggestion boxes, and he was the only one who was permitted to know the names of employees making suggestions. The same practice was adopted in regard to complaints, and it has been found that the elimination of the name encourages better results and excludes friction between employees and departments.

W. Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company, said that the biggest factor in the safety movement was that of making the employees think. Many accidents could have been avoided if employees had just thought or had been disciplined to keep their minds constantly on their work.

BUSINESS SESSION

Following this discussion President Schneider called for the report of Secretary-Treasurer Neereamer. This was published on page 413 of the issue of last week. Following this report, the president addressed the association briefly and thanked the members for their cooperation in making the year's work a success. At this point the report of the nominating committee was received and approved, and the following officers were elected for the ensuing year:

President, Charles L. Henry, president and general manager Indianapolis & Cincinnati Traction, Indianapolis, Ind.; first vice-president, A. Benham, general manager Ohio Electric Railway, Springfield, Ohio; second vice-president, C. N. Wilcoxon, president Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.; treasurer, A. L. Neereamer.

The new executive committee consists of the following members: E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway; W. S. Whitney, general freight and passenger agent Ohio Electric Railway; H. A. Nicholl, general manager Union Traction Company of Indiana; W. A. Carson, general manager Evansville Railways; E. B. Peck, vice-president Terre Haute, Indianapolis & Eastern Traction; R. A. Crume, general manager Dayton & Troy Electric Railway; H. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway; J. F. Keys, general passenger agent Detroit United Railway; F. D. Carpenter, general manager Western Ohio Railroad; S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction; S. D. Hutchins, Westinghouse Air Brake Company, and W. H. Bloss, Ohio Brass Company.

It is planned that the next meeting of the association will be held on June 17 and 18, 1915, and if enough members will take part, a boat will be chartered for a forty-eight-hour trip from Cleveland to Buffalo and return. Both the railway and supply members voted unanimously for the boat trip meeting.

On Thursday evening, Feb. 25, the members of the association and their ladies were the guests of the Drew Electric & Manufacturing Company in a theater party given at Keith's Theater. On Friday afternoon, Feb. 26, about seventy-five members of the association were the guests of the Prest-O-Lite Company, Inc. The trip to the plant was made on two special cars furnished by the Terre Haute, Indianapolis & Eastern Traction Company. At the plant the members inspected the manufacture of prest-o-lite and the pressed-steel holders. After following the various processes through the plant, the Indianapolis speedway, which was nearby, was inspected.

Abstracts of Governor Ralston's letter and of addresses presented at both sessions follow.

LETTER FROM THE GOVERNOR OF INDIANA

Hon. Samuel M. Ralston, Governor of Indiana, sent a letter to President Schneider of the association, which was mentioned briefly in the report of the meeting last week. Governor Ralston said in part:

"Both as a citizen and as an official, I am greatly interested in the business in which you are engaged. The work of the common carrier has grown to such proportions in this country and is so intimately associated with the country's welfare that when it ceases to be profitable, the injurious effects are immediately apparent. For the last few years it has been the contention of the railroad and interurban interests of the country—especially in Indiana—that the passenger fares allowed by law are not sufficient to cover the expenses incurred in passenger traffic. This point has been pressed with much vigor upon the public mind, and at this time there is a bill pending before the Legislature of Indiana proposing to fix the passenger fares at 2½ cents per mile.

"On all hands it is agreed that all railroads and interurbans are expected to furnish the best service possible in consideration of the charges they are permitted to make therefor. Generally speaking, there is no complaint on the part of the public of the character of service furnished, but it is the contention by these companies that their passenger traffic is losing them money. If this be true, it is not as it should be. So long as the public demands a high grade of service it should be willing to make that service possible on the basis of a reasonable profit to those furnishing the service; and, broadly speaking, I think the public is willing that this should be done.

"The difficult question is, however, What are the facts? Does the service rendered the traveling public for the charges permitted in Indiana make it impossible for the railroads and interurbans to realize a reasonable profit? If the ex parte statements of the railroads and interurbans can be taken as the truth, this question must be answered in the affirmative. I believe it is conceded that the increase in passenger fares sought by these roads would yield them in Indiana approximately $500,000 a year. This is a large sum of money; too large, I think you will agree with me, for representatives of the people to authorize the railroads to collect from the people on the ex parte statement of the interested party. I am not insinuating that this ex parte statement is or would be erroneous, but I believe that the question it seeks to influence favorable action upon is of such vast importance to the public that no official, either in executive or representative capacity, would be warranted in acting favorably upon it without hearing from both of the interested parties. It would be difficult, if not impossible, for the present Legislature at this late day, with all the other work demanding its attention, to take up this important subject and give it a thorough investigation and come to an equitable conclusion.

"Personally I am friendly to these great properties, and I know the people of Indiana are. I want them to receive a fair profit for their service and to succeed; but this should be done on a basis that will be fair, so far as it is possible to arrive at such a basis, to both the roads and the public.

"With this idea in view, it is my intention to recommend to the Legislature that it empower the Public Service Commission of Indiana to authorize an increase in the passenger fares in this State not to exceed ½ cent per mile. The commission should, of course, make an investigation of the conditions of any road, upon its filing a petition with the commission asking for an increase of fares. This petition should contain such facts as would warrant such increase and as may be required to be set forth therein, under a rule of the commission; and it may be the showing made by some roads in support of their petitions will be so conclusive of the question at issue, although ex parte, that but little additional evidence will be required by the commission. This course it appears to me, considering the circumstances of the case, will best promote an intelligent settlement of this difficult public question; one, too, in which all the factors of a political nature or party advantage will disappear."

ADDRESS BY HON. THOMAS DUNCAN

Hon. Thomas Duncan, chairman Public Service Commission of Indiana, began his address by referring to the condition of the interurban electric railways in the State, and saying that the volume of the business conducted by this class of lines, their readiness to serve the public at many places and at frequent intervals, and the strength of their cars. He commended the plan of holding annual conventions for the consideration of mutual interests, as he believed the time has passed when a competitor can hope to outstrip his rival by secret means or undermine him by silent encroachment.

He then analyzed some of the causes of the present business depression, and its moral, as he saw it, was the homely old maxim, "Live within your income." He said that the people of Indiana were proud of the achievements of those who invested in electric railway properties, and, if he read the times correctly, there is among the people of the State a friendly feeling toward these properties. There prevails a general solicitude for the welfare of the business and a desire to be helpful at this time. In return for this helpfulness, however, the people demand absolute honesty, the highest efficiency consistent with prudent economy and a faithful public service. This public service does not favor the increase of the revenues of the companies to fill their coffers and make them rich but to furnish sufficient revenues to save them from distress and ruin in a time of general business depression. The public is willing to pay a reasonable return upon the fair value of the property that has been prudently provided for the performance of a public service. The people are willing to forego any further expenses for what might be adequately termed the luxuries of transportation and are only demanding that they be carried in safety by the transportation companies.

Mr. Duncan then presented a summary of statistics from the reports filed with the Public Service Commission of Indiana for the year ended June 30, 1914. He said that the roads so reporting at that time had outstanding the following capital liabilities:

Common stock	$81,587,291.67
Preferred stock	39,996,510.00
Funded and floating debt	104,869,134.05
Total capital liabilities	$226,452,936.72

There was paid in dividends the following amounts:

On common stock	$139,335.00
On preferred stock	400,802.11
Interest debts of leased roads	2,049,622.82
Total	$2,589,759.93
Interest accrued during year	$3,925,928.46

The book value of the entire lines June 30, 1914, was $207,328,208.42.

The total operating revenues for all these lines were as follows:

Passenger revenues	$16,736,164.21
Freight revenues	1,223,716.80
All other operating revenues	606,241.43
Total	$18,566,122.44

Revenues from other than operating sources increased this total to $19,188,610.77.

Of all the revenues of the interurban lines 86.06 per cent was derived from passenger transportation and 7.68 per cent was derived from freight transportation. The four street railway systems derived from passenger transportation 92.7 per cent, 97.8 per cent, 98.6 per cent and 98.6 per cent of their revenues, respectively.

There was expended in operating expenses $11,580,787.08, or slightly more than 60 per cent of the total revenue. This sum was divided as follows:

	Total	Per Cent
Maintenance of way and structures	$1,974,315.98	17.04
Maintenance of equipment	1,285,971.80	11.10
Traffic	113,649.61	0.98
Conducting transportation	6,230,502.98	53.80
General and miscellaneous	1,976,346.71	17.07
Total	$11,580,787.08	100.00

There was paid for superintendence of transportation about $236,248.05. Payment for injuries and damages required $556,877.75 during this year. Trainmen received $2,453,968.96, or 21.19 per cent, of the operating revenues. This is a little over 12.7 per cent, or more than one-eighth of all revenue received.

After defraying the operating expenses of these various lines there was left for the industry $7,607,823.69. There accrued during the year interest liabilities against these companies in the sum of $3,925,928.46. There was also a fixed charge for taxes, the aggregate of which was $1,010,464.31. The sum of these two items is $4,936,392.77. Deducting this sum from $7,607,823.69 leaves $2,671,430.92, as the net return of this industry for that time. This would pay a dividend of 6 per cent on the $39,996,510 of the preferred stock of the electric railways and leave nothing for dividends on the common stock, or it would pay 4 per cent on the preferred stock and leave practically 1 per cent for common stock. This, Mr. Duncan said, was not an inviting picture from the standpoint of the investors, even if a certain percentage of the common stock represents water.

ANALYSIS OF RETURN ON INVESTMENT

Continuing, Mr. Duncan said in part:

"These properties are private properties clothed with a public interest subject to the reasonable regulation of the State but with the management of this left largely to the owners. The public is under no obligation to protect the investors. It does not guarantee returns or underwrite investments in electric railway properties. Its duty ends by paying, above operating expenses and taxes, including depreciation, such a sum as will yield a fair return upon the reasonable value of the property used and useful for the convenience of the public. Tested by this rule let us reason together.

"After the payment of taxes and all operating expenses for the year 1914 there was left from the earnings $6,597,359.38.

"The total mileage of the electric railways reporting to this commission is 3099.93, or, for practical purposes, 3100. This surplus would yield a return of 5 per cent on a value of $42,583 per mile. It would yield a return of 6 per cent on a value of $35,469 per mile. It would yield a return of 7 per cent on a value of $30,402 per mile. It is believed, that when the interurban railways of the State are placed on the copper-zone basis, the revenues of these roads, considered as a whole, will yield a return of 6 per cent on a valuation of the roads at between $35,000 and $40,000 per mile.

"Our commission has not yet been able to complete the valuation of a single line of interurban road. Our engineers have been for some time engaged in the valuation of the Indianapolis, Columbus & Southern Traction Company. The reports, however, show that six of these roads are capitalized at less than $40,000 per mile and twelve are capitalized at less than $50,000 per mile. The total operating revenues of the interurban lines was 30.34 cents per car-mile, and the average operating expenses of these lines was 18.30 cents per car-mile.

"It is my judgment that the people of the State served by these lines have very little reason to complain of unjust charges and of inadequate services. We have encouraged the change from the nickel to the penny zone. This we have done upon the theory that it was more equitable to the passenger and would add something to the revenues of the company. But one line so far has actually changed the basis of its fares.

BASIS OF RATES TO BE THE COST OF SERVICE

"Unless I have misapprehended the spirit of recent legislation touching public utilities, it means that ultimately the basis of all rates will be the cost of the service rendered. This will not be adverse to the prosperity of the electric railway business, unless the electric lines are overwhelmed by competition arising from the activities of its younger competitor. For, if rates were to-day based wholly upon a just and reasonable return of the actual value of the properties used, it is my judgment that there would be no reduction in the rates for the transportation of either freight or passengers. It is my further judgment that these roads are now entitled to at least the increased earnings that would follow the penny-zone basis of fares. But it is also my opinion, that when the rate for the transportation of passengers is fixed at 2 cents per mile, these roads will earn a net return of at least 6 per cent on the fair value of any one of the interurban lines. A further increase of fares above the penny-zone basis would probably add nothing to the revenues of the electric carriers, while the rate for the steam passenger carriers remains at a maximum of 2 cents per mile.

"The spirit of the age is not philanthropic. It does not pay fares for the sole purpose of assisting the carriers, nor do the carriers establish and operate their business for the sole purpose of rendering a public service nor for the purpose of adding comfort and convenience to that part of the public which desires to travel. The age is largely utilitarian. The people are constantly endeavoring to secure adequate service at the least reasonable rate. The carriers are with equal pertinacity endeavoring to obtain the largest return that is practicable to earn upon the investment in the property.

"So long as the public and the carriers assume toward each other the attitude of opposing interest, so long the day of justice will be deferred. The interests are not opposing but are identical, and when I say the age is utilitarian, I do not mean that the people or the utilities have lost any of their sense of justice. I am not a believer in the idea that the golden age is in the past. On the contrary, I am firmly of the opinion that each generation lives in a golden age. I am optimistic. I believe that in the business world and in all relations of life there were never greater opportunities than there are at the present hour. We have the embarrassment arising from a temporary depression in the business world, but this can only be the shifting of clouds in front of a splendid sun. With the unbounded resources of this country, with its splendid people and with the best government in the world, we have no reason to complain and no reason to insist that at any other time or in any other age there were opportunities better than there are at this hour.

"There has been less criticism of the conduct of the interurban railways in this State than of any other public utility under the jurisdiction of our commission. There have been complaints from private individuals in an informal way against a number of the street car lines, but no formal proceeding has been filed on this subject before the commission. It is a pleasure to note that the managers of these properties have shown a friendly disposition toward the law, and a spirit of co-operation with the commission. I do not recall that we have at any time asked any one of the managers of these properties for information that has not been cheerfully given, even though at times granting the request necessarily incurred some inconvenience and some expense.

"I do not believe that State regulation of the electric railways has been harmful to the industry. On the contrary, I think it has been helpful. Whatever of present embarrassment encompasses some of the lines is not chargeable to the State regulation of public utilities nor to the administration of the regulatory laws. I am firmly convinced that the electric railway business has no greater discouragements and encounters no greater adversities than any other great business has encountered in its infancy. After watching with as much care as the manifold duties of my position would permit for a period of nearly two years the management and the conduct of the electric railway business in this State, I feel that the people of the State are proud of these properties, and that the owners and managers, as a whole, have no just grounds for complaint. The business can be established on foundations of permanent and continued success only by the attainment of such efficiency as will render to the public such services at such reasonable rates as just men ought to appreciate and be willing to pay.

RESPONSIBILITIES OF RAILWAYS

"I am convinced that the public, and even the managers of these properties, have underestimated the great responsibilities this industry assumes. When we reflect upon the fact that in one single year more than two and one-half times the population of the United States entered and alighted from the cars of the electric railways of Indiana, we begin to comprehend the tremendous responsibilities this business carries. The safety of all that Indiana respects, honors and loves is confided to you many times during the year.

"As a commission we will enforce the laws in a spirit of justice, without fear and without favor, and you will observe that, in so far as any one but the utilities themselves are concerned, the law moves only against transgressors.

"The only advice that I could give to you at this time would be to husband your resources with the most rigid economy, increase the efficiency of yourself and your employees by every method known to the industry, and at every opportunity inspire the public mind with a confidence in your integrity and in your unselfish devotion to the people's service. Realize as fully as you can a great fact often ignored, that public sympathy and a friendly public spirit toward you is an asset of supremest value."

ADDRESS BY DANA WEBSTER

Dana Webster, inspector accident and liability department Aetna Life Insurance Company, Indianapolis, read a paper entitled "Safety" at the meeting on Friday. Mr. Webster said, in part:

"It is the experience of every large employer, as well as other agencies which have taken an active interest in accident prevention, that, if a successful safety campaign is to be waged, a comprehensive organization to formulate and carry out a definite plan or program is absolutely essential. The necessity for organization in safety work is apparent when we consider the many-sided problem that is involved in accident prevention. Broadly speaking, it may be said to include as its chief branches:

"(1) Ascertaining the actual conditions of a risk under which employees in any institution perform each task and determining the practical possibilities of eliminating or reducing the risk.

"(2) The provision of proper working conditions and of efficient safeguards for dangerous conditions or for dangerous machinery and appliances.

"(3) The careful selection, instruction and supervision of workmen and their assignment to work for which they are not unsuited.

"(4) The promulgation of rules for safeguarding and their rigid enforcement.

"(5) The inculcation of habits of caution in the minds of all concerned.

"Workmen can well be selected for their caution as well as for their ability to do work. A reckless employee, no matter how skilled he may be, costs his employer more money than he is worth. Every employee should be carefully instructed in his work, not only in how to get results but in how to avoid danger to himself and others. The 'stitch in time' adage applies no place better than it does here. In assigning a man to work and in keeping him at it, his personal characteristics should always be duly considered.

"Another very important function in accident prevention work is that of impressing upon the employee the sincerity of the employer in his desire to prevent accidents. You cannot consistently ask the workman to do his share in accident prevention unless you are doing your own. Spending some of your money, however, in a way which he cannot help see will inure to his benefit is the best sort of a guarantee of good faith.

"When we come to consider the inculcation of habits of caution as a means of accident prevention we reach the most difficult and, at the same time, the most important part of the problem. Any accident prevention campaign must fail largely in its purpose unless the co-operation of the workmen themselves is secured. As a great safety leader said recently 'Safety men are more important than safety things.'

"One of the most efficient means of getting employees interested in 'safety first' is to have the employee serve on a safety committee which will go over the plan and equipment once a week and look for dangerous conditions and the means of guarding them, seeing if the safeguards provided are being used, and observing if the workmen are doing their work as safely as possible. This not only results in better safeguarding and working methods, for in many respects no one knows so well as the workmen themselves what is needed to prevent accidents, but it also greatly stimulates the interest of the men in safety work. The members of this committee can be changed from time to time so as to get the widest range of suggestions and to bring as many men as possible within this sphere of influence, and each man who has served on a committee is urged to consider himself an unofficial safety inspector ever afterwards, keeping up his active interest and making any suggestions that may occur to him.

"One of the greatest fields for productive safety work is among the workmen of the future, through systematic education. This education can well be given to apprentices, in the industrial schools, in the training departments of our great industrial establishments, in the vocational schools, in the manual training departments of our public schools and, to some extent, possibly in the ordinary school classes. If habits of caution are inculcated in our future workmen during the formative period of youth, when they are most inclined to be receptive, they will cling to them through life."

ADDRESS BY CHARLES C. PEIRCE

Charles C. Peirce, vice-president American Electric Railway Manufacturers' Association and manager railway department, General Electric Company, Boston, Mass., spoke first of the work of the Manufacturers' Association. He referred to the permanent office at 165 Broadway, New York, where electric railway men and manufacturers of electric railway apparatus and their agents are always assured of a hearty welcome; of the plans of the secretary and treasurer, Mr. McConnaughy, to supply the members of the association information in regard to openings for foreign trade through an arrangement made with the bureau of foreign and domestic commerce of the Department of Commerce, and of attendance by committees of the association at the National Foreign Trades Council at St. Louis and at the meeting of the Chamber of Commerce of the United States at Washington a short time ago. The results of the observations of the committees will be transmitted to members as soon as possible.

Mr. Peirce then referred to the status of the electric railway companies, which he said were carrying about all of the troubles they could stand, and to the influence on public opinion of the press. He quoted Dr. Hadley, of Yale University, that the power now possessed by the press carries with it a grave responsibility to the public, and said that it was the duty of the press to clear up any misunderstandings that may have arisen between the public and the transportation utility. He said that he had recently had an opportunity of reviewing the editorial comments from more than fifty newspapers of the United States upon the mid-year meeting at Washington. Much of these comments had to do with the address of President Wilson, and they were couched in various tones of commendation and criticism, but through them all ran a spirit of friendliness to the business interests of the country, which is encouraging to a degree. It was Mr. Peirce's belief that the American newspaper to-day had become America's greatest utility, and therefore, to paraphrase Grover Cleveland's celebrated remark, "The position of the editors of a newspaper is an absolute position of public trust."

THE MANAGEMENT AND PUBLIC RELATIONS.

In continuing Mr. Peirce said, in part: "During the last decade, which, in this country, has been one of marvelous growth, the individual ownerships of our utilities have passed over to corporations, and there has resulted an unfortunate attitude on the part of the public toward the street railways which has been caused sometimes by the unthinking acts of mistaken corporation officials, who gave the impression that corporations were not human; that they were organized under the laws mainly to evade personal responsibility, and that, having accepted the acts which give them the right of incorporation, they set themselves up as greater than the people from whom their power was derived.

"And we ofttimes hear it said that the attitude of a corporation is reflected in the acts of its officials. I have often felt that, given the opportunity of getting upon the rear platform of a car, I could, in nine cases out of ten, tell the peculiar characteristics of the management which handles that property. Being a new art, in many cases we have made the mistake of selecting weak men for managerial positions. It has been no uncommon thing in the early days to see properties which have cost hundreds of thousands of dollars being managed by directorates who thought they were wise in hiring men at very low salaries, thinking thereby to save money for the benefit of their enterprise. But a workman is always worthy of his hire, and you only get in this world for labor return exactly what you pay for, and low-priced men, generally speaking, are able to give only a low-priced return.

"In the evolution of all forms of corporations in the last decade, there has been a tendency to do away with the personality of the active agent in almost every instance. This is a reaction from the so-called one-man control, which has been unpopular from the belief that has crept into the minds of the American people that no one man should be allowed, under our democratic form of government, to exercise such abnormal control. Yet it seems to me that this works to destroy the strength of the corporation, as the successes of most of our great corporations have generally been made under the personal magnetic direction of a single mind.

"The tendency has been toward doing away with direct responsibility and going into committee management. But it is a well-known saying that divided responsibility is no responsibility. Committee management in many cases does not, and cannot, give anything except a compromise direction. Of course we know that in committee work, generally speaking, there is always a strong mind which dominates. If this is a fact, to get properties back to the most efficient basis, strong men should be placed at the helm, and if they are not strong enough to do the work they should be replaced and others appointed who are able and will produce the results aimed at.

"In corporation growth the personality of the active agent and the potentiality of personality have seemingly been lost sight of by the various authorities who pose as organizers, efficiency engineers and students of so-called 'system.' The very magnitude of our American corporations to-day requires positive personalities for efficient direction. In the street railway business especially, unlike the other utilities, our agents are in immediate contact with the community every hour of the day and night. How easy it is, therefore, for our agents to create a wrong impression for our company by some little act or statement."

THE PROBLEMS OF THE INDUSTRY

Mr. Peirce, in continuation, said that the ten years which ended in 1905 were the banner years for electric railway extension. Their power for good was recognized by the people and their promoters received every encouragement. Since that time the situation had changed materially, and more and more restrictions have been thrown around electric railway development.

with the consequence that there had been a slackening and in some communities an almost total cessation of electric railway extension. Those in the electric railway business believe that if the public knew, as the railway men know, that the profits are not exorbitant, and in fact hardly commensurate with the risks taken, there would be fewer such restrictions.

The nickel of the passenger has been divided into its component parts according to the uses to which it is put, and it has been shown that 1.68 cents goes into wages of employees; 0.97 cent for supplies; 0.74 cent for interest; 0.56 cent for rent; 0.23 cent for taxes; 0.21 cent for claims of damages; 0.16 cent for reserve funds; 0.14 cent for salaries, and 0.31 cent to the stockholder.

The interest of the supply man in electric railways is very marked, as it is the nickel of the passenger that enables electric railways to live, and it is the nickel of the passenger that enables the electric railways to buy supplies. When the flow of these nickels into the pockets of electric railway companies ceases, or is diminished, the life-blood of the manufacturer of railway supplies is vitiated. Hence, the manufacturers should help the railways, and by so doing they are helping not only the interests of the railways, but their own interest.

In the American Electric Railway Association there is a splendidly equipped and most potential means of securing the object which the railway men and the manufacturers seek. Through its committees and publications and numerous other channels, it is battling, and with some degree of success, for the rehabilitation of conditions as they have existed. It deserves the support of every railway man and of every manufacturer and of every representative of a manufacturer.

In conclusion Mr. Peirce said, "I am sorry that there is no more intimate way in which it can be designated than by the somewhat coldly impersonal term of 'association,' since it is rather the railway man and the manufacturer who are fighting through the association than it is that the association in itself is performing the work. It is our organization, gentlemen. Its success is our success; its failure, if such a thing is conceivable, would be our failure. And I trust that I am not pre-empting the prerogatives of my fellows in the operating field when I urge upon you the duty, not of supporting its interests by your co-operation and enthusiasm, but of supporting your interests through this instrument which stands 'ready made' for your use."

ADDRESS OF MATTHEW C. BRUSH

In his address on Feb. 25 at the Central Electric Railway Association, M. C. Brush, second vice-president Boston Elevated Railway and president American Electric Railway Transportation & Traffic Association, explained that he had been requested by President Allen of the American Electric Railway Association to represent him at the meeting. He said he had been selected because one of the vice-presidents, Mr. Henry, was a member of the Central Electric Railway Association and Mr. Allen felt that it was unfair to call upon him for this reason, and the three other vice-presidents were unable to attend. Mr. Allen could not be at the meeting on account of an expected operation.

Mr. Brush complimented the Central Electric Railway Association on its membership and representative character. He then showed the growth of the electric railway industry during the past 33 years by giving some statistics for 1882, when the national association was organized, and at the present time. He then sketched briefly the work being undertaken by the American Electric Railway Association, mentioning particularly the committee on public relations, the committee on federal relations, the bureau of fare research, the joint committee on overhead and underground line construction, the committee on standard classification of accounts of the Accountants' Association, the committee on standards of the Engineering Association, the board of accident prevention and the association's monthly publication. He also referred to the mid-year convention at Washington, which he said was the most successful winter meeting the association had ever had, and commended the selection of Washington instead of New York. The speaker believed that the publicity which the association received in connection with this meeting would help the public to understand some of the problems of the railways. Continuing, he said: "The public as a whole is fair, but the great difficulty in the past has been that the public has not understood the real facts relating to the conduct of the transportation business, for which misunderstanding the companies themselves are in a measure at fault for not having earnestly endeavored to acquaint the public with the facts.

"Mr. Allen was very anxious that I endeavor to convey to you his thought that while corporations can be members of the associations, the corporations themselves cannot do anything in the line of work. The work of the association, like all their work, must be performed by individuals. Individual effort, or the efforts of three or four individuals, would produce a certain amount of work. The highest efficiency, therefore, in the association work is produced with a large group of individuals, and the larger the group the higher the standard of the association work. Mr. Allen believes that the association must tell the story of the electric railway industry to the world. One of the means is to tell those engaged in the industry what the story is, make them believe in it to such an extent that they will tell it to their neighbor, to the butcher, the baker, the barber, etc. He believes that the majority of electric railway employees today do not understand what the real story is and what the real troubles are. Associations like the Central Electric Railway Association, co-operating with the American Association, can be of great value to the industry in educating the men now depending on the industry for their bread and butter to the true story, and then having them go forward and tell it to the world."

In conclusion, Mr. Brush congratulated the companies in the Central States on the support they had given to the national association and on the services which representatives from that section had rendered to the national association. He then made a plea for continued support of the association from all present.

ANNUAL REPORT OF CHAIRMAN OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION

BY A. L. NEEREAMER

During the year ended Dec. 31, 1914, your association has held eleven meetings, all of which have been well attended and as a result a great deal of good work has been accomplished. Of the membership of the Central Electric Traffic Association, forty-seven lines representing 3626 miles, participate in tariffs and other publications of our association. This is an increase of one line and 57 miles over the previous year. Joint and local baggage tariff No. 8, participated in by forty-three lines and cancelling joint and local baggage tariff No. 7, was issued Aug. 14, 1914. This is the second issue of this tariff during the year.

The interchangeable 1000-mile ticket is now participated in by thirty-one lines representing 2868 miles, as shown by joint passenger tariff No. 13, issued Sept. 24, 1914, an increase of one line and 76 miles over the year preceding. This ticket appears to grow in popularity as 6000 tickets were ordered and placed in the hands of the agents during the year past, making in round numbers 28,000 tickets ordered since its inception, or an average of more than 4200 per annum.

The official classification is filed by the chairman for thirty-nine member lines, an increase of one over the year preceding. There has been only one issue of the official classification during the year, but that publication now has ten supplements, and from present indications it will be reissued about July 1, 1915, with quite a number of very important changes in its construction.

In September, joint passenger tariff No. 14, which is a reissue of joint passenger tariff No. 6, was placed in the hands of the member lines. This publication is participated in by thirty-seven of the member lines, and when the present supplement, which is now in the course of compilation, is completed, two additional lines will be added.

Joint freight tariff No. 10, participated in by thirty-eight lines, covering exceptions to official classification, is now about ready to be placed in the hands of our member companies. This tariff cancels joint freight tariff No. 8, which was issued March 31, 1914.

The committee having in charge the basis of uniform class rates has been working diligently on this subject, and the information collected by them will be of great value to us.

The official interurban map is now in the hands of the map makers, being revised, and when finished will be complete and up to date. An index of all cities and towns will be printed on the back, thereby making it of greater value to the traveling public. The committee having this in charge devoted considerable time to securing the necessary data.

In a paper read before the parent body at the meeting held in Toledo last June, your chairman referred to "intangible benefits" derived from the association by its members. The past year is one in which this has been more perceptible than any period during the life of the association.

The past year has been fraught with great activities as well as being one of progression and, notwithstanding the depressed financial condition, of success to the association. This success and the results achieved is due to the co-operation of the members and the valuable assistance given by members—individually and collectively—as well as the various committees (all of which have been active and energetic) to the chairman in the discharge of his duties. And for that support he now extends his heart-felt thanks. The display of the same spirit and loyal co-operation during the coming year will achieve greater and more valuable results, as well as extend the scope of the association.

Legal Aspects of Accidents

At a recent meeting of the Washington Railway & Electric Company section of the American Electric Railway Association, George P. Hoover, attorney for the company, presented the attorney's view of the accident question. He contrasted the old and the new conditions in regard to the attitude of the courts toward responsibility for accidents and explained how the work of the trial attorney can be lightened through co-operation.

Mr. Hoover quoted an early accident report as follows: "On ——— trip, north bound, at 4½ and Missouri Avenue, Chinaman jumped off car and fell; couldn't get his name; chased him two squares and couldn't catch him." Mr. Hoover said that accident reports in the early days were written principally upon the backs of transfers. People at that time had not become so enlightened upon the subject of suing for damages, lawyers were not so active in the prosecution of claims against railroads, and doctors had not become so proficient in the discovery of the various ailments which are now attributed very largely to accidents on railroads.

In the early days it was easy for the railroad to win accident cases because the courts held that if it appeared that the person injured had failed to look out for approaching cars, as a matter of law he was guilty of contributory negligence even if the employees of the company were negligent in the operation of the cars. Under such circumstances the courts did not undertake to measure the degree of negligence on the one hand or the other. During the past few years the courts have adopted what is commonly termed the "humanitarian doctrine" or the "doctrine of last chance." In simple language, this means that even though the man who sustains the injury has himself not exercised the degree of care which is imposed upon him by the law and by his own carelessness has placed himself in a position of peril, nevertheless, if the motorman of the car by the exercise of reasonable care could have seen him in a position of peril and then by the exercise of ordinary care could have stopped the car in time to avoid the accident, the company is liable to the man injured. The courts have practically nullified the doctrine of contributory negligence in this class of cases.

There is also a variation in the law itself and in the enunciations of the principles of the law which make it more difficult for railroad companies to win their cases in court and more important for the railway to prevent accidents, and in those which cannot be prevented to secure as many witnesses as possible, and to make observations as to its exact location. A company's attorneys, even after investigation of an accident by the claim department, sometimes have difficulty in determining the nature of the charge which is to be presented against the company upon the trial of the case. Hence any statement by the plaintiff made before the trial of how the accident occurred, or how he claims the accident occurred, is valuable. As the claimant may deny or correct this statement in court, other testimony should be secured.

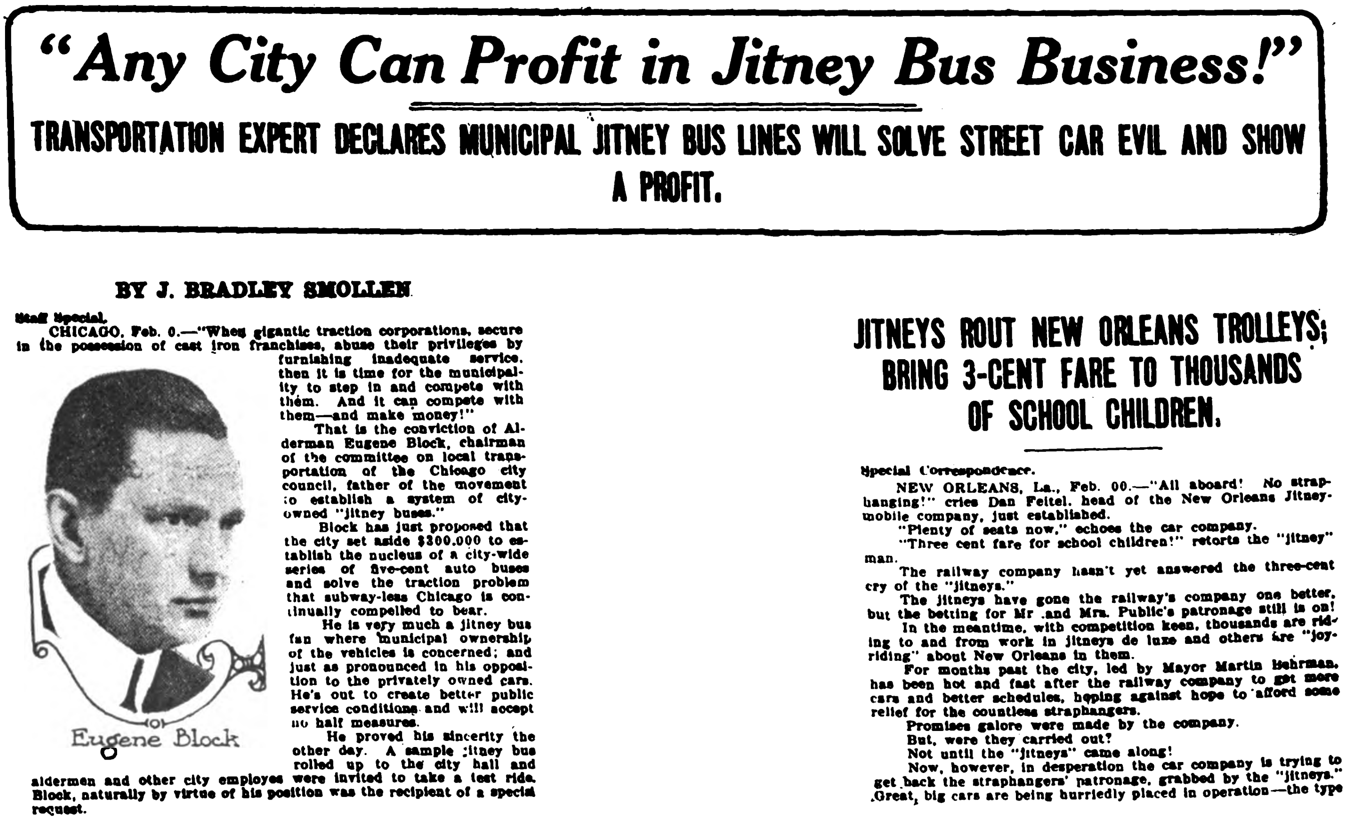
Mr. Hoover showed that the operating department is primarily charged with the responsibility for keeping the road open and the public is primarily interested in being transported to their destinations, and not in helping to secure the names of witnesses. Further, the use of a curtain behind the motorman often makes it difficult for passengers to see an accident. But a systematic investigation by the company's representative frequently secures the names of people who have seen the accident, and this is the only means by which the company can defend itself against claims. The names of witnesses should be secured even if an accident appears trivial at the time, for a slightly injured person may later have an exaggerated idea of his injury and may decide to present a claim.

In conclusion the speaker instanced a number of classes of accidents which are very difficult to defend, particularly those due to persons crossing behind a car which is passing another at a high rate of speed, to the swinging of the rear end of double truck cars, to unsafe or improperly located platforms, to icy platforms and steps, etc. Finally he urged the managements of electric railways to impress upon employees the necessity for avoiding accidents and to commend them for prompt action when accidents occur.

Syndicated Anti-Railway News

An Account of How Some Daily Newspapers Get Their "News"—Anti-Railway Material Send Out as "Features" for Local Paper Reproduction

Those who are not acquainted with the methods followed by daily newspapers in securing the material which they print in their pages have little idea of the great variety of sources from which news comes. Many readers believe that practically all the matter printed in a daily paper, except that received from the associated or other news bureaus by wire and the advertisements, is originated in the editorial office of the daily paper. By inference they apply this same deduction to editorial articles, local news, cartoons, the joke columns, the book reviews, the society column and so on. This is as far from the facts as would be the conclusion of the man in the street that a railway company manufactured all of its cars, trucks, motors, over-head equipment and power station equipment in its own shops.



"Any City Can Profit in Jitney Bus Business!"

TRANSPORTATION EXPERT DECLARES MUNICIPAL JITNEY BUS LINES WILL SOLVE STREET CAR EVIL AND SHOW A PROFIT.

BY J. BRADLEY SMOLLEN

Staff Special.

CHICAGO, Feb. 0.—"When gigantic traction corporations, secure in the possession of cast iron franchises, abuse their privileges by furnishing inadequate service, then it is time for the municipality to step in and compete with them. And it can compete with them—and make money!"

That is the conviction of Alderman Eugene Block, chairman of the committee on local transportation of the Chicago city council, father of the movement to establish a system of city-owned "jitney buses."

Block has just proposed that the city set aside $300,000 to establish the nucleus of a city-wide series of five-cent auto buses and solve the traction problem that subway-less Chicago is continually compelled to bear.

He is very much a jitney bus fan where municipal ownership of the vehicles is concerned; and just as pronounced in his opposition to the privately owned cars. He's out to create better public service conditions and will accept no half measures.

He proved his sincerity the other day. A sample jitney bus rolled up to the city hall and aldermen and other city employes were invited to take a test ride. Block, naturally by virtue of his position was the recipient of a special request.

Eugene Block

JITNEYS ROUT NEW ORLEANS TROLLEYS; BRING 3-CENT FARE TO THOUSANDS OF SCHOOL CHILDREN.

Special Correspondence.

NEW ORLEANS, La., Feb. 00.—"All aboard! No straphanging!" cries Dan Feitel, head of the New Orleans Jitneymobile company, just established.

"Plenty of seats now," echoes the car company.

"Three cent fare for school children!" retorts the "jitney" man.

The railway company hasn't yet answered the three-cent cry of the "jitneys."

The jitneys have gone the railway's company one better, but the betting for Mr .and Mrs. Public's patronage still is on!

In the meantime, with competition keen, thousands are riding to and from work in jitneys de luxe and others are "joy-riding" about New Orleans in them.

For months past the city, led by Mayor Martin Behrman, has been hot and fast after the railway company to get more cars and better schedules, hoping against hope to afford some relief for the countless straphangers.

Promises galore were made by the company.

But, were they carried out?

Not until the "jitneys" came along!

Now, however, in desperation the car company is trying to get back the straphangers' patronage, grabbed by the "jitneys." Great, big cars are being hurriedly placed in operation—the type

SYNDICATED ANTI-RAILWAY "NEWS"—TWO "SPECIALS" DIRECTED TO EDITORS BOOMING THE JITNEY BUS

Practically no newspaper could afford the force to prepare in its own office all of the material which appears in its columns, and the smaller the city, the more the daily paper has to depend on outside sources for its material. The result is that there is a large number of bureaus of national scope which supply all classes of information to daily papers, syndicating it so that the cost of the service for each paper is comparatively small. These services include practically anything that an editor may think a considerable number of his readers might want, that is to say, society news, sporting news, literary news, comic pictures, political gossip, travelogues and even "plate material," which is matter already stereotyped so that the local editor does not even have to set it.

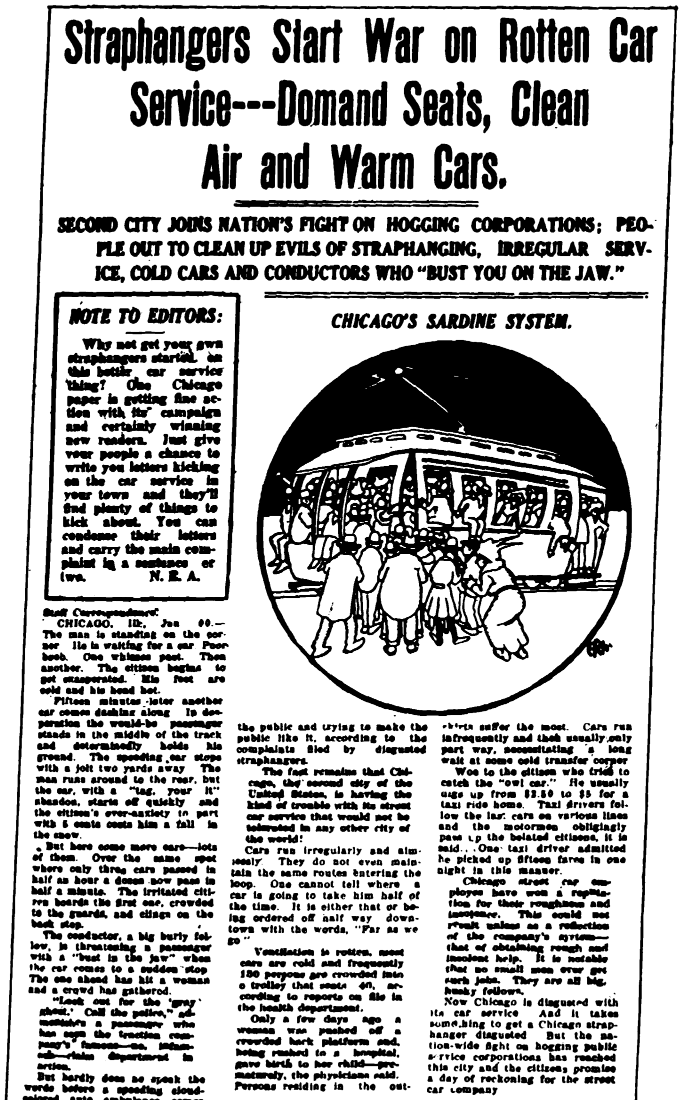
This explanation may be of help to a reader in explaining why his local daily paper may take up a certain subject apropos of nothing. The answer may be that the newspaper is a subscriber to some national bureau which is sending out news or "feature" material of this particular kind at this particular time. The article, when received by the local daily paper, may be changed around somewhat to give it local color, but the idea and central thought are not that of the local editor at all. Very often the pictures used to illustrate the article are syndicated.

The local editor is protected as regards the "news" feature because he knows that the national bureau does not sell to more than one paper in a city, and to the local editor it makes very little difference if the same material does appear at the same time in other papers in other cities.

ANTI-ELECTRIC RAILWAY CAMPAIGN

The ELECTRIC RAILWAY JOURNAL has had drawn to its attention some syndicated material of this kind which has recently been sent out to daily papers by a newspaper publicity bureau, together with the "mats," or matrices, required for the illustrations. Three of these are reproduced herewith. The interest to electric railway companies lies, of course, in the fact that this particular bureau, having exhausted other subjects which it thinks of live interest, is suggesting an attack on local railway companies as a means of "winning new readers." The note to the editors on the reproduction on page 463 is particularly significant. The rank injustice inflicted on the local company or the immorality of attacking a legitimate business enterprise without cause does not seem to have occurred to the news bureau. This month it is the railway company. Next month it may be some other interest or enterprise. And during the excitement produced by the jitney bus movement, it is possible that other concerns of this kind will utilize all sorts of muck-raking material on this subject. How little regard may be shown for facts is fairly well indicated by the article headed "Any City Can Profit in the Jitney Bus Business."

To just what extent this material has been published by daily papers in this country the ELECTRIC RAILWAY JOURNAL is unable to say. The bureau in question is said to issue from five to eight pages of newspaper material with illustrations in mat form every day from its central office, as well as additional material from two other offices which it has in other parts of the country. If the usual course is followed, the matter prepared by this syndicate will be offered to every newspaper in the country that is a possible purchaser. This matter carries in one of its headlines the declaration that straphangers are starting a war on "rotten car service." No particular city's car service could have been in mind when this head was written. It is merely a cheaply multiplied and broad-coated libel offered at a trifling sum per column in the hope that some editor too feeble minded to think for himself will use the copy. The case would be much the same if a newspaper syndicate offered a story headed "Mothers Start War on Clerical Child Poisoners."



Straphangers Start War on Rotten Car Service---Demand Seats, Clean Air and Warm Cars.

SECOND CITY JOINS NATION'S FIGHT ON HOGGING CORPORATIONS; PEOPLE OUT TO CLEAN UP EVILS OF STRAPHANGING, IRREGULAR SERVICE, COLD CARS AND CONDUCTORS WHO "BUST YOU ON THE JAW."

NOTE TO EDITORS:

Why not get your own straphangers started on this better car service thing? One Chicago paper is getting fine action with its campaign and certainly winning new readers. Just give your people a chance to write you letters kicking on the car service in your town and they'll find plenty of things to kick about. You can condense their letters and carry the main complaint in a sentence or two. N. E. A.

CHICAGO'S SARDINE SYSTEM.

Staff Correspondence.

CHICAGO, Ill., Jan 00.—The man is standing on the corner. He is waiting for a car. Poor boob. One whizzes past. Then another. The citizen begins to get exasperated. His feet are cold and his head hot.

Fifteen minutes later another car comes dashing along. In desperation the would-be passenger stands in the middle of the track and determinedly holds his ground. The speeding car stops with a jolt two yards away. The man runs around to the rear, but the car, with a "tag, your it" abandon, starts off quickly and the citizen's over-anxiety to part with 5 cents costs him a fall in the snow.

But here come more cars—lots of them. Over the same spot where only three cars passed in half an hour a dozen now pass in half a minute. The irritated citizen boards the first one, crowded to the guards, and clings on the back step.

The conductor, a big burly fellow, is threatening a passenger with a "bust in the jaw" when the car comes to a sudden stop. The one ahead has hit a woman and a crowd has gathered.

"Look out for the 'gray ghost.' Call the police," admonishes a passenger who has seen the traction company's famous—no, infamous—claim department in action.

But hardly does he speak the words before a speeding cloud-colored auto ambulance comes around the corner. The unconscious woman is loaded in and carried off to a hospital, her whereabouts to be unknown to relatives or friends until she has been bullied into accepting a small cash amount for her injuries and relinquishing all rights to sue the corporation.

That is what the traction companies of Chicago are inflicting on the public and trying to make the public like it, according to the complaints filed by disgusted straphangers.

The fact remains that Chicago, the second city of the United States, is having the kind of trouble with its street car service that would not be tolerated in any other city of the world!

Cars run irregularly and aimlessly. They do not even maintain the same routes entering the loop. One cannot tell where a car is going to take him half of the time. It is either that or being ordered off half way downtown with the words, "Far as we go."

Ventilation is rotten, most cars are cold and frequently 180 persons are crowded into a trolley that seats 40, according to reports on file in the health department.

Only a few days ago a woman was pushed off a crowded back platform and, being rushed to a hospital, gave birth to her child—prematurely, the physicians said.

Persons residing in the outskirts suffer the most. Cars run infrequently and then usually only part way, necessitating a long wait at some cold transfer corner.

Woe to the citizen who tries to catch the "owl car." He usually digs up from $2.50 to $5 for a taxi ride home. Taxi drivers follow the last cars on various lines and the motormen obligingly pass up the belated citizens, it is said. One taxi driver admitted he picked up fifteen fares in one night in this manner.

Chicago street car employes have won a reputation for their roughness and insolence. This could not result unless as a reflection of the company's system—that of obtaining rough and insolent help. It is notable that no small men ever get such jobs. They are all big, husky fellows.

Now Chicago is disgusted with its car service. And it takes something to get a Chicago straphanger disgusted. But the nation-wide fight on hogging public service corporations has reached this city and the citizens promise a day of reckoning for the street car company.

CHICAGO, JAN. 4.

SYNDICATED ANTI-RAILWAY "NEWS"—CIRCULAR IN WHICH EDITORS ARE URGED TO START A CAMPAIGN AGAINST "ROTTEN CAR SERVICE"

The attempt to capitalize in the cheapest form a preconceived animosity toward city transportation companies might easily have been the text for another paragraph in President Hadley's article in the February *North American Review* under the title "The Organization of Public Opinion." As it is, the following sentences, should they come to the eye of the railway baiting syndicate or of newspaper editors, will not seem ungermane to the subject here discussed:

> "A man who desires to make his newspaper popular is under a constant temptation to cater to the prejudices of his public. Without actually making grave mis-statements he can print the facts which they like in large type and suppress or relegate to the obscure columns the facts which they do not like. Under these circumstances their judgment is distorted and their preconceived opinions confirmed, until they become incapable of weighing the real evidence on which their political action ought to be based. If another paper tries to furnish them with the true facts, they do not believe it. They are accessible only to the kind of evidence that their particular journal prefers to furnish."

The Red Book

The McGraw Publishing Company, Inc., will not hereafter issue the McGraw Electric Railway Manual, commonly called "The Red Book." When publication of this manual was begun in 1894, very few electric railway companies published annual reports, and there was no place where the financial statistics of these companies could be obtained except for the roads of about six states in which the reports of railroad commissions were published.

This condition has now changed. A sense of the importance of making such statistics available has led most companies to issue annual reports in a form available to the investor. Elaborate statistics also are published by regulatory commissions in nearly every state. Again, at least three financial manuals devoted originally to steam railroad securities now include statistics of electric railway companies. A further publication of the Red Book would therefore seem largely to duplicate the reports being made by the electric railway companies and others.

Consular Recommendations on South American Trade

That the United States has in the last few years been making steady advances in the markets of the various South American countries is plainly brought out in a publication just issued by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce, entitled "Consular Recommendations in South American Trade." Consular recommendations are well summarized in a report from Rosario, Argentina, which states that the principal factors in extending American trade may be included under five heads: Investment of American capital, steamship facilities, credits, direct personal effort, and willingness on the part of American manufacturers to comply with local requirements. The first two of these points have been thoroughly discussed in the press and in official publications, and steps have been and are being taken to provide the missing facilities.

Twentieth Quarterly Meeting of N. Y. E. R. A.

At the Lake George Meeting, Held March 2 and 3, the Main Topics Discussed Were Maintenance and Fare Collection

The twentieth quarterly meeting of the New York Electric Railway Association was held at the Fort William Henry Hotel, Lake George, on March 2 and 3, with President James F. Hamilton, Schenectady, in the chair. The meeting opened with a banquet on Tuesday evening, attended by 104 persons, and the formal proceedings were confined to a 3½-hour session held on Wednesday morning. The latter was preceded by a meeting of the executive committee.

THE BANQUET

The banquet toast list was prepared with a view to giving the railway men the point of view of the outsider as far as possible. In introducing the speakers Mr. Hamilton compared the association to a school which comprises both teachers and students. Several speakers took a cue from this and made reference to education in its relation to railway work.

James O. Carr, counsel for the General Electric Company, explained the relation of the lawyer to the public service corporation, which includes, he thinks, the function of helping his employer to comply with the law and not to evade it. J. Teller Schoolcraft, mayor of Schenectady, told a string of stories designed to show the pleasant relation existing between the officials of that city and the railway. He concluded with a poem "Making Your Dreams Come True," which expressed the relation of the track worker to the railway official from the former's standpoint. C. S. Sims, vice-president and general manager D. & H. Railroad, emphasized the unsatisfactory financial condition of electric railway properties and urged the companies to work primarily to secure fare rate increase. N. I. Schemerhorn, a merchant of Schenectady; Rev. C. B. McGill, a Presbyterian clergyman of the same city; Harlow C. Clark, representing the American Electric Railway Association, and Elmer J. West, president of the Chamber of Commerce of Glens Falls, also spoke. Mr. McGill gave a condensed history of invention in this country and its relation to electric railway development and Mr. Clark showed briefly the identity of the railway men present and the national association. Mr. West, who is also vice-president of the Adirondack Electric Power Corporation, spoke from the standpoint of a civic body which has taken a reasonable attitude in the recent agitation against the D. & H. Railroad. He said that the corporation needs friends in these days but the corporation is not free from blame for the present condition.

WEDNESDAY'S SESSION

The main session of the meeting was devoted to three topics: "What the New York Electric Railway Association Can Do For Me," "Collection and Registration of City and Interurban Fares," and "What Constitutes Good and Sufficient Maintenance?"

In opening the discussion on the first topic Mr. Hamilton outlined the manner in which the program had been prepared. As the association is made up of individuals, each must take advantage of the opportunities which it affords. There followed what might be termed an "experience meeting," opened by C. J. Witherwax, passenger agent Schenectady Railway Company. He defined the purpose of the association, which is to discuss topics of every-day practical use. The educational function is prominent, and even if a particular discussion is not exactly along the line of one's everyday work it is important in promoting interdepartmental sympathy. The association can help in developing a higher grade of ability necessary to success. W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, thought that the banquet benefits him most, as the speeches reflect the experience of important men. The "personality" of the meetings, that indefinable something which results in "liking the fellows" is also important.

C. H. Smith, assistant general manager United Traction Company, Albany, took another "tack" in urging that railway income must be increased and that the association should secure legislation permitting charging for transfers. Coming back to the course previously marked out, B. Penoyer, engineer maintenance of way, and C. J. MacAleer, claim agent, Schenectady Railway, and C. F. Hewitt, general manager United Traction Company, reinforced the claims of earlier speakers regarding the value of the meetings.

Harlow C. Clark, New York, started the meeting off on another "tack" by using the jitney bus situation to illustrate the lines of cleavage of national and state association work. Mr. Hewitt followed with the statement that these bus lines must be kept within the jurisdiction of the public service commissions. J. E. Hewes, general manager Albany Southern Railroad, gave fresh information showing the injustice of the present terms of competition, illustrating by a case in which a bus line has an exclusive franchise to use a state highway under practically no restrictions. He believes that buses on state highways should obey crossing laws. He urged the association to secure legislation to that effect and also to make failure to register fares, on a conductor's part, prima facie evidence of theft. He gave amusing instances of how railway property is valued for taxation purposes and said that the railways should exert a regulating influence on commissions.

George A. Lewis, Auburn local manager Auburn & Syracuse Electric Railroad, noted a tendency of the commissions to make concessions and urged the railways to stand firm in their reasonable requests. William M. Lawyer, Whitmore Manufacturing Company, Cleveland, Ohio, stated that the larger salaries and more secure tenure of office of Canadian commissions produce more satisfactory results than our system.

J. P. Barnes, general manager Buffalo, Lockport & Rochester Railway, spoke for association publicity. Charging for transfers is but scratching the surface. To convince the public of the good faith of the railways the full message with reasons must be given. Referring to the appropriate clause in the first article of the association's constitution he recommended the establishment of a permanent secretarial office for the supply of ammunition with which to fight false statements. F. E. Belleville, auditor Schenectady Railway, gave statistics showing that out of $370,000 of net income of his company last year $100,000 went into taxes of one kind or another. H. C. Prather, Syracuse local manager Rochester, Syracuse & Eastern Railroad, then read a resolution embodying Mr. Barnes' suggestion of a permanent association office, which was referred to the executive committee with power, the sentiment favoring such action if practicable.

Following the above discussion James E. Hewes, general manager Albany Southern Railroad, read the paper on "Collection and Registration of City and Interurban Fares," abstracted elsewhere. He explained extemporaneously the plans used and to be used on his road and incidentally mentioned that the cost of producing transportation is 9 mills per passenger mile and that, by increasing rates considerably last year, the gross income was increased with 110,000 fewer passengers carried. In the discussion C. H. Smith said that, in his opinion, the best system for collecting city fares is the pay-enter plan with cash-box and register. Inspectors should check up conductors frequently. Mr. Hewes agreed with this. C. F. Hewitt pointed out the difference between city and interurban fare collection and that railway men differ as to the necessity for auxiliary registers. W. S. Hamilton, superintendent Schenectady Railway, expressed his belief in the use of available methods, the financial condition of many properties not being such as to permit of the rental or purchase of registering devices. In Schenectady cars are equipped with counting fare-boxes, revenue and non-revenue registers, and pay-enter conductors are required to balance fare-boxes and registers on each half trip, recording balances on the daily reports. These are checked frequently and immediate explanations of discrepancies are called for. All cash and revenue tickets are registered on the "cash" register. A poor system rigidly enforced is superior to a good system more loosely conducted. All cash and revenue fares should be deposited by the passengers.

J. P. Barnes took up the subject of conductor honesty, dividing men into three classes: (1) Those normally and naturally honest; (2) those who will study out ways to "beat" any system, and (3) those whose honesty is dictated by circumstances. With honest conductors registration of fares is simply a counting mechanism for supplying data for changes in service, etc. Devices should protect honest men and encourage the third class to be honest. The system also should produce legal evidence of theft, not necessarily for use in prosecuting cases, but for the moral effect.

In reply to the question as to what evidence will be satisfactory in court, James McPhillips, attorney Hudson Valley Railway, replied that he did not know any way by which such evidence can be produced by a system of fare collection. These systems are thwarted in their real purpose by dishonest conductors. He thought that most conductors are honest and did not believe in having much patience with dishonest ones. He did not believe that a law would be effective in making failure to register fare prima facie evidence of theft.

F. E. Belleville, Schenectady Railway, stated that the "tear-off duplex" system is in operation on the lines of this company and that the use of the register has been discontinued. The ticket serves as a receipt and an identification check. Conductors at the end of each trip collect the "squares" in the passengers' hands and turn them over to the auditor. At the end of each trip conductors are required to note on their trip sheets the opening and closing numbers of the duplexes torn, together with their denominations. These are checked against the station master's report.

V. L. Edmunds, Railway Audit & Inspection Company, Philadelphia, Pa., stated that discharging men for dishonesty has little effect as it is apt to be taken as a joke. He instanced a motion-picture film in which the hero was "Rob Nickels." Preaching rather than law must be resorted to, as the preachers formerly got results with "eternal damnation." H. W. Peck, general manager Schenectady Illuminating Company, thought that reward would be better than penalty, say the use of a bonus for good work, but C. F. Hewitt replied that "virtue would have to be its own reward." J. P. Ripley, J. G. White Management Corporation, said that the bonus had been tried without success. L. A. Hall, purchasing agent Fonda, Johnstown & Gloversville Railroad, thought that a dishonest conductor can beat any register especially with a totalizer on it, while Elmore De Witt, Pennsylvania Steel Company, ventured the suggestion that it may be considered a bright thing to beat a register.

In closing Mr. Hewes expressed general agreement with previous speakers, but said that an occasional change of system is good if for nothing more than the moral effect.

WHAT IS GOOD MAINTENANCE?

The last feature of the meeting was the reading by Mr. Barnes of his paper abstracted elsewhere in this issue and the discussion briefly summarized below.

B. Penoyer, engineer maintenance of way Schenectady Railway, said that as far as the track is concerned it must be kept well aligned and the joints must be promptly and well repaired, all welds being ground smooth. Especially in paving is the removal of small evidences of wear necessary. Sometimes entire paving is ordered replaced when repair of only part was required. C. H. Smith, United Traction Company, agreed with this, urging incessant inspection and prompt repair, the latter carefully supervised. Insufficient track maintenance means high operating cost; accidents, derailments and wear and tear of rolling stock, etc. Good and sufficient maintenance also means "safety first."

J. P. Ripley followed with the statement that Mr. Barnes is really arguing for economical maintenance. The real question is how much money the directors will grant for maintenance, no matter how desirable and profitable the latter may be. Mr. Hewitt agreed with this, but encouraged the engineers to keep up their good work, stating that if their recommendations could be carried out property would be improved and returns would be better.

F. A. Bagg, chief engineer Fonda, Johnstown & Gloversville Railroad, instanced improved bonding as an element in maintenance and said that the word "Best" should replace "Good" in the title of the paper under discussion. Physical perfection in maintenance is rarely justified for operation and maintenance are interlinked. H. L. Barber, general manager Plattsburgh Traction Company, discussed waterproofing around track structure and showed that sometimes municipal specifications for paving do not take the railway's requirements into consideration. He wondered if the association could do anything to improve this condition.

J. E. Hewes, Albany Southern Railroad, pointed out certain inconsistencies in the public service commission's requirements regarding maintenance due to lack of experience on the part of commissioners. He thought that commissions should include, each, a financier and a railway manager. Replying to this and the remarks of other speakers, James McPhillips, Hudson Valley Railway, summed up as follows: Railway directors will always give favorable consideration to clear and definite recommendations. Railways should not tolerate illogical rulings of commissions. These matters should not be regulated by laws, already too numerous. City councils will usually give consideration to explanation of what type of railway construction is best suited to local conditions.

F. S. Doyle, master mechanic Schenectady Railway, gave the mechanical man's point of view regarding maintenance. Equipment should have daily inspection duly recorded. Inspection on a mileage basis should also be enforced and light repairs should be made promptly. Annual inspection should be more complete. The record of car failures is a good indication of the efficiency of the mechanical department.

President Hamilton then closed the meeting after a resolution of sympathy to Mrs. J. H. Pardee on account of Past-President Pardee's critical illness had been passed and ordered sent by telegraph.

COLLECTION AND REGISTRATION OF CITY AND INTERURBAN FARES

BY JAMES E. HEWES, GENERAL MANAGER ALBANY SOUTHERN RAILROAD COMPANY

Years ago the cash drawer of the retail and wholesale traders was replaced by the cash register, and to-day even the bootblack, with his one assistant, must have a cash register. The financial outlay represented by this cash register is as nothing when compared to the results accomplished by the new mechanical bookkeeper.

The value of the public indication has made the cash register indispensable in all lines of business activity, including the railway business.

Publicity is the safeguard against dishonesty, and therefore the more publicity we have the better. Money is the greatest tempter. Dishonesty is a recognized factor in railway operation. We do not doubt that our men are honest, they would not be in our employ if we knew them to be otherwise, but a check is necessary to make dishonesty as nearly impossible as we can.

There are many so-called cash fare-registers in use throughout the country to-day, but some are not adequate. To my mind the essential feature of a car register is that it be capable of recording each fare registered under its separate classification. The principle of registering a five-cent cash passenger and a three-cent cash passenger simply as two passengers is wrong, and is one to be discouraged because of the opportunity it gives the conductor to "knock down" two cents on each five-cent fare registered, aside from the fact that it is not good business.

A fare registering system to be successful must be one that is fair to the conductors' interests as well as to the company's interests. If your conductor is collecting five different denominations of fares and is registering three of these of widely different value upon one counter, what means has your conductor to show you that he has turned over all of the various fares as were paid by the passengers? If you provide means for a separate registration and indication for each of these five different denominations of fares the conductor is collecting, he knows that he has indicated to his passengers the receipt of their fares, and the permanent register record shows that he has registered them as paid. This same register record shows you that you are getting all of the fares paid by the passengers.

So much for the man who cares, but what about the man who does not care, the man who believes he is entitled to more of the company's money than is paid him in wages? How does the former system affect him? You virtually say to him: "Here is a machine upon which to register your fares; for every fare you register upon it you must turn in a fare"; thus leaving it to him to say how many of the various kinds of fares he has collected. If it suits his convenience to turn in a lesser number of 5-cent fares than were collected and to turn in a correspondingly larger number of school tickets than were received, making up the excess of school tickets from a stock previously purchased by his friends, how can you know of this substitution, as he has turned in a fare for every fare the register calls for? His chances to substitute school and regular tickets for 5-cent fares enable him to pilfer an enormous amount of money within a short time.

Now, a fare-register providing a separate counter for the school tickets, for the 4 1/6-cent tickets and for the 5-cent cash fares would prevent this substitution. When the conductor registers a fare he should indicate to the passenger its value by registering the same, and once the fare is recorded it should remain an untamperable record, compelling the conductor to turn in fare for fare as received.

In like manner there should be a separate registration and classification for each pass, special ticket, commutation ticket, etc. There is danger in the register which permits a change of the indication on the register after the fare has been recorded. Thus, on such machines it is the practice of disloyal conductors to register one value and to indicate another, that is, a man may register a 5-cent fare and then quickly indicate 50 cents on the register.

It is the aim of most interurban railway companies to require passengers to secure tickets at all agency stations before entering the cars. In some cases arbitrary measures are taken to attain this end; in others it is sought by indirect means, such as by levying an extra charge upon those who neglect to buy tickets, a receipt being given the passenger whereby he can have this extra charge rebated upon presentation of the receipt at a ticket office. With the car register, such a transaction is handled by the conductor registering the actual value of the ride, and collecting, say, ten cents in excess of the fare, for which he issues a ten-cent redeemable excess receipt. If the conductor starts with one hundred excess checks, at the end of the day he must account for these one hundred receipts or their cash equivalent over and above the amount which is shown on his register record.

The necessary thing in connection with handling tickets is the immediate cancellation of tickets and prompt transmission of such tickets to the auditing department. Until canceled, a ticket is in some respects like a bank bill; the general demand for it gives it a value. Consequently some men are tempted, and, through collusion, some take advantage of this circumstance to resell or replace on the market tickets that should be canceled and destroyed.

There are two ways to prevent the manipulation of tickets, which on interurban properties is a serious problem; first to place time limitations on them, and, second, to register the tickets as collected at their actual cash value.

Furthermore, the classified register record should be hidden from the conductor. With the record locked within the register, he has no means of knowing what this record calls for, consequently he must turn in all his collections. He counts his change before starting to work, deducts this amount when he quits, and turns in all of his day's collections. Now he is turning in upon the basis of what has been collected and not what has been registered.

By means of this closed record of registration we have a basis for figuring the personal efficiency of the conductor and therefore we can grade our men accordingly. At the present time, when so much stress is laid upon the human factor and the efficiency of our employees, this grading of our men according to their merit is very important. With such information the operating official is placed in most intimate touch with the work of his conductors that he cannot see.

So far as human ingenuity can provide for the performance of a duty, there is a moral force behind the system that compels some registration—the proper registration for each fare collected. The several indicators make the registration compulsory, for the reason that the conductor does not know but that the very passenger from whom he has received a fare is on the car for the purpose of watching him. If that particular passenger is not doing so, some other may be, and this fact requires him to be careful and honest. It raises his standard of efficiency, gives him a better opinion of himself and makes him a more competent, all-around employee, capable in time of filling a position "higher up."

As a summation, we know that any system which makes a bookkeeper out of the conductor is, at best, inaccurate, and, furthermore, inaccuracy breeds carelessness, and carelessness breeds inefficiency, and inefficiency makes dissatisfied patrons. Inaccuracy, carelessness, inefficiency, dissatisfied patrons; these spell "loss."

WHAT CONSTITUTES GOOD AND SUFFICIENT MAINTENANCE?

BY JAMES P. BARNES, GENERAL MANAGER BUFFALO, LOCKPORT & ROCHESTER RAILWAY COMPANY

Opinions differ widely as to the degree of maintenance which could be defined as good and sufficient on various properties, but it may be defined broadly as that which keeps a property in such condition as to permit and facilitate good and efficient operation.

As maintenance expense is a part of operating expense, maintenance and operation are closely interlinked, and maintenance must always be considered in the light of the operating conditions and problems of the individual property.

If current maintenance is as thorough as possible, the depreciation charges will be relatively small, while if the current maintenance is kept to as low an expenditure as possible the deterioration of the property will be more rapid and consequently the depreciation charge should be correspondingly increased. This fact will tend toward a constant expenditure on maintenance; with the special divisions as between current maintenance and depreciation — which may be described as deferred maintenance—varying in respect to each other in accordance with the manner in which the current maintenance is handled.

There are two matters in connection with current maintenance which seem of prime importance:

(1) Maintenance of such degree as positively to insure safety, reliability and convenience of operation.

(2) Maintenance of such degree as to insure, so far as possible of determination, a minimum depreciation charge.

Considering the first requisite, it is obviously essential for any property that it be maintained to such a degree as to insure safety and reliability of operation, no matter what its earnings or conditions of operation may be. This is the first duty the transportation corporation owes the traveling public, and it will not be disputed. The fulfillment of this condition requires that roadbed, pavement, line, power house, and car equipment shall be maintained to a standard sufficient to fulfill the conditions of safety and convenience. For example, track must be maintained in such condition as to permit operation at schedule speeds without danger of derailment, not only on account of the physical dangers involved, but equally for the reason that the results of derailments are deranged schedules, dissatisfied patrons and all the ills resultant from adverse public opinion.

Continuing the reference to track structures, an excessive number of low joints and the consequent noisy operation may bring about the same results, so far as adverse public opinion is concerned, but the revenues of the company may be insufficient to allow for the complete elimination of this particular source of difficulty and at the same time allow for the proper standard of safety in maintenance of other structures and equipment. Under these conditions it would certainly not be wise to repair the low joints if the expense of that repair necessitated the departure from standards of safety in the maintenance of other structures and equipment, and, therefore, it would seem that this poor condition of track might be, for the property so situated, properly classified as good and sufficient maintenance.

The question now arises as to whether the property, situated as we have supposed in the above instance, should make any charge to depreciation, or deferred maintenance. If the depreciation is considered in the light of a periodical increment, based upon the cost of eventual replacement, the charges may be spread out over a long period of time and be individually small, or may be grouped within a small period and be individually large.

The second method may be considered as drawing upon the future for present needs, as the amount which would otherwise be charged to depreciation would thus be made available for current maintenance.

Numerous instances might be cited where the earnings of a property are not more than sufficient to pay its operating expenses, taxes and fixed charges. Whether an allowance for depreciation should be included in the operating expense of such a property is a question for consideration.

Considering the second requisite, where the earnings of the property are sufficient properly to care for its maintenance, it would seem obvious that the standards of maintenance should be such that the physical condition of structures and equipment will be at all times the best possible, resulting in the longest possible life and the greatest convenience and reliability of operation.

Experience has taught all of us that equipment which is kept up—well lubricated, bearings renewed when they should be, bolts kept tight, small defects remedied before attaining large proportions, etc.—will actually have a longer useful life than equipment which is not so carefully and completely maintained. This standard of maintenance would result in a small depreciation charge. This may be carried to the extreme.

To be good and sufficient, maintenance must be economical. In this connection, economical is taken to mean that money expended on maintenance is expended only where actual, positive and beneficial results are to be obtained. Maintenance must be planned ahead so that relatively heavy jobs may be undertaken and accomplished at times when the operating requirements of the property are light.

Joint Committee on Line Construction

The fifth meeting of the national joint committee on overhead and underground line construction was held in New York on Feb. 24. The committee devoted practically all day to a continuation of the revision of the present power wire crossing specifications, and divided the work up into sections to be apportioned to various sub-committees for revision. The committee expresses a desire for suggestions as to desirable requirements, and also detailed criticism of any of the clauses of the present standard power wire crossing specifications. The next meeting is scheduled for March 31.

Although 1913 and 1914 were years of strikes and depression in Colorado, the new business department of the Arkansas Valley Railway, Light & Power Company, Pueblo, under the superintendency of E. F. Stone, made a record in securing new business. During this period the horse-power of connected motor load was increased from 14,956 to 18,485—a gain of 23.6 per cent. Gross receipts from this source during the same period increased 29 per cent.

COMMUNICATIONS

Rational Units for the Boiler Room

INTERBOROUGH RAPID TRANSIT COMPANY
NEW YORK, Feb. 26, 1915.

To the Editors:

Your editorial support of the plan to rate boilers on a heating-surface basis is very much to the point. Present American practice in this regard is most illogical, and it is not surprising that confusion results from a system of nomenclature under which 3000-sq. ft. boilers can have ratings that range between 250 hp and 350 hp and then are put into service wherein they are said to have outputs that range from 200 hp to 1000 hp. The unit, "boiler horsepower," has long since outlived its usefulness, and it may well be discarded. Obviously, the proper basis for the purchase of a boiler is area of heating surface.

There is, however, a point in connection with the matter which was mentioned only indirectly in your editorial of Feb. 20. This is that the boiler horsepower has come to be widely used not only as a basis for purchase but also as a unit of production, or output, for steam-generating apparatus. When it is applied in the latter sense there is somewhat more excuse for it than in the former, but still it has two serious objections: First, the fact that it is an absolutely arbitrary unit which can be converted only with difficulty into the common terms of heat production and power; and second, the fact that it is thoroughly misleading.

With regard to the first of these objections it may be said that the output of steam-generating apparatus can be directly expressed only in thermal units. In ninety-nine cases out of one hundred, however, the heat of the steam is eventually transformed into electrical energy. For this reason a unit of output which is easily convertible into electrical terms would be somewhat more convenient than the b.t.u., because a calculation for changing heat units into kilowatt-hours would have to be made anyway.

The boiler horsepower offers no such convenience. Its value expressed in b.t.u. is a complex number, difficult to remember, and its value in kilowatt-hours is equally unhandy in calculations. In fact, it is divisible by no common unit and its retention imposes entirely unnecessary labor upon engineers merely for the sake of an outworn precedent which even was established in error. In consequence, I have been for some time past strongly in favor of the use of the myriawatt, but if this cannot be generally accepted, some unit such as 100,000 b.t.u. is the only logical alternative.

The second objection, or the misleading character of the "boiler horsepower" as applied to output, also constitutes an important argument against it, and abolition of the term would, perhaps, serve to clarify some of the fundamental principles of boiler operation which have become decidedly obscured. Most important among these is the necessity for distinguishing clearly between the different functions of the furnace and the heating surface.

The furnace gives out heat—the heating surface absorbs it. The duties of the two are fundamentally different. Only the former is properly subject to a rating in terms of power, because the output of the heating surface (or that which is commonly called the boiler) is quite incapable of being definitely measured by a single expression. Little or no control can be exercised over heat absorption by the heating surface. Cleanliness is the only factor. On the other hand, flame conditions and excess air in the furnace may alter the efficiency 20 or 30 per cent, according to the character of stoker operation. Manifestly, the stoker or furnace is the controlling factor, and the heating surface is largely incidental to steam generation.

That apparatus of such indeterminate duty as this should be endowed with a definite output, at least by implication, because of the existence of the term "boiler horsepower" is a most unfortunate misapplication of names. No engineer would try to express the output of a condenser in horsepower without qualifying his statement by giving the vacuum and intake temperature. Why should it be considered any more reasonable to speak of the horsepower of heating surface? No heat-transfer apparatus, such as condensers, evaporators or feedwater heaters, can logically be rated in horsepower.

H. G. STOTT, Superintendent of Motive Power.

Uniformity in Car Colors

DENVER TRAMWAY COMPANY
DENVER, COL., Feb. 23, 1915.

To the Editors:

I have read with interest the editorial in your issue of Feb. 6, on the question of car colors. Most of us are strong for uniformity and standards and accustomed to working out savings of even less amounts, but if a certain color is pleasing to the public, that fact no doubt has a value equal to several times the amount saved—should some other color be cheaper. Assuming the same durability in both cases, $5 per car is probably the full amount which can be saved by any change in color on a large city car. On a system which I have in mind, having a total of 386 cars, and possibly an average of 300 cars during a period of six years ending Dec. 31, 1914, 226 cars were repainted during this period. This is equivalent to thirty-seven a year, which, at $5 a piece, would mean a saving of only $185.

No doubt the steam railroads chose their present general standards on the basis of the colors on which coal dust and smoke would show the least and not particularly because the color in other ways was cheaper to maintain or that it would look better for a longer time. I doubt very much whether there is any great difference in the cost of maintaining the various tints or shades now in use, provided always that the best quality is used.

There is good reason for standards of color on steam roads, but with electric cars in city service I can hardly see any good reason for them, and in view of the strong efforts now being made by electric railway companies to "please the public," and the popular maxim that "it pays to advertise" it seems most important for a company to continue with the color which it considers is most cheerful and pleasing to the greater number of competent judges.

W. H. MCALONEY,
Superintendent Rolling Stock.

Chicago Elevated Club

The Elevated Club of the Elevated Railroads of Chicago held its fourth meeting on Thursday, Feb. 25, 1915. The principal part of the program was taken up by C. C. Farmer, of the Westinghouse Traction Brake Company, who gave an illustrated talk on air brakes. The difference between the old and the new methods of application of air brakes was described, and the marked advantage obtained by the latest equipment as installed on the new steel cars recently purchased by the company as compared with the old types was explained. Mr. Farmer described in detail the new air-brake equipment, as well as the construction and operation of the new Universal valve with its quick action feature which was also installed on the new all-steel cars. Although this club is only about three months old, its membership now approximates 130 and is growing rapidly.

Equipment and Its Maintenance

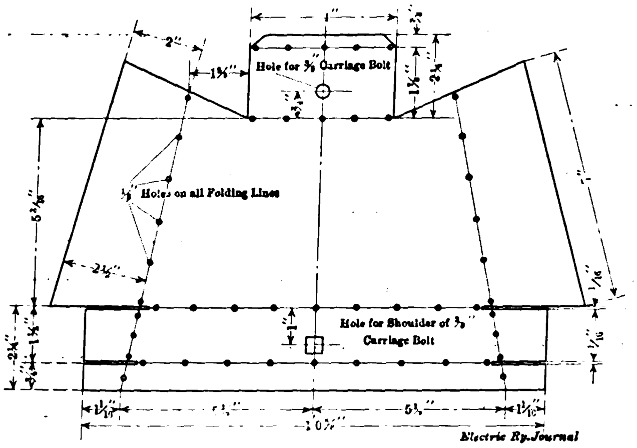
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

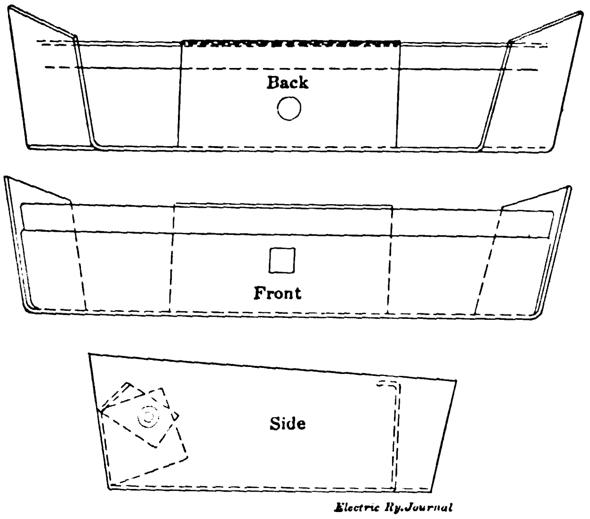
Removing Snow from Under-Running Third-Rail

BY F. L. HINMAN, MASTER MECHANIC NEW YORK STATE RAILWAYS—SYRACUSE AND ONEIDA LINES

Some trouble has been experienced during several winters past in the operation of the under-running third-rail system between Oneida and Syracuse (West Shore electrification) due to the drifting up of snow under the third rail in such quantities as to cause the collecting slipper to lose contact with the rail and seriously interfere with schedules. In order to overcome this trouble a sheet-steel snow slipper of the design illustrated was developed. This slipper is easily and quickly attached to the collecting shoe, and by its use the space under the third rail is kept free from snow.


2"
1⅛"
Hole for ⅜" Carriage Bolt
⅛" Holes on all Folding Lines
2½"
Hole for Shoulder of ⅜" Carriage Bolt
5¾"
1⅛"
2¼"
1³⁄₁₆"
5¾"
1³⁄₁₆"
Electric Ry. Journal

PATTERN PLAN FOR THIRD-RAIL SNOW SLIPPER


Back
Front
Side
Electric Ry. Journal

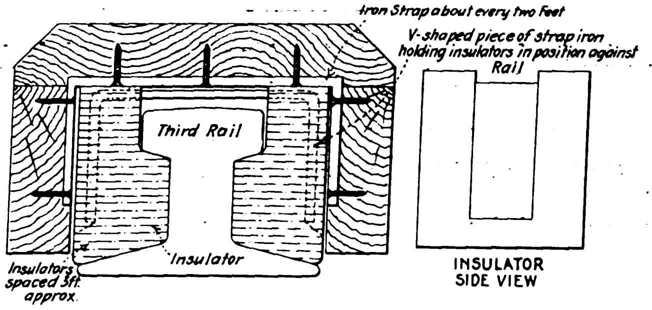
THREE VIEWS OF THE THIRD-RAIL SNOW SLIPPER

When this slipper was first tried out we found that the additional weight of the snow slipper was too great to be taken care of properly by the shoe springs then in use. However, the substitution of a stronger spring overcame this defect. During several trials made this past winter it was found that at speeds of from 25 to 40 m.p.h. this device is very effective, although it clears fairly well even at lower speeds.

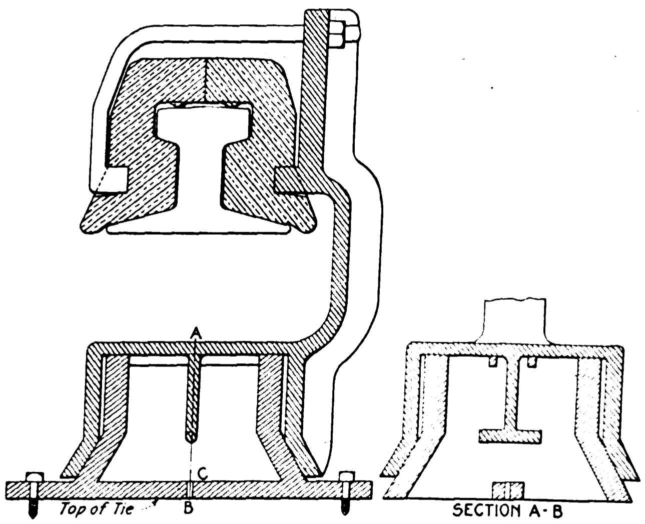
High-Voltage Third-Rail Construction

BY A. H. TRACY, ASSISTANT ELECTRICAL ENGINEER COMMITTEE OF INVESTIGATION ON SMOKE ABATEMENT, CHICAGO, ILL.

The accompanying drawings show a suggested type of third-rail support and protection suitable for high-voltage operation. The improvement in the support consists in so mounting the supporting bracket on a cup-shaped casting that the third-rail and its insulators are relieved of all strains due to the depression of the ties caused by passing trains. The third-rail is prevented from turning over by the T-shaped portion of the bracket base which is limited in its upward movement by the two cross webs at the top of the cup-shaped casting.


Iron Strap about every two Feet
V-shaped piece of strap iron holding insulators in position against Rail
Third Rail
Insulator
Insulators spaced 3ft. approx.
INSULATOR SIDE VIEW

THIRD-RAIL PROTECTION BETWEEN SUPPORTS


A
C
Top of Tie
B
SECTION A-B

HIGH-VOLTAGE THIRD-RAIL SUPPORT

To erect the third-rail a nail is driven into the tie at the point *c* which has previously been located by a template. The cup is then centered by means of the nail and is revolved horizontally so that the T-shaped projection on the bracket will pass between the webs of the cup. When the bracket has been mounted the cup is revolved 90 deg. into its normal position and bolted to the tie. The third-rail is then blocked up into position and erected in the usual manner.

Between supports the major portion of the insulating qualities is provided by porcelain insulators held in position by U-shaped pieces of flat iron strap. These insulators also serve as the supports for the protection proper which is simply an inverted trough.

The construction described permits rapid and cheap erection and at the same time provides high insulating qualities. Since the protection boards or trough are not relied upon for the major portion of the insulating quality they can be creosoted and their life thus materially increased without appreciable detriment to the insulation. Rapid deterioration of the inner surface of the protection due to contact with the rail is avoided. The first cost of the protection will probably be less since the protection trough can be made in quantity in the shop and the high cost of carpenter work in fitting the protection to the rail along the right of way will be avoided. Space for bonding is provided between insulators.

Painters' Putty and Shellac for Repairing Controller Division Plates

BY R. H. PARSONS, ELECTRICAL FOREMAN

Controller division plates are subjected continually to heavy arcs so that they are gradually eaten away until there are holes through them. Long before that time it is necessary to renew the plate to prevent more serious trouble. These plates vary in cost from 11 cents each upward, according to the type of controller and the manufacturer, in addition to which some labor is involved in renewing them.

A very simple and surprisingly efficient manner of repairing such plates lies in the use of painter's putty and shellac as hereinafter described. Although the use of putty would seem to mean patch work a trial will prove it to be a kink worth knowing.

When the car comes in for inspection or shop repairs and the division plate is found with a burn hole it can be repaired, unless the plate is nearly gone, in the following way:

Without removal from the arc deflector, scrape every particle of burned or glazed parts from the division plates to leave the hole well cleaned. Then shellac the entire surface.

Mix together good shellac and putty until it is thinner than putty alone, but pliable and sticky. Then fill up the hole, making a neat, smooth job. After a few minutes shellac again over the plate. For the best results the filling should be allowed to stand as long as possible, say twelve hours. If the car or controller cannot be held out of service, one hour will do. In the latter instance the surface would burn a little when exposed to a heavy arc, but the harder under-layer would not be affected.

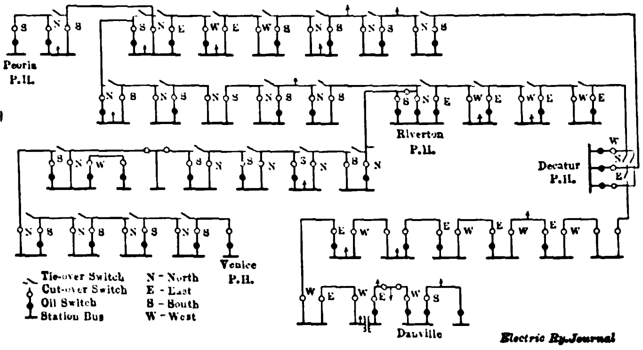
Any plate which has enough left for the putty to cling to can be repaired in this manner for a life equal to and often longer than that of a new plate. The same scheme will apply to line switches and contactors, except in cases where the arcing plates are purposely made of light material. In the latter case it would be cheaper to throw them away than to spend labor on repairs. The arc plates and chutes of circuit breakers can also be repaired advantageously by the same process.

Power Dispatching

BY G. L. FITCH, POWER DISPATCHER ILLINOIS TRACTION SYSTEM

The position of power dispatcher on an electric railway has been advanced until it now has become one of the most prominent in the economic operation of the road. The time when the electric energy could be handled by the train dispatchers or the line could be cleared for work by the co-operation of the linemen and the substation attendants has passed, and many of the larger roads now place the responsibility on one man.

In order to give an idea of the duties involved in power dispatching on the Illinois Traction System, a brief description of the arrangement of the power houses, substations and facilities for handling power, is necessary. In general the system radiates in three principal branches from Springfield, Ill., situated at the approximate center of the State. One branch extends to Peoria, Ill., a distance of 75 miles, another to St. Louis, Mo., a distance of 98 miles, and a third to Danville, Ill., a distance of 123 miles. These branches, together with several connecting lines, form an interurban system of 427 miles in length.



I. T. S. POWER DISPATCHING—DIAGRAM OF HIGH-TENSION CIRCUITS

Energy at 33,000 volts for these interurban lines, as well as for supplying power and light to consumers distributed over the entire system, is furnished by four power houses situated one at the end of each branch and one at Riverton, Ill., near Springfield, or the center of the system.

The Venice power house at the St. Louis extremity of the line is the largest and contains two turbo-generators, one 5000 kw and one 3000 kw, and also one 1000-kw Corliss, direct-connected engine. In this power house also is a substation with two rotaries, each of 1800-kw capacity, which supply the interurban lines and a small city railway system. A 1700-volt lighting and power transmission line to Edwardsville, Ill., 22 miles distant, is also supplied from this station.

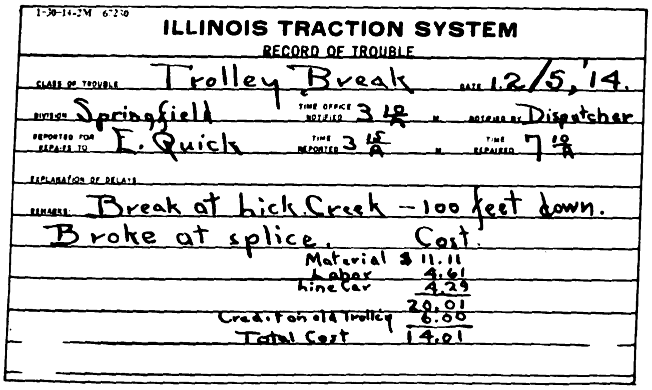
The Riverton power house, at the center of the system, has a total rating of 4000 kw with three units consisting of two turbines of 2000-kw and 1000-kw capacity, and one 1000-kw Corliss, direct-connected engine. This station also contains one rotary converter of 300 kw and the generating capacity will be increased further by a 5000-kw turbine which is in the course of installation.

At Danville, the eastern extremity of the line, is one of the smaller stations which also furnishes power for the city railways, one of the properties of the Illinois Traction System. This station contains a 2000-volt a.c. Corliss unit, direct connected, one 1000-kw d.c. generator and one 1000-kw rotary converter. Additional capacity is being provided for by the installation of one 5000-kw a.c. turbine.

Peoria, at the northern extremity of the system, has a capacity of 4000 kw a.c. in two units, a 3600-kw d.c. unit and two rotary converters of 1800 kw each. In addition to the energy furnished to the interurban lines this station supplies power to the Peoria City Railway and the Peoria & Pekin Terminal Railway.

Spaced at equal distances of approximately 10 miles, between these power stations are thirty-four substations in which the 33,000-volt a.c. energy is transformed to 650 volts d.c., at which potential it is fed to the trolley. These rotaries are of several types embracing the Stanley, Westinghouse and General Electric and range in capacities from 300 kw to 750 kw.

A three-phase, 33,000-volt transmission line connects all of the power houses and substations through two sets of disconnecting switches located at each substation. Also on the outside of each substation in the line, between the ingoing and outgoing lines, are disconnecting switches of the Burke, Delta-Star air-break and General Electric outdoor, underhanging type, which permit any station to be cut out without breaking the line. These last switches have been found very convenient on numerous occasions, being used to clear the high tension in a substation while repairs are being made.


1-30-14-2M 67250

ILLINOIS TRACTION SYSTEM

RECORD OF TROUBLE

CLASS OF TROUBLE Trolley Break DATE 12/5,'14.

DIVISION Springfield TIME OFFICE NOTIFIED 3 45 A M. NOTIFIED BY Dispatcher

REPORTED FOR REPAIRS TO E. Quick TIME REPORTED 3 45 A M. TIME REPAIRED 7 10 A

EXPLANATION OF DELAYS

REMARKS Break at Lick Creek — 100 feet down. Broke at splice. Cost.

Material	$ 11.11
Labor	4.61
Line Car	4.29
	20.01
Credit on old Trolley	6.00
Total Cost	14.01

I. T. S. POWER DISPATCHING—TROUBLE CARD

There are two separate telephone lines connecting the power houses and substations. One line is used by the train dispatchers and the other for commercial business, both centering on a switchboard in the power dispatcher's office at Springfield. The power dispatcher has precedence over all other business during high-tension trouble, hence direct conversation may be held with the engineers at the power houses or with substation attendants at all times. In case both these telephone lines are out, a long-distance Bell telephone is available. All maintainers are provided with a test set which they connect to the telephone line when requesting that the high tension be cleared for making repairs. Thus the power dispatcher is enabled to notify them in case any trouble occurs on another part of the system, which would make it necessary to put the power through the cleared section.

PROCEDURE IN HANDLING POWER

The Illinois Traction System has passed through the experimental stage of handling power through the train dispatchers. This method proved unsatisfactory on account of the different dispatching divisions, in which each dispatcher endeavored to handle the power for the best interest of his own division. Power dispatchers were first located at Decatur, Ill., where they worked shifts of twelve hours each and reported to the operating engineer. At that time they were made responsible for the proper distribution of the power and the handling of all high-tension switches in power houses or substations. In other words, no one was allowed to open or close a switch without direct orders from the power dispatcher. This also applied to the 2300-volt signal power transmission line which is fed from several of the substations.

This arrangement continued until about two years ago, when the superintendency of the overhead and substations was transferred to the signal engineer and the power dispatcher was moved to Springfield. This new arrangement has worked out very satisfactorily since it gives the power dispatcher the proper authority over the signal maintainers, thus permitting cases of trouble to be handled with greater dispatch.

POWER DISPATCHING METHODS

When the power dispatcher is asked to clear the line between two stations, the lineman must stay on the line until it is reported clear. During this time the lineman hears each order given to the substation attendant, and is thereby assured that the correct directions have been given. In clearing the line the power dispatcher first orders the attendant to drop his oil switch, pull out his disconnecting switches on the side of the station he wishes to clear, and be certain that his tie-overs are open. When the attendant reports back that the orders have been executed, the dispatcher clears the substation at the other side of the defective section by similar orders. After ascertaining that the lineman has his test set connected, the dispatcher reports the line clear. This makes the lineman who is asking for the line responsible for the rest of the men with him, since no one else can order the power on, and then only through the power dispatcher.

Most power interruptions occur during electrical storms due to the breaking down of insulators, and in many cases the wire is burned in two. This has been overcome as much as possible by requiring the maintainers to keep close watch for broken insulators and to make renewals promptly with new 45,000-volt insulators which have been adopted as standard.

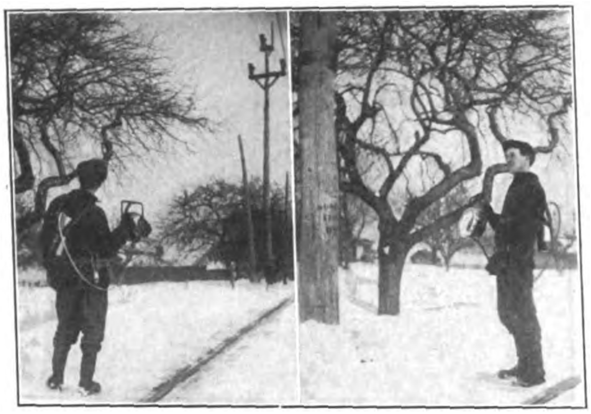
In addition to handling the power, the night power dispatcher has charge of the terminal at Springfield. The day power dispatcher operates the telephone exchange from the six lines, keeps in touch with the linemen, telephone, signal and substation maintainers, who report to him three times a day to receive orders or report cases of trouble. In addition to these duties a record is kept and turned in to the assistant general manager each day showing the trouble of the previous twenty-four hours for all substations, high-tension lines, telephone lines, trolley and signal systems.

In order to facilitate the work of the dispatcher a chart of the transmission lines and substations is placed in front of his desk. This shows the manner in which the 33,000-volt lines enter each station, also the locations of the smaller power lines. Another conveniently-located chart enables the power dispatcher to keep a record of the substations at which extra men are worked. A third chart, also hung near by, shows the 2300-volt signal line with all switches, and a fourth chart is used to show the different places where the 33,000-volt line may be cut, red pegs being inserted to indicate at a glance which switches are out in every substation. In addition to this last chart, as a further check, a large record sheet is kept to make note of each change, all cases of station and high-tension trouble and the names of persons who are working on the high-tension line. A report is turned in each day by the different substations, and a trouble card is made out for every case of power interruption, the latter being shown in one of the illustrations. These reports are filed as to date and are kept as a permanent record.

Linemen's Non-Electric and Electric Searchlights

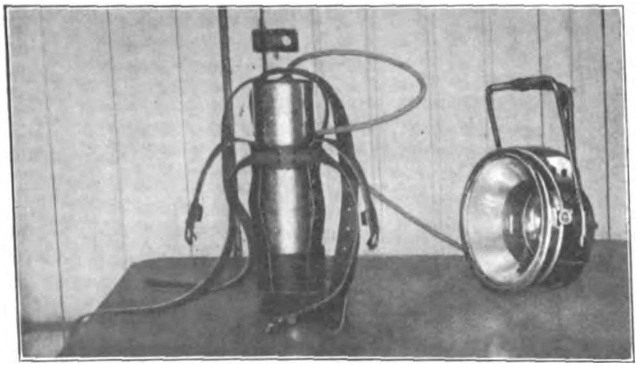
A necessary part of the equipment of the cross-country lineman is a searchlight outfit to permit him to examine insulator or other line equipment on the poles or towers. In a recent trip through central New York two different combinations for this purpose were found.

The Buffalo, Lockport & Rochester Railway, which has 60,000-volt transmission lines, furnishes its linemen with an outfit comprising a Prestolite Type MC (motorcycle) tank, a "Grandad" solar lamp of 9½-in. front diameter and 6¼-in. depth, made by the Badger Brass Manufacturing Company, Kenosha, Wis., and the necessary harness for conveniently carrying the outfit. The tank holds fuel to provide light for twenty hours, from which it is evident that its weight, now 10¾ lb. including the strap, could be somewhat reduced by providing a size to hold only one night's supply. The lamp alone weighs 7¼ lb. Its rays will show a cracked or crumbled insulator at 50 ft. The cost of charging the twenty-hour tank is only 50 cents to 60 cents, as against twice that sum for five dry cells.



MANNER OF CARRYING AND USING TANK OUTFIT

The neighboring New York State Railways—Rochester Lines—have, for the last three years, been using a battery outfit with tungsten lamp and high-power parabolic reflector, all mounted in an aluminum case and weighing 2½ lb. The cell capacity is good for ten hours, and the illumination is ample for inspecting cross-arm fittings on poles 40 ft. to 45 ft. high. The trade name of this outfit is "Niagara Flashlight" and it is made by the Niagara Searchlight Company, Niagara Falls, N. Y. It is listed at $10, but is usually sold at about one-third less. It has the distinct advantage of being readily carried as a part of the equipment in a lineman's belt.



LINEMAN'S SEARCHLIGHT OUTFIT ASSEMBLED BY THE BUFFALO, LOCKPORT & ROCHESTER RAILWAY

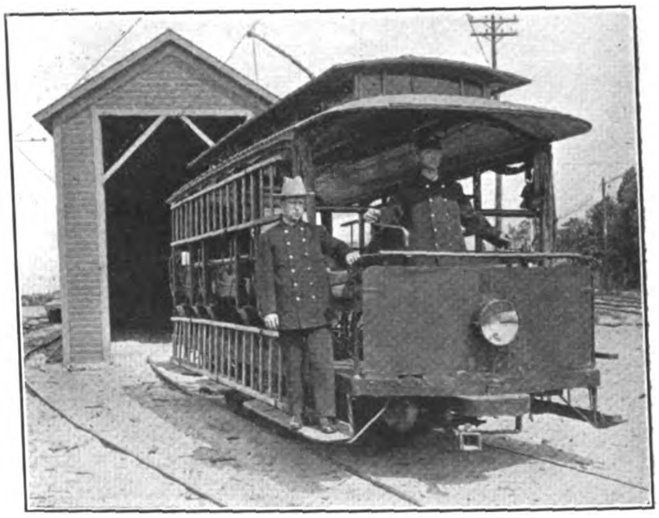
Fire-Fighting Car at Duluth

George D. McCarthy, assistant secretary Commercial Club, Duluth, Minn., presents in the February issue of *The American City* the following data on a fire-fighting trolley car used at Park Point, a suburb of Duluth.

An unusual condition was responsible for the equipment, but the same idea may be found applicable to other isolated suburbs where poor roads or other barriers prevent ready response by horse or motor equipment.

The harbor of Duluth is formed by a narrow strip of land extending across the western end of Lake Superior. This strip, only 400 to 600 ft. wide, extends for 7 miles from the Minnesota to the Wisconsin shore. About 3 miles of it, extending from the Duluth shore, are built up with a variety of residences.

The settled portion of Park Point, as the suburb is called, is cut off from the city proper by the entrance to the harbor, which is spanned by an aerial bridge. It would take too long to cross this bridge to respond in time to a fire alarm. However, this is not the main obstacle to reaching the houses at Park Point with fire-fighting apparatus. This suburb is so narrow that only one street is laid out. The car tracks are laid in that street, the surface of which is beach sand, loose and shifting and offering no foundation to team travel.



DULUTH OPEN CAR USED FOR FIRE-FIGHTING

The fire-fighting problem proved a difficult one for many years. Bucket brigades did what they could, but when a house on Park Point took fire the chances were ten to one that it would burn to the ground. Insurance rates were high, permanent residence was discouraged and cheap construction encouraged. A fire tug would solve the problem under ordinary circumstances, but the water along the shore is so shallow that a fire tug could not approach.

Some bright mind hit upon a trolley fire department. The co-operation of the Park Point Traction Company was obtained. In 1907 a car that was in good condition, but had served its usefulness as a passenger car, was purchased by the city for $650. The seats were taken out and the braces retained. A hose box was installed the whole width of the car. It was left open at both ends, so that no matter which way the car is going it can carry the hose line from the hydrant to the point of the fire.

The equipment consists of 1500 ft. of 2½-in. hose, two shut-off nozzles, twenty 26- and 30-ft. ladders, a 14-ft. roof ladder, six axes, four pike-poles, two 6-gallon Babcock extinguishers, extra charges, rubber coats and hats for volunteers.

Under the arrangements with the railway, the city agreed to pay the company $30 a month, for which the company erected a house for the car, keeps it in repair and furnishes a man to operate it when an alarm of fire is turned in. The car is stored near the main offices of the company, so there is always a motorman on hand to respond to an alarm.

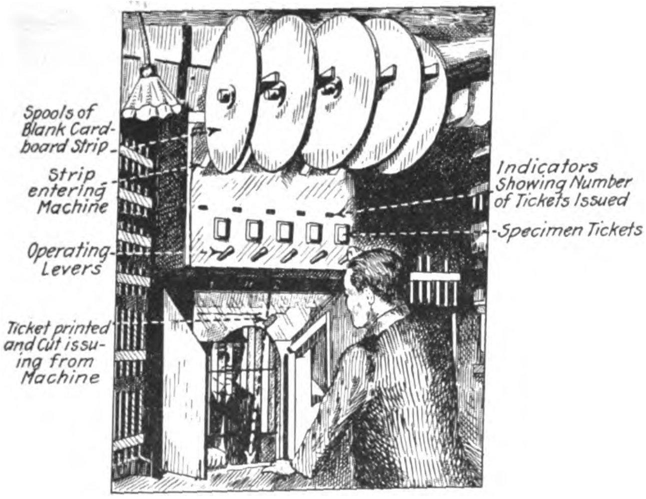
When an alarm is turned in from Park Point the car is started down the tracks immediately, and has absolute right of way; an automatic electric gong is cut in as soon as the car starts, so that all along the Point notice is given that a fire alarm is being answered. Volunteers are picked up on the way and are usually plentiful. As soon as the alarm arrives at headquarters it is conveyed to the nearest regularly organized company, and the members respond without equipment. Usually the volunteers have checked the fire before they arrive.

London Ticket-Selling Machine

A ticket-printing machine has been on trial service at the Victoria underground station of the Metropolitan District Railway, London, England.

This machine is arranged to print, cut and deliver at the counter five distinct types of 1¼-in. x 2¼-in. tickets of the following fare denominations: 1d., 1½d., 2d., 3d., and 4d. Cardboard in narrow strips is stored in five rolls and is fed into the machine. The motor of this machine is put in operation by the ticket agent, who depresses the small lever corresponding to the denomination of the ticket required.

The mechanism is contained in a metal box about 2½ ft. wide and 1½ ft. high attached to the wall above the booking window. Counting machines are located above the levers, with indicators showing to the operator the number of tickets issued of each denomination. During nine weeks the machine issued 119,568 tickets.


Spools of Blank Cardboard Strip
Strip entering Machine
Operating Levers
Ticket printed and Cut issuing from Machine
Indicators Showing Number of Tickets Issued
Specimen Tickets

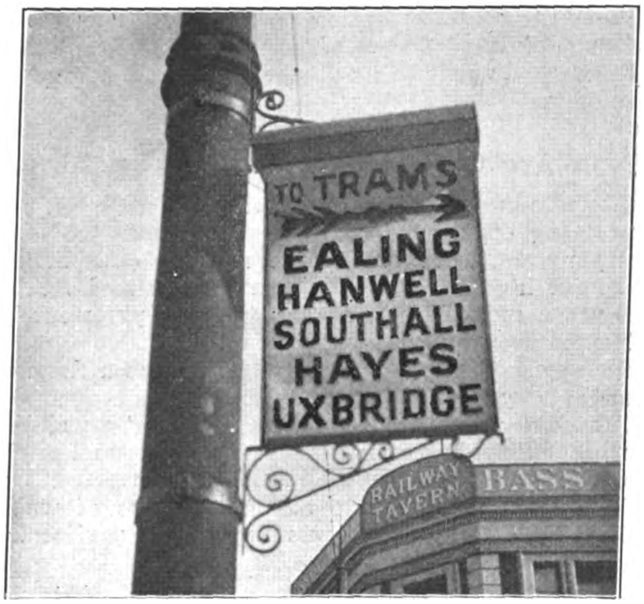
INSTALLATION OF TICKET-PRINTING MACHINE AT VICTORIA STATION, METROPOLITAN DISTRICT RAILWAY, LONDON, ENGLAND

Each ticket is printed in the regular form, and gives the destination, route, transfer directions, class and fare. The date is also printed across the end.

The machine has proved satisfactory except for occasional imperfections in cutting from the roll, and somewhat indistinct printing. The delivery of the ticket is very rapid; in fact, it is often on the counter before the purchaser is ready for it. One hundred tickets a minute can be issued. The management believes there is a future for such a machine and that present defects will be overcome after a reasonable period for experiment with different inks, paper stock, etc.

Illuminated Guide Signs In England

Transparencies installed on trolley poles, to denote the direction of various routes from important centers, are a favorite mode of advertising with European street railway companies. The London United Tramways, Ltd., utilizes signs of this description, notably at the Shepherd's Bush terminal point in West London, and at other transfer points.



TRANSPARENCY OF LONDON UNITED TRAMWAYS WITH ARROW INDICATOR

The signs are about 2 ft. x 3 ft. x 5 in., a sheet-metal frame with ground-glass panes forming a transparency. The glass faces are variously inscribed, some merely setting forth principal destinations in black letters, with red arrow, as in the case of the route direction to Ealing and other towns, reproduced herewith. Other signs bear painted scenes or figures in colors, men-

TRANSPARENCY OF LONDON UNITED TRAMWAYS CARRYING SCENE ON COLORED GLASS tioning some notable attraction—a park or public resort, for example. These signs are illuminated by eight or ten small-wattage lamps, half on either side, in simple white refractors which diffuse the light throughout the interior, lighting both faces. Connection with the electric railway poles is with ornamental iron brackets clamped on the pole.

While the cost of operating such signs on the railway lighting services is inconsiderable, their effectiveness in directing the public to its proper destination is sure to be of value.

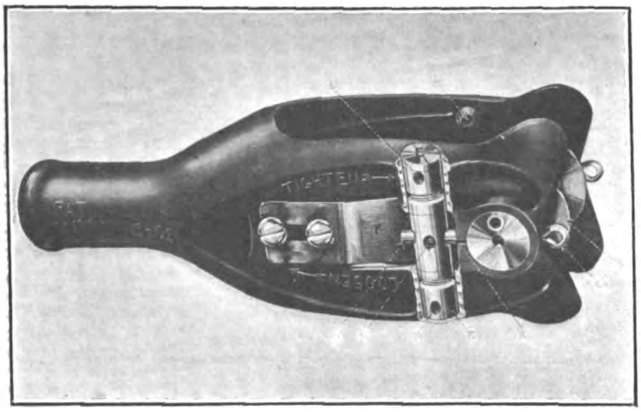
Non-Arcing Harp and Oil-less Bushing

New designs in trolley-wheel harps and bushings are now being offered by the More-Jones Brass & Metal Company, St. Louis, Mo. The company's non-arcing harp for high and low-speed service has as its chief feature a method for gripping the axle pin securely. This feature prevents deterioration due to the arcing which arises between the pin and harp when the connection between these parts is loose.

The other new product is the V & K type oil-less bushing which has been developed for use in all of the forty-eight wheel designs of this manufacturer and which is also adapted to any other make of wheel. These oil-less bushings are recommended particularly for city and suburban service.

An accompanying illustration shows the new harp with a portion of the frame cut away, so that the details of the pin-locking device may be clearly seen. This harp is bottle-shaped, to eliminate the possibilty of catching on the overhead wires. The harp is made of malleable iron or bronze, as required, and is designed with standard pole-fit dimensions.

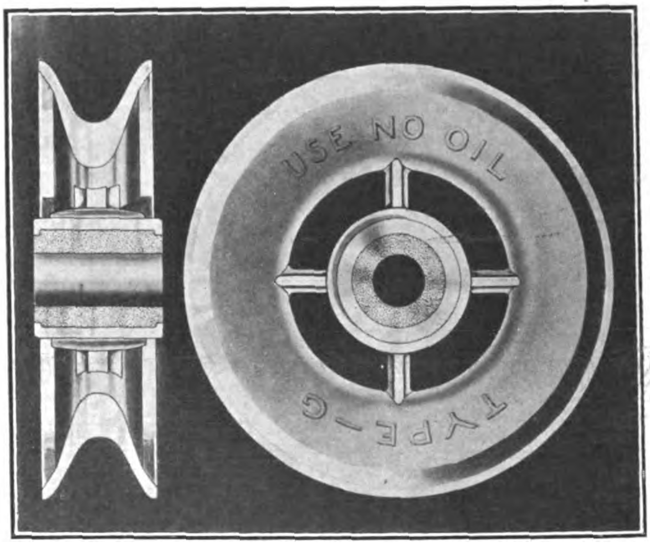
The patented gripping device for locking solidly and holding the axle pin securely consists of right and left-hand steel screws fitted into the limbs of the harp. A central gripping nut made of bronze connects the two opposing screws. Movement of this nut in one direction serves to clamp the harp body metal tightly around the axle pin. Reverse movement loosens the pin. In practice this movement is obtained by turning the nut. The axle pin is locked in place by a cotter pin passing through harp, axle pin and the center of the locking nut. Thus the pin is held rigidly in place and no opportunity for chattering and arcing is afforded. This tight fit in the harp assures maximum wheel mileage because it affords a rigid bearing for the wheel. Also this rigid fastening maintains a good path for the flow of current between the axle and the harp and thus the contact springs are relieved of part of their usual duty.



NON-ARCING HARP

By means of the expanding and contracting feature of the gripping nut a wide range of adjustment is possible in the axle pinhole. This greatly simplifies the operation of inserting or removing a pin. It obviates entirely the necessity for the common and sometimes destructive practice of driving pins in and out with a hammer whenever wheels are changed. From the operating standpoint the foregoing features, particularly that of being able to change wheels on the road without the use of tools, should be attractive.

The manufacturer states that this type of harp is adapted for any make of wheel and that any wheel in this harp, notwithstanding its type or manufacture, will show 30 per cent. to 50 per cent. greater life than with the ordinary harp, this increase being due to the rigid pin bearing. The gain is effected because of the absence of wear in the pinholes. This harp when fitted for high-speed service has contact springs with single rubbing surfaces. The springs are held in place by two screws threaded into bosses on the harp casting. With this construction the springs may easily be replaced without cutting rivets.



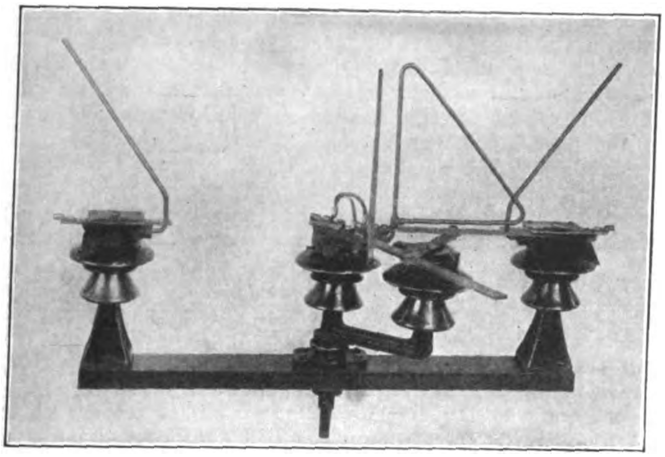
SECTIONS OF TROLLEY WHEEL AND OIL-LESS BUSHING

For high-speed service the company recommends its solid or hollow case-hardened axle pin, lubricated with grease. For city and suburban service the new More-Jones oil-less trolley-wheel bushing is recommended. A wheel with this type of bushing inserted is illustrated herewith. The distinctive feature of this wheel is the patented Simpson graphite and bronze gauze bushing. This bushing consists of a solid bronze housing of standard exterior dimensions which make it interchangeable, and an interior bearing material of bronze gauze impregnated with graphite and hydraulically compressed into the bronze housing.

One of the important claims which is made for this type of bushing is the following: It has high conductivity and consequent low drop in voltage between the line and the motor circuit, because the bearing is made of conducting material and because it is self-lubricating without the use of oil or grease. Another important factor in favor of the oil-less bushing is that the expense connected with the usual frequent lubrication of other types of wheels and the destructive effect of oil on car roofing are avoided. Also the first cost of the bushing includes the final and only lubricating cost. In cold weather the lubricating qualities do not vary as when oil or grease are used. The harp and wheel are always clean and in fit condition to be handled by car crews if wheel changes on the road are necessary. When once properly assembled no further attention is required until the wheel is worn out.

Double-Throw Horn Gap Switch

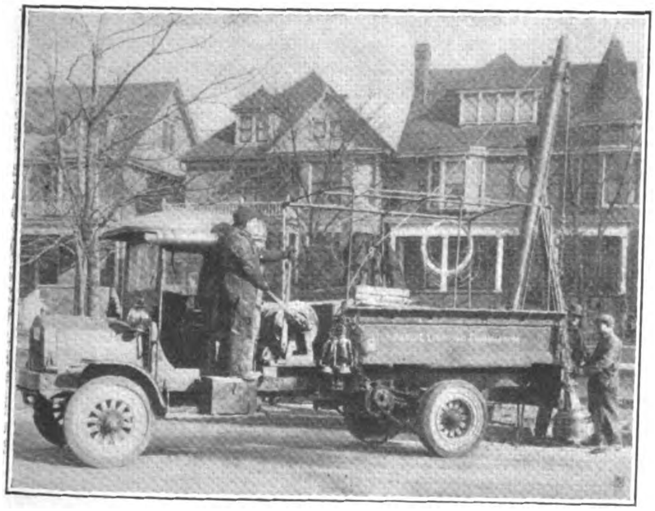
A single-pole unit of a new double-throw horn gap switch is shown in the accompanying cut. The main contacts of the switch are protected from all burning by auxiliary arcing horns. A feature of particular interest is the use of two blades at an angle of 60 deg. from each other. With the use of two blades mounted in this way it is necessary for the switch to rotate through less than 120 deg. of the circle, which condition allows a simple crank and connecting bar type of operating mechanism to be used for interconnecting three such units for simultaneous operation.


DOUBLE-THROW HORN GAP SWITCH

A three-pole switch of this type for 22,000-volt service can be carried on the top of a single wooden pole. The equipment is manufactured by the Railway & Industrial Engineering Company, Pittsburgh, Pa.

Winch for Pole Handling

The Northern Engineering Works, Detroit, Mich., has recently supplied one of its Northern motor truck hoists or winches on a Packard truck for use by the Public Lighting Commission of Detroit.


PLATFORM DRUM WINCH SETTING POLES

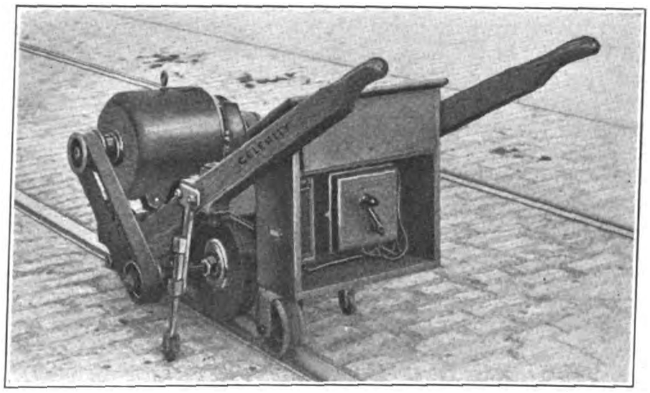
This hoist is of the platform drum winch type with inclosed gears, is made in both spur-geared and worm-geared form and is driven by a clutch connection from the motor shaft of the truck. It can be used either in the form of an ordinary winch for hauling articles off and on the truck or in connection with boom and tackle as shown. The gears are all cut, running inclosed in oil. The drum is machined and is made in various sizes, according to the amount of rope that is to be wrapped. This winch can be applied to any truck but is usually recommended for those of very heavy capacity. It is made in various sizes from 1000 to 2000 lb. capacity, single line.

A One-Man Rail Grinder

The Equipment Engineering Company, London, Eng., is the maker of the "Celerity" rail grinder which is designed for leveling rail joints, deepening grooves, switches and crossings, and executing all other kinds of grinding work in connection with rails. It is very light, weighing only about 420 lb. complete. The weight of the motor is balanced over the running wheel to give the requisite pressure for the grinding wheel and relieve the operator as much as possible.

The machine can easily be wheeled along the track by one man, or placed on the car front. Street obstruction is reduced to a minimum, as a width of only 2 ft. is occupied, and the ordinary highway traffic can use the side paving just as if no grinding were in progress. As but one rail is occupied at a time, it is easy to wheel the machine out of the way of passing cars, and put it on the track again as soon as the line is clear.

The power is obtained direct from the overhead wire, and as the motor is close to its work, one of low output is sufficient to drive the grinding wheel. The power is transmitted by belting, the elasticity of which, in such intermittent work as grinding, is valuable.



ONE-MAN ONE-RAIL GRINDER READY FOR WORK

The machine is operated by one man only, who stands in an easy upright position and moves the grinder forward and backward over the rail joints. The motor starter is within easy reach, so that the machine can be stopped instantly by the operator without the assistance required in the case of most grinders. The labor costs of operating this machine are about one-half of those for other types, since one man only is required to work the grinder, with the help of a boy, if the condition warrants it, to ward off other traffic and remove the trolley attachment when cars are passing.

As the machine is of the mono-rail type, its bearing is instantly obtained. The second wheel is merely provided to carry the frame and is fitted with an adjustable spring sufficiently powerful to lift the grinding wheel clear of the rail immediately the pressure of the hand is removed, so that the depth of cut is regulated by the pressure of the hand on the shafts. In addition to the sense of touch, the operator is also enabled to know the depth of cut taken by the quantity of sparks from the grinding wheel. The automatic cutout in connection with the starter is so arranged that the machine cannot be made to cut too deeply. The grinder is already in use on many systems in England and elsewhere including Blackburn, Darwen, West Ham, Southampton, Wigan, S. Shields, Bolton and Salford.

LONDON LETTER

Tramway Prosperity Affected by War—Some Roads Extending—Women Conductors Considered in Edinburgh

(From Our Regular Correspondent)

A further reduction in the dividend of the Dublin United Tramways from 5½ per cent to 5 per cent was recently announced. The report shows that the distribution could have been maintained, but the directors decided on a conservative policy, owing to the war. After paying all interest charges, the sum of £98,000 was available for dividends. A year ago, only £10,000 was set aside for renewals. This year £23,000 in all is specially appropriated, and the amount carried forward is increased from £9,500 to £11,400.

Although the revenue of the Manchester Corporation Tramways undertaking shows a considerable falling off for the nine months of the municipal year recently completed as compared with the corresponding period of the previous year, the receipts for the past few weeks have been on the up-grade, and have been actually in excess of those for the early part of last year. The all-night cars, which have now been running upwards of a year, have not been profitable, but as they have proved a great convenience the committee has decided to continue them.

Owing to the increased cost of living, the executives of the Amalgamated Society of Tramway & Vehicle Workers at the monthly meeting at Salford unanimously decided to permit all branches of the society to apply for an increase of 15 per cent in wages. The society has a membership of nearly 30,000, and the meeting was attended by representatives from London, Manchester, Birmingham, Leeds and Wales. At the close of the meeting the secretary stated that the executives had a number of applications from the branches for permission to apply for increases in wages owing to the extra cost of living.

Railless trolley omnibus schemes seem popular in South Wales, and following upon the opening of the 5-mile route from Williamstown, through Tonyrefail, to Gilfach Goch, in the Rhondda Valley District, comes a proposal from the Aberdare Urban District Council to make extensions totaling about 5 miles in that area for operation by railless traction. The estimated cost is nearly £50,000.

The question of the lighting of the Leicester tramway routes was discussed recently at the meeting of the Leicester watch committee. Experiments have been made with the high pressure gas system near the gas offices and elsewhere, and with electric light at the end of Horsefair Street, the Midland Station, and suspended central lights on the recently constructed tramway in King Richard's Road. The lighting sub-committee submitted a unanimous recommendation to the watch committee in favor of electric light for the illumination of tramway routes generally, and this was adopted subject to the approval of the Council.

The extension of the Bakerloo Railway from Paddington to Queen's Park has been opened for traffic. It makes an addition of 2 miles 36 chains to the mileage of this railway, which now extends from the Elephant & Castle, on the south side of the river, to the Queen's Park station on the main line of the London & Northwestern Railway, a total distance of about 7 miles. There are four stations on the new extension. The extension serves a large and populous district, and enables travelers on the tube system to join the trains of the London & Northwestern Railway running on its new line to Watford. When this new line has been electrified through trains will be run from the Elephant to Watford, but at present it is necessary to change at Queen's Park. The lifts at these new stations have been abandoned in favor of escalators, and long passages have been carefully avoided.

The report of the Board of Trade on London traffic, just issued, deals largely with the growing necessity for increasing main arterial roads owing to the constant expansion of traffic. Theoretically, the substitution of motor for horse-drawn vehicles should tend to lessen congestion, but practice shows that the intermingling of fast motor traffic and slow horse traffic neutralizes the advantage. As to obstruction, the horse vehicle takes first place and the electric tramcar second. The report adds that opinions have been unduly influenced in favor of the electric tramcar by its carrying capacity and its comparative immunity from fatal accident, but that these factors cannot be taken into consideration when dealing with road obstruction. In the case of the motor omnibus, while its power of acceleration and retardation is not so good as that of the tramcar, its flexibility enables it to circumvent obstructions and to give room to overtaking or meeting vehicles.

The Edinburgh Tramways, which has sent between 300 and 400 men to the army, is considering a proposal to replace some of the enlisted employees with women conductors. The work is not more arduous physically than some in which women already engage, and much of the mounting of stairs which it involves on most types of tramcars might easily be avoided if passengers would tender their fares to the conductor as soon as they stepped on the platform.

In the report of the London & Southwestern Railway for the year ended Dec. 31, 1914, it is stated that the work connected with the electrification of the company's suburban lines has, notwithstanding various difficulties, made steady progress during the year. The main power house at Wimbledon and the substations at other places are practically complete, and the machinery is being erected. Several of the trains are ready. Good progress has also been made with the placing of conductor rails, the bonding of track rails and the laying of high-tension cables on the first section of the railway to be electrified, namely from Waterloo to Kingston via Twickenham and Malden.

According to the London County Council returns as to recent tramway receipts, about £10,000 was lost as a consequence of the tramway breakdown some weeks ago. During that week 3,000,000 fewer passengers were carried. Now the Council proposes to arrange for linking up the system with other sources of electrical supply. The London Electric Supply Corporation is already furnishing the Council with energy, and the company has now offered a further supply up to 3500 kw at a price of £3 a kilowatt a year, plus a stated price per unit for at least six months. The Council is to have the option of extending the arrangement for a further period of six months. If at any time after the expiration of the first period of six months the Council merely requires a supply of power for standby purposes only, the charge to be made will be at the rate of £2 a kilowatt a year. The electrical energy will be provided at the company's Deptford generation station, and the Council is to furnish the requisite high-tension cables to connect this generating station in parallel with the Council's Greenwich generating station. When the necessity for continuing these arrangements has ceased, the cables can be retained between the two generating stations and utilized for providing such power as may be required on emergency, or they can be withdrawn from the ducts and used elsewhere.

The electricity scheme promoted by the London County Council has been killed by the Council itself. In November last the Council decided to obtain Parliamentary authority for its proposals, and the bill dealing with the matter has been duly deposited. Under Act of Parliament, however, it was necessary that the resolution of November should be confirmed by an absolute majority of the whole Council. That majority the scheme has not secured. The reasons for Progressive hostility were explained by Sir John Benn, who pointed out that the scheme, on its technical side, contained the basis of a settlement, but that the proposals were vitiated by bad finance, the flouting of Parliament, the breaking up of local government, and the surrender of the rights of the ratepayers. The borough councils, as a body, were also against the bill, while ten of the wealthy companies were combining against the Council with a view to presenting an opposing bill.

At the annual meeting of the City & South London Railway, the chairman stated that but for the war the company would now have been well forward with the reconstruction authorized by Parliament in 1913. When the war came plans and drawings had been passed and arrangements made with contractors and a portion of the money had been raised, but no contractors' men had been set at work. When this railway passed under the control of the Underground Electric Railways, London, it was intended to increase the tubes to the same size as the other tubes controlled by the company and to furnish new rolling stock of a type similar to that used on the other railways. This work, however, has been entirely suspended for the time being.

A. C. S.

News of Electric Railways

NEW YORK COMMISSION INVESTIGATION

Among those who testified on Feb. 25 were Mayor Mitchell, President McAneny of the Board of Estimate, and Frederick W. Whitridge, president of the Third Avenue Railway. Both Mayor Mitchel and Mr. McAneny agreed in the main points of their testimony. About transferring the construction work from the commission to the Board of Estimate, they thought it advisable theoretically. The drafting of a new charter seemed to afford an opportunity for the transfer. Mayor Mitchel thought that the transfer should come into force on Jan. 1, 1918, at the beginning of the next city administration.

Mr. Whitridge thought that the original commission, appointed by Governor Hughes, had made the public service law ridiculous, while their successors were courteous and sensible. The first commission treated its large powers like a plaything. He had to call the attention of the original commissioners to the fact that it was a misdemeanor to disseminate false information about the value of securities. Asked what he would do about constructing the subways, Mr. Whitridge said he would get Colonel Goethals and tell him to go ahead. He thought the expenditures of the commission should be limited to $400,000 or $500,000 a year. He favored taking from the commission the right to issue orders, and requiring it merely to report facts to the courts, which would have the right to make orders. If he were commissioner he would send for the right man and tell him what he wanted and if he refused he would call in the newspapers and have a hearing.

On Feb. 26 the committee had on the stand as witnesses ex-Mayor Seth Low, ex-Chairman of the Commission W. R. Willcox, George B. Cortelyou, president of the Consolidated Gas Company; Theodore P. Shonts, president of the Interborough Rapid Transit Company, and Timothy S. Williams, president of the Brooklyn Rapid Transit Company. Mr. Shonts favored regulation. He did not consider that the commissioners so far appointed had tried with earnestness to solve difficult problems. He did not see how regulation could be carried on effectively except by somebody in daily touch with the companies. He had a very high opinion of Alfred Craven, chief engineer of the commission, and the other engineers of the commission, but even these men were not so well qualified as the company's own men to say what was best for the practical operation of a railroad. There had never been any conscious effort on the part of the Interborough Rapid Transit Company to evade the orders of the commission. He thought that the rule of reason should be applied to violations of the commission's orders. He did not quite know how far the authority of the commission went, but it certainly should not extend to making up the company's train schedules or saying how much it should spend on maintenance.

Mr. Williams said that without any disrespect to any of the gentlemen who had occupied the position of commissioner it was indisputable that not one of them had, at the time of his appointment, any administrative or technical experience to qualify him for the office. The men on the commission were, with few exceptions, of sincere purpose and industry, but they had to be educated in office to a knowledge of the necessarily complicated problems upon which they were called to decide. He thought that the wheelguard order of the commission was purely a matter of personal pride and prejudice on the part of Mr. Maltbie. Mr. Williams criticised the report on Brooklyn Rapid Transit service made to the commission by Joseph Johnson, head of the commission's transit bureau.

Mr. Willcox reviewed the points of difference at which the commission and Mr. Whitridge had come into contact. The law was opposed to the transfer of the rapid transit work of the commission to the Board of Estimate. He thought that a member of the Board of Estimate might be appointed to the commission.

The hearings as regards the commission for the first district were concluded with a session open to the public to present suggestions on Feb. 27. Only two persons availed themselves of the opportunity.

The drafting of the report to the Governor in regard to the inquiry into the first district commission by the legislative committee has been intrusted to a sub-committee consisting of the chairman, the counsel, Senators Mills and Foley, and Assemblymen Meier and MacQuistion. This committee met on March 2 to frame its findings for submission to the full committee. It was said at the time that the sub-committee was divided on the question of how far the report should go in criticising the official conduct of the public service commissioners, but it was expected that the report to the full committee would be made by March 4. On that date the committee was still at odds and the inquiry into the commission for the second district was begun despite the previous threat of William Hayward, counsel to the committee, that he would delay the investigation.

DETROIT PURCHASE VOTE ON MARCH 31

A special meeting of the stockholders of the Detroit (Mich.) United Railway has been called for March 31 to take action on the proposal of the City Street Railway Commission to assume, with the approval of the electors, bonded indebtedness of $24,900,000 in exchange for the lines of the company within the one-fare zone. The company has not as yet given any indication as to what recommendation it will make to the stockholders, but it is understood that the board of directors is inclined to recommend that the city's offer be accepted.

The announcement of the commission's proposal to purchase has already called forth numerous attacks upon the plan, and in the event that the commission and the company reached an agreement a bitter fight is sure to occur before the proposition reaches the public. There are many legal questions involved which must be adjusted before the matter will be in shape for presentation to the electors; in fact it is held by several legal authorities in communications to the newspapers that charter amendments and special action by the Legislature will be required before the city is empowered to assume the company's bonds. The commission is now giving most of its attention to the legal phases.

It is understood that the traffic survey prepared by Barclay Parsons & Klapp, New York, will be presented to the commission by March 15. This survey is an exhaustive study of the transportation needs of Detroit covering present lines, needed lines, rerouting and the subway question. It will undoubtedly have a large bearing upon the entire street railway question.

BAY STATE ARBITRATION HEARINGS

In the hearings before the arbitration board in the Bay State Street Railway wages investigation, C. F. Bancroft, superintendent of motive power and machinery, was called as a witness by the employees' organization. Mr. Bancroft stated that the average hourly wages of armature winders had been increased from 21.05 cents in 1905 to 27.74 cents in 1914. The company had more than thirty carhouses and stations. About 1200 men were employed in the motive power and machinery department. Wages varied with the locality, tending toward higher amounts in the larger places. The company had offered the operating staff at the Quincy Point (Mass.) power plant a bonus dependent upon reductions in the consumption of coal, and in this way wages had been increased. Fifteen years ago the power plants of the various roads now making up the system generally were operated in two twelve-hour daily shifts; about ten years ago ten-hour shifts were substituted, and in 1910 the plants were put upon an eight-hour basis. The wages of all employees in stations had remained unchanged per day, but automatically increased per hour. Mr. Bancroft did not consider power-station work difficult, but felt that it was responsible and trying. There were now forty-three power-station engineers, fifty firemen and thirty-five oilers in the company's service, compared with thirty-four engineers, forty-six firemen and twenty-seven oilers in 1910. A reduced working day in a generating plant correspondingly decreased the amount of work done per man. A 10,000-hp generating unit now requires less labor than a 2500-hp machine did twelve years ago. Such units were increasingly automatic in their operation.

INDIANA LEGISLATURE

A bill has been introduced in the Senate of Indiana prohibiting the location of freight depots within 1000 ft. of places of worship. The following bills have been passed by the Senate: Bill regulating news agencies and requiring the Associated Press to file a schedule of rates with the Public Service Commission; the Symons bill providing that railroads shall maintain flagmen or automatic crossing signals at all crossings where the view is obstructed; bill providing that employers must give service letters to discharged employees upon request. The bill making it unlawful to trespass upon railroad property was killed in the Senate.

Representative Waltz has had withdrawn the 2½ cent railroad fare bill introduced by him, and, in accordance with the recommendations made to the Legislature by Governor Ralston and outlined in his letter to the Central Electric Railway Association at the meeting in Indianapolis last week, Mr. Waltz has introduced a bill giving the Public Service Commission of Indiana the right to increase the passenger rates of railroads to 2½ cents per mile upon petition and examination of the facts showing that such increase is justified.

The following bills have passed the House: the Sare workmen's compensation bill, amended and made a compromise measure; the Feick bill providing for a board of mediation and arbitration for all labor controversies; the bill amending the public utility act by placing stock yards under the jurisdiction of the commission; the bill providing penalties for officers of public utility corporations that collect money in excess of published tariffs, but exempting from this law utility corporations of fourth and fifth class cities that contracted to give free service to manufacturing industries prior to May 1, 1913. The following bills have been killed: amendment to the boiler inspection law providing that all boilers placed in service after July 1, 1915, shall be allowed a factor of safety of not less than 5.5; bill providing that public service corporations giving service by measured rates shall not fix a minimum charge for service.

CINCINNATI SUBURBAN FRANCHISE

The Council of Cincinnati, Ohio, on Feb. 16 refused to entertain the suggestion of the Federated Improvement Association that the franchise recently granted to the Cincinnati, Newport & Covington Street Railway be repealed and that a new ordinance be passed specifically providing that the company shall change the location of its tracks to streets other than those designated to be occupied.

Richard P. Ernst, attorney, representing the company, made an address before the Cincinnati Real Estate Exchange on Feb. 18, in which he furnished a complete analysis of the franchise. The new routes forced upon the company have been found unprofitable by the Cincinnati Traction Company, and the purely local business in Cincinnati will not amount to much. The road carries 30,000 people into Cincinnati every morning. The franchise granted to the company will necessitate the giving of rights, even to a road that might come into Cincinnati from northern Ohio. Mr. Ernst read letters from President Hinsch of the Fifth-Third National Bank and E. W. Edwards, president of the Rapid Transit Commission, stating that they will support the ordinance at the referendum election in March.

CLEVELAND CONSTRUCTION ORDINANCES

An ordinance was passed by the City Council of Cleveland, Ohio, on the evening of March 1 authorizing the laying of a double track on Euclid Avenue between East Twenty-second and East Fortieth Streets. The consents of property owners have not yet been secured. Peter Witt, street railway commissioner, says that the consents are unnecessary under the charter provisions. This section of Euclid Avenue is known as "Millionaires' Row."

It seems likely that there will be serious opposition to the construction of a street railway on East 123rd Street, Cleveland, although the Council adopted a resolution in April, 1914, agreeing to authorize the expenditure of funds for that purpose on the dedication of the street. The changed financial conditions of the country have made several members doubtful as to the propriety of building the line the coming summer, and the city may not accept the street until there are better prospects for business.

LEGISLATION IN NEW YORK

The following bills have been introduced in the Senate: to amend chapter 478 of the laws of 1893, entitled "An act to incorporate the city of Olean," in relation to the location of street surface railroad tracks in the streets of said city; to amend the railroad law, in relation to fencing right-of-way; to amend the railroad law, in relation to footpaths upon certain trestles; making an appropriation for the elimination of certain grade crossings.

The following bills have been introduced in the Assembly: to amend the railroad law, in relation to lighting railroad cars on steam railroads in cities of the first class; to amend the railroad law, in relation to the rate of fare on certain elevated railroads operating in Kings County; to provide for the improvement of the New York Central & Hudson River Railroad tracks and property along Riverside Park, in the city of New York, to require trains to be operated thereon by electricity; to amend the workmen's compensation law; to amend the penal law, in relation to persons unable to read and write not to act or be employed as engineers, firemen, hostlers, watchers or trainmen in running or operating locomotive engines or trains; to amend chapter 478 of the laws of 1893, entitled "An act to incorporate the city of Olean," in relation to the location of street surface railroad tracks in the streets of said city; to amend chapter 345 of the laws of 1888 entitled "An act to provide for the relief of the city of Buffalo and to change and regulate the crossing and occupation of the streets, avenues and public grounds in said city by railroads," in relation to the care, repair and maintenance of bridges, viaducts and subways at street crossings above and below railroad tracks; to amend the railroad law, in relation to footpaths upon certain trestles; to extend the time of the New York Connecting Railroad to finish its road and put the same in operation; to extend the time of the New York Connecting Railroad to complete the construction of its bridge across the East River, as authorized by chapter 752 of the laws of 1900, chapter 691 of the laws of 1905 and chapter 606 of the laws of 1910; making an appropriation for the elimination of certain grade crossings; to amend the general corporation law, in relation to an action against a corporation to compel specific performance of obligations.

OHIO LABOR LEGISLATION

Representatives of a number of street and interurban railways appeared before the labor committee of the House of Representatives at Columbus on Feb. 18 to protest against the passage of the Ott bill regulating the hours of labor for conductors and motormen. The principal objection was to the requirement that the men have thirteen consecutive hours of rest. J. J. Stanley, president of the Cleveland Railway, said that such a requirement would make a 3-cent fare impossible, as the schedules could not be arranged so that the men could have that period of rest without increasing the number of motormen and conductors very materially. The company employed 2500 motormen and conductors and this change would mean a large increase in the wage item.

Frank B. Carpenter, of the Western Ohio Railway; E. F. Schneider, of the Cleveland, Southwestern & Columbus Railway, and F. W. Coen, of the Lake Shore Electric Railway, represented the interurban interests. They contended that it would be impractical to apply the conditions of this bill to the train service without employing many men who would be called upon to work only one or two hours a day. G. Davies, Cleveland, and W. W. Smith, Cincinnati, presidents of the local unions in the two cities, represented the employees. They argued that the schedules of hours could be applied to the operation of cars without much additional expense.

The Myers bill has been recommended for passage by the Senate judiciary committee. It makes legal the service by a sheriff on a receiver of an interurban railway in any county through which the road passes. The Smith bill requiring dust-proof screens for the protection of motormen and conductors on both street and interurban cars was passed by the House on Feb. 16.

A hearing was held on Senator Louis P. Pink's bills by the Senate judiciary committee on Feb. 24. These bills provide that proof of injury to persons or property by steam or electric railways shall be *prima facie* evidence of carelessness on the part of the operators of the locomotives or cars which caused the injury. Attorneys for the roads said that the bills would make them practically insurers of everything along their right-of-way. It is likely another bill may be formulated that will require claim departments to produce all the evidence they secure.

A resolution has been introduced in the Legislature calling for a detailed statement of the finances from the State treasurer, in order that appropriations might be made in an intelligent manner. This would give public utility companies, insurance companies and other corporations an opportunity to show what they are paying for the support of boards, commissions and other organizations established to regulate their operation.

Senator William Behne introduced a municipal ownership measure on Feb. 24 which is practically a reproduction of the Mills bill of the preceding session. It provides that bonds issued by a municipality for the purpose of constructing a public utility plant or purchasing one already in existence shall be a lien on the entire tax duplicate of the municipality instead of on the property only, as the law now stands. It also provides that bonds issued for this purpose shall not be considered with those issued for other purposes. The Mills bill in its original form was defeated at the last session of the Legislature.

Senator W. R. Collins of Cincinnati has introduced a bill that provides for the cancellation of the lease of the Miami & Erie canal and the payment by the State to the city of Cincinnati of $74,707, which the State has already received as rental for that portion of the property within the city. The bill further provides for a new lease with rent on the property free. The city desires to use this property for a portion of its rapid transit line.

CONDITIONS IN RHODE ISLAND

Men in Charge Under Federal Dissolution Decree Review Problems Before Them

The trustees appointed under the dissolution decree in the New Haven Railroad case to hold the stock of the Rhode Island Company, Providence, R. I., have issued a statement in part as follows:

"The trustees find that nearly all of the property is held by the company under leases calling for the payment of large annual rentals and imposing burdensome requirements; that the company is subject to the terms of a strict franchise agreement with the city of Providence; that there is a contract between the company and organized labor, and that the company has been operated for many years with what, under ordinary conditions, would be considered an undue regard for economy. They find at the present time a reduced income and the necessity for increased expenditure. These are conditions which the trustees did not create and which at present they are unable to change and they seem to call for considerate judgment on the part of the public.

"That which is most needed for safety of operation must be done first and less pressing needs must be attended to in their order. Within the last fifteen years the company has adopted as its standard a type of platform collection or prepayment car which compares favorably with the cars of other cities, except that in many places where there are wider streets a much larger car can be used. The adoption of the prepayment car as approved by the city of Providence necessitates a very early abandonment of the small cars still in use, and large expenditures for radical repairs to such small cars are not therefore justified. New cars are needed and are being constantly put in commission, but all that are required cannot be obtained at once.

"Neither in Providence nor elsewhere has it been found possible to provide, by any system on, or above, or below the surface of the ground, all the transportation that is demanded at rush hours. Every effort will be made to provide it here, but complete success cannot be hoped for. It is to be borne in mind that during the greater part of the day cars are not occupied to nearly their seating capacity, and that there must be some relation between income and outgo. It costs about $10,000 per year to keep in operation a single car, and additional cars cannot be put on unless the service demands them.

"The company has, we believe, an excellent corps of employees who share with the directors the desire to make the service the best possible. The trustees hope to give the community all the service that it is in their power to give. To this end they invite rather than resent fair and intelligent criticism, and suggest that such criticism be made in the first instance to the officers of the company and especially to A. T. Potter, the vice-president, who will either himself act upon them or else bring the matter to the attention of the board of directors."

PHILADELPHIA'S AMENDED ORDINANCE

The ordinance in the interest of high-speed rapid transit was put through the Philadelphia Councils on March 4 as amended recently in opposition to Director of City Transit Taylor. The bill was passed by a vote of sixty-two to eighteen in the Common Chamber and thirty-four to eleven in the Select branch. The forces on either side had been sharply aligned long in advance of the meeting. A plan offered by Councilman Dripps to eliminate the specification of routes from the measure was lost. As one paper put it there were "hours of caustic debate and insinuation." The *Ledger* said on March 5:

"The ordinance as passed, Director Taylor declares, nullifies Philadelphia's purpose to build a comprehensive system of high-speed transit. It destroys plans for which the citizens spent thousands of dollars. Common Councilmen Dripps, Conn and Horn, as leaders, fought valiantly to so amend it that it would be possible to construct practical subway and elevated structures. The voters in the galleries and corridors, hundreds who had turned out in support of their interests as taxpayers, added their voices to the pleas of these men, but Connelly, Seger and Costello held the balance of power."

ONTARIO RADIAL RAILWAYS

At the annual meeting of the Hydro Radial Union of Ontario on Feb. 24 representatives of municipalities from all parts of the province indorsed the project for constructing a network of municipally owned radial railways to serve the rural districts. Sir Adam Beck said the Dominion government should grant the usual subsidies to the municipalities, as the proposed lines were for the general benefit of Canada. The time had arrived for stopping the payment of subsidies to private companies. He praised the Toronto City Council and the Harbor Board for the provision made for entrances for the radial lines. Resolutions were passed requesting the Dominion and Provincial governments to grant subsidies towards the cost of constructing the proposed lines.

Reports on Utah Utility Bill.—It was stated on Feb. 25 that two reports on the Evans public utility bill will be made to the judiciary committee of the Senate. The majority report, it was said, would be unfavorable.

P. A. Y. E. Coin Boxes for Ferryboats.—It is announced that the Southern Pacific Company will install coin boxes at the San Francisco ferry terminal so that local ferry passengers for Oakland, Berkeley and Alameda will not be required to buy ferry tickets.

New Oklahoma Road.—The Cushing (Okla.) Traction Company placed about 17 miles of line in operation recently from Cushing to Drumright and has construction work under way for the electrification of 17 miles of steam track between Drumright and Jennings. This is a freight handling line with a large oil tank-car traffic.

Toronto's Transit Plans.—The three engineers who are to plan the new rapid transit system for Toronto conferred with Mayor Church, Sir Adam Beck and the Board of Control on Feb. 26. The Mayor announced later that satisfactory arrangements had been made for the completion of a general plan and that the details and the estimates of cost would probably be ready by Nov. 1.

Chicago to Build 20 Miles of New Track.—In compliance with its contract agreement with the city of Chicago, the Chicago Surface Lines has planned to undertake during 1915 new track extensions which will total approximately 20 miles and rehabilitation work on fifty-one different streets, the amount of work varying from short sections of one block to sections of more than a mile in length.

Full Crew Legislation in New Jersey.—A bill was introduced in the New Jersey Assembly on March 2, calling for the repeal of the full crew law. Another bill authorizes the State Board of Public Utility Commissioners to determine the number of men that shall be hired to operate passenger and freight trains when the passenger trains are made up of three or more cars and the freight trains of six or more cars.

New Haven Reindictments.—The Federal Grand Jury at New York has returned a superseding indictment against the twenty-one officers, directors and lawyers of the New York, New Haven & Hartford Railroad, charging violation of the Sherman anti-trust law. The indictment is similar to the one returned last November, but was found for the purpose of overcoming objections made to the manner in which the first indictment was obtained.

Illinois Legislative Deadlock.—Owing to a deadlock which has lasted for seven weeks, the General Assembly of Illinois is just now preparing to begin work. A speaker has been elected, but he has not appointed his committees. The Senate has been tied up by a contest for power between Republicans and Democrats, and committees have not been named there. In neither house had the introduction of bills been commenced on Feb. 27.

Municipal Line Receives Financial Aid.—Claiming that the Seattle (Wash.) Municipal Railway System is still incomplete and will not have a fair test until it is extended to Ballard on the north, six of the nine Councilmen at a recent meeting of the Council voted to appropriate $10,000 from the general fund to continue the operation of Division "A." Mayor Gill opposed the loan, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 27, page 431.

Extension to Toronto Civic Line Opened.—Mayor Church, of Toronto, Ont., assisted by several Aldermen and chief civic officials, formally opened the new civic car line on Bloor Street on Feb. 23. The civic party made a trip over the entire route from Dundas Street to Quebec Avenue and return. The Mayor acted as motorman and Works Commissioner Harris as conductor. After the trip short addresses were made, and it was suggested the line should be extended to Jane Street.

Couple Arrested for Forgeries.—Frank Harris was recently arrested in Chicago and Mrs. Dora Fitzgerald was arrested in Cleveland on Feb. 23 on the charge of issuing forged checks for more than $2,000, the Northern Ohio Traction & Light Company being the victim. Harris was formerly employed by the company. Shortly after he left bogus checks began to come in bearing the signature of M. M. Erdman, treasurer. The woman is supposed to have been responsible for the penmanship on the checks.

Suit in Seattle.—Scott Calhoun and Joseph Parkin, receivers of the Seattle, Renton & Southern Railway, recently filed in the Federal Court a suit against the city of Seattle, seeking to restrain and enjoin the city from proceeding to appropriate, condemn or damage the company's right-of-way, extending from Jackson Street on the north to Ryan Street, the city limits, on the south. The value fixed by the receivers on this right-of-way is in excess of $1,000,000. The petition will be heard by the court on March 15 unless some other date is agreed upon by the parties in interest.

Bus Franchise Considered in New York.—Members of the committee on franchises of the Board of Estimate met on March 1 to consider the applications for motor bus franchises in Manhattan. Applications for franchises were made more than a year ago. In July so-called model routes were laid out by the bureau of franchises. Mayor Mitchel was asked on March 1 if action on the motor bus franchises could not be expedited so that such vehicles could be placed in operation to relieve the traffic congestion on the Eighty-sixth Street Crosstown railway and the Ninth Street Crosstown line. He said that traffic congestion was no reason for acting on franchise matters not fully matured.

Washington Senate Passes Utility Bill.—With but one vital change, the public utilities bill passed the Senate of the State of Washington on Feb. 24. The measure is an amendatory substitute for the Taylor bill, which established the new principals of granting indeterminate franchises, and required the issuance of certificates of necessity and convenience after a full hearing on the question before a new or competing utility company can enter a field already occupied. The bill gives supervisory powers over municipal corporations which have the franchise-granting privilege, but vests in the various city councils the right to issue the original franchise. As amended by Senator Taylor, its sponsor, the bill is to be submitted to popular vote by referendum in 1916.

Elevated Third-Tracking in New York.—Alfred Craven, chief engineer of the Public Service Commission for the First District of New York, has reported to the commission that with additional reinforcement, which will not cost more than $200,000, the Second Avenue elevated railroad in Manhattan will be strong enough for the operation of trains composed of the composite cars now used in the subway which the Interborough Rapid Transit Company proposes to transfer to lighter trucks and to operate upon the elevated railroads. He is also of the opinion that the Third Avenue elevated railroad will be strong enough for the same operation after the third-tracking work is completed, but suggests that he be allowed six months in which to complete his investigation and decide finally as to the Third Avenue road.

Safety First Federation Meeting.—The Safety First Federation of America, which has for its objects uniform laws for control of automobile traffic and improvement of street traffic conditions throughout the country by a standard system of supervision, was organized in New York on Feb. 26. In addition to the election of a board of directors, which includes police commissioners, representatives of automobile clubs, and civic organizations from fourteen cities, these officers were elected: Vice-presidents, Harold W. Newman, police commissioner, New Orleans; Charles M. Talbert, director of streets, St. Louis; John Gillespie, police commissioner, Detroit; J. H. Lippincott, New Jersey Traffic Commission; treasurer, Charles L. Bernheimer; executive secretary, Frederick H. Elliott, New York. The federation will meet again in Detroit in the fall.

Severe Storm in Missouri.—A storm the night of Feb. 22, followed by a fall in temperature, resulted in the downfall of sixty-two poles on the Excelsior Springs division of the Kansas City, Clay County & St. Joseph Railway. Most of the poles were blown over and not broken. The line was out of operation between Kansas City and Liberty for about eighteen hours, and the section between Liberty and Excelsior Springs was tied up until Friday evening, Feb. 26. The poles carrying the high-tension line fell over the track. Not all the damage was continuous, the longest series of felled wires being about 1½ miles. The other damage was scattered. There was no damage to other equipment or to persons. None of the other interurban railways reported damage to wires or poles, but telephone and telegraph companies in eastern Kansas and northern Missouri suffered heavily.

Decision in New York Labor Case.—During the week ended Feb. 27, the Court of Appeals of New York handed down decisions in the Heim and Crane cases, upholding the constitutionality of the labor law in respect to the provision which forbids the employment of any but citizens of the United States upon contracts for public work. This decision affects practically all of the contracts on the new subways which the city of New York now has outstanding, and which aggregate about $142,000,000. There are thirty separate contracting firms engaged in the work, which employ about 16,000 men. Two days after the decision was published one of the contractors had suspended work and others were proceeding with reduced forces. It is the contention of the contractors that it is next to impossible to procure American citizens to do the kind of work which in the past has been done by foreigners. The contractors, however, have announced that they will obey the law. It was announced on March 1 that the case would be carried to the United States Supreme Court on an appeal on a writ of error from the decision of the New York Court of Appeals. On March 4 the operation of the alien labor law in New York State was suspended by the United States Supreme Court pending the review of the decision of the Court of Appeals declaring the law constitutional.

Financial and Corporate

PRESENT INVESTMENT TREND

Now that banking business and credit facilities have been fairly well restored from a domestic point of view, it is the opinion of A. B. Leach & Company, New York, that the present points of interest are the rapid accumulation of capital on account of business far below normal, and the higher trend of security prices on account of low money rates. This banking house looks for an era of unparalleled business activity at the close of the European War, with an increased demand for capital, higher money rates and security prices at a lower level.

As regards the present returns on securities it is said that 5 per cent has fairly represented the value of money for the last twenty years, and the average investor has been able to loan his funds at this rate. During the last ten years public utility bonds have generally carried 5 per cent coupons. This has had its effect in enlisting the interest of the investor as against 3½ to 4 per cent railroad issues, and the investor today looks upon utility issues as the most satisfactory for his surplus funds. Refunding operations, new financing and higher money rates will exert comparatively little effect on prices of public utility issues; they will even hold their place against offerings of 5 per cent railroad bonds.

KANSAS CITY REORGANIZATION

Federal Court Refuses to Sanction the Plan Proposed for Financial Reorganization

Judge William C. Hook in the United States Court at Kansas City, Mo., listened on Feb. 26 to the arguments of attorneys representing stockholders and bondholders and other creditors, in support of their suggestions for the reorganization of the street railway of Kansas City. The court declined to approve the plan, and the session adjourned with the interested parties still at variance, but with confidence prevailing that some method of reorganization could be devised that would avoid foreclosure.

The plan proposed depended chiefly upon a combination of the electric light company with the Metropolitan Street Railway so that the credit of the former could be available as an unincumbered equity in case of later emergencies. Judge Hook insisted that he would, under no circumstances, consent to any arrangement resembling the operation of a holding company, and that the electric light company and the street railway must be kept separate. The court pointed out that the railway owned power houses, while the light company had none, and that the city, interested under the franchise in only the street railway property, would, if the suggested plan were adopted, want to see as large a revenue for current as possible, while the light company would want to obtain its current as cheaply as possible. If the city should wish to sell power to other concerns besides the light company, it would soon be competing with itself.

The court criticised the efforts of the attorneys to insist upon the union of the light and railway interests. He also intimated that heretofore, and in the proposed plan, the bond and stockholders and noteholders were seeking to take the settlement of the affairs of the companies out of the court's hands, and to protect only their own interests. He said that, under the new franchise, the Kansas City Railways, the new company, must start out free of debt and that many obligations must be taken care of, the creditors in which had not yet been heard from. The court would see that all interests and creditors were protected.

Mayor Jost of Kansas City addressed the court after the opinion was delivered. He insisted on strict compliance with the terms of the franchise. The court asked explicitly if the Mayor would insist on the bonds running the full term of the franchise, and the answer was positive that he would so insist. Both Judge Hook and the Mayor expressed the opinion that no better franchise than that granted was obtainable from Kansas City, and the Mayor added that no other franchise would be considered while he was the city's executive.

ANNUAL REPORTS

United Railways of St. Louis

The comparative statement of income, profit and loss of the United Railways of St. Louis, St. Louis, Mo., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Revenue from transportation	$12,359,219	$12,612,787
Revenue from operation other than transportation	91,705	89,857
Total operating revenue	$12,450,924	$12,702,644
Operating expenses (depreciation included)	8,644,735	8,573,617
Surplus over operating expenses	$3,806,189	$4,129,027
Taxes	767,794	653,674
Net income from operation	$3,038,395	$3,475,353
Income from other sources	87,901	84,350
Gross income (less operating expenses and taxes)	$3,126,296	$3,559,703
Deductions from income	2,618,255	2,660,673
Net income	$508,041	$899,030
Dividends on preferred stock	......	......
Surplus	$508,041	$899,030

The passenger revenue for the year 1914 was $12,280,581, a decrease of $246,791, or 1.97 per cent, compared with the year 1913. During the first six months of the year the passenger revenue showed an increase of $95,263, or 1.55 per cent, but during the second six months a decrease of $342,054, or 5.35 per cent. Other revenue from transportation decreased $6,777. Revenue from operation other than transportation increased $1,848, and income from other sources increased $3,551. The gross earnings and other income amounted to $12,538,825, a decrease of $248,169. Total operating expenses (including depreciation) increased $71,118. The taxes applicable to the year 1914 were $767,794, an increase of $114,120, or 17.46 per cent, of which $112,855 was in favor of the city of St. Louis. The average number of employees in the service of the company during the year was 5500. The amount of money paid in wages was $4,304,408, or 34.57 per cent of the gross earnings.

The total number of passengers carried during the year 1914, as compared with the year 1913, and the car mileage figures in these two years, follow:

	1914	1913
Revenue passengers 5 cents	243,183,207	247,936,404
Revenue passengers 2½ cents	4,856,826	5,222,072
Total	248,040,033	253,158,476
Transfer passengers	127,444,829	123,266,765
Total passengers	375,484,862	376,425,241
Passenger car mileage	44,355,113	42,409,907
Other car mileage	377,536	380,179
Total car mileage	44,732,649	42,790,086

These figures show an increased passenger car service of 1,945,206 car miles, or 4.59 per cent, as compared to the decrease in passenger revenue of $246,791, or 1.97 per cent. The percentage of revenue passengers using transfers during the year 1914 was 51.38, an increase over the year 1913 of 2.69. This large increase in the percentage of transfer passengers was caused by the more generous transfer system put into effect July 1.

During 1914 there was expended and charged to capital account, for added property, the sum of $247,876, as follows: real estate, buildings, tools and fixtures, $27,515; track and roadway construction, $104,549; electric line construction, $61,273; power plant—buildings and equipment, $19,693, and cars and electric equipment of cars, $105,081—less real estate sold, $70,235. During the years 1910 to 1914, inclusive, the company spent on its property $12,841,652—$1,382,966 for construction and equipment, $7,251,433 for maintenance and $4,207,253 for reconstruction and replacement charges. The expenditures so made were 23.24 per cent of the gross earnings during the period, which amounted to $55,251,087.

The total mileage of single track on Dec. 31, 1914, was 345.52 miles for city track and 112.67 miles for county track, or 458.19 in all. During the year 1.91 miles of track were added, 5.79 miles were removed, 21.77 miles were reconstructed and 12.69 miles of unpaved track were retied and reballasted. In addition to the regular repair and maintenance work, the following cars and equipment were built:

Sixty-two steel center entrance trailers, one steel bottom motor car (sample design), two motor cars, forty-one combination cars converted into closed cars, 382 cars thoroughly overhauled and converted into the closed rear platform type, and three new work cars. During the year 1690 cars passed through the repair shops for truck repairs, body repairs or painting.

New York State Railways

The statement of income, profit and loss of the New York State Railways, Rochester, N. Y., for the year ended Dec. 31, 1914, follows:

Earnings from operation		$7,595,001
Expenses of operation (including depreciation)		4,600,572
Net earnings from railroad operation		$2,994,429
Taxes		496,659
Net earnings		$2,497,770
Net non-operating revenues		165,466
Gross income		$2,663,236
Income deductions (interest and rentals)		1,355,466
Net income		$1,307,770
Schenectady Railway surplus	$37,985	
New York State Railways proportion 50 per cent		18,992
Ontario Light & Traction Company surplus	$2,453	
New York State Railways proportion 100 per cent		2,453
Total income applicable to dividends		$1,329,215
Dividends preferred stock 5 per cent		193,125
		$1,136,090
Dividends common stock 5 per cent		997,350
Balance		$138,740

The total owned mileage of main track and sidings of the New York State Railways is 439.48 miles, divided as follows: Rochester lines, 227.16 miles; Syracuse lines, 85.5 miles; Utica lines, 114.44 miles, and Oneida lines, 12.38 miles. The total leased mileage is 143.33 miles, separated in this way: Rochester lines, 12.47 miles; Syracuse lines, 9.58 miles; Utica lines, 15.68 miles, and Oneida lines, 105.6 miles (trackage rights only). The total owned and leased is 582.81 miles, but this includes 0.33 miles for a Syracuse line leased but not operated, giving a net figure of 582.48. The total equipment is 1038 cars, divided 554 for the Rochester lines, 253 for the Syracuse lines, 199 for the Utica lines and 32 for the Oneida lines.

The following statement shows the result of operations of the Schenectady Railway for the year ended Dec. 31, 1914:

Earnings from operation	$1,304,303
Expenses of operation	833,372
Net earnings from railroad operations	$470,931
Taxes	84,803
Net earnings	$386,128
Net non-operating revenues	5,683
Gross income	$391,811
Income deductions	107,826
Net income	$283,985
Dividends—6 per cent	246,000
Surplus	$37,985

During the same fiscal year the earnings from operation of the Ontario Light & Traction Company, Canandaigua, N. Y., were $53,980 and the expenses $36,600, leaving net earnings from operation of $17,380. Taxes and uncollectable bills totaled $2,678 and $64 and net non-operating revenues $5,288, so that the gross income resulting was $19,925. After making income deductions of $17,472, there was left a net income of $2,453.

Binghamton (N. Y.), Railway.—The total revenue of the Binghamton Railway for the year which ended Dec. 31, 1914, was $485,430, divided as follows: Passenger revenue, $476,701; chartered car revenue, $945; mail revenue, $416; express revenue, $4,777; advertising revenue, $2,400, and rent of building, $191. The operating expenses of $321,473 were made up of $90,418 for maintenance expenses, $4,881 for traffic expenses, $178,188 for expenses of operation and $47,986 for general expenses. Taxes accrued amounted to $16,200, giving income for railway operation of $147,757. The addition of $12,974 for electric lighting revenue gave an operating income of $160,694. Interest accrued totaled $108,729, making a net corporate income of $51,924. The car-miles operated during the year were 1,974,019, the car-hours 226,127, and the car-seat-miles, 72,616,067. The revenue passengers carried during the year totaled 9,524,652, and the transfers 1,772,147. The company now has 48.26 miles of track.

Chicago (Ill.) Elevated Railways.—At the recent annual meeting of the Metropolitan West Side Elevated Railway, the South Side Elevated Railroad and the Northwestern Elevated Railroad, subsidiaries of the Chicago Elevated Railways, the number of directors in each company was reduced from seven to five. The members elected to the boards are the following: Samuel Insull, Henry A. Blair, Britton I. Budd, William H. Fox and G. H. Gulick.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Ohio Public Utilities Commission has amended its order of Oct. 15, 1914, so as to allow the Columbus Railway, Power & Light Company to extend its issue of first refunding and extension sinking fund 5 per cent gold bonds to retire the following underlying bonds from time to time as the holders thereof may agree: For the $511,000 of general mortgage 6 per cent gold bonds of the Columbus Light, Heat & Power Company, dated Aug. 1, 1908, $1,100 in face value of the first refunding and extension bonds for each $1,000 of these latter general mortgage bonds; and for the $182,000 of first mortgage 6 per cent gold bonds of the Columbus Public Service Company, dated Feb. 1, 1901, $1,100 in face value of the first refunding and extension bonds for each $1,000 of these latter first mortgage bonds.

Fairmount Park Transportation Company, Philadelphia, Pa.—The reorganization committee of the Fairmount Park Transportation Company on Feb. 26 sent out letters to the stockholders who had assented to the reorganization plan, calling for payment of the second subscription installment of $1 per share by March 15. The first payment of $1 was made at the time the shares of stock were deposited. As noted in the digest of the reorganization plan appearing in the ELECTRIC RAILWAY JOURNAL of Jan. 16 and Feb. 27, the total amount to be subscribed was fixed at $3.50 per share. More stockholders assented than was anticipated, however, and this amount has been cut to about $2.95. The remaining 95 cents will probably be called by Sept. 15. On the 27,174 assenting shares the company will receive about $80,000 in subscriptions.

Gary & Interurban Railroad, Gary, Ind.—In view of the recent defaults in interest, a protective committee of bondholders composed of Dimmer Beeber, president Commonwealth Trust Company, Philadelphia, David Halstead and Morgan J. Saupp is receiving deposits of $400,000 of Gary & Connecting Railway first mortgage bonds. A similar committee, including the same chairman, Edward McLain Waters and Edward B. Wilford, is receiving deposits for the $1,000,000 of Gary & Interurban Railway refunding and first mortgage 5 per cent bonds of 1910. Coupons of Dec. 1, 1914, and Jan. 1, 1915, respectively, are in default. If any financial plan is adopted, dissenting depositors will be given thirty days in which to withdraw, on payment of their share of expenses, not to exceed 2½ per cent on their deposited bonds.

Georgia Railway & Electric Company, Atlanta, Ga.—Charles C. Harrison, Jr., & Company, Philadelphia, have purchased a block of refunding and improvement mortgage forty-year 5 per cent sinking fund gold coupon bonds of the Georgia Railway & Electric Company. The authorization of $160,000 of these bonds by the Georgia Railway Commission to cover expenditures made from Jan. 1 to June 30, 1914, for extensions and betterments was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1914.

Holyoke (Mass.) Street Railway.—The Holyoke Street Railway has applied to the Massachusetts Public Service Commission for authority to issue $850,000 of twenty-year 5 per cent first mortgage bonds to retire $250,000 of bonds maturing on April 1 and to provide $600,000 for paying floating indebtedness. This proposed bond issue is the initial amount of a bonded debt of $2,500,000 authorized at a meeting of the stockholders on Feb. 17.

Kansas City Railway & Light Company, Kansas City, Mo.—John B. Dennis, chairman of the committee of holders of the 6 per cent notes of the Kansas City Railway & Light

Company, due on Sept. 1, 1912, has announced to the holders of certificates of deposit representing these notes that the company has arranged for the payment on March 1 at the New York Trust Company, New York, of interest on the notes from Sept. 1, 1914, to March 1, 1915, at the rate of 7 per cent per annum.

Lake Shore Electric Railway, Cleveland, Ohio.—The Lake Shore Electric Railway has filed a certificate increasing the authorized capital stock of the company from $7,500,000 to $8,000,000.

Manila Electric Railroad & Light Corporation, Manila, P. I.—A quarterly dividend of 1½ per cent has been declared on the $5,000,000 of capital stock of the Manila Electric Railroad & Light Corporation, payable on April 1 to holders of record March 18. This compares with 1¾ per cent from April, 1913, to Jan., 1915, both inclusive.

Massachusetts Electric Companies, Boston, Mass.—Blake Brothers & Company, Hayden, Stone & Company, and Jackson & Curtis are offering at 98 and interest, to yield about 5.75 per cent, $3,000,000 of 5 per cent gold coupon notes of the Massachusetts Electric Companies. These notes, which are of a par value of $1,000, are dated April 1, 1915, and are due on April 1, 1918. They are issued to take up $3,100,000 of coupon notes due on May 1 and will then constitute the only debt of the company, except current bills payable.

Mexico Tramways, Mexico City, Mexico.—On Feb. 23, U. de B. Daly, secretary Mexico Tramways, announced that owing to the continued unsatisfactory condition of affairs in Mexico the directors had no alternative but to defer the payment of the half-yearly coupons due March 1 on the general consolidated first mortgage fifty-year 5 per cent gold bonds of the company. As previously reported, the Mexican government has taken over the control of the business of the tramways and is receiving the earnings from the operation thereof. The company, therefore, is not in a position to remit the necessary funds to meet the coupons. With a view to protecting the interests of those holding the company's securities, however, representations have been made to the British and United States governments on behalf of the company.

Montgomery Light & Traction Company, Montgomery, Ala.—Howard R. Taylor & Company, Baltimore, are offering at 105 and interest, to yield 5.25 per cent, a block of the $350,000 of Montgomery Street Railway first mortgage 6's of 1893, due in August, 1923. These bonds are a closed first mortgage issue on about 30 miles of electric railway, ranking prior to $1,000,000 of first and refunding bonds of the Montgomery Light & Traction Company, which operates the entire system or street railways and an electric light and power system in Montgomery and suburbs.

New York (N. Y.) Railways.—The amount of interest that is payable upon New York Railways 5 per cent income bonds for the six months ended Dec. 31, 1914, will be submitted to arbitration. The bondholder directors are unwilling to sign the income statement for six months ended Dec. 31, 1914, as recently submitted by the company, and prefer to have the whole matter arbitrated as provided in the mortgage covering the bonds. Under these provisions one arbitrator is chosen by the company, one by the trustee under the mortgage, who is E. S. Marston, president Farmers Loan & Trust Company, and those two choose the third arbiter. Payment on the bonds for the six months ended June 30, 1914, which was 1.288 per cent, was also decided upon by arbitrators.

Petaluma & Santa Rosa Railway, Petaluma, Col.—The Petaluma & Santa Rosa Railway is asking the holders of $217,000 of second mortgage 6 per cent bonds maturing on April 1 to extend the same for two years.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—At a hearing before the California Railroad Commission on Feb. 23 Richard Sachse, chief engineer of the commission, fixed the valuation figures of the San Francisco-Oakland Terminal Railways as follows: Reproduction value—operative properties, $18,959,281; non-operative properties, $4,564,077; total, $23,523,358; reproduction value, less depreciation—operative properties, $16,011,870; non-operative properties, $4,334,844; total, $20,346,714. The reproduction value as found by the engineers is about $32,000,000, and the company's own book total for all its assets is more than $50,000,000. Mr. Sachse testified that the element wherein the greatest difference was found as between his and the company's figures was land. He said the company's book figures were not of much value, because they contained "large intangible or non-existent values."

Springfield Railway & Light Company, Springfield, Mo.—Bodell & Company, Providence, R. I., are offering at par and dividends $750,000 of 7 per cent cumulative preferred stock of the Springfield Railway & Light Company. The stock is redeemable at the option of the company at 115 and dividends. The company has outstanding $2,183,000 of first lien 5 per cent bonds and $1,100,000 of common stock. The company controls the entire street railway, steam heating, electric light and power business in Springfield.

Toronto (Ont.) Civic Railway.—The gross revenue of the Toronto Civic Railway for the year ended Dec. 31, 1914, was $166,994 and the operating expenses $166,087. The total expenditures, including operating expenses, interest and sinking fund charges, were $253,698. On the basis of the 1,097,088 car miles traveled during the year, the revenue per car mile was 15.2216 cents, the operating expenses 15.1389 cents per car mile and the total expenditures 23.1246 cents per car mile. Hence the profit over operating expenses was 0.0827 cent per car mile, while the loss on total expenditures was 7.903 cents per car mile. The number of passengers carried was 9,829,765 and the revenue per passenger 1.6988 cents. The passengers per car mile numbered 8.9598 and the cost of power per car mile 4.7764 cents.

United Gas & Electric Corporation, New York, N. Y.—The United Gas & Electric Corporation has sold (1) to Drexel & Company, Philadelphia, $5,500,000 of three-year 6 per cent gold notes secured by $7,650,000 of its new thirty-year 6 per cent collateral trust sinking fund gold bonds, and (2) to Bertron, Griscom & Company, New York and Philadelphia, and Reilly, Brock & Company, Philadelphia, the remaining $2,350,000 of the $10,000,000 of such thirty-year collateral trust bonds issuable during the life of the notes. The notes are offered at 98½ and interest to yield more than 6.5 per cent. The proceeds are to be used to provide working capital and funds for the payment at maturity of $7,500,000 of three-year 5 per cent secured notes, due on April 1. It is understood that the holders of the maturing notes will be offered the privilege of exchange on a desirable basis.

Utah Securities Corporation, Salt Lake City, Utah.—The Utah Securities Corporation, which, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 27, has, through its subsidiary, the Utah Power & Light Company, assumed formal control of the Utah Light & Traction Company, has deposited with the Guaranty Trust Company, New York, as trustees of its ten-year 6 per cent notes, $500,115 with which to take up on tenders such part of these notes as the money will purchase. In April, 1914, $7,008,000 of the notes were bought at an average price of 84.881, not including accrued interest, and in July $1,151,000 were bought at 84.81 and accrued interest.

Winnipeg (Man.) Electric Railway.—G. V. Hastings has been elected a director of the Winnipeg Electric Railway to succeed Sir William Whyte.

DIVIDENDS DECLARED

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

El Paso (Tex.) Electric Company, quarterly, 2¼ per cent, common.

Frankfort & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Galveston-Houston Electric Company, Galveston, Tex., 3 per cent, preferred; 3½ per cent, common.

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

Manhattan Bridge 3-Cent Line, Brooklyn, N. Y., quarterly, 1½ per cent.

Manila Electric Railroad & Light Corporation, Manila, P. I., quarterly, 1½ per cent.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Jan., '15	$431,113	......	......	......	......
1 " " '14	429,018	......	......	......	......
ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, MAINE					
1m., Jan., '15	$22,527	$20,360	$2,177	......	......
1 " " '14	22,657	*20,779	1,878	......	......
CITIES SERVICE COMPANY, NEW YORK, N. Y.					
1m., Dec., '14	$404,808	*$12,045	$392,763	$40,833	$351,929
1 " " '13	413,862	*3,897	409,964	29,166	380,797
12 " " '14	3,934,453	*116,908	3,817,545	420,000	3,397,545
12 " " '13	2,170,411	*85,348	2,087,063	123,062	1,964,000
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Dec., '14	$59,937	*$27,603	$32,334	$28,791	$3,543
1 " " '13	56,904	*19,446	37,458	25,099	12,359
12 " " '14	681,606	*298,335	383,271	324,637	58,635
12 " " '13	608,636	*294,652	313,983	272,680	‡77,153
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.					
1m., Dec., '14	$278,561	*$151,427	$127,134	$43,463	$83,671
1 " " '13	276,016	*168,491	107,525	......	......
12 " " '14	3,066,298	*1,886,746	1,179,552	520,438	659,114
12 " " '13	3,003,454	*1,939,520	1,063,934	......	......
DALLAS (TEX.) ELECTRIC COMPANY					
1m., Dec., '14	$186,415	*$96,203	$90,212	$33,390	$56,822
1 " " '13	203,917	*118,832	85,085	26,670	58,414
12 " " '14	2,208,879	*1,287,660	921,219	370,961	550,258
12 " " '13	2,193,500	*1,280,057	913,443	302,971	610,473
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Dec., '14	$55,656	*$31,445	$24,211	$8,773	‡$15,438
1 " " '13	55,001	*32,903	22,098	8,244	‡18,724
12 " " '14	673,095	*401,932	271,163	101,639	‡169,525
12 " " '13	440,442	*270,592	169,850	71,177	‡141,355
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Dec., '14	$88,387	*$42,957	$45,430	$4,191	$41,239
1 " " '13	87,721	*47,452	40,269	4,210	36,059
12 " " '14	1,041,792	*575,472	466,321	51,356	‡461,965
12 " " '13	886,880	*478,359	408,521	48,015	‡369,741
FORTY-SECOND STREET, MANHATTAN & ST. NICHOLAS AVENUE RAILWAY					
3m., Sept., '14	$481,951	$237,723	$244,228	$148,028	‡$96,623
3 " " '13	477,501	228,662	248,839	......	‡104,828
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEXAS					
1m., Dec., '14	$192,136	*$102,226	$89,910	$36,209	$53,701
1 " " '13	203,561	*115,341	88,220	36,549	51,671
12 " " '14	2,424,120	*1,310,859	1,113,261	441,125	672,136
12 " " '13	2,373,066	*1,352,374	1,020,692	421,213	599,479
NEW YORK CITY INTERBOROUGH RAILWAY, NEW YORK, N. Y.					
3m., Sept., '14	$171,425	$106,795	064,630	$43,063	‡$21,904
3 " " '13	160,705	109,372	51,333	......	‡12,746
NEW YORK & LONG ISLAND TRACTION COMPANY, HEMPSTEAD, N. Y.					
3m., Sept., '14	$130,708	$81,995	$48,713	$24,549	‡$25,344
3 " " '13	126,489	93,345	33,144	......	‡9,556
NEW YORK & QUEENS COUNTY RAILROAD, NEW YORK, N. Y.					
3m., Sept., '14	$381,879	$357,422	$24,457	$86,410	†‡$61,936
3 " " '13	383,444	309,464	73,980	......	†‡12,503
RICHMOND LIGHT & RAILROAD COMPANY, NEW YORK, N. Y.					
3m., Sept., '14	$131,555	$93,638	$37,917	$38,121	‡$41,517
3 " " '13	131,225	115,193	16,032	......	‡19,286
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Dec., '14	$71,678	*$45,578	$26,099	$23,420	$2,679
1 " " '13	74,505	*49,864	24,642	22,967	1,675
12 " " '14	842,639	*552,987	289,652	275,333	14,319
12 " " '13	827,780	*557,921	269,859	263,264	9,595
SECOND AVENUE RAILROAD, NEW YORK, N. Y.					
3m., Sept., '14	$260,724	$155,953	$104,771	$65,393	‡$39,377
3 " " '13	287,167	165,647	121,520	......	‡63,356
STATEN ISLAND MIDLAND RAILWAY, NEW YORK, N. Y.					
3m., Sept., '14	$121,352	$69,244	$52,108	$18,333	‡$33,972
3 " " '13	117,975	85,590	22,385	......	‡14,808
THIRD AVENUE RAILWAY, NEW YORK, N. Y.					
3m., Sept., '14	$1,005,281	$584,807	$420,474	$612,605	‡$36,577
3 " " '13	1,035,830	534,027	501,803	......	‡87,097
UNION RAILWAY, BRONX, N. Y.					
3m., Sept., '14	$773,591	$490,896	$282,695	$157,680	‡$132,153
3 " " '13	762,489	538,972	223,517	......	‡74,371
YONKERS (N. Y.) RAILROAD					
3m., Sept., '14	$194,066	$133,272	$60,794	$49,025	‡$11,904
3 " " '13	194,013	123,234	70,779	......	‡21,490

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE "JITNEY" BUS

Trend of Recent Legislation—Companies State Their Attitude—Automobile Man Sanguine

History in regard to legislation covering the operation of buses is being made rapidly. On Feb. 18 the City Commission of Ogden, Utah, passed an ordinance abolishing licenses for automobiles used for carrying passengers where charges for hire were made. Under this ordinance the operation of 5-cent auto buses in Ogden is impossible unless a franchise similar to that of the street railways is granted to the motor-bus operators. On Feb. 17 the City Commissioners of Port Arthur, Tex., passed an ordinance governing the operation of "jitney" cars. That measure places the "jitneys" under bond, and permits their use only on certain streets of the city. The ordinance became operative three days after its passage and on the day that it went into effect the owners of the "jitney" buses decided to discontinue operation. A petition is being circulated asking for a referendum vote on the measure.

On Feb. 19 the City Council of Beaumont, Tex., passed unanimously an ordinance governing the operation of the "jitney" cars. The new measure requires the operators to apply to the City Council for a franchise and makes it an offense punishable by a fine of not more than $200 to operate a "jitney" without a franchise. Up to that date the members of the City Council had not decided on the terms that should be incorporated in the "jitney" bus franchise ordinance. The "jitney" bus ordinance that was passed in Fort Worth, Tex., went into effect on Feb. 22. An effort was made by the operators of "jitney" buses to secure an injunction against the further publication of the ordinance, but the petition was not allowed. Here also a petition for referendum election is being considered. In the Texas Legislature the Mendell bill to regulate "jitney" automobile lines in cities of 10,000 or more has been killed by the committee on judiciary on the ground that under the home rule act cities are empowered to regulate the operation of such transportation lines.

An ordinance regulating "jitney" automobiles was adopted on Feb. 9 by the City Commission of Tulsa, Okla., and is being enforced. The main features of the ordinance are that it prohibits the "jitneys" on streets where street cars are operating, makes them adopt routes and schedules of their own not used by the car lines, and requires them to operate continuously for sixteen hours each day; in other words, to have their own routes and give dependable public service. A conviction has already been secured for violation of this feature of the ordinance. The City Commission of Tulsa took the view that duplication of service was of no advantage to the city, but that they would welcome the "jitney" bus provided operators selected fixed routes and rendered the public proper service by maintaining schedules. As burdens in the way of licenses, assessments, etc., the only fee required is one of $5 a passenger seat a year, with a credit for the regular license charged automobiles, so that in the case of a Ford, for instance, seating four passengers, the extra fee charges is only $5 a year. On March 1 only two "jitney" routes were being operated in Tulsa. They were on streets paralleling the Tulsa Street Railway one block away.

Up to Feb. 24 neither Los Angeles nor San Francisco had taken final action with regard to the traffic measures to regulate the "jitney bus" service. Previous to that date, however, City Attorney Albert Lee Stephens, of Los Angeles, had completed the draft of a proposed ordinance for that city and it was expected that action on the matter would be taken within a few days. The proposed ordinance in the main follows the recommendation of the utilities committee. It contains eighteen sections and approximately 1800 words. The ordinance does not apply to street or interurban railway cars, sight-seeing vehicles, hotel buses, vehicles operated from a fixed stand in the street or from a private or public garage, the destination and route of which are under the direction of a passenger or passengers being carried.

There has been introduced in the Indiana Senate a bill providing that any person, firm or corporation engaged in the business of transporting passengers for hire by automobile shall constitute a "public utility" and be subject to all the provisions of the utility commission act, and that such person, firm or corporation shall not engage in or continue in such business except under a license granted pursuant to an ordinance which must be passed by the municipality wherein such utility is operating, fixing the terms and conditions and providing for a satisfactory bond. the Public Service Commission to have the right, on petition, to review and modify the term of any such ordinance.

The commissioners of Spokane, who have been considering the matter of the regulation of the "jitney" bus, have decided on the general terms of the franchise which it is likely will be passed in that city. Under the measures as tentatively drawn "jitney" buses will be placed in a class by themselves, required to run over a stated route on a fixed schedule, secure a Councilmanic permit, give a bond of $5,000, have lights in the cars, collect no fares when in motion and allow no riding on the running boards or undue crowding on the cars.

The City Council of San Diego has taken a tack different from that employed in most of the other cities. It is seeking an injunction to prevent the Red Star Auto Line from operating on city streets, claiming that the "jitney" is a common carrier and that it must apply to the city for a franchise to use the streets.

The question of an ordinance to govern the "jitney" bus at Pueblo, Col., having come up, City Attorney Alva P. Adams, in a formal report to the City Council said that while the city could not prohibit the operation of buses it did hold the power to license and regulate the cars in such a manner as to insure the safety, welfare and convenience of the city and its inhabitants. He said he reached his conclusion reluctantly, and that his opinion was at least at variance with what seemed the opinion of certain public organizations in the city and with the conclusions reached upon the subject at Denver.

In the city of Memphis the question of the regulation has been passed on to the city attorney with instructions for an opinion. On Feb. 21 Director of Streets and Sewers Talbert of St. Louis began preparing amendments to the pending taxicab bill to regulate the operation of the "jitney" as a common carrier in that city.

A great deal has been printed about the proposed ordinance to be introduced in the Council of Kansas City. It was said a few days ago that this ordinance would provide for a bond of $10,000 for each car, an occupation license tax of about $5 a car annually and a vehicle tax of $10 a car annually. The bond requirement would compel each "jitney" driver to put up $10,000 security himself, as the bonding companies have refused to assume "jitney" risks.

From all parts of the country come stories of the organization of the "jitney" bus owners and operators for their own protection. Some of these organizations are showing a considerable amount of strength. In one city in Texas the city officials at present holding office were loath to put themselves on record, fearful of the consequences at the impending election.

John N. Willys, of the Willys Overland Automobile Company, and Henry Ford are said to have expressed themselves freely recently in regard to the "jitney" bus. Mr. Ford was quoted in the papers in the East on Feb. 27 as stating that he contemplated putting into service in Chicago Ford cars with a seating capacity of sixteen persons each. Mr. Ford subsequently denied this. Mr. Willys is reported to have said:

"The tremendous political influences exerted by the electric street railway interests may succeed for a short period of time in retarding the sudden and great development of the automobile transportation property known as the 'jitney' bus, but it will never be able to suppress the new and popular means of locomotion. The public in this country is just awakening to the possibilities and advantages of motor transportation. The promise of cheap, satisfactory transportation for the American public has been made possible by the wonderful strides in this country in the construction of good, serviceable automobiles at only about half the price at which they can be produced abroad. This means more to the 'jitney' bus business than might at first be supposed, when one thinks only of first cost or the original investment carried as a fixed charge."

Among the electric railways that have gone on record recently in regard to the 'jitney' are the Louisville Railway, the United Railways of St. Louis, the Georgia Railway & Power Company, the Birmingham Railway, Light & Power Company and the Capital Traction Company. The attitude of the Louisville Railway is discussed in its publication, *Trolley Topics*. The company says:

"Should an attempt be made (to operate 'jitney' buses) they should be regulated in as substantial a way as is the Louisville Railway, in that the rate of fare, the tax to be paid, the route to be followed, should be prescribed; also the routes should be sufficiently long to be a benefit to the riding public and not merely operated in the congested districts, which are already thoroughly covered by street car lines; for, unless so regulated, they can be of no real benefit to any class of citizens, but, on the contrary, would be a detriment to the entire city and cause increased taxation on every citizen in the city. Indeed, it is by no means certain that the 'jitney' buses can be legally operated in Louisville, as it seems there is a city ordinance, which has been in effect for many years, prohibiting the operation of a bus or other vehicle to carry passengers in competition with established street railroads, carrying a penalty of $5 to $50 for each offense."

The article which appeared in the February issue of the *United Railway Bulletin*, published by the United Railways, St. Louis, reviewed the "jitney" situation in general and more particularly the ordinances and regulatory measures which have been adopted in various cities in which the "jitney" has been placed in operation. In conclusion the article said:

"If any evidence of the viciousness of this lack of inspection is needed it is only necessary to tabulate the automobile accidents any Sunday during the summer, when the streets are full of automobiles run by amateur drivers. The street railways pay a large part of their gross earnings as taxes and also are required to maintain the pavement between their rails and tracks. It is hardly likely that the municipalities will allow automobiles conducting a similar business to go free of license and taxes."

J. P. H. de Windt, vice-president and general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala., stated the attitude of his company recently to the members of the city commission. He is quoted as having said among other things:

"All I ask is a square deal. I am willing to meet competition any time. I will turn over the books of my company to any member of the commission or to any man of fair principles to show him whether or not we are making any improper profits. The 'jitneys' have cut our gross revenues perhaps $700 a day."

George E. Hamilton, president of the Capital Traction Company, Washington, D. C., in a letter to the Public Utility Commission of the District, protested against "jitney" bus operation without regulation. He said that it was essential for the commission in the true performance of its duties to protect common carriers in the enjoyment of their legal rights and charter privileges, and that the progress and development of the District depended in a considerable measure on the service given by the street railways and the development and betterment of that service. To allow the "jitney" to enter the field as a free lance without franchise, without regulation and without responsibility and compete under such unequal conditions with the street railroad would probably cripple and might destroy a service that was good and dependable. This, he thought, was the last thing that the public utilities commission would desire.

The Georgia Railway & Power Company recently carried in the papers of Atlanta a long advertisement in which it gave seven reasons why Atlanta should proceed in the matter of the "jitney" bus regulation with full thought of future consequences. It said frankly that the company's profits were concerned with the proposed inauguration of the "jitney" buses. In conclusion the company said:

"'Jitney' buses were novelties. Now the novelty is wearing off. Regulations to control the buses are being shaped in many cities—but with more difficulty than if those regulations had been prepared in advance. Will Atlanta look before she leaps?"

The Fort Wayne *News* of Feb. 20 sounded an editorial note of caution in regard to the "jitney" bus. The paper said in part:

"The city authorities will do well to go slow, very slow, in the matter of 'jitney' bus lines in Fort Wayne. While justice demands that a corporation that has invested an immense sum of money here be given decent consideration, the claims of the people are, after all, paramount, and it is certain that 'jitney' bus lines are decidedly inimical to their interests. There always has been fault-finding—most of it captious—and there always will be, yet we all know that the street car is a pretty dependable proposition and that its management is responsible. It is really a pretty good thing to have about the municipal house. The same cannot be said, however, for the owners of the 'jitney' buses whose operation increase the probability of accidents to passengers and pedestrians fourfold. These people are practically irresponsible in a financial way. The 'jitney' bus has no proper place in our social economy."

The Puget Sound Traction, Light & Power Company, operating in Seattle, estimates from January business that it will carry 20,736,000 fewer passengers in 1915 than it hauled in 1914, if the competition of 5-cent motor buses continues unabated. The company has placed stub cars on the outer portions of the suburban lines, transferring passengers to downtown cars.

In Tucson, Ariz., "jitney" drivers have been arrested under the old "hack stand" ordinance. Injunction proceedings are threatened. E. N. Sanderson, New York, president of the Federal Light & Traction Company, protested against the operation of the "jitneys."

The special "jitney" service feature is being used more generally in Kansas City with large passenger cars, the charge being 10 cents, however, and the machine gathering its passengers from hotels and apartment houses for boulevard rides downtown. The use of automobiles is being welcomed by residents of suburban districts as the solution of their transportation problems in respect to lines where street railways would not be profitable for several years to come.

T. F. Grover, general manager of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, took the "jitney" bus for his subject at the regular monthly meeting of the employees of the company on Feb. 24. His remarks were published practically in full in the Terre Haute *Star* and by the other daily newspapers in Terre Haute. He has had the statement printed in pamphlet form. He replied in his remarks to the questions of the effect of the "jitney" on the future of the company, whether there would be a war between the company and the "jitney," and what effect the "jitney" would have on the city of Terre Haute should it continue to operate under present conditions. He included in his remarks a very interesting summary of the cost of "jitney" operation. On Feb. 18 there were about seventy-five "jitneys" in operation in Terre Haute, while on Feb. 25 Mr. Grover estimated that there were not more than fifteen in operation.

HEARING IN INDIANAPOLIS-LOUISVILLE I. C. C. CASE

A supplemental hearing was held at Indianapolis on Feb. 23 and 24 before Examiner Fleming of the Interstate Commerce Commission on Interstate Commerce Commission docket No. 5217, originally brought in the name of the Louisville Board of Trade vs. Indianapolis Columbus & Southern Traction Company, et al, in the matter of through freight service between Louisville and Indianapolis. As a result of the original hearing the Interstate Commerce Commission ordered that through freight service be established between Louisville and Indianapolis and intermediate points, which service was instituted on Sept. 15, 1914. The participating carriers, the Interstate Public Service Company, Indianapolis & Louisville Traction Railway, Louisville & Northern Railway & Light Company and Louisville & Southern Indiana Traction Company, were, however, unable to agree on the basis of divisions of the resulting revenue, and finally the Louisville & Northern Railway & Light Company petitioned the commission for a supplemental hearing for the purpose of having the basis of divisions of freight revenues fixed by the Interstate Commerce Commission. A great deal of testimony was introduced bearing upon the equitable division of freight earnings, and many traffic managers of Indiana interurban lines appeared before Examiner Fleming. As there are still a number of briefs and arguments to be filed with the commission, it is probable that three or four months will elapse before any decision will be handed down.

CHICAGO SERVICE QUESTIONS

Several points to be considered in seeking relief from congestion in the Chicago downtown loop district were brought out by L. A. Busby, president of the Chicago Surface Lines, at the recent hearing before the Illinois Public Utilities Commission. Mr. Busby stated that the basis for calculating the regular rush-hour schedules was eighty passengers to each car seating fifty-two persons. He considered it advisable to allow about 3½ sq. ft. for each passenger after deducting reasonable space for entrances, exits and the car crew. It should be borne in mind that the physical capacity of certain lines in the downtown district was greatly exceeded during the rush hours by the number of passengers demanding service and that the problem of meeting the labor agreement has to be taken into consideration. He laid stress on the relief that could be obtained by the immediate elimination of teams from the tracks in the loop district. Relief could not be secured through the use of trail cars, as their operation on lines passing through the loop was prohibited under the present franchise ordinance. Mr. Busby expressed the opinion that the public would object to the walk which would be involved if the present downtown terminals of the surface lines were changed by turning back cars before they reached the center of the business district. The police would be impotent to enforce service standard regulations such as obtain in some foreign cities.

While before the commission R. F. Kelker, Jr., city traction supervisor, submitted a plan for rerouting cars in the Chicago loop district in order to reduce the number of double-track crossings and thereby speed up schedules. Under the present routing there are twenty-five double-track crossings in the loop district, and if Mr. Kelker's plan was adopted this number would be reduced to the equivalent of six double-track crossings by turning back east and west lines at Clark Street, or at a point where they would not intersect the heavy north and south lines.

SERVICE STANDARD ORDINANCE

The local transportation committee of the City Council of Chicago, Ill., with the aid of the Bureau of Public Service and Prof. E. W. Bemis, the city's representative on the Board of Supervising Engineers, has drafted a service standard ordinance. In preliminary form this ordinance requires that all lines must operate on a written schedule, a copy of which must be filed with the commissioner of public service in Chicago. In case schedules are changed the revisions must be submitted to the commissioner of public service at least three days before the new schedules are put into effect. All cars are required to carry run numbers which will fix their position in the schedule, and extra cars are also to be indicated.

The non-rush-hour service standard requires that the aggregate number of seats within the cars passing any point in any one direction shall not be less than the aggregate number of passengers carried during any period of fifteen consecutive minutes. It is provided, however, that if less than three cars of any line or lines pass any point at which a check is made during the fifteen-minute period, then the aggregate number of seats carried by three consecutive cars passing in any one direction shall not be less than the aggregate number of passengers carried. The service standard also requires that at no time or place on any line operating within the city of Chicago shall there be scheduled less than one car during each twenty-minute period of the entire twenty-four hours, the four hours between 1 a. m. and 5 a. m. being excepted. The right to designate checking points is retained by the commissioner of public service, who is required to notify the railway company of its location. Exceptions are made in cases where it is physically impractical to comply with the standard of car loading, or where the elements interfere, but the burden of proof is on the railway. A fine of $200 for each violation of this ordinance is included.

SAFETY ARTICLES FOR SCHOOL CHILDREN

In connection with a systematic and permanently-organized safety movement the Chicago & Joliet Electric Railway, Joliet, Ill., has prepared a set of twenty printed articles with the assistance of the superintendent of the city schools and heads of the city departments. These articles were written for children of different ages and vary in length from 300 to 750 words. J. R. Blackhall, general manager, and W. H. Heun, superintendent transportation and claim agent of the company, have experienced no difficulty in obtaining the co-operation of the parochial and public school teachers and superintendents in the distribution of these leaflets. They are given to the teachers in sets, each set being contained in an envelope appropriately indexed. The titles follow: "Meaning of Safety"; "Fire Facts by the Fire Chief"; "Health and Happiness"; "Suggestions by Chief of Police"; "Danger from Live Wires"; "Keep on the Sidewalk"; "Keep Away from Wagons and Automobiles"; "Trolley Cars are Dangerous"; "Better Safe Than Sorry"; "Help Others"; "Dangerous Fun"; "Be Thoughtful" (for younger children); "Thoughtfulness" (for older children); "Those Who Seek Excitement Court Danger" (for older children); "The Cruel Giant"; "Ed's Mishap"; "The Safety Button Soliloquy"; "Safety Everywhere"; "First Aid"; "Fair Play."

DEALING WITH THE SPITTER

Officers of the Louisville & Interurban Railway and the county health authorities have agreed upon a plan by which they hope to help keep down disease and improve the appearance of the cars on the several electric lines running out of Louisville, Ky. In future when conductors or motormen of the company remonstrate with those who spit in the cars they will speak with authority, for they will be State officers, with the titles of sanitary inspectors. The officials of the company have been exerting themselves to keep down the filthy practice, and they readily assented to the plan when it was suggested by the health authorities.

When a conductor or motorman discovers a passenger violating the law against spitting he will fill out a blank which he will carry and which will rank as a legal notice. These blanks will be handed to the violators and warn them that repetition of the offense will mean arrest, the train men being empowered, even charged, to swear out warrants so providing. The names of all the trainmen on the cars running out of Louisville have been furnished to the State board of health and the appointments are to be issued immediately. The Louisville & Interurban Railway and the Louisville Railway are co-operating with the health authorities, city, county and State.

Accident Record in Louisville, Ky.—The Louisville Railway has carried a total of 417,449,000 passengers and the Louisville & Interurban Railway 17,812,000 since there has been a fatal accident to any of their passengers.

Mileage Books Discontinued.—The Cortland County Traction Company, Cortland, N. Y., has announced that the sale of interchangeable ticket or mileage books at $10 per book will be discontinued after April 1. Books outstanding after that date will be honored in accordance with the terms and conditions under which they were sold.

Service Hearing in St. Louis.—The final hearing before the Public Service Commission of Missouri in connection with the inquiry into the adequacy of the service of the United Railways, St. Louis, was held in that city on Feb. 24. Henry S. Priest and Morton Jourdan represented the company as counsel. Each side has been given ten days in which to file briefs.

Testimony Completed—Testimony has practically been completed in the arbitration proceedings which have been under way for some weeks, involving the differences between the Kentucky Traction & Terminal Company and the union trainmen. F. W. Bacon, vice-president of the company, was the last witness for the company, after which rebuttal testimony was offered by the union. Arguments are to be heard in conclusion by Charles C. Bagby, Danville, the umpire.

Safety Work to Continue.—The Ontario Safety League will continue its work in 1915. The officials hope to be able to take up the question of industrial safety and co-operate with employers of labor in an endeavor to reduce accidents in factories, workshops, etc. The help of the General Ministerial Association was enlisted on Feb. 22 when a deputation appeared before the association and asked for its assistance in forwarding the objects of the league. The association has arranged for an announcement to be made in the churches of Toronto to bring the matter before the whole public.

Welfare Work in New York.—H. H. Vreeland, director of welfare of the Interborough Rapid Transit Company and the New York Railways, has contributed to the February issues of the magazines published in the interest of the emplolyees of the companies reviews of the work of his department as it relates to each company. He says the work reflects progress, reveals the wisdom of the officials in thus co-operating with the employees and sustains the most sanguine expectations of both officials and employees. The figures which are included in the reviews are especially significant of the activities carried on.

Toronto Civic Fares.—The proposal to increase the fare on the civic railway lines in Toronto, Ont., has been revived by Alderman McBride. The plan has the support of Works Commissioner Harris, who suggests selling nine tickets for 25 cents. The present charge of 2 cents or six tickets for 10 cents is not sufficient to make the system self-supporting. On Feb. 26 the works committee of the City Council adopted the recommendation of Commissioner Harris to increase the cash fare to 3 cents. with nine tickets for 25 cents. An amendment to make it ten tickets for 25 cents was voted down, seven to five.

Safety Council at Columbus.—On Feb. 26 Columbus Council No. 19, National Safety Council, was organized at Columbus, Ohio. Thirty representatives, superintendents and safety directors of local industries were present, including those from the Columbus Railway, Power & Light Company. Victor T. Noonan, safety director of the Industrial Commission, said that, through educational work, the accidents in the State may be reduced 50 per cent. E. E. Watson, actuary of the commission, spoke on the economic phases of the work. Secretary Babbitt of the Columbus Railway, Power & Light Company explained the results of the safety work that has been done by his company.

Welfare Work in St. Louis.—The pamphlet report of the United Railways, St. Louis, Mo., for the year ended Dec. 31, 1914, contains the following reference to the welfare work of the company: "The Employees' Mutual Benefit Association, which was started in February, 1914, has proved a great success. On Dec. 31, 1914, the association had 3247 members, and during the eleven months of its existence paid out in sick benefits $19,212, and in death benefits $5,100. Nothing which the company has ever done has been of so much benefit, and nothing has brought about such close relations between our employees and the company as the institution of this association. We propose to put into effect in the year 1915 a pension system for aged and incapacitated employees, and also a savings and loan association for the benefit of those employees who wish to save their money, or build or purchase homes of their own."

Health Commissioner Seeks to Fix Car Capacity.—On March 1 Commissioner of Health Goldwater of New York affirmed his intention of strictly inforcing his order limiting the number of passengers to 150 per cent of the seating capacity of the Fifty-ninth and Eighty-sixth Street cars. He also announced that similar orders affecting several Brooklyn car lines will soon be issued. Dr. Goldwater said in part: "If the Board of Health is compelled to take its case into court we shall be able to present not only the testimony of our own inspectors but that of numerous citizens who have volunteered to join us in the effort to obtain their rights, and we shall keep right on until we get results. The order issued by this department, largely because of its unprecedented character, has aroused varied comment and has given rise to some misunderstanding. It is to be observed that the order is not general, but relates to specific nuisances which the railroad companies are requested to abate." On March 2 the New York Railways obtained a stay of the order of the Board of Health until March 16. A public hearing will be held on March 15.

Personal Mention

Mr. A. M. Nanton has been elected vice-president of the Winnipeg (Man.) Railway to succeed Sir William Whyte.

Mr. A. T. Davidson has been appointed purchasing agent of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., to succeed Mr. Lewis Keim.

Mr. C. Nesbitt Duffy, vice-president in charge of operation of the Manila Electric Railroad & Light Company, Manila, P. I., has been elected vice-president of the Manila Merchants' Association.

Mr. John S. Moore, formerly assistant traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has been appointed traffic manager of the company to succeed Mr. W. O. Woodward, resigned.

Mr. Lewis Keim, who has been purchasing agent of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., for the last four years, has been appointed general inspector of the company, with duties corresponding to those of the position of assistant general manager.

Mr. C. T. Chapman, whose resignation as traffic manager of the Interurban Railway, Des Moines, Ia., was announced in the ELECTRIC RAILWAY JOURNAL of Feb. 27, was the guest of honor at a banquet of the traffic men of Des Moines on Feb. 23. Mr. William Clapper, who has succeeded Mr. Chapman, was also present.

Gen. George H. Harries, who was recently elected president of the Omaha Electric Light & Power Company, Omaha, Neb., and who continues to serve as president of the Louisville Gas & Electric Company, Louisville, Ky., will in the future take active charge of the Omaha property and devote only a portion of his time to the Louisville property, according to an announcement made by H. M. Byllesby & Company, Chicago, Ill., by which company both of these properties are controlled.

C. L. HENRY

Mr. Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., was elected president of the Central Electric Railway Association at the annual meeting held in Indianapolis on Feb. 25 and 26. Mr. Henry was educated as a lawyer. He became interested in railways in 1891, when he purchased the horse car line in Anderson, Ind. Under his direction the line was electrified. In 1897 Mr. Henry built an electric railway from Anderson to Alexandria, which in the year following was extended to Summittville. This was the first interurban line in Indiana and became a part of the Union Traction Company of Indiana when that organization was formed in 1899. Mr. Henry, as general manager of this company, constructed the lines from Muncie to Indianapolis via Anderson. Several years ago Mr. Henry sold out his interest in the Union Traction Company and interested himself in the Indianapolis & Cincinnati Traction Company. Mr. Henry was born on a farm in Hancock County, Ind., on July 1, 1849, and received his education in the common schools, in the literary department of Asbury (now De Pauw) University, and graduated from the law school of Indiana University in 1872, practising law in Pendleton and Anderson until he began his connection with the electric railway industry. Mr. Henry served in the Indiana State Senate from 1881 to 1885, and as a Representative in Congress from 1895 to 1899. He was made fourth vice-president of the American Electric Railway Association in 1911, third vice-president in 1912, second vice-president in 1913 and first vice-president in 1914. Mr. Henry is credited with having been the pioneer builder of interurban electric railways in Indiana and with having originated the word "interurban," as applied to electric railways.

C. S. BANGHART

Mr. C. S. Banghart, who has been elected second vice-president and a director of the Binghamton (N. Y.) Railway in addition to general manager, became connected with the company as general manager on Aug. 1, 1914. Previous to that he had been superintendent of the New York & Queens County Railway, operating about 75 miles of electric railway in Long Island City and elsewhere in the Borough of Queens. He was appointed to that position in 1908, having served for five years previously as master mechanic of the company. In all Mr. Banghart has been engaged in electric railway work about twenty-five years. His first position was with the line department of the Allentown & Bethlehem Traction Company. After leaving that company he entered the service of the Thomson-Houston Company during the electrification of the Union Railway, New York. On the completion of that installation he became connected with the M. A. Greene Engine Company, Altoona, Pa., with which he remained about eighteen months. Mr. Banghart then accepted the position of chief electrician with the Flushing & College Point Railway & Lighting Company, with which he remained until he was appointed master mechanic of the Union Traction Company, Reading, Pa. He was with that company from 1895 to 1903 and then accepted the position of master mechanic of the New York & Queens County Railway. The Binghamton Railway operates 31 miles of line and controls the Scranton & Binghamton Railroad which has under way the construction of an electric railway to connect Binghamton with Scranton, Pa.

Mr. F. L. Fuller has been elected president of the Binghamton (N. Y.) Railway to succeed Mr. G. Tracy Rogers, resigned. Mr. Fuller was formerly, up to 1909, president and general manager of the New York & Queens County Railway, Long Island City, N. Y., and before taking charge of that property was general manager of the United Power & Transportation Company, which controlled electric railway and light properties in the neighborhood of Philadelphia and Wilmington, Del. Mr. Fuller entered street railway work in 1888 as foreman of the Selby Avenue Cable Line of the St. Paul City Railway. The following year electricity was installed in St. Paul and Mr. Fuller acted as assistant superintendent. On the consolidation of the St. Paul and Minneapolis systems in 1893, Mr. Fuller became connected with the West Chicago (Ill.) Street Railway as assistant superintendent. The Chicago company's system was then divided between cable and horse lines, and in 1894 the work was begun of equipping the horse lines with electricity, with Mr. Fuller as superintendent. In 1899 Mr. Fuller became connected with the United Power & Transportation Company, Philadelphia, going from there to Long Island City.

OBITUARY

Edgar Allen, the founder and chairman of Edgar Allen & Company, Ltd., London, England, died at Sheffield on Jan. 28. He was seventy-seven years of age.

Col. N. H. Heft, formerly head of the electrical department of the New York, New Haven & Hartford Railroad, is dead. Colonel Heft had for years been the electrical expert for the company and it was under his supervision that the Nantasket Beach line was equipped with the third-rail, the first application of its kind in the United States. Colonel Heft had been president of the Bridgeport (Conn.) Traction Company, the Greenwich Tramway, the Meriden Street Railroad, and the Stamford Street Railroad. He was formerly president of the Bridgeport Board of Trade. He had not been active in electric railway work for a number of years. In 1901-02 Mr. Heft was second vice-president of the American Street Railway Association. He also presented several papers before that association on heavy electric traction subjects.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Richwood-Hamilton Traction Company, Hamilton, Ohio.**—Incorporated in Ohio to build an electric railway between Richwood and Hamilton. Capital stock, $10,000. Incorporators: Eugene Purtelle and others.

McConnellsburg & Fort London Railway, McConnellsburg, Pa.—Chartered in Pennsylvania to build a 9-mile electric railway between McConnellsburg and Fort London. Capital stock, authorized, $60,000. Incorporators: Edward J. Post, D. H. Patterson, George A. Harris and B. C. Lamberson. [E. R. J., Feb. 6, '15.]

FRANCHISES

Fresno, Cal.—The Railroad Commission has issued an order approving a lease between the Fresno Traction Company and the Southern Pacific Company, by which the latter company will operate the traction company's line from Muscatel Station eastward, a distance of 8.1 miles.

Webster, Mass.—Worcester & Webster Street Railway has asked the Council for a franchise in Webster.

Worcester, Mass.—The Worcester Consolidated Street Railroad has received a franchise from the Council to extend its tracks on Adams Street in Worcester to the site selected for the new distributing station.

Cleveland, Ohio.—The Cleveland Railway has received a franchise from the Council to extend its double track line in Clark Avenue from the intersection with West Sixty-fifth Street thence in West Seventy-third Street to its intersection with Denison Avenue in Cleveland.

Columbus, Ohio.—Philip B. Gaynor, New York, president of the East Linden Electric Railway, has made application to the Columbus City Council for franchises for two new routes. One of them would extend north from the intersection of Joyce and Leonard Avenues to the corporation line and thence to Linden. The other would begin at the terminus of the present Leonard Avenue line and pass through the village of Shepard to the west bank of Alum Creek. The latter line would be a competitor of the Columbus, New Albany & Johnstown Railway, on which the fare between Columbus and Shepard is 15 cents. It is understood that Mr. Gaynor proposes to make the fare 5 cents, which would probably be added to the fare on the lines of the local company to reach the central portion of the city. [E. R. J., Jan. 6, '15.]

Columbus, Kenton & Toledo Traction Company, Kenton, Ohio.—Surveys have been completed by this company over 88 miles of its line between Columbus and Findlay. No definite plans have been made when construction will be begun. This 138-mile line will connect Columbus and Toledo. J. W. Caine, Kenton, vice-president. [E. R. J., Aug. 16, '13.]

Toronto, Ont.—The Eastern Ontario Electric Railway has asked the Ontario Parliament for an extension of time on its franchise to build its line from Toronto to Cornwall via the counties along Lake Ontario. The Board of Control is opposed to granting the extension of time to the company.

Portland, Ore.—The United Railways has filed an acceptance of the provisions of a franchise granted on Feb. 10, 1915, by the Council, for the construction for a line along Front Street and in North and South Portland. By the terms of the franchise the company will remove its tracks on Stark Street in Portland.

Phoenixville, Pa.—The Phoenixville, Valley Forge & Strafford Electric Railway has received a franchise from the Council to lay tracks across Gay Street Bridge in Phoenixville, but only under certain conditions.

Collegeville, Pa.—The Perkiomen Traction Company has received a renewal of its franchise in Collegeville from the Council. This is part of a plan to build an electric line from Collegeville to Schwenkville and vicinity. [E. R. J., Jan. 23, '15.]

TRACK AND ROADWAY

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—Work has been begun by this company raising its tracks on North Fourth Street between Town Creek and the Southern Railway in Gadsden.

***Buffalo, Ark.**—G. T. Uplegraff, Helena, and Phillip DeWolf, Bristol, R. I., are considering plans to build an electric railway from Buffalo to Yellville, via the Buffalo River. Power would be secured from the Buffalo River. This line would furnish transportation to all the zinc mines in the Buffalo River zinc district.

Lone Pine Utilities Company, Big Pines, Cal.—Work on the construction of the trackless trolley up Swarthout canyon by this company will be begun soon, according to Manager Denton, who is getting ready to put a force in the mountains to finish the project started last spring. The right-of-way for the power line has been secured. The line will be 9 miles long from Grava, on the Santa Fé, south and southeast up the canyon to Lytle Creek, where the company has a tract. It is stated that $50,000 will be spent on the project during the coming months. It is planned to have it completed before the opening of the summer season. [E. R. J., Feb. 28, '14.]

Northern Electric Railway, Chico, Cal.—Plans are being made to rebuild the section of this railway between Meridian and Colusa recently damaged by floods. One abutment of a steel bridge crossing the Sacramento River was carried away and 3 miles of track washed away. The cost of repairs will be approximately $50,000.

Humboldt Transit Company, Eureka, Cal.—Right-of-way is being secured by this company for an extension around the bay to Arcadia and out on Mad River bottom in Arcata.

Fresno (Cal.) Interurban Railway.—During the next six weeks this company expects to award contracts to build 6½ miles of electric railway from Barton to Clovis. Also 1½ miles of new track in Fresno.

Marin County Electric Railway, Mill Valley, Cal.—Contracts will soon be awarded by this company to build the Cascade Canyon unit of this railway. [E. R. J., Feb. 13, '15.]

San Francisco (Cal.) Municipal Railway.—Mayor Rolph has signed a resolution of the Board of Supervisors directing that the Church Street municipal railway be constructed according to plan No. 9. This plan provides that between Eighteenth Street and Twentieth Street the railway shall extend through Mission Park, and that a right-of-way shall be acquired for it through private property between Twentieth Street and Twenty-second Street in San Francisco.

Stockton Terminal & Eastern Railway, Stockton, Cal.—This company has requested authority to issue $319,500 of bonds to be used in completing its line to Jenny Lind, Calaveras County. The company asks, if the commission should not grant its application in full, that it be allowed to sell sufficient bonds to construct 2 miles of railway in order to reach certain gravel beds, from which it is expected considerable traffic can be secured.

Connecticut Company, Bridgeport, Conn.—Work on the new line from Hollister Avenue, Bridgeport, Conn., to Lordship Manor will be begun soon. The first work to be done will be the erection of five new bridges. The Fred T. Ley Company, which has the contract for the laying of the tracks, expects to begin the work on the railway as soon as the weather permits.

Washington Railway & Electric Company, Washington, D. C.—Formal notice was given this company recently that its application for permission to issue bonds to cover certain improvements, including the building of an extension on Fourteenth Street from F Street to Pennsylvania Avenue, will be considered by the Public Utilities Commission. The total amount of the issue for which authority is sought is $207,000. In addition to the Fourteenth Street improvement, the bonds will provide for placing underground electric connections of the Anacostia line, between Anacostia Bridge and Talbert Street, and an extension of the line on Nichols Avenue. The commission also notified the company that it will consider an application for bonds to cover certain expenditures for equipment authorized by Congress and the orders of the commission.

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—Work will soon be begun by this company on the extension on Twenty-second street to the ball park at Coffee Pot Bayou in St. Petersburg.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—Improvements of its lines in Augusta are being planned by this company.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—Preliminary arrangements are being made by this company to build its line between East St. Louis and Harrisburg, via Belleville, Duquoin, Herrin and Johnston City. [E. R. J., Feb. 20, '15.]

Lee County Central Electric Railway, Lee Center, Ill.—Possible early extensions planned by this company include a branch northerly to Ashton or Rochelle or DeKalb and a branch southwesterly to Princeton, Ill.

Peoria & Chillicothe Electric Railway, Peoria, Ill.—This company has awarded the contract to the Allen Engineering Company to make the surveys for the proposed electric railway from Peoria to Chillicothe via Mossville and Rome, and terminating at the Santa Fé Railroad depot in North Chillicothe. Work will be begun at once on this line. Among those interested are: Arthur C. Black, E. A. Mitchell and E. V. Mattice.

Rockford & Interurban Railway, Rockford, Ill.—Plans are being considered by this company to build a new bridge over Rock River in Rockford.

Lafayette & Northwestern Railway, Lafayette, Ind.—Surveys are being made and construction will be begun in April on this line to connect Lafayette and Chicago, via Rensselaer, Hammond, Princeton, Round Grove and West Point. It is stated that contracts are about to be closed for 250,000 ties for the line. O. L. Brown, general manager. [E. R. J., Nov. 7, '14.]

Keokuk, Ia.—Preliminary work on the proposed Keokuk, Ia., to Jefferson City, Mo., interurban railway is progressing. This line will extend to Argyle where connections with the Santa Fe Railroad will be made direct to Keokuk. At Melrose this railway will turn south into Missouri territory, and cross the Des Moines River at Francisville. H. W. Knight and Thomas Pettersen, Chicago, are interested. [E. R. J., Nov. 21, '14.]

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—During the next two weeks this company will award contracts to build 23 miles of new track. It also expects to build a 1500-ft. steel bridge and a 1200-ft. pile trestle.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company plans to build 1 mile of new track in Manhattan.

***Louisville, Ky.**—A syndicate of Louisville, Jeffersonville and Glasgow, Ky., men have purchased the property of the Olympian Springs Hotel Company, in Bath County, and the plans for improvement include the construction of a 3-mile electric railway to connect the hotel and the Chesapeake & Ohio Railroad. G. W. Armes, who will be manager of the property, said that an Eastern syndicate is considering the plan to build the lines and that the construction would probably begin this spring or early summer. M. H. Thatcher, Dr. Armes, John P. Haswell and J. T. Doores, Louisville; Frank A. Best, Jeffersonville, Ind., and William Henry H. Jones, Glasgow, are the proposed incorporators of the projected company, which is to be capitalized at $200,000.

Southwestern Traction & Power Company, New Iberia, La.—Plans are being considered by this company to build a 12-mile line between New Iberia and Jeanerette.

New Orleans Railway & Light Company, New Orleans, La.—The new South Claiborne Avenue and Broadway line of this company in New Orleans has been placed in operation.

Shreveport (La.) Traction Company.—Work has been begun at once by this company on the extension of the Fairfield line from the present terminus at a point a few blocks beyond King's highway to Delaware Street in Shreveport, a distance of 1 mile.

Saginaw-Bay City Railway, Saginaw, Mich.—During the next few weeks this company will award contracts to build a ½-mile extension of its tracks in Saginaw.

***Benton Harbor, Mich.**—Plans are being considered to build an electric railway to connect Benton Harbor, Sister Lakes and Keeler and later to extend it to Paw Paw. Among those interested are: Henry D. Deam, Charles Sutherland, Sister Lakes, and N. Simpson, Jr.

***Libby, Mont.**—Amos L. Thompson, one of the directors of the First State Bank of Libby, is reported to have stated that plans are under way to build an electric railway from Spokane to Kalispell by way of Kootenai valley.

New York & Long Island Traction Company, Brooklyn, N. Y.—This company is asked to consider plans to double-track its line on the Rockaway Road and Rockaway Turnpike from Broadway, Ozone Park, to City Line, at Rosedale, a distance of 7 or 8 miles. The line extends from the Brooklyn city line to Freeport, in Nassau County.

Buffalo & Depew Railway, Depew, N. Y.—During the next few weeks this company expects to award contracts to build about 2 miles of extensions. It will also award contracts for 200 30-ft. and 35-ft. poles and 4000 6-ft. x 8 ft. ties.

Grand Forks (N. D.) Street Railway.—During the next two weeks this company expects to award contracts to build about 1 mile of new track in Grand Forks.

Cleveland, Alliance & Mahoning Valley Railway, Cleveland, Ohio.—The extension of this railway between Newton Falls and Warren will be completed and ready for operation by April 1.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—The tracks of this company have now reached a point within the corporate limits of Athens, Ohio. When ready for operation on this end of the line there will be a complete connection between Nelsonville and Athens.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—Since the City Council of Findlay has granted a franchise that this company will accept, an announcement has been made that the company will spend $116,000 in Findlay upon its property during the coming summer. New rails, ties and other changes will be made on the city line to cost $38,000, while the company's share of repaving the streets will cost $48,000.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company has purchased 22 miles of 3/0, figure-8 trolley wire to be installed in a two-wire electric line between Willoughby and Nottingham on its Shore Line Division.

Cushing (Okla.) Traction Company.—This company is now operating about 17 miles of its line between Cushing and Drumright and has construction work under way for the electrification of 17 miles of steam track between Drumright and Jennings. Frank Brown, Independence, president. [E. R. J., Dec. 19, '14.]

Toronto, Ont.—Bids are desired until March 16 by T. L. Church (Mayor), chairman Board of Control, for furnishing material for the Lansdowne Avenue line in Toronto as follows: (a) track material, Contract "A" (rails, plates, bolts, spikes, etc.); (b) overhead line material Contract "B" (wire, fittings, etc.); (c) oak ties, Contract "C."

Toronto, Ont.—The new car line on Bloor Street from Dundas Street to Quebec Avenue in Toronto has been placed in operation. Plans are being contemplated to extend this line to Jane Street in Toronto.

Conestoga Traction Company, Lancaster, Pa.—Surveys have been completed by this company for a new 13-mile branch which will be an extension of the Lancaster & Coatesville division. The new line will begin about a mile east of Conestoga Park, near Mellinger's Church, follow the old turnpike to the Horseshoe Road, and along it to Witmer, from which place it will cross the country to Bird-in-Hand, and thence along the old Philadelphia turnpike to Intercourse.

Pennsylvania & Maryland Street Railway, Elk Lick, Pa.—This company is building a new steel bridge across the Elk Lick Creek in Elk Lick.

Montoursville (Pa.) Pass Railway.—During the next few weeks this company plans to rebuild its bridge on park section in Montoursville.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—Contracts will be awarded on May 1 by this company to build an electric line from Kingsport southwest to Newport, 75 miles. There will be five steel bridges on the line. H. S. Reed, 205 Grant Building, Los Angeles, president. [E. R. J., Jan. 30, '15.]

SHOPS AND BUILDINGS

Boston & Worcester Street Railway, South Framingham, Mass.—This company is preparing plans for the construction, at an early date, of a new carhouse and a large repair shop. It has not yet been decided definitely just where these new buildings will be located.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission, First District, has approved the proposed award by the New York Municipal Railway Corporation for the construction of nine stations on the Sea Beach line to Post & McCord, Inc., the lowest bidders, for $331,163. The Sea Beach line is a reconstructed four-track railroad, which will join the Fourth Avenue subway at Sixty-fifth Street, Brooklyn, and extend from there to Coney Island. The reconstruction of this line is about completed, with the exception of the stations, tracks and other equipment. The stations to be constructed are at Eighth Avenue, Fort Hamilton Avenue, New Utrecht Avenue, Eighteenth Avenue, Twentieth Avenue, Twenty-second Avenue, Kings Highway, Avenue U and Eighty-sixth Street.

Oklahoma Interstate Railroad, Miami, Okla.—This company has opened an office in Miami.

POWER HOUSES AND SUBSTATIONS

United Railroads of San Francisco, San Francisco, Cal.—This company will add to its substation equipment a 1500-kw synchronous converter, three 525-kva transformers and switchboard ordered from the General Electric Company.

Arkansas Valley Railway Light & Power Company, Pueblo, Col.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for three 150-kva, single-phase, thirty-cycle, 22,000-volt high tension, 460-volt low tension outdoor O. I. S. C. transformers.

Danbury & Bethel Street Railway, Danbury, Conn.—This company will place in operation in its power house a new 937-kva Curtis turbo-generator and has awarded the contract to build and install the unit to the General Electric Company.

Morris County Traction Company, Morristown, N. J.—During the next few weeks this company expects to build a new substation. Machinery for this structure has already been contracted for.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company recently purchased a new, all-steel, portable substation with complete electrical equipment from the Westinghouse Electric & Manufacturing Company to replace its Ashtabula substation which was destroyed by fire. The electrical equipment includes a stepdown transformer and a 300-kw, 650-volt rotary convertor.

Toronto (Ont.) Suburban Railway.—This company's new substation at Thistledown, which has been in course of erection for several months, has now been completed and will be in operation in a few days. The station was built in connection with the extension of the railway to Woodbridge. A telephone system of dispatching the cars has also been installed.

Carbon Transit Company, Mauch Chunk, Pa.—During the next six weeks this company expects to purchase substation equipment including two 300-kw, sixty-cycle, rotaries with transformers, etc., to convert 11,600-volt, three-phase to 600-volt direct current for railway work.

Scranton & Binghamton Railroad, Scranton, Pa.—During the next four weeks this company expects to build a new substation at Foster, Pa. It plans to purchase transformers for its power plant to step up the voltage to 66,000 for transmission.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 300-kva, three-phase, sixty-cycle, 11,400-volt high tension, 440-volt low tension, O. I. S. C. transformers.

Manufactures and Supplies

ROLLING STOCK

Scranton & Binghamton Railway, Scranton, Pa., has ordered four cars from The J. G. Brill Company.

Binghamton (N. Y.) Railway has ordered twenty double-truck cars from the Cincinnati Car Company, through W. R. Kerschner, its eastern agent.

Consolidated Street Railway, Cottonwood Falls, Kan., expects to purchase within the next twelve weeks one storage-battery car complete.

New York State Railways, Rochester, N. Y., has issued specifications for forty prepayment center-entrance cars for its Rochester lines.

Fresno Interurban Railway, San Francisco, Cal., expects to purchase within the next six weeks one suburban and one interurban passenger car.

Manhattan City & Interurban Railway, Manhattan, Kan., will purchase six open bench trailers and about two or three good second-hand, single-truck motor cars.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa., has issued specifications, through L. B. Stillwell, consulting engineer, New York, N. Y., for ten all-steel interurban cars.

Carolina, Clinchfield & Ohio Railway, Johnson City, Tenn., has purchased from the McKeen Motor Car Company one 40-ft. 200 hp gasoline motor concrete mixing car for lining tunnels.

Chicago, Waukegan & Fox Lake Traction Company, Chicago, Ill., has purchased one 55-ft. 200 hp combined passenger-baggage gasoline motor car from the McKeen Motor Car Company.

Empire United Railways, Syracuse, N. Y., is considering the purchase of ten light interurban cars. Specifications have not yet been issued. It is reported that the company is also contemplating the purchase of about eighty additional cars at a later date.

Chicago & Milwaukee Electric Railway, Highwood, Ill., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1915, as expecting to buy fifteen cars, has ordered this equipment from The J. G. Brill Company. The cars will be all-steel. The railway company retains an option of ordering fifteen more cars of the same type.

Yonkers (N. Y.) Railroad will soon go into the market for some new cars, probably a large-sized order. The Third Avenue Railway's new radial axle car was tried out in Yonkers recently and was operated very successfully on the steep hills with which the city abounds. Quite likely this will be the type ordered.

Boston & Worcester Street Railway, South Framingham, Mass., will probably order within a few days six closed and six open cars, twelve trucks and electrical equipment for same, to replace the eleven open cars and one closed car which were destroyed in its recent Westboro carhouse fire. E. P. Shaw, general manager of the company, advises that the railway may possibly decide to purchase good second-hand open cars instead of new cars, if the former are available in first-class condition.

TRADE NOTES

The J. G. Brill Company, Philadelphia, Pa., has received an order for forty auto buses from a concern in Chicago.

Quasi-Arc Company, New York, N. Y., dealer in Quasi Arc weldtrodes and electric welding accessories, has removed its offices from 111 Broadway to 61 Broadway.

Ed. Elson, of the Walter A. Zelnicker Supply Company, Universal Iron & Supply Company and the Zelnicker Crayon Works, St. Louis, who formerly made his headquarters in New Orleans, La., is now making his headquarters in Chicago at the Hotel Morrison.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, announces that it has again been awarded the exclusive gear and pinion contract for the Stone & Webster Engineering Corporation, this being the fourth year that the Stone & Webster companies have purchased tool steel gears and pinions under contract.

Sangamo Electric Company, Springfield, Ill., has received an order from the Pullman company for several thousand ampere-hour meters. This is the second large contract between the two companies for this type of meter. As rapidly as possible each and every Pullman sleeping and parlor car is being equipped with these ampere-hour meters to control the battery charge by the method developed by Ernest Lunn, chief electrician of the Pullman company.

General Electric Company, Schenectady, N. Y., has received orders for the following equipment: Norfolk & Bristol Street Railway, four GE-200, 40-hp four-motor car equipment; Chicago & Joliet Electric Railway, four GE-240-hp four-motor car equipment; Pacific Electric Railway, twenty-four GE-254, 135-hp four-motor car equipment; Empire United Railways, Syracuse, N. Y., twelve GE-200 40-hp two-motor car equipments and twelve straight air-brake equipment; Metropolitan Street Railway, Kansas City, Mo., fifty 50-hp, four-motor car equipments and fifty control and air-brake equipments; Sheboygan Railway & Electric Company, Sheboygan, Wis., two GE-247, 35-hp, four-motor car equipments; two CP-25 straight air-brake equipments and four GE-201 60-hp motors.

William Wharton, Jr., & Company, Inc., Philadelphia, Pa., now a subsidiary to the Taylor-Wharton Iron & Steel Company, are building a new and extensive plant at Easton, Pa., having begun work about June 1 last. The plot of ground on which the plant will be situated comprises fifty acres and is located just west of the city of Easton, with direct connections with both the Lehigh Valley Railroad and the Central Railroad of New Jersey, through which five other railroads entering Easton are reached. Nearly ten acres will be under roof when all the buildings are completed. The main shop, which will be devoted entirely to the manufacture of special track work for electric railways and steam railroads, will be more than 450 ft. square, consisting of seven bays and one cross-bay, and one bay for storage of supplies and partly finished material. Other buildings are the power house, a fine office building, a foundry for both steel and iron castings, a large pattern shop with laying-out floor and a forge shop. The Wharton company expects to combine the business of its present Philadelphia plant and Jenkintown plant at the new works, and in the forging department the business in all kinds of steel and iron forgings of the Tioga Steel & Iron Company, another subsidiary of the Taylor-Wharton Iron & Steel Company will be handled. The works will be equipped throughout with the most modern and improved machinery for the purpose. The plant will be in operation early next summer. As it is within 20 miles of the large foundry plant of the Taylor-Wharton Iron & Steel Company at High Bridge, N. J., where are made all the manganese steel castings for the special track work manufactured and sold by Wm. Wharton, Jr., & Company, a concentrated organization is possible.

ADVERTISING LITERATURE

Zelnicker Crayon Works, St. Louis, Mo., has issued a folder on its railroad crayons.

Keystone Varnish Company, Brooklyn, N. Y., has issued a catalog describing its washable linseed oil paint for interior painting.

Railway Supply & Curtain Company, Chicago, Ill., has issued a folder describing its car curtains, curtain fixtures, curtain rollers, vestibule curtains, vestibule curtain fittings, and curtain material.

Stow Manufacturing Company, Binghamton, N. Y., has issued a catalog describing its combination of flexible shaft and electric motor for drilling, grinding, buffing, die-sinking and screw-driver work.

Thew Automatic Shovel Company, Lorain, Ohio, has issued a catalog describing its electric railway shovels. The catalog contains illustrations of the shovel in actual operation in St. Louis, Cincinnati, Indianapolis and Cleveland, and also includes data on the results obtained.

Street Railway Signal Company, Inc., Philadelphia, Pa., has issued a catalog which describes and illustrates its contactor signal for either single or double track. These signals, "Model E," are of the all light trolley-contact operated type, having the three-position aspect for single track opposing protection, but permitting following movements. The catalog shows photographs of installations of these signals on several electric railways, including the New York & Queens County Traction Company, Wilkes-Barre (Pa.) Railway and Terre Haute, Indianapolis & Eastern Railway.

Railway Improvement Company, New York, N. Y., has issued a very attractive and clearly-planned book entitled "The Clock Trust." The book contains a series of pages which show the brakeshoe, power and coal savings effected by twelve prominent electric railways, through the use of coasting recorders supplemented by the system of inducing motormen to use current economically by offering rewards and by ranking them. The book also includes reproductions of letters which contain operating engineering data on the saving of coasting recorders on about thirty different railways.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Catalog No. 22 which describes its type AR single-phase motor, in sizes of ½, ¾, 1, 1½, 2, 3, 5, 7½ and 10 hp for 60-cycle circuits, 110 and 220 volts, This motor is designed for starting heavy loads with minimum starting current. It starts as a repulsion motor and operates as an induction motor with constant speed characteristics. It is constructed for hard service under severe operating conditions, especially where the starting current must be kept at a low value. The company has also issued a catalog on its electric fans and data sheets on its current-limiting reaction coils and cam limit switches.

Cambria Steel Company, Johnstown, Pa., has issued a catalog describing its "Slick" steel mine ties for mine and industrial railroads. These ties are of rolled steel section, combining light weight with sufficient strength. The necessary rail fastenings, which consist of flanged buttons, are always in place, ready for use and cannot become lost or misplaced. The fastening buttons are adapted to be turned with comparative ease by means of an ordinary adjustable or solid wrench. One of the greatest advantages of the tie as used in mine room is due to the fact, illustrated by photographs in the catalog, that it is only ½ in. high, as compared with a wooden tie, which is at least 3 in. in height.

General Electric Company, Schenectady, N. Y., has issued as a supplement of the *General Electric Review* a remarkably beautiful reproduction of two pages which were included in resolutions, contained in highly artistic book form, of appreciation on the occasion of the retirement of C. A. Coffin and the election of E. Wilbur Rice as president of the company. These resolutions were adopted at the twenty-ninth annual convention of the Association of Edison Illuminating Companies, Cooperstown, N. Y., 1913. The resolutions express deep appreciation of the constructive thought and effort of Mr. Coffin in furthering the development of the electrical industry, and tender congratulations to Mr. Rice on his appointment as a well-deserved recognition of his abilities and service.

Graphite Lubricating Company, Bound Brook, N. J., has issued an unusually complete catalog on the subject of oil-less bearings, which have special application as trolley wheel bushings for electric cars. As stated in a chapter in the catalog entitled "The Story of the Trolley Wheel Bushing" this company received its first order for twelve trolley bushings in 1889. It is now producing over a million per year. A remarkable instance of wearing quality is shown by an illustration of a trolley bushing which was recently returned to the company by the Colorado Springs & Interurban Railway, Colorado Springs, Col. This particular bushing, still in fine condition, had been removed from a worn-out 4-in. trolley wheel, after having run 27,633 miles. The catalog also contains ample testimony as to the excellent service of the "Bound Brook" bushings when used in connection with various other types of machinery.

The following significant editorial comment on the attitude of the Georgia Railway & Power Company in connection with the "jitney" bus appeared in the Charleston (S. C.) *News and Courier:*

"Incidentally, the plan taken by the street car people of arguing this matter out with the public on its merits is significant of the new attitude of capital in such matters. Such a move even ten years ago would have been regarded with amazement. Now it is accepted as a matter of course."

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NEW YORK ALIEN LAW AMENDMENT

The amended Spring bill that has just passed the New York State Senate points the way to an apparently workable settlement of the alien labor question in connection with subway construction in New York. The bill provides that preference shall be given to citizens over aliens in work on public contracts but that aliens may be employed where citizens are not available. The term "not available" would supposedly give contractors the proper freedom of action and make it possible for them to select their laborers on the basis of physical fitness and willingness to work for the wages paid to aliens. The bill does not admit the illegality of the exclusion of aliens, but in a hedging fashion it is a confession of the inexpediency and unfairness of so doing. As long as aliens are admitted to this country, they should not be deprived of equal opportunities of livelihood by exclusion from labor on public works or similar provisions. If they are to be seriously hampered in their labor, it would be better to attack the matter at the source and prohibit the immigration. As long as this is allowed, comity between state and national governments demands fair treatment of them in this country.

LEGISLATIVE REPORT ON REGULATION

The most striking feature of the report of the legislative committee on the investigation of the Public Service Commission of the First District, New York, is that it was not unanimous. While the members of one political party, constituting the majority of the committee, condemn the commissioners, a minority, including all the members of the other political party, defends them. Even the majority is not entirely unanimous in its conclusions on its own findings. There was an excellent opportunity here for a careful and unbiased examination of the efficacy of commission regulation. At the time it was begun the New York system constituted a radical departure from those followed by other states, and the extent of the interests involved made the experiment which was initiated by Governor Hughes in 1907 of great importance to the country. The chief question on trial was whether, under our political system, it was possible to keep the commission free of politics, a condition which many doubted. The report of the legislative committee, dividing as it does on party lines, will emphasize this doubt so long as the law governing the appointment of the commissioners and their removal from office as it exists at present remains on the statute books. This conclusion will remain irrespective of the qualifications of the present commissioners in New York for their office. We believe in the regulation of public utilities by commissions but insist that the office should be surrounded by as many safeguards to secure independence of judgment and action by the commissioners as in the case of justices of the Supreme Court. In no other way can good men be obtained or retained.

CUTTING DOWN ASSOCIATION DUES

It is not often that an association makes a reduction in dues as the American Electric Railway Manufacturers' association has just done. This reduction, while temporary, is an indication of a desire on the part of the management to share with the members the saving which is to be effected by omitting special exhibits at San Francisco. The amount of money saved to each member is not great, but the impression created by the reduction cannot but be favorable. While the great industrial show which has come to be such an important feature of the annual conventions is the most conspicuous of the association's activities it is, after all, only a part of the machinery for fostering good relations between the operating and manufacturing divisions of the electric railway industry. Those who are in touch with the permanent headquarters know that it is a center of unceasing diligence. There is, therefore, a necessity for a reasonable income aside from that connected with the exhibits. The omission of the convention exhibits will be a relief to those who would otherwise have been responsible for its management. As a former association president said recently in the writer's hearing, few of the attendants at a convention realize the weight of the burden of responsibility, for the safety of the members and guests and the smooth working of the exhibit and entertainment plans, which rests upon the few who bear it. Any slight faults of the superstructure are so much more conspicuous than the virtues of the foundation that they are apt to cause more comment. A little relief this year will produce results in renewed effort on behalf of the 1916 meeting.

REGULATION FROM A NEW QUARTER

While the investigation of the New York Public Service Commission has been going on Dr. S. S. Goldwater, Health Commissioner of New York, has hit upon a plan which he thinks has solved the problem of public service regulation. His method is simple. It consists simply in invoking the police power which under the law is granted to the health commissioner to make the railways do what he thinks proper. An obvious merit of this plan is that it obviates extended hearings with counsel on both sides, any division of opinion among several commissioners and any necessity of a staff of legal, engineering or transportation experts to advise the commission. Under this new system of regulation, if the health commissioner thinks that the railway cars should not carry more than one-and-a-half times their seating capacity, the conductors of the cars must close their gates when that number is on the car, and those who cannot get on the cars must walk home. Another advantage of Dr. Goldwater's plan, besides its simplicity, is its comprehensiveness. Its application is by no means confined to the surface railways. If the water supply of the city becomes insufficient, it is dangerous to health, and the health commissioner may order more aqueducts. Theaters inadequately supplied with exits must be closed until the condition is remedied. Building laws must be modified according to the ideas of the health commissioner, and parks must be opened in different parts of the city because they are necessary as breathing spaces to the public. Still another advantage of Dr. Goldwater's plan is that it reduces all of the city offices and commissions to one, with the possible exception of the police department, which we assume will be retained in order to carry out the orders of the health department. We commend the idea to the consideration of students of municipal problems.

THE "JITNEY" SITUATION

The "jitney" has now reached Portland, Me., having completed the journey from California to Maine in less than four months, because it was only last November that its advent in Los Angeles began to attract attention in other cities. Some railway men profess to see the wane of the movement and base this idea upon the adverse legislation which has been passed in different cities. Others do not yet see any material reduction in the "jitney" movement. They base this belief on the large number of second-hand automobiles in the country and the desire of their owners to get the most out of them before they are thrown on the scrap heap, the favor of the public at large for novelties, and the influence which the automobile manufacturers will presumably be willing to exert to stimulate the demand for both old and new automobiles. This influence is apt to be powerful, especially when exerted through local dealers, agents and branch managers, all of whom are large advertisers for their local business in the daily papers.

Those who do not see an early end to the "jitney" movement say that it may not be difficult to prove that the "jitney" is a losing proposition; that an attempt to substitute "jitneys" for electric cars on streets in any large numbers would produce the worst kind of congestion, and that to meet "jitney" competition the electric roads would have to reduce their service to the suburbs and perhaps increase their long-haul fares. But these points, they believe, would not greatly influence the owner of an old car that has practically no value except in "jitney" service, nor would it deter a great many people from patronizing a "jitney" instead of a street car if it carried them to the place to which they wished to go.

How, then, can the situation be combatted by all those who realize the conditions under which the electric railways are carrying people long distances for a 5-cent fare?

One thing which can be done, and must be done, is to correct misstatements as to the cost of "jitney" operation when they appear in the local papers. Articles of this kind will not be uncommon during the next few months. The "jitney" bus is a novelty and, as such, appeals to the editor of the average local daily paper. The arrival of the first "jitney" in a town makes a good "news" item, and the arrival of a second or third will make another. It is to be expected, also, that stock companies will be organized to operate buses of this kind by promoters who see through them an easy plan to draw money from confiding stockholders in small amounts by alluring statements. Railway men who see figures of this kind in print and know the facts should not hesitate to set the public right as to the profits which can be made in this kind of transportation. They should also point out the most conspicuous objections of the unrestricted "jitney" for general transportation, such as the lack of regulation over their routes and schedules, the dangers to women from riding in closed cars, the unsanitary features of the cars as compared with electric cars which are cleaned regularly, perils to pedestrians, etc. We believe that the "jitney" will not be a permanent competitor of the electric car, even for short distance business, but we also believe that its disappearance can be hastened by active local attack upon its weak features by the electric railway companies.

IMPROVEMENT OF CONVENTION PROGRAMS

We know of hardly any place where careful, conscientious planning will return a larger amount of money for work expended than in the drafting of a convention program. If we assume that the average expenses per delegate attending a convention lasting a day is from $10 to $20 and the value of his time the same amount, we get from $20 to $40 as the amount which each delegate or his company will spend for his attendance. With 100 delegates at a convention we have from $2,000 to $4,000 as the expense of a convention with that number of attendants and lasting for but one day. Expressing this in the electric railway man's fiscal unit, it is from 80,000 to 160,000 nickel fares. This is a considerable amount of money, and every effort should be made to see that the association as well as the delegates get full return for its expenditure. Assuming that the sessions cover six hours, the cost of this time is of the order of $10 per minute. Now, a considerable part of the value of a convention to those in attendance is represented by the papers and discussions presented; that is, by the technical proceedings. There are other advantages, such as meeting representatives of other companies and exchanging experiences with them in private conversation, but, after all, the official program is the pièce de résistance of the meeting, as well as the means of gathering the largest attendance and of eliciting the best exchanges of experience. For this reason the committee on subjects is one of the most important which any association can appoint.

In this connection the Southwestern Electrical & Gas Association has established an interesting plan to secure a program of this kind. The secretary, in laying his plans for the annual convention some two months off, has called the attention of the members to the fact that it would be a waste of time "to give up the various sessions to matters full information as to which may be obtained at any time from the secretary or from the technical papers or from text books." In consequence, the members are urged to send in suggestions as to topics of a practical but unfamiliar nature so that the papers and discussions may give information not available elsewhere and where the experience of the members will be most valuable to each other. The plan is a good one in principle and should also be so in practice, as, indeed, it has proved in previous sessions of the Southwestern Association. Progress is being made so rapidly in the electrical field that there should be no dearth of good subjects, and we have no doubt that the Southwestern Association can find this year a sufficient number of them to make a live program for its 1915 meeting.

Why would it not be a good idea for a sectional association in search of a good topic to select one which has been considered at one of the other sectional sessions? The subject could be introduced by the presentation of a summary of the paper as read at the other convention and an abstract of the conclusions reached there. The ELECTRIC RAILWAY JOURNAL believes in the value of sectional associations and has always made a feature of the publication of their proceedings, so that this information is easily available. Starting at this point, those in attendance could give their views without retracing any ground already covered, and in this way a consensus of opinion from all parts of the country would be obtained on different subjects which would be of the greatest value to the industry.

ENERGY REGENERATION IN HEAVY TRACTION

In the steam railway electrifications on lines having grades the possibility of energy regeneration has had a potent influence in the selection of system. Not that the actual saving in energy was necessarily a prime consideration, but the accompanying braking effect, with reduction in brakeshoe wear, has been considered a feature to be secured if possible. Assuming that total resistance would be about the same for a train ascending a grade and descending it while regenerating, it should regenerate all of the power due to the grade in excess of 1 per cent. It should, of course, be capable of holding back when going down any grade that it can climb. Actual data of regeneration on a section of the Italian State Railways were given in an article by G. Pontecorvo which appeared in last week's issue of the ELECTRIC RAILWAY JOURNAL. These showed a regeneration of 50 per cent on a grade of 3 per cent to 3½ per cent and a reduction of two-thirds in brakeshoe wear. There is no doubt, therefore, that practice bears out theory in this case.

One complication of the regenerative systems has been the necessity for taking up surplus power supplied by a train descending a grade when there was not a demand for it from other parts of the line. This has to be provided by rheostats in the power house, as described in the article referred to above, as it would scarcely be practicable to take it up by train brake application.

The three-phase system, which has had some vogue abroad, has made its claim to favor on the basis of its natural or inherent regenerating ability. When one thinks of regeneration this system instinctively comes to mind. But the thinking usually stops there because the imagination immediately conjures up a picture of networks of overhead, entangled wires, at the entrance to some familiar freight yard, for example. As a consequence, we have in this country but one lonely three-phase electrification in full commercial operation to-day, and this is so far away that very little is heard of it. In this Great Northern Cascade tunnel plant, braking qualities were considered of prime importance, but energy saving was not, as the water-power could be used for nothing but the railway and hence had little value after having served its purpose.

The next step in regeneration progress is the single-phase-three-phase electrification now rapidly approaching completion on the Norfolk & Western in West Virginia. In this three-phase power is produced in the locomotive from single-phase in the heretofore little-used phase converter. In this case, also, economical braking was considered more important than energy saving. Unofficial reports from that region indicate that the converters are doing their work in first-class fashion.

In the meantime the regenerative principle is being applied in the designs for the great Chicago, Milwaukee & St. Paul electrification, and details of the regenerative equipment are awaited with great interest. To date the d.c. series motor has not been considered a satisfactory generator although it has been so used with the magnetic brake to a limited extent. The St. Paul plan, whatever it is, will constitute the third important step in the series. To offset the additional complication of equipment, the d.c. regenerative scheme will have an advantage over the a.c. in that the motors become self-exciting generators and do not therefore depend upon the power house for excitation. A three-phase locomotive would, of course, "run away" if it were not held by the brakes if for any reason power went off the line.

These examples show conclusively that for heavy trains on steep grades regeneration is practicable. That to date it should have been used primarily for the sake of a by-product is interesting. On general principles of energy conservation it is gratifying to realize that we shall shortly have in operation three heavy electrifications, all employing different types of equipment and all regenerating energy on down grades. Some valuable data should soon be available for comparison from the regeneration standpoint.

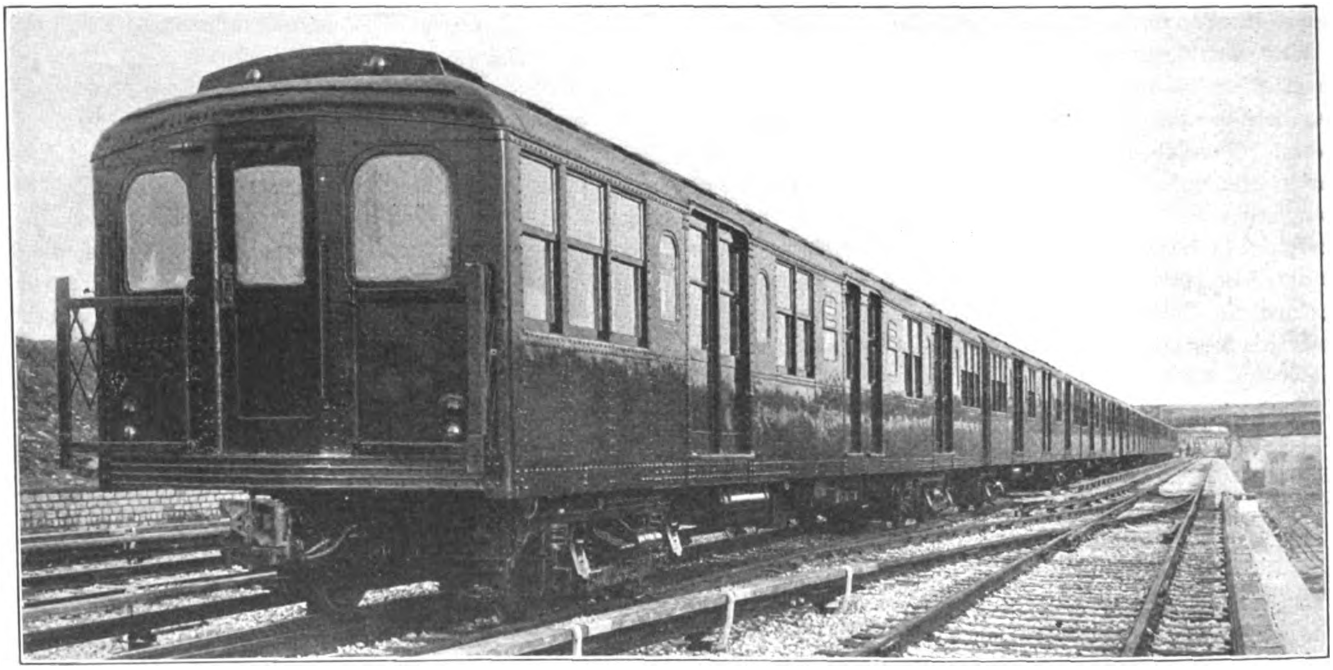
The New York Municipal Car—Motors, Control, Conduit and Collectors

Tapped-Field Motors Give Economical Operation in Both Local and Express Service—The Control Ties in with the Auxiliary Circuits and Its Switches Are Placed in One Box to Obtain Lowest Weight and Simplest Inspection—Conduit Runs Have Been Reduced by Eliminating Separate Conduits for Each of the Wires in the Main Circuits

The motors, the control and the accessories of both on the New York Municipal car embody the same principle of progress that characterizes the features of design and equipment which have been previously described in these columns.[*] As the following paragraphs will show, the New York Municipal Railway Corporation has not only taken advantage of the latest advances in the art but it has also set up new standards and devised new practices which will accrue to the benefit of other electric railway operators.

CHARACTER OF FORTHCOMING SERVICE

To appreciate the reason for electing to use the tap-field motor in the forthcoming service it is well to point out that three distinct services—local, express and a combination or these two—are contemplated. For purely local runs the schedule speed will be 15 m.p.h. with an average station stop of 20 seconds, and for purely express service the speed will be 25 m.p.h. with an average stop of 30 seconds.



NEW YORK MUNICIPAL CAR—THE FIRST EIGHT-CAR TRAIN READY FOR A TRIAL RUN ON THE NEW SEA BEACH LINE

On a typical local run like that of Fifty-ninth Street, New York, to Coney Island, by way of the Manhattan Bridge and Brighton Beach line, the shortest distance between stations will be 1100 ft., the longest 6220 ft., exclusive of the Manhattan Bridge, and the average 2430 ft. The length of this run will be 68,090 ft. plus the 10,560 ft. of the Manhattan Bridge.

On a typical express run like that from Forty-eighth Street, New York, to Sheepshead Bay, the shortest distance between stations will be 3930 ft., the longest, 9870 ft. and the average 7230 ft. The length of this run will be 43,380 ft.

On a typical combined express and local run like that from Forty-eighth Street, New York, to Coney Island via a 7000-ft. tunnel and the Brighton Beach line the shortest distance between stations will be 1263 ft., the longest, 9870 ft. and the average 4573 ft. The length of the run will be 82,327 ft. In general the local runs will be longer but the express runs shorter than on the present rapid transit lines of New York.

It was obvious that the tap-field motor was ideal for running conditions of the character described, inasmuch as such a motor could be run on full field in local service and on tapped field in express service. Self-ventilation was also desirable for the motor because the limiting weight per driving axle made it essential to combine greatest output with least weight. Besides this, the motor equipments will be kept in almost continuous service, as some of them will have only three minutes lay-over at terminals during continuous working periods of eighteen hours. Local trains will consist of two to five cars each and express trains of two to eight cars each.

THE MOTOR

The motor selected for the first 100 cars (two per car) is the GE-248-A commutating pole type with fan assembled on the pinion end of the armature head. The frames are also constructed with openings in the covers. The motor weight, including the gear, pinion and gear case, is 5975 lb. The motor, under the A. I. E. E. standards, has an hourly rating of 160 hp at 600 volts.

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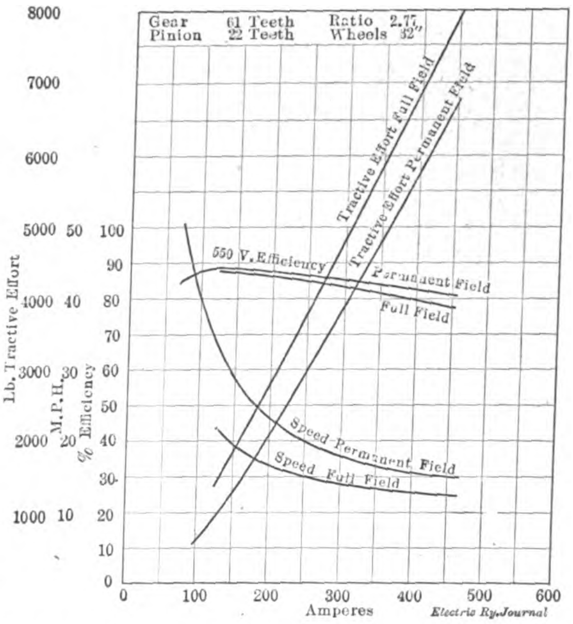
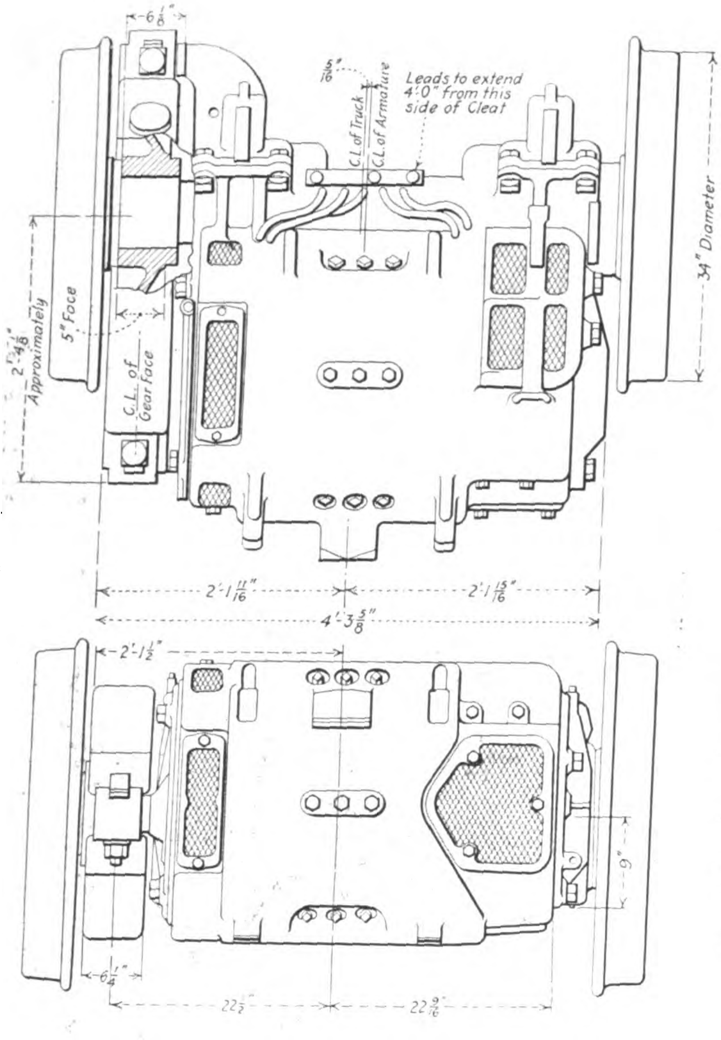
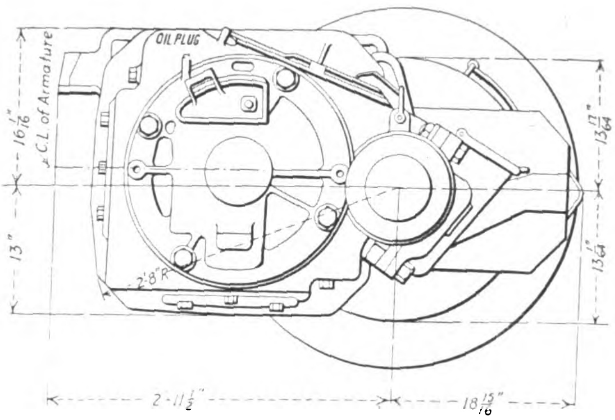
[*] See New York Municipal Car articles on "Design," "Body" and "Trucks, Brake Rigging and Draft Gear," June 6, June 13 and Dec. 26, 1914, respectively.

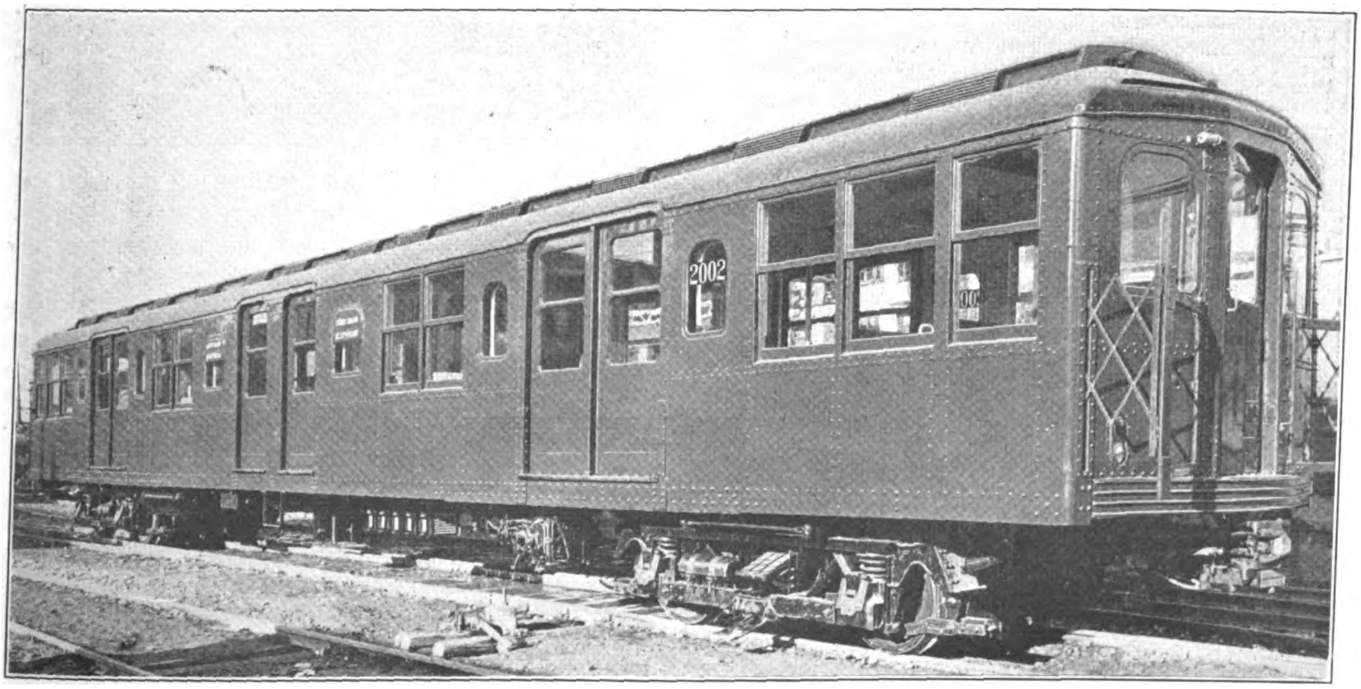


NEW YORK MUNICIPAL CAR—CHARACTERISTIC CURVES OF 160-HP TAP-FIELD MOTOR

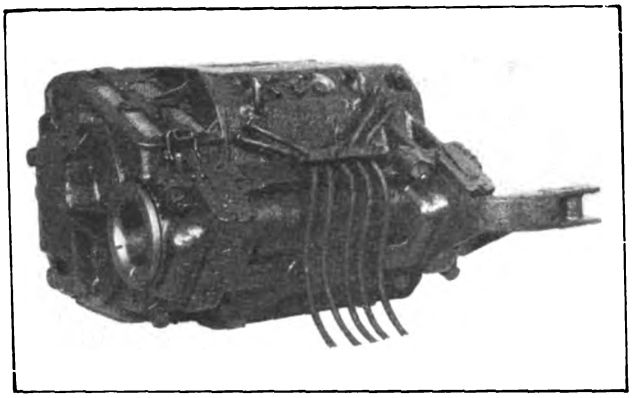

6 1/8"
5/16"
Leads to extend 4'0" from this side of Cleat
C.L. of Truck
C.L. of Armature
34" Diameter
5" Face
2' 4 5/8" Approximately
C.L. of Gear Face
2'-1 11/16"
2'-1 15/16"
4'-3 5/8"
2'-1 1/2"
9"
6 1/4"
22 1/2"
22 9/16"


OIL PLUG
C.L. of Armature
16 1/16"
13"
2'8"R
13 17/64"
13 1/64"
2'-11 1/2"
18 13/16"

NEW YORK MUNICIPAL CAR—OUTLINE DRAWINGS OF 160-HP MOTOR, USED TWO PER CAR, SHOWING ALSO ARRANGEMENTS FOR VENTILATION, OUTSIDE OIL GAGE WELLS AND ARRANGEMENT OF LEADS



NEW YORK MUNICIPAL CAR—COMBINED SIDE AND END VIEW OF COMPLETELY EQUIPPED CAR



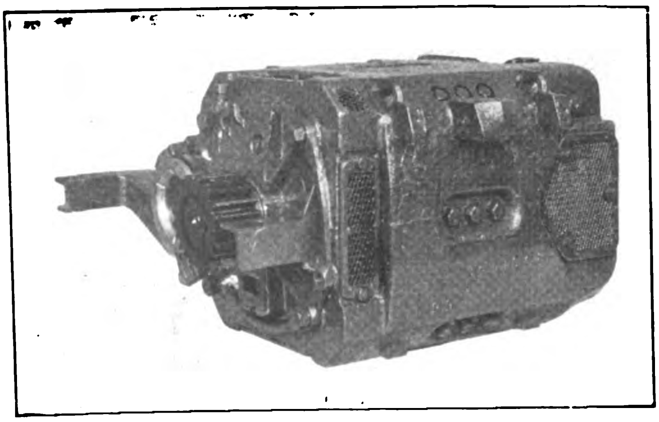
NEW YORK MUNICIPAL CAR—AXLE SIDE, COMMUTATOR END OF MOTOR

This motor must operate over a voltage range of 450 to 750 volts, and its continuous ratings up to 600 volts are as follows: 140 amp at 300 volts, 147 amp at 400 volts, 154 amp at 500 volts and 157 amp at 600 volts, with a temperature rise in the windings not exceeding 75 deg. Cent. when all the covers are off. The general characteristics are shown in the curves on page 497. The ability of two of these motors to propel at an average of 550 volts a car weighing 113,000 lb. fully-loaded (200 passengers at 140 lb. each) is based on an assumed adhesion of 27.5 per cent between the driving wheels and rails, a curve resistance of 0.8 lb. per ton per degree of curvature and the following train resistance values:

M.P.H.	Pounds Per Ton	M.P.H.	Pounds Per Ton
8	7.26	30	11.86
10	7.45	32	12.21
12	7.81	34	12.76
14	8.14	36	13.20
16	8.47	38	13.75
18	8.91	40	14.19
20	9.35	42	14.74
22	9.79	44	15.29
24	10.23	46	15.95
26	10.72	48	16.50
28	11.22	50	17.05

The train resistance values were derived from tests made on near-by rapid transit lines.

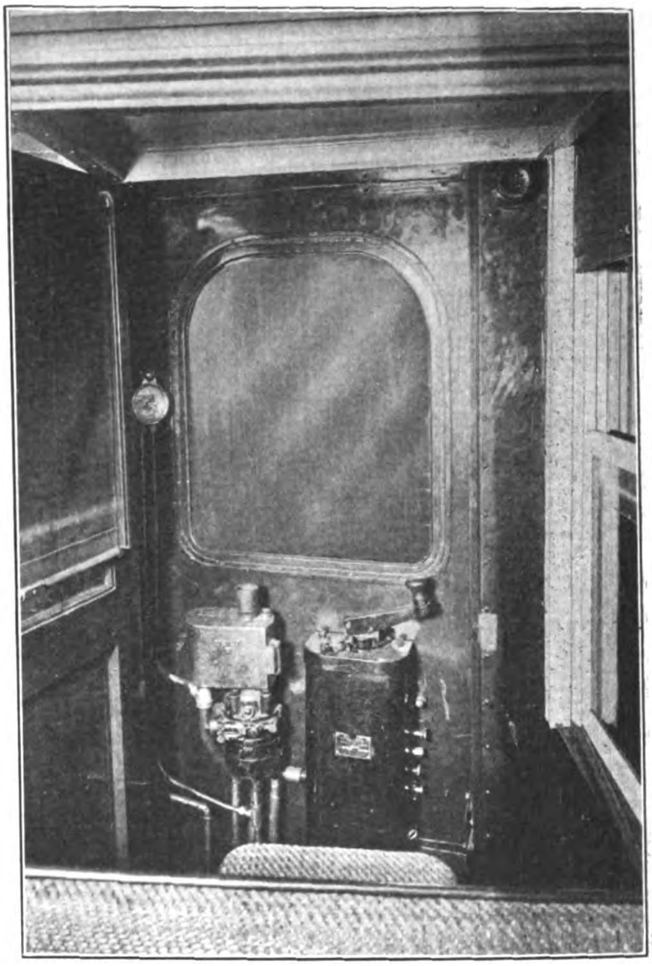
The motor frame is of the box type, of cast steel fitted with a removable wearing plate of hardened steel on the motor suspension lug, and with cast bales for handling the completely assembled motor. A feature in the construction of the field coils is that their final coating of insulating compound has the unusually high melting point of 135 deg. Cent. Other features are that metal shields are fastened on the inner perimeter of the coils to prevent chafing on the pole pieces and that all the field coils are held in place against flat steel springs to prevent their movement in service.



NEW YORK MUNICIPAL CAR—SUSPENSION SIDE, PINION END OF MOTOR

The brush-holders, which are designed to permit 1-in. safe radial wear of the commutator, have shunts so constructed that they will not have any wearing action against the brush-holder casting. The brushes are placed in staggered relation, and their tension is adjustable between 3 lb. and 10 lb. The mica insulation between the commutator bars is cut 3/64 in. and extends 1/8 in. back of the commutator neck.

Lubrication has received special attention in the design of this motor. The bearing housings are supplied with separate oil gage wells and waste chambers. By removing the wooden plug of the external well and inserting a gaging ruler, the shopman can determine the quantity of oil in the gage well and if necessary can replenish the oil supply without exposing the lubricating packing to dust or needless handling. Oil deflectors are provided on the armature shaft to prevent the oil from working into the motor windings, onto the commutator or onto the brush-holders. The housings also contain grooves for conducting overflow oil to an auxiliary chamber on the outside of the motor. Wool waste is used in both the armature and axle bearings.

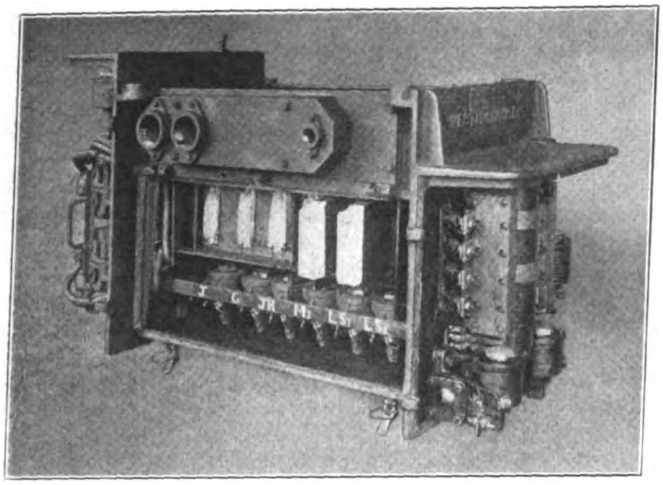


NEW YORK MUNICIPAL CAR—INTERIOR OF CONTROL CAB WITH CURTAIN RAISED

Note projection of motorman's seat, which is hinged to back of passenger seat.

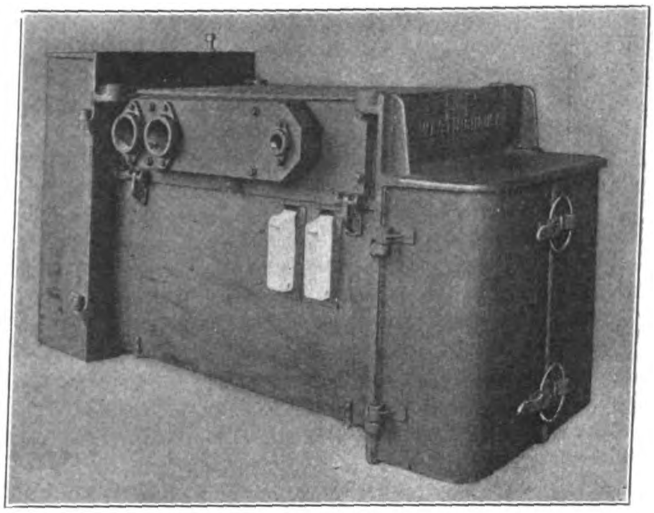
As the motors are of self-ventilating type special care was taken to prevent, as far as possible, dust from entering the bearings or wearing surfaces, dust guards being used at exposed points. Further, the axles are entirely inclosed in a shield to exclude dust from the inner ends of the bearings.

Safety straps are provided to prevent the fall of the lower half of the gear case should the nuts from the clamping bolts be lost. The gears and pinions are



NEW YORK MUNICIPAL CAR—SWITCH GROUP-CONTROL BOX WITH WIRING AND PIPING COMPLETE, OPENED TO SHOW THE MAIN SWITCHES AND PK HEAD

J, G, J R and M2 are main bridging switches for going from series to parallel.
LS-1 and LS-2 are circuit-breaker switches which open on overloads and short-circuits.



NEW YORK MUNICIPAL CAR—SWITCH GROUP-CONTROL BOX CLOSED WITH EXTENDED ARC CHUTES OF CIRCUIT-BREAKER SWITCHES EXPOSED

made of Grade F forged steel and have a ratio of 61:22. The gearing has teeth with a stub profile to meet the severe conditions anticipated.

CONTROL

The control system is designated by its manufacturer, the Westinghouse Electric & Manufacturing Company, as Type 100 ABF. While it represents no great change in principle from a combination of the Westinghouse ABF and PK types of control, old elements have been combined in new ways and special duties have been added, as hereinafter detailed.

In this control the following features have been met for the first time:

First—Combined design, which includes provision for the use of the storage battery furnished for emergency car lighting, common use of apparatus of the brake and electrical equipment, provision for signal and other functions in the control equipment and particular adaptability to the use of automatic electric couplers.

Second—Selective acceleration, the current input being determined by the load.

Third—Operation of sixteen motor cars from a common train line.

Fourth—Use of a common eighteen-wire train line, including provision for auxiliary circuits.

Fifth—The combination of all control apparatus in a single box to obtain the lowest weight and the simplest inspection.

The company considered also the use of control current taken direct from the 600-volt line, but it decided in favor of the 34-volt battery train line for the following reasons:

First—In a 600-volt train line if the power is off the first car, none is available for operating the control for the rest of the train.

Second—Since the brake actuating circuits should be independent of line voltage, it would be objectionable to have a 600-volt control circuit in a common train line with the low-voltage brake circuit.

Third—The use of the battery permits the bucking of motors for emergency braking if the line power fails.

Fourth—Low voltage secures greater freedom than line voltage from derangement of circuits such as those due to grounding and short-circuits.

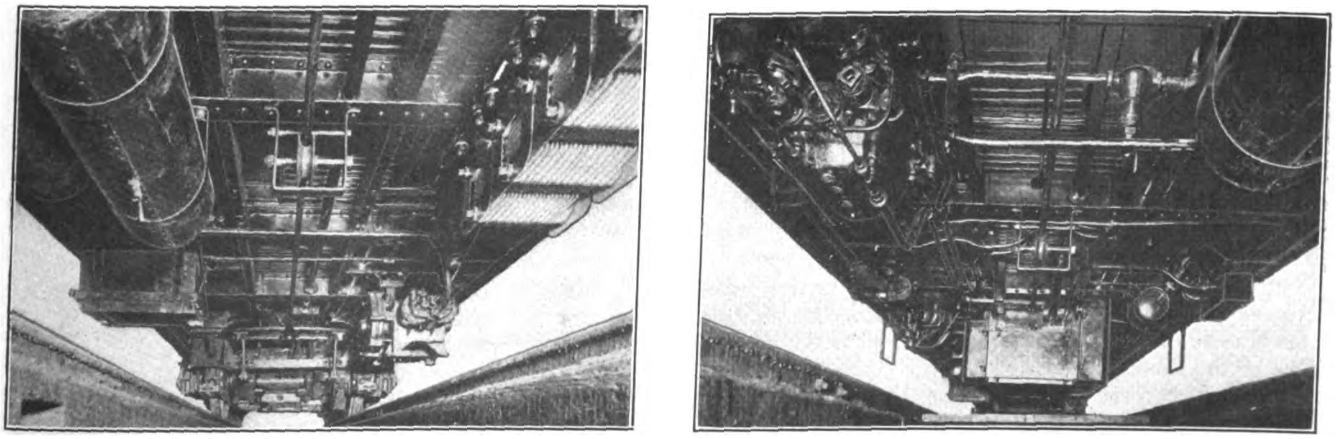
Fifth—A material saving in the cost of control power is secured.

Sixth—Installation is simpler, with the elimination of switches, fuses and resistance elements.

Seventh—There is greater certainty of reliable operation of a low voltage automatic electric coupler.

Eighth—There are no high-voltage connections in the control apparatus above the floor of the car.

Ninth—The storage battery required for emergency lighting and brake control can, without change, supply power for the control purposes.



NEW YORK MUNICIPAL CAR—TWO VIEWS OF THE UNDERFRAME, SHOWING ARRANGEMENT OF AIR AND ELECTRICAL APPARATUS AND THE LAYOUT OF THE CONDUIT

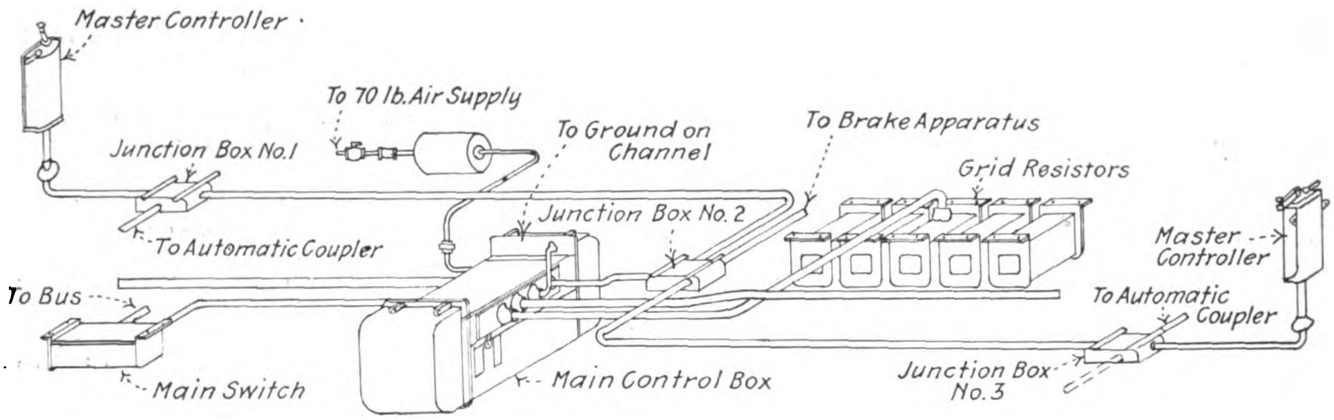
Tenth—Simpler design and installation of accessory apparatus, such as automatic electric couplers, is secured.

Eleventh—The form and design of apparatus and contacts for handling the control circuit are simpler, with the elimination of burnouts on the master controllers and interlock fingers.

BATTERY AND TRAIN LINE

In order to make the battery circuit available for signal lights, door circuit interlocks and to insure correct operation for a maximum possible train length of 1075 ft. the control battery had to be raised from the old standard of 14 volts to 34 volts. The cross-section of the train wires was also increased to avoid excessive drop, each conductor in the eighteen-conductor train line consisting of seven strands of No. 24 wire. The door signal circuit involves the use of train wires which extend in series to a distance equivalent to more than twice the train length.

All control circuits are energized from storage batteries on each car, all of which are permanently grounded on the negative side. The valve magnets require approximately 1.5 amp per car when the motors are in series, and 1.8 amp per car when the motors are in parallel. The storage battery has an estimated capacity of not less than 20 amp-hr. Charging current is available from the compressor during operation. Therefore the battery is mainly for emergency lighting, end and rear marker lights and for the operation of the electro-pneumatic brake circuit.



NEW YORK MUNICIPAL CAR—ORIGINAL SCHEMATIC LAYOUT OF EQUIPMENT AND CONNECTIONS TO MASTER CONTROLLERS AS SUBMITTED BY THE MAKER; THE LAYOUT ON THE CAR IS SOMEWHAT DIFFERENT, BUT THE EQUIPMENT IS THE SAME

A total of eighteen wires is included in the train line, disposed as follows: Battery positive, one; brakes and speed control, five; local signal circuits between cars, one; starting signal and door interlock circuits, one; control circuits, seven; extra, three; total, eighteen.

The train line has three junction boxes, and includes wires for the operation of the magnet valves of the air-brake system, suitable outlets being provided for the circuits to the brake apparatus in the center of the car, and for the engineer's valves at each end. This includes provision for the automatic speed control device and for synchronizing the compressor governors.

The air supply for the operation of the switching apparatus and the reverser of the control box is taken from the common air brake supply outside the reducing valve of the air-brake system.

With the reverse drum of the master controller in either the forward or the reverse position, the battery plus circuit is completed to the main drum of the controller, which in turn energizes the series wire, the progression wire and the multiple wire, on the first, second and third notches of the controller, respectively. On the first notch the main drum also completes the battery plus circuit for the operation of the reverser magnets to throw the reverse drum to the desired position.

The interlocking on the main switches, reversers and the commutating switch is such that all operation must take place in the sequence indicated, and all main circuit apparatus is protected against injury due to the false operation of any part. It is necessary to complete the circuit for three wires at the master controller before power can be applied to the motors. These wires are the series wire, one or the other of the reversing wires, and the wire which is the return circuit for all magnet coils. With this provision and low-voltage control practically absolute insurance is given against any possibility of a faulty connection in the train line which might cause the operation of the train to be taken from the control of the motorman.

THE CONTROL BOX

Another innovation in control equipment was promoted by the customer's specification that all of the usual under-car motive power apparatus, namely, unit switches, commutating switch, reverser, circuit-breaker and relays should be mounted in one box to effect a large saving in the length, weight and cost of conduit: and also to simplify inspection and to avoid shopping a car for several days when overhauling of the main control parts is required.

This control box includes the following parts:

Two unit switches acting as circuit breakers.
Four unit switches for series paralleling the motor.
One drum type reverser.
One drum type commutating switch.
One limit switch.
One overload trip relay.
One main circuit terminal board.
One control circuit terminal board.

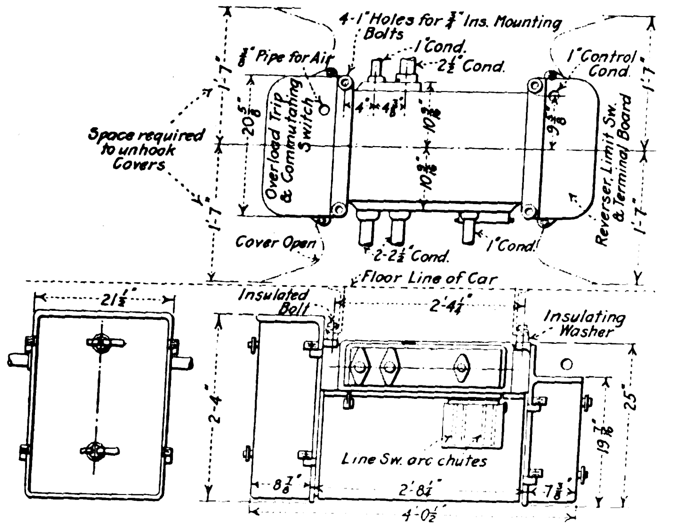
Unit construction is the basis of the switch design, and each switch, magnet, jacket and cylinder may be removed independently of the other parts of the apparatus.

The control is so designed that the upper compartment of the control box accommodates a main circuit junction box. By removing the motor leads and resistance leads from the terminal board and from a few of the studs the main assembly can be lowered from the car by loosening four supporting bolts, following which a new group may be substituted. It is estimated that within thirty minutes one man with the proper hoisting equipment can remove and replace the switch group.

The top frame of the switch group box is constructed to hang from the center sills of the car underframe by means of four lugs, no hanger straps being used. As shown in one of the under-car views, this box is mounted under the center of the car in such fashion that a man can walk around it on all sides. He is therefore able to remove with ease the doors which cover each compartment and then inspect the group and unit switches and the terminal board above them.

The general layout of the equipment in the control box is shown in part in an accompanying halftone and drawing, and further data on the location of individual parts are presented in the following paragraphs.

The current limit relay is placed alongside the reverser while the 34-volt terminal board is placed beneath the limit switch at the reverser end of the switch group. To this board is brought the conduit through which the control wires are run. All the necessary wiring connections for the motive power circuits were made at the factory, the only job left to the user being the attachment of ten motor leads, eight resistance leads, eight control wires, one ground lead and one trolley lead.



NEW YORK MUNICIPAL CAR—OUTLINES OF SWITCH GROUP, PK HEAD AND REVERSER

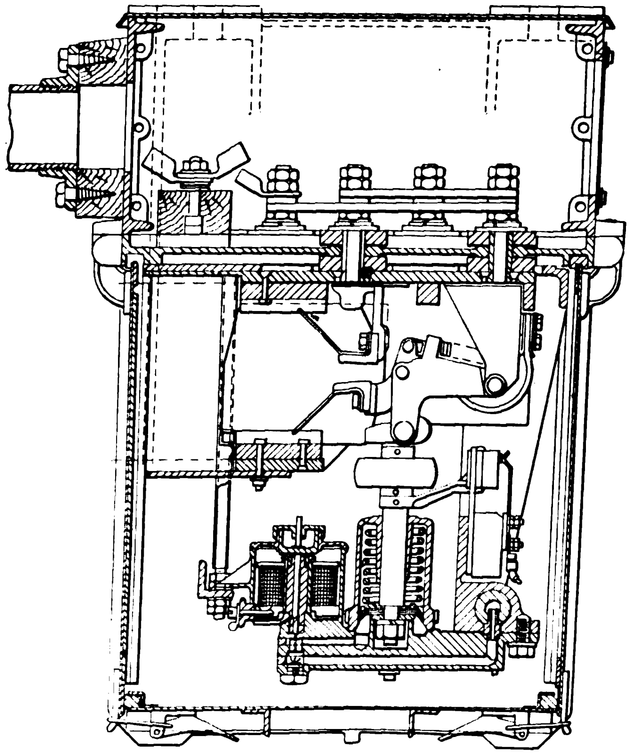
The overload trip relay is mounted next to the limit switch and consists of a plunger actuated by an arm which lifts at a predetermined current in the trip coil. The relay is calibrated in five steps at 100-amp intervals, starting with 450 amp which is approximately twice the one-hour rating of the motor. Contact disks on the plunger open the control circuits to all switches, and these circuits are re-established by unlatching the plunger by means of the reset coil, which may be energized by pressing a button in the top of the master controller after the main handle has been returned to the off position.

On the opposite end of the group of switches is mounted the PK head. The double air cylinder operating this drum is controlled by the unbalanced pressure system whereby the drum is moved from notch to notch under the control of the limit switch. Full pressure of air is maintained in both cylinders, and is intermittently exhausted from one side in order to allow the drum to move from notch to notch. After the drum has advanced, cutting out resistance and changing the field circuits to normal field in series, it returns to the first position after the closing of the *J* switch and advances again after the bridging and parallel connection has been made by the unit switches.

It will be noted that in normal operation no arcs can be broken on the commutating switch and drum, since the main switches are so arranged that no current is passing through the resistance fingers at a time when they are leaving the ground. However, a magnetic blowout is provided to protect the field fingers in case a motor-lead becomes open-circuited. In passing from series to parallel, the *J* switch is closed, thus short-circuiting all resistance before the drum falls back to the first position, and in shutting off from any position on the master controller all the unit switches open before the drum starts to move backward.

For the specific manipulation of the main circuits, six steps are provided in series and four in multiple, with closed circuit or bridging transition between series and multiple to insure uniform acceleration. Each contact with this method carries the current for a single motor only. The two switches which are used as circuit breakers are isolated and have a separate vent for the expulsion of the arc to atmosphere. They differ from the other unit switches only in the use of extended arc chutes, thus making all switch parts interchangeable. The remaining four unit switches establish the motor circuit connection to secure the series-parallel connection. In the operation of the overload trip all these switches open at the same time.

For the minor changes in the motor circuit the PK head is used. The PK contacts care simply for changes in resistance and for the changes in the field connections. They carry current for a single motor only. The adoption of this modified form of PK equipment eliminated eight control switches, made possible the use of a control box 4 ft. in length instead of 6 ft., and reduced the weight of the switch group to 850 lb.



NEW YORK MUNICIPAL CAR—CROSS-SECTION THROUGH UNIT SWITCHES

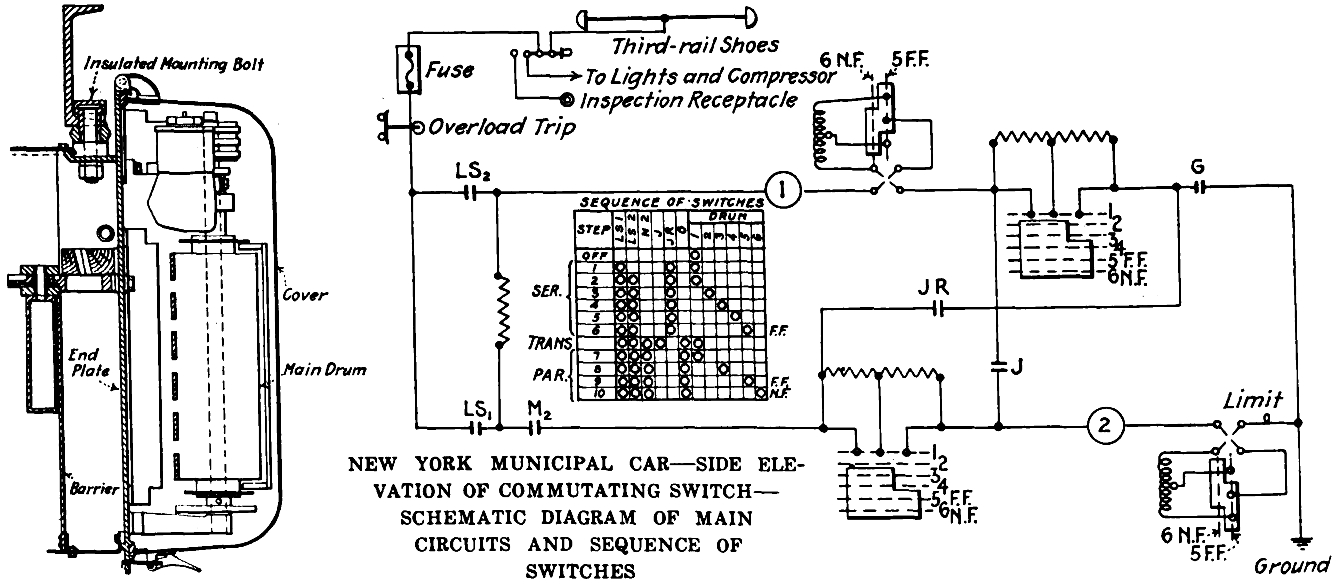
The course of the circuit is as follows:

From the 500-amp position of the knife-switch connection to the current collectors, the circuit passes directly to the control box and to the overload trip. From the trip the circuit divides, passing through the two circuit-breaker switches, and then through each of the two motors with their starting resistance, and to the ground connection on the car body.

As shown on the main schematic diagram the circuit passes through *LS*-1 on the first notch; through the switching resistance; the No. 1 motor; the main starting resistance; through the *JR* switch; the resistance for the No. 2 motor, and through the No. 2 motor and the limit switch to ground. *LS*-2 closes for the second notch, and the remaining notches to full series are secured by cutting out the main starting resistance.

In passing from series to parallel, the bridging transition circuit is formed through the switches *M*-2, *J* and *G*. After the *J* switch is opened, the motors are in parallel with resistance, the resistance is then cut out step by step and the field connections changed to normal field in the same manner as was done in the series connection.

The line relay, which is placed on a switchboard located between the two center doors instead of being in the control box, is energized directly from the 600-volt circuit. Its contact disk is so connected in the control circuit that all unit switches open whenever power fails, permitting the control to advance in regular sequence when power is restored, without the master controller being returned to the off position. The relay is so adjusted that it will lift at approximately 350 volts and drop at approximately 150 volts. With this range, the relay has sufficient travel to insure positive action of the contacts and contact disk. The line relay also has auxiliary contacts to light the emergency lamps.



NEW YORK MUNICIPAL CAR—SIDE ELEVATION OF COMMUTATING SWITCH—SCHEMATIC DIAGRAM OF MAIN CIRCUITS AND SEQUENCE OF SWITCHES

MASTER CONTROLLER

The master controller is equipped with the usual three notches for switching, series and multiple positions and with a separate reversing drum and the usual deadman's handle. The movement of the reverser handle to an operating position energizes the control-circuit supply, thereby eliminating an auxiliary cut-out switch. Inserted in the case at the right-hand side of the controller are an emergency cut-out switch for the 34-volt control circuit, a circuit-breaker reset button, a line relay cut-out button and marker-light switch button.

The deadman's handle on this controller acts by the application of battery current to the emergency train line wire. This application instantly energizes all emergency valves in the train upon the relaxation of the motorman's grasp at any position of the handle, whether the reverser is forward or reverse. By the same operation a special device completely cuts off power from the propulsion circuits.

The marker-light switch was added to the controller by the New York Municipal Railway. The signal lights which indicate that all doors have been closed are also installed in the master controller to avoid too many individual pieces of apparatus in the cab.

In addition to the usual contacts and fingers for the control circuit, the master controller has interlock contacts mounted on the reversing-drum shaft to provide for three auxiliary contacts. Two of these contacts are for signals and one is for tail-lights. These unusual features will be described in a later article in connection with the door signals, marker lights and train line coupler. The reverse drum acts as a switch to close the battery circuit to the control.

Still another new feature is that both polarities of the control circuits are broken at the controller. This is accomplished by running an extra train line wire for the negative side of the magnet coils. As no attempt has been made to ground the return circuit of the control, local grounds cannot create false circuits or cause false operation.

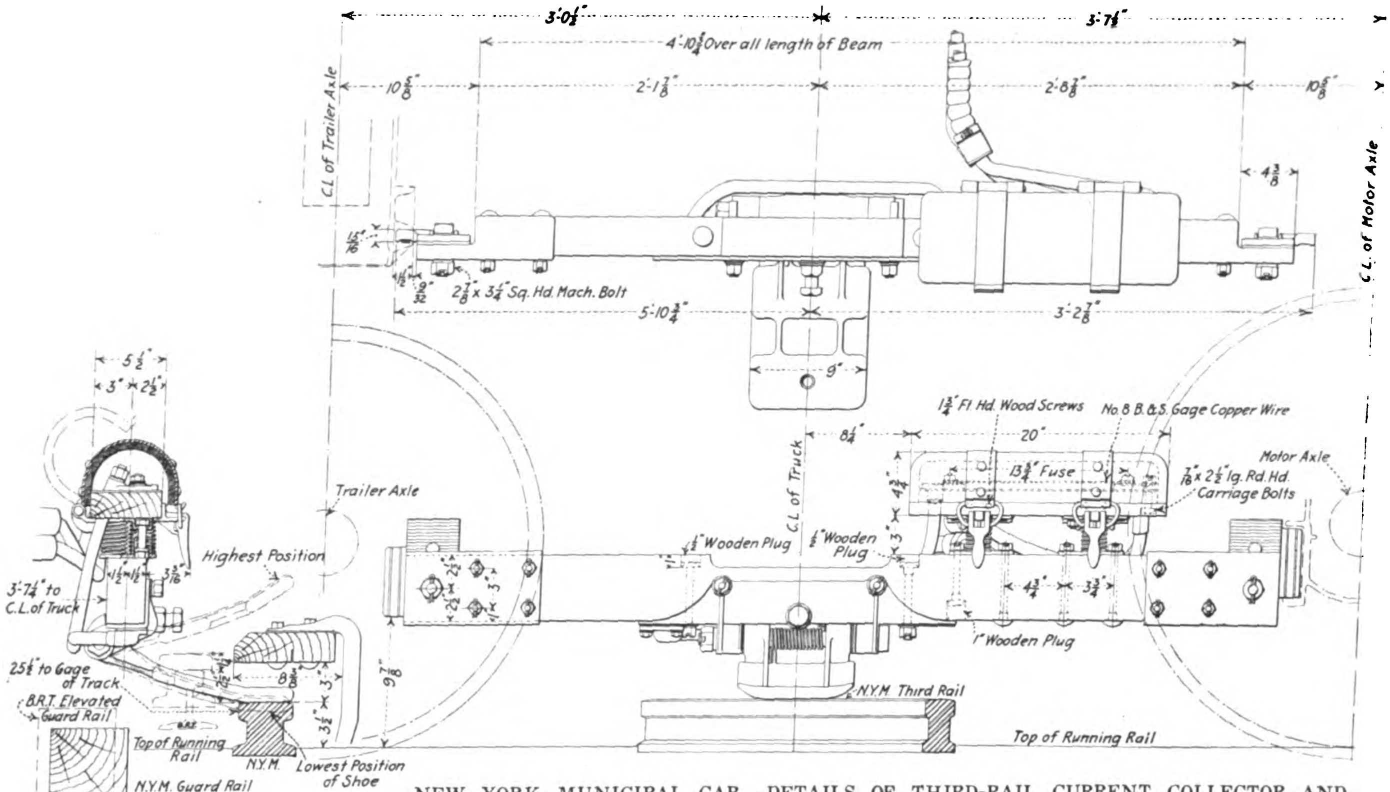
The line relay cut-out will permit the feeding up of the control when power is off the line and the bucking of the motors, as an emergency method of stopping the train should power be off the line and the air brake fail.

SELECTIVE ACCELERATION

In order to obtain the same rate of acceleration with all passenger loads from minima to maxima there is provided an extra winding on the limit switch which modifies the current input to the motors. The amount of current through this winding is controlled from a switch operated in connection with the empty and load brake mechanism. The adjustment of this mechanism corresponds directly to the deflection of the bolster springs under load.

CONDUIT

In the earlier installations of equipment separate conduits were used for each of the wires in the main circuits. In the present installation, however, multi-conductor cables are used. Consequently one large conduit pipe serves for each set of motor leads. Likewise, all resistance leads are formed into a cable and are carried from the switch group to the resistors through a single conduit with a Crouse-Hinds eight-conductor outlet. In order to reduce the weight of the conduit itself, material of the following character was used: For straight runs inside the car, circular steel tubing of 1/32-in. wall, inside diameter corresponding to standard pipe sizes, fitted at each end with one Ellcon conduit fitting, lock-nuts and spring lock washers; for straight runs under the car sherardized steel tube with suitable thickness of wall and inside diameter to correspond to standard

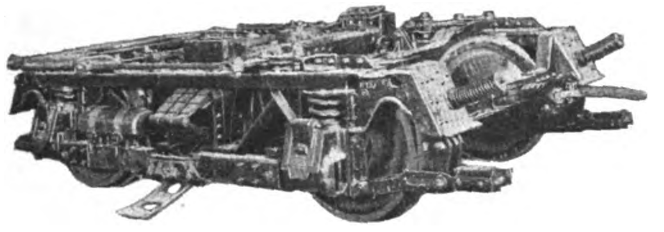

3'-0½"
3'-7½"
4'-10¾" Over all length of Beam
10⅝"
2'-1⅞"
2'-8⅞"
10⅝"
C.L. of Trailer Axle
C.L. of Motor Axle
4⅜
15/16"
1½"
9/32"
2⅞" x 3¼" Sq. Hd. Mach. Bolt
5'-10¾"
3'-2⅞"
9"
5½"
3"
2½"
1¾" Fl. Hd. Wood Screws
No. 8 B. & S. Gage Copper Wire
8¼"
20"
13¾" Fuse
Motor Axle
7/16" x 2½" lg. Rd. Hd. Carriage Bolts
4¾"
3"
Trailer Axle
C.L. of Truck
½" Wooden Plug
½" Wooden Plug
Highest Position
1½
1½
3 3/16"
3'-7¼" to C.L. of Truck
2½"
2½"
3"
4¾"
3¾"
1" Wooden Plug
25½" to Gage of Track
B.R.T. Elevated Guard Rail
8⅜"
3"
3½"
9⅞"
N.Y.M. Third Rail
Top of Running Rail
Top of Running Rail
N.Y.M.
Lowest Position of Shoe
N.Y.M. Guard Rail

NEW YORK MUNICIPAL CAR—DETAILS OF THIRD-RAIL CURRENT COLLECTOR AND SPRING-SUPPORTED FUSE BOX MADE WITH COVER OF MOLDED INSULATION

pipe size fitted at each end with one Ellcon conduit fitting, lock-nuts and spring lock washers; for runs requiring bends, "Sherarduct" with lock-nuts and spring lock washers. By the use of this system of conduit, the weight was reduced to a great extent.

THIRD-RAIL COLLECTOR AND KNIFE SWITCH

The current collector is the usual type of overrunning shoe with rack adjustment at the ends but with a bolt adjustment in the center to take care of finer adjustments within a range of 1 in. The terminals are somewhat unusual in having a taper fit so that by removing a nut the connection may be slipped off very readily. In order to eliminate the breakage of fuses and connections due to vibration, the fuse box is spring-supported. Another feature is that the cover of the box is formed of a single arch of Hemmit molded insulation. Instead of building the box of wood with joints and fastenings, in the present construction only the base of the box is of wood, and this is covered with transite. The shoe beam is supported from the journal boxes with proper link action for any difference in movement between the two boxes from which it is carried. It has no permanent fastenings but is slipped into 1⅝-in. deep side pockets on the side of each box. Between each shoe-beam rack and journal box is a compression spring to prevent rattling of the beam. Armored cable is used for the connections to the car body, but rigid conduit is employed as the conductor between the shoe-beams of the same truck. Castle nuts with cotters are used throughout.



NEW YORK MUNICIPAL CAR—MOTOR TRUCK CARRYING FUSE BOX WITH COVER OF MOLDED INSULATION

In conclusion it should be noted that the main knife switch not only has a 500-amp position for the connection to the current collectors described, but also a 75-amp position. With the switch in the 75-amp position the light, compressor and heater circuits are connected to an inspection attachment within the switch box, through which line voltage may be plugged from any convenient point for inspection purposes when it is desired to have the source of power disconnected from the main circuit. This main knife switch is of single-pole double-throw break type.

Qualifications of a Railway President

In a recent lecture delivered in the city of New York, H. A. Bullock, secretary New York Municipal Railway Corporation, outlined the following as the qualities which must be possessed by the successful modern railway president. He must have the ability to formulate sound policy and to present it to the directors or the stockholders for approval; to grasp the financial problems of an enterprise so as to keep the directors accurately and intelligently advised of the results expressed in gross and net earnings, as affected by a continuance of the existing investment of a railroad property, the investment of new money by way of additions or extensions and the diminution of the existing investments by means of the abandonment or sale of any part of the railroad's operating system; to comprehend the practical operating problems as presented to him; to give practical interpretation to technical propositions made from time to time; to retain the mastery of the administrative work of the property, and to interpret the difficult problems which the railroad has to meet.

Prof. S. J. Lochner, University of Akron, has inaugurated a series of lectures on "Elementary Electricity," discussing this subject to its conclusion. The lectures are free to anyone who wishes to attend. They are given on Tuesday and Friday of each week at the university.

Transportation Exhibits at San Francisco

The Electric Railway Exhibits at the Panama-Pacific Exposition Divided Between Buildings, the Palaces of Transportation and of Machinery—The Transportation Exhibits Are Briefly Described

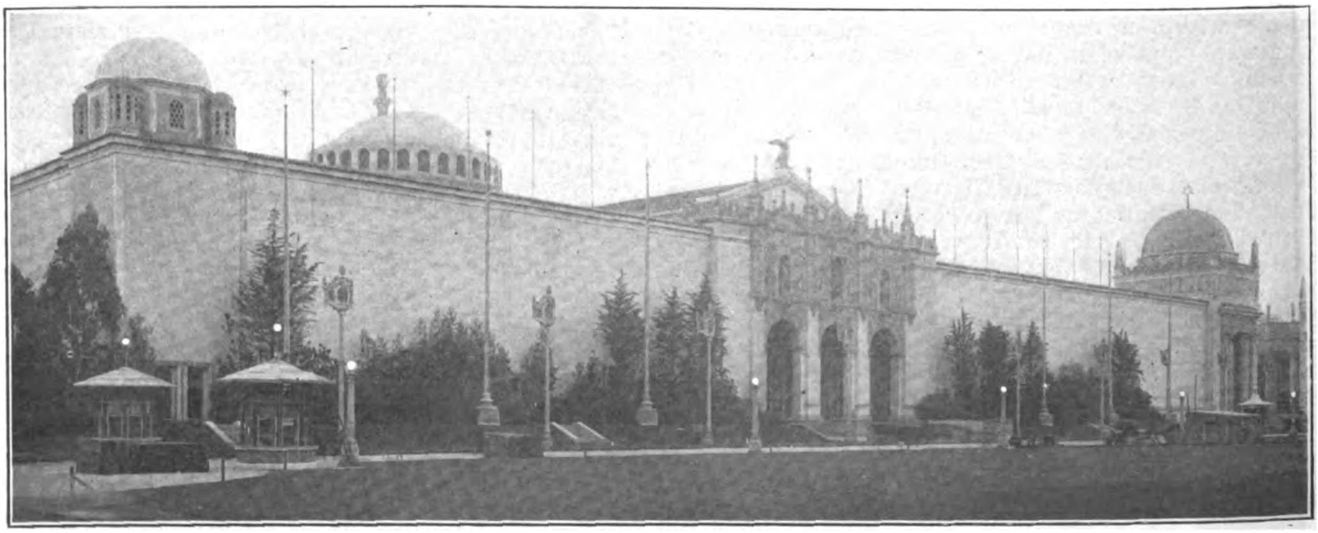
"Educational" is the theme upon which the exhibits at the Panama-Pacific International Exposition have been planned and assembled. It has been the aim to make displays contemporaneous rather than historical, but development and progress in modes of transportation during the past decade are effectively portrayed. It is to be noted that much of the machinery and electrical apparatus is shown in actual operation, and where feasible mechanisms are cut in sections to expose the working parts. Common to all the transportation exhibits there is the tendency to exemplify fundamental principles and to bring out the essential features and functions of the apparatus so as to facilitate explanation and study.

A well-known American writer has pronounced the exposition to be "the most economical" of any he had ever seen, and those who heard the remark, thinking of the $50,000,000 which the exposition has cost and the maintenance items, such as $1,000 per night for illumination, asked him to explain. He did so by pointing out that it was economical from the standpoint of the visitor who could acquire in a short time at this exposition more information and a more accurate and practical knowledge of modern processes and machines than had ever before been possible. And probably it is for this reason as much as because the exposition is so beautiful and truly universal that the attendance is so large, in spite of conditions that might have been thought to lessen interest in it. At the end of the first week of the exposition, when this article was written, the total attendance had been 618,998, as against 253,577 at Chicago and 325,144 at the St. Louis Exposition during the corresponding periods.

PANAMA-PACIFIC EXPOSITION—GENERAL VIEW OF GROUNDS AND BUILDINGS

PALACE OF TRANSPORTATION

The field of transportation has perhaps more progress to record and more to show that is new than most of the departments into which exhibits are classified. In the Palace of Transportation are to be seen representations and examples of every phase of modern methods of transportation, and these are designed not merely to impress the layman but to instruct and stimulate the ideas of the man familiar with the field. For instance, the electric railway manager will find great interest in comparing the inventions and appliances for safeguarding life and property, he will examine the latest types of car equipment and will profit much by an inspection of the wide variety of railway supplies in which manufacturers have taken pride in presenting their very latest productions. The range of exhibits extends from a time-card file to a large articulated electric locomotive and covers both freight and passenger



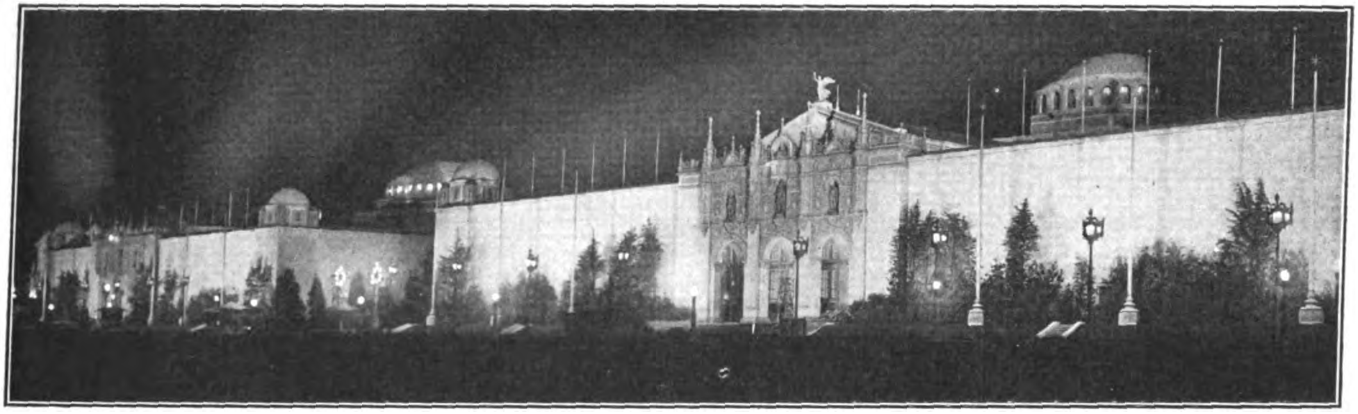
PANAMA-PACIFIC EXPOSITION—PALACE OF TRANSPORTATION FROM THE MARINE GARDENS rolling stock. Several of the companies represented have added moving picture equipment to their displays in order to show to better advantage actual operating conditions.

Although it is not feasible to chronicle here even a partial list of the more interesting exhibits, it is worth while to note, by example, the general tone of displays. For instance, in the center of the building is a standard 4000-hp Pennsylvania electric locomotive exhibited by the Westinghouse company. This locomotive is shown on a turntable which revolves so that spectators can see all sides of it. Types PK and HL control are also shown. In the General Electric exhibit there are five types of locomotives, complete and ready for operation in as many classes of service. Two Type MK control equipments are mounted ready for service, connected by standard control jumpers and air-brake equipment for train operation. Each of these is provided with a GE-247 motor mounted on trucks beneath the racks, and the whole represents the complete underframing of a two-car train so assembled that the operation and connections are easily observed and can be compared with illuminated diagrams on either side of the racks.

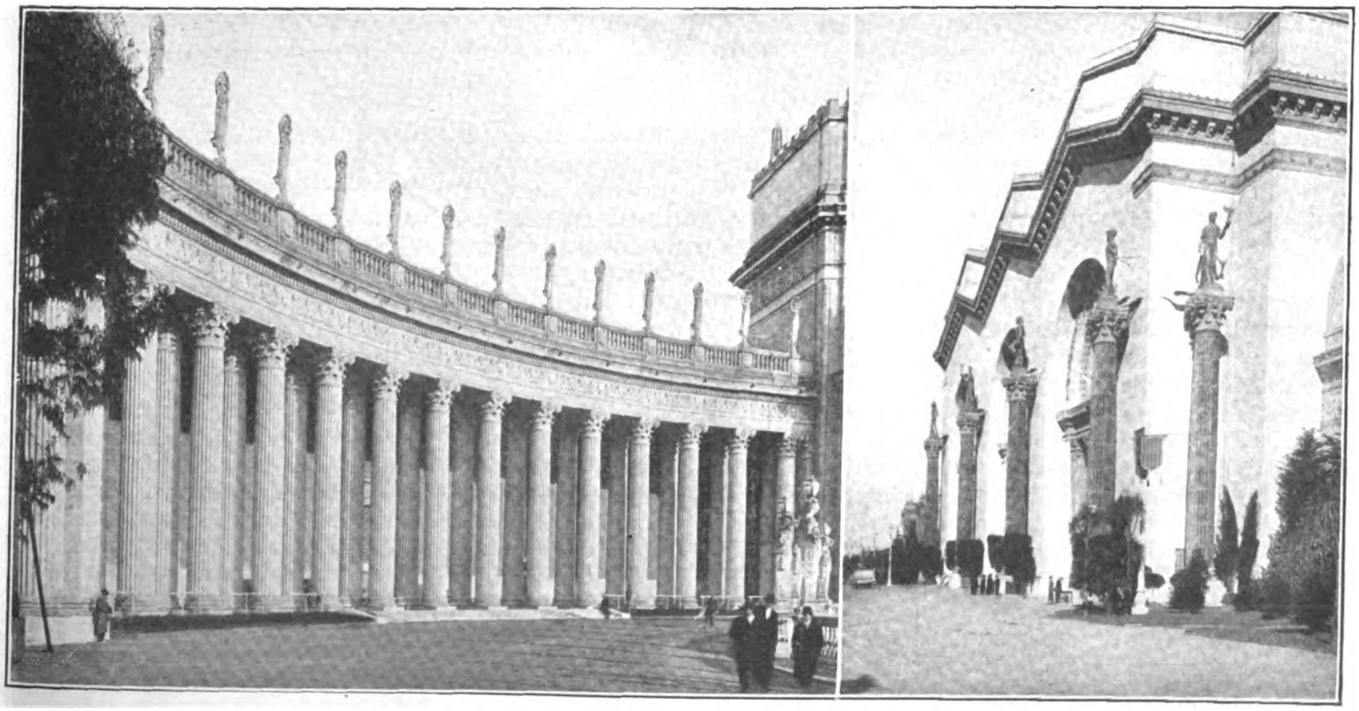
A lightning arrester demonstrating the dissipation of high-voltage charges through a device connected in 600-volt, 1200-volt or 1500-volt circuits without interrupting normal service may attract the visitors' attention, and next there will be an Edison storage-battery locomotive equipped also with a trolley arm; beyond is a newly developed electro-pneumatic brake demonstrating its operation on an interurban train, and next may be the stereomotograph showing on a ground-glass screen the most interesting features of power-house and substation apparatus which the exhibitor could collect and ship to his booth. Other exhibits in this building are track special work, steel ties, car wheels and maintenance of way and construction equipment.

However, the foregoing has touched on only typical examples in that portion of this building devoted to electric railway interests. There is also much space devoted to other methods of transportation; fourteen steam locomotives are shown and 12,000 sq. ft. of space is occupied by automobile exhibits. Nor are all of the displays of interest to the electric railway field within the Palace of Transportation, for the scope of exhibits in the Palace of Machinery includes, for example, perhaps even more electrical equipment covering motors of all types, as well as luminous and measuring apparatus. Here there are also a variety of steam generators and accessory appliances, together with internal combustion engines in operation which are attracting special attention as applied to the generation of electric power.

A list of some of the principal exhibits by manufacturers in these two buildings is found on another page in this issue.



PANAMA-PACIFIC EXPOSITION—ILLUMINATION OF PALACE OF TRANSPORTATION

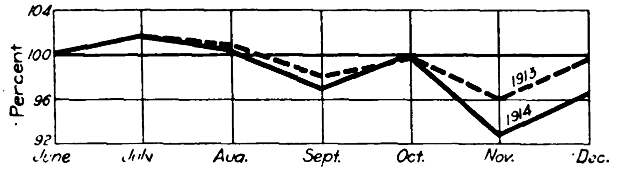


PANAMA-PACIFIC EXPOSITION—FAÇADES OF PALACES OF TRANSPORTATION AND MACHINERY

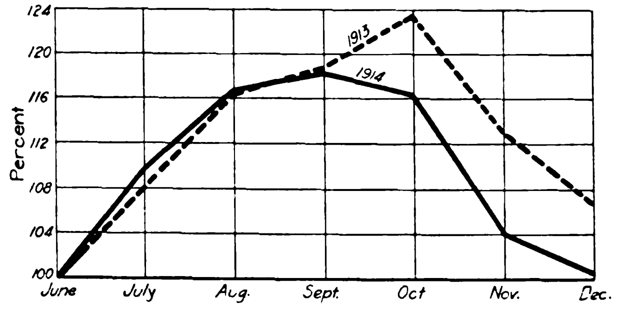
Electric Railway Statistics

Comparison by Bureau of Fare Research with Statistics of Steam Railroads, Bank Clearings and Building Construction for a Period of Seven Months from June, 1914, to January, 1915

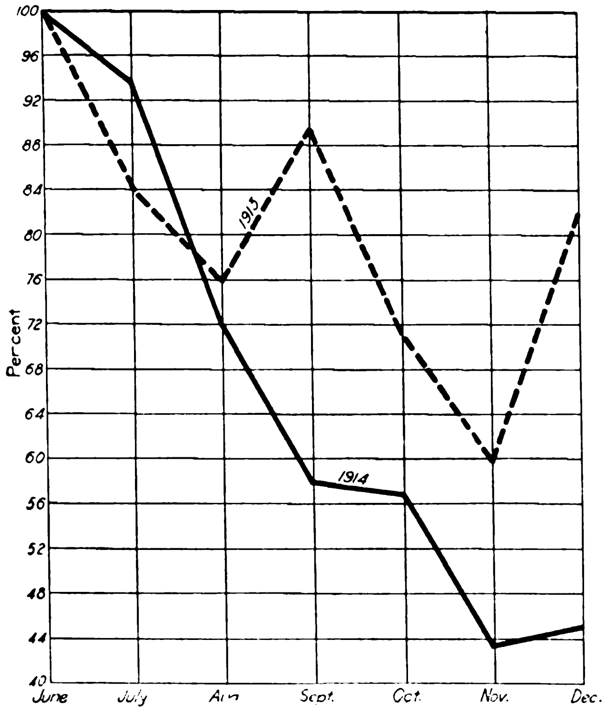
In the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 23, page 183, there appeared a report from F. W. Doolittle, director of the bureau of fare research of the American Electric Railway Association, containing statistics from various sources showing the trend of electric railway earnings, steam railroad earnings, bank clearings and building permits for the months of June, July, August and September, 1914. Mr. Doolittle has continued this study and has just completed seven months' comparisons by including the months of October, November and December. The following statements present his conclusions.



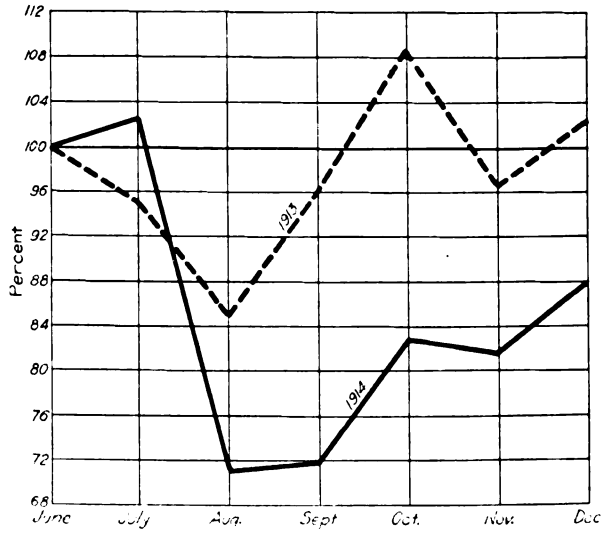
Electric Railway Operating Revenues



Steam Railroad Operating Revenues



Building Permits



Bank Clearings

STATISTICS OF ELECTRIC RAILWAYS, STEAM RAILROADS, BUILDING PERMITS AND BANK CLEARINGS FOR LAST SEVEN MONTHS OF 1913 AND 1914 IN PER CENT OF JUNE FIGURES IN EACH YEAR

The accompanying diagrams show the trend of the items considered during the last seven months of 1914. As before, there was no adequate means of making a comparison between electric railway earnings in 1914 and in 1913, so that the bureau has confined its observations to a running comparison, beginning with the month of June. In connection with the diagrams, the relations shown in the following table should be borne in mind:

	June to December inclusive, 1914	1913	1914 in per cent of 1913
Gross earnings — steam roads	$1,766,383,915	$1,897,499,370	93.09
Bank clearings	83,279,767,186	97,631,749,952	85.30
Value of building permits. (50 cities in 24 states)	309,052,330	359,450,023	85.98

Such figures as are available indicate a relatively small seasonal variation in electric railway earnings when the country as a whole is considered. A large variation is unlikely, inasmuch as a very considerable part of the business of every electric railway company come from the residents of the community in which each road operates, and the use by residents is largely determined by necessity and habit. The casual riding by floating population and riding to parks and places of amusement vary from month to month in each city, but when the country as a whole is considered, these variations equalize, and the result is a greater uniformity than is the case with the traffic of steam roads.

There are available figures covering electric railway operating revenues during the last six months of 1913 for seventy-nine companies, well distributed throughout twenty-one states. These figures are shown graphically in the diagrams as of possible interest, although they are not for the same companies as are included in the figures for 1914. While the 1913 figures are for fewer companies than those included in the 1914 totals, they represent about the same monthly operating revenue. Inasmuch as the 1913 figures begin with July, they are for that month made to coincide, as to the percentage of June, with those of 1914.

TABLE I. OPERATING REVENUES AND EXPENSES OF NINETY-FIVE ELECTRIC RAILWAY COMPANIES IN THE UNITED STATES

	United States				East				South				West			
	Revenues		Expenses		Revenues		Expenses		Revenues		Expenses		Revenues		Expenses	
Month 1914	Amount	Per Cent, June	Amount	Per Cent, June	Amount	Per Cent, June	Amount	Per Cent, June	Amount,	Per Cent, June	Amount	Per Cent, June	Amount	Per Cent, June	Amount	Per Cent, June
June	$14,480,768	100.00	$8,765,233	100.00	$9,065,625	100.00	$5,464,759	100.00	$373,831	100.00	$217,461	100.00	$5,041,312	100.00	$3,083,013	100.00
July	14,816,092	102.32	8,802,032	100.42	9,275,197	102.31	5,439,557	99.54	389,328	104.15	226,675	104.24	5,151,567	102.19	3,135 800	101.71
August	14,640,857	101.11	8.554.051	97.59	9,206,150	101.55	5,283,684	96.69	379,754	101.58	220,951	101.60	5,054,953	100.27	3,049,416	98.91
September	14,086,223	97.28	8,280,978	94.48	8,787,396	96.93	5,135,966	93.98	353,198	94.48	211,104	97.08	4,945,629	98.10	2,933,908	95.16
October	14,358,872	99.16	8,502,027	97.00	8,882,022	97.97	5,208 037	95.30	355,805	95.18	244,750	112.55	5,121,045	101.58	3,049,240	98.90
November	13,268,486	91.63	7,948,299	90.68	8,206,637	90.52	4,864,467	89.02	316,957	84.79	197,437	90.79	4,744,892	94.12	2,886,395	93.62
December	13,704,117	94.64	8,136,271	92.83	8,501,471	93.78	4,940,310	90.40	334,996	89.61	191,469	88.05	4,867,650	96.56	3,004,492	97.45

TABLE II. OPERATING REVENUES OF 105 ELECTRIC RAILWAY COMPANIES INTHEUNITED STATES

	United States		East		South		West	
Month 1914	Amount	Per Cent, June	Amount	Per Cent, June	Amount	Per Cent, June	Amount	Per Cent, June
June	$19,113,164	100.00	$13,698,021	100.00	$373,831	100.00	$5,041,312	100.00
July	19,459,649	101.81	13,918,754	101.61	389,328	104.15	5,151,567	102.19
August	19,162,513	100.26	13,727,806	100.22	379,754	101.58	5,054,953	100.27
September	18,486,986	96.72	13,188,159	96.28	353,198	94.48	4,945,629	98.10
October	19,100,164	99.93	13,623,314	99.45	355,805	95.18	5,121,045	101.58
November	17,687,749	92.54	12,625,900	92.17	316,957	84.79	4,744,892	94.12
December	18,393,919	96.24	13,191,273	96.30	334,996	89.61	4,867,650	96.56

TABLE III. COMPARATIVE VARIATIONS OF BANK CLEARINGS*

	1914		1913		1912	
Month	Amount (last 000,000 omitted)	Per cent of June	Amount (last 000,000 omitted)	Per cent of June	Amount (last 000,000 omitted)	Per cent of June
June	$13,957	100.00	$14,285	100.00	$14,023	100.00
July	14,298	102.44	13,606	95.25	13,914	99.22
August	9,893	70.88	12,108	84.76	12,418	88.55
September	10,004	71.68	13,728	96.11	14,168	101.04
October	11,604	83.14	15,545	108.82	16,823	119.97
November	11,154	79.92	13,762	96.34	14,470	103.19
December	12,365	88.59	14,594	102.17	15,842	112.97
Total	$83,279		$97,631		$101,660	

*Compiled from figures in *New York Evening Post*.

TABLE IV. VALUE OF BUILDING PERMITS*

	United States		East		South		West	
	Per cent of		Per cent of		Per cent of		Per cent of	
Month, 1914	Same month, 1913	June, 1914	Same month, 1913	June, 1914	Same month, 1913	June, 1914	Same month, 1913	June, 1914
June	103.00	100.00	105.96	100.00	77.82	100.00	97.53	100.00
July	115.23	93.86	95.76	73.64	150.32	116.44	167.84	166.48
August	97.58	71.83	105.95	72.15	88.71	79.07	75.59	69.53
September	66.33	57.73	67.38	57.40	65.44	43.57	62.99	61.11
October	82.80	56.96	81.57	54.96	71.48	47.97	88.55	65.84
November	75.11	43.37	78.09	43.60	57.80	36.39	67.91	43.56
December	56.68	45.16	50.58	42.45	83.44	35.46	81.99	56.79

*Compiled from figures in *Engineering News*.

TABLE V. GROSS REVENUES OF STEAM ROADS—UNITED STATES*

Month	1914	Per cent of June	1913	Per cent of June
June	$230,751,850	100.00	$241,107,727	100.00
July	252,231,248	109.31	261,803,011	108.58
August	269,593,446	116.83	280,919,858	116.51
September	272,992,901	118.31	285,850,745	118.56
October	269,325,262	116.72	298,066,118	123.62
November	240,235,841	104.11	272,882,181	113.18
December	231,253,367	100.22	256,869,730	106.54
Total	$1,766,383,915		$1,897,499,370	

*Compiled from figures in *Commercial & Financial Chronicle*.

It is of interest to note in connection with the diagrams that for the steam roads, the earnings during July, August and September bear very closely the same relation to June in 1914 as in 1913. This shows that these roads felt the effects of the acute disturbances of the past summer first in October. Building operations first showed a material variation in the percentage of June during the month of September, while the amount of bank clearings, a highly sensitive barometer, showed a sharp drop in the first month following the beginning of the European war. By far the smallest fluctuation from month to month, both in 1913 and in 1914, is shown by electric railway earnings. In addition, the electric railway earnings for 1914 show a smaller variation from those in 1913 than is indicated in the other items assembled for comparison, although it does not follow that this small decrease in gross below 1913 indicates a relatively small decrease in net, because the electric railway business is conducted on a margin very much smaller than that of most commercial enterprises.

The accompanying tables are presented as of general interest.

President Harmer on Springfield (Mass.) Electrolysis Report

A Brief Analysis of the Bureau of Standards' Recent Report. Together with the Attitude of the Railway Toward It

President J. T. Harmer of the Springfield (Mass.) Street Railway has announced that the Stone & Webster Engineering Corporation, Boston, Mass., has been engaged to make a thorough study of the electrolysis report recently completed by the bureau of standards, with recommendations as to future power developments. The report was in three parts, as below:

Part 1 discussed test data obtained in the survey, stating that the over-all potential measurements are too high and that they should average for a twenty-four-hour period not over 3 or 4 volts, the potential gradient not exceeding 0.3 volt per thousand feet of track. Small differences of potential between pipes and track and between lead sheaths and other underground structures were found, with small currents in water and gas mains. None of the data shows any damage to underground structures, although there was a small voltage drop around the insulated joint in the 30-in. Little River water main. The report stated that "in general conditions at present cannot be regarded as alarming nor calling for hasty or precipitate action."

Part 2 contained a general discussion of electrolysis mitigation, based on the data given in Part 1. It appears, said Mr. Harmer, to favor insulated joints in water and gas pipes after other precautions have been taken, and it objects strongly to pipe drainage. As a remedy, a four-substation layout is recommended, such that the average twenty-four-hour potential gradient shall not exceed 0.45 volt per thousand feet of track. Mr. Harmer points out that owing to the lack of experience in this country with railway installations in which voltage drops in the negative return have been maintained low enough to give substantial freedom from electrolysis troubles, the bureau has based its conclusions largely on the standards laid down in England and Germany. The company feels that these conclusions should be given independent expert engineering study.

Part 3 outlined four possible methods of eliminating electrolysis difficulties in Springfield. The first provided that the railway company enter into an arrangement with the Turners Falls hydroelectric power interests, whereby the latter would take over the Margaret Street steam plant of the railway in Springfield at its present cash value and enter into a contract whereby the power company would supply power from substations to be built and operated by the railway company, three in the city of Springfield and one in West Springfield. The bureau concluded that this plan is the most advantageous. As one alternative the bureau recommended the installation by the street railway of additional negative return feeders without any change in the present distribution system, involving the expenditure of several hundred thousand dollars with little direct benefit to the company. Another involved the remodeling of the Margaret Street power station from a d.c. to an a.c. generating plant, the substations to be erected by the railway. This would cost more than the first plan. A third alternative was the installation of one substation in Springfield and one in West Springfield, using the Margaret Street plant, operated by the hydroelectric company as a combined a.c. plant and substation, to supply the remainder of the load. This plan also would be more expensive than the first.

President Harmer points out that the Margaret Street station is well equipped and produces power at a satisfactory cost, and with purchases of power now being made from other companies efficiently fills the present requirements. For some time, however, it has been recognized by the company that with future expansion some changes might be necessary in the system of power distribution, and various studies have been made, but lack of funds has prevented any action. Mr. Harmer states that it cannot be expected that the street railway company would or could, without the best advice, abandon a plant valued by the city at $700,000, and states that the estimate by the bureau of standards as to the price to be paid by the purchaser might not be satisfactory either to the railway company or the purchaser. As the property is covered by the street railway company's mortgage, a sale would not appear to be such a simple matter as might be inferred from the report, although eventually it might be found the proper course to pursue.

Prior to the investigation by the bureau, the company was discussing negotiations and proposed methods of power utilization with the Turners Falls company, but these were suspended when it became evident that the bureau would go beyond a mere statement of conditions. Mr. Harmer says that when the engagement of the bureau of standards was contemplated, the railway company declined to share in the expense because it had previously expended a large amount of money in examining and rebonding tracks, and any suggestions involving expense would fall most heavily upon it. Every facility, however, was afforded the representatives of the bureau in its investigation.

Insulation for Railway Motors

Westinghouse Designer Analyzes Materials and Methods Used in Armature and Field Coil Insulation

In the current issue of the *Electric Journal* R. E. Hellmund discusses the characteristics desirable in insulating materials for railway motors, briefly describes the materials now available and explains how these materials are selected and applied. As desirable properties he mentioned ability to stand mechanical stresses and vibration without cracking or chafing; flexibility and strength to withstand bending and pounding during manufacture or repair; freedom from deterioration under high temperature to the extent of losing mechanical and insulating qualities; non-shrinking character on application of heat or mechanical stress; compactness; moisture proofness; high dielectric strength; smoothness of surface, and low cost. No insulating material possesses all of these desirable qualities and the best that can be done is a compromise.

Available insulating materials are divided into two classes; first, mineral materials like mica and asbestos which withstand comparatively high temperatures and, second, fibrous materials like cotton, paper, linen, etc., which will withstand only comparatively low temperatures. Unfortunately the materials of the first class are lacking in some respects. Mica, for instance, if subjected to chafing will pulverize, and it is practically impossible to apply it anywhere in its natural form except in flat sheets. It is also very expensive. As a result pure mica can practically be used only as an insulation between the segments of commutators, and even here its use has been practically abandoned because the natural mica is rarely found in sufficiently large plates of uniform quality. Pure asbestos is practically unavailable for use in railway motors in the small thicknesses required. The best substitute for pure mica and asbestos are materials consisting principally of them with certain supporting or binding materials.

Built-up mica, consisting of small, thin pieces held together by shellac, is used to good advantage for insulation between commutator segments, but care must be taken that the minimum amount of shellac is used, otherwise the material is liable to shrink under pressure and heat. Flat sheets of built-up mica are used also between layers of field coils, and, since the small pieces of mica used are flexible in themselves, it is possible to build up various shapes such, for instance, as the V-ring for commutators.

In applying mica to coils or heavy strap conductors it is necessary also to use some fibrous material like paper or cotton as a base for the mica. It is customary to build up mica on thin sheets of fish paper or Japanese paper, and to wrap the resultant sheet around the straight parts of the armature coils or heavy conductors. It is also customary to build up mica on a thin cotton tape and to use the resultant material for taping coils or heavy conductors. If the amount of paper or tape is small and if the material is applied in such a location, as in an armature slot, so that the mica will remain intact even after the paper or the cotton tape has deteriorated, these materials may be expected to withstand fairly high temperatures. In all of these applications the built-up mica fulfils the requirements except that it is expensive and it is liable to pulverize under vibration.

Asbestos insulation can be applied to wires and small straps with the use of binding materials, but in all these cases, except in that of asbestos tape which can readily be used in taping armature or field coils, the mechanical qualities of these insulations are still quite poor. It is, for instance, very difficult to wind an armature with asbestos-covered wire without injuring the insulation, and while an armature wound with this wire will be less subject to roasting than one wound with cotton-covered wire, it is doubtful whether there is any real gain because of the frequent breakdown caused by the mechanical injuries sustained during winding. Asbestos windings also require much space if used in sufficient thickness, they are not in themselves moisture-proof, they have very low dielectric strength, they do not give a smooth surface, and they are expensive.

Fibrous materials, while they do not withstand high temperature, are advantageous in a good many other respects and are extensively used in railway motors. Cotton insulation is, after all, the only one which can be applied satisfactorily to small conductors such as the wire used in railway motor armatures. Paper products of the various types manufactured for insulating purposes, while not withstanding very high temperatures, serve many good purposes in the insulation of railway motors. Fuller board also is used to advantage in many places.

The impregnating of fibrous and asbestos products with varnishes, gums, bakelite, etc., produces several results: First, the treating materials fill up the pores of the basic material and eliminate moisture; second, the dielectric strength is increased even where there is no moisture to be considered; third, most treating materials assist in producing smooth surfaces; fourth, the heat resistance quality of the basic material is often increased, and, fifth, the filling up of the pores may in certain cases reduce the tendency to shrink. Incidentally the treating materials increase the heat conductivity of the insulation resulting in less difference of temperature between the conductors and the outside.

Syndicated Anti-Railway News

Continuation of Adverse Bulletins—The "Jitneys" Are Now Being Boomed

In an article in the last issue of this paper an account was given of a newspaper syndicate association which suggested to newspaper editors that they start a war on "rotten car service." The offer was made to sell a service of "canned" agitation, and reproductions were published of one of the bulletins sent out advocating an anti-trolley campaign and of two bulletins setting forth the superiority of "jitney" transportation over the electric railway service.

A number of recent bulletins of the same kind of syndicated anti-railway news, issued in form for use by daily papers, have reached the office of this paper. Most of them relate to the "jitney" movement. Several typical ones are published, in part, below. The first is the introductory part of some "special correspondence" from Houston, Tex., and reads as follows:

(Special Correspondence)

HOUSTON, TEX., Feb. 00.—You can't find a straphanger in Houston to-day with a spyglass. A year ago there were more than 20,000 straphangers daily. But nowadays those 20,000 people are paying their nickels to the "jitney" buses —and are riding to and from work in comfortable, cushioned seats, with fresh air filling their lungs and only half the time spent on the trip.

"We've solved the transportation problem," says Steve McCormick, the pioneer Houston "jitney" driver. "My cars are each paying me from $7.50 to $10 over all expenses, and a depreciation charge." McCormick figures that a Ford will last a year or more in the business. "The 'jitney' business is a regular epidemic in America," he says.

Another "Special Correspondence" from Baltimore begins as follows:

"JITNEYS" MARCH FROM COAST TO COAST.

GIRL RUNS FIRST MOSQUITO FLEET IN BALTIMORE; WASHINGTON SOON TO HAVE "JITNEYS" TOO

(Special Correspondence)

BALTIMORE, MD., Feb. 00.—The "jitneys" have invaded the East. The first "jitney" bus on the Atlantic Coast began operating in Baltimore a week ago.

And, as usual, it was a woman who started things. Miss Sarah Henderson, who has been nicknamed, "The Jitney Girl," started the first bus, running from the eastern edge of the city to the City Hall, a distance of twenty-five city blocks. On her first run "The Jitney Girl" cut the time of the trolley line in half. Two buses were put into operation to start the line, and seven passengers constituted the first load, all riding to the City Hall.

In each case the same animus against the local electric railway industry is shown. This is the way the Toledo situation is described, in part:

"JITNEYS" THREATEN RUIN OF TOLEDO TRACTION TRUST!

FEDERAL "TWO-LEGGED" JUDGE CAN'T FINE 'EM AS HE DID NEWSPAPER WHICH ATTACKED STREET RAILWAY MONOPOLY!

TOLEDO, OHIO, Feb. 00.—So strong is the "jitney" bus idea with Toledo people that the city council is already considering a bond issue to establish a municipally-owned and operated system of the popular vehicles. This, although the city last summer voted for municipal ownership of the street car system and an $8,000,000 bond issue to that end is now pending.

Just when the franchises had expired and the people of Toledo believed that a fair settlement might be reached with the company, the corporation took refuge in the United States Court. The City Council has passed an ordinance requiring the company in consideration of operating without a franchise to accept a 3-cent fare. The company adopted the policy of refusing the 3 cents but carrying the passenger free. This lasted from March until September last. The people felt that the company was being forced toward a proposition by the city of a franchise that would give a fair return on actual investment.

Then Judge John M. Killits in federal court granted an injunction restraining the city from enforcing the 3-cent ordinance as a rental for its streets.

There was general public criticism of this action. Judge Killits haled in the business agent of the Central Labor Union, The Toledo *News-Bee* and its editor, N. D. Cochran, and one or two others on charges of contempt of court. He tried the cases himself, found the defendants guilty, roundly rebuked the labor leader, fined the *News-Bee* and its editor $7,700. The only defense made by the defendants was that they had the right to discuss publicly matters of public interest if they did not exceed the bounds of truth and good citizenship.

That was probably the final blow to the company's chances of a franchise. That and the wretched service especially at busy hours explain the popularity of the "jitney" bus and its active support by the people.

The following is still another example of the same kind of newspaper bulletin sent broadcast to the daily papers for publication as original matter.

MOVIE TOWN OUSTS TROLLEY FOR "JITNEYS"

Universal City, the only moving picture municipality in the world, is going to oust the trolley system entirely. The town solons have decided to establish a "jitney" bus line from the entrance to the city, down Lankershim Boulevard and thence east along the Laemmle Boulevard to the eastern suburbs of the town.

The new "jitney" bus line will thus connect the zoo and ranch houses with the city itself, centering around the administration buildings. The advent of the "jitney" bus on the Pacific Coast threatens to oust the trolley system entirely.

Abstracts of Electric Railway Reports

The Public Service Commission for the Second District of New York recently issued Volumes I and II of its report for the year ended Dec. 31, 1913. The first volume contains the cases and orders, but the second is devoted to abstracts of corporation reports for steam railroads, electric railways, express companies and sleeping-car companies. The section for electric railways contains a statement of the organization of such companies as of June 30, 1913, and their mileage. Tables are also presented showing the cost of road and equipment, funded debt, funded debt issued or assumed, capital stock, location and length of road operated, classification of mileage within New York, car equipment, operating revenues, operating expenses, operating statistics, employees with salaries and wages, accidents, and principal officers and offices. Such tables are in the main for both operating and lessor companies. Supplemental sections present data in regard to inchoate and dormant electric railways and also to changes in the corporate organizations of electric railways during the year.

Valuation Conference in Washingion

A valuation conference has been called to be held in Washington, beginning March 22. The division of valuation of the Interstate Commerce Commission has virtually completed its appraisals of a number of railroads. In the prosecution of this work many questions have come up which the commission believes can be answered at a hearing in which the carriers, as well as representatives of the state commissions, will have an opportunity to take part. Among the questions to be considered are how depreciation shall be determined, whether by mortality tables or actual observation or by a combination of these two methods; whether obsolescence and inadequacy shall be considered and whether an allowance will be made for appreciation; what overhead charges shall be allowed and how shall the time necessary to reproduce the property be determined.

American Association News

Manufacturers Association Announces Reduction in Dues—Biographical Sketches of Officers of Manila Section, Completing the Series Are Given—Other Activities Are Reported

POWER DISTRIBUTION COMMITTEE

The sub-committee on materials for 600-volt trolley construction met in the association rooms on Feb. 25 and 26. Those present were A. S. Richey, Worcester, Mass., chairman of the main committee, and C. L. Cadle, Rochester, N. Y.; C. F. Woods, Boston, Mass., and C. R. Harte, New Haven, Conn., of the sub-committee.

After completing work on the "general clauses," "wrought iron and mild steel," "malleable castings" and "wood cross-arms" specifications were carefully considered and put in tentative shape with the understanding that the chairman of the sub-committee, Mr. Harte, will take up certain details with manufacturers. The sub-committee will meet again on April 1.

OFFICERS OF THE MANILA ELECTRIC RAILROAD & LIGHT COMPANY SECTION

At the organization meeting of the section held on Dec. 15, Oscar Keesee, superintendent of transportation, was elected president and Walter E. Smith, purchasing agent, secretary. Brief biographical sketches follow.

Mr. Keesee has occupied his present position since 1910 after a year's experience as assistant superintendent. He was born in Hillsboro, Texas, in 1876 and attended the local public schools and Baylor University until 1895. After occupying sundry positions he enlisted, in 1898, in the Third Texas Volunteer Infantry, holding successively the ranks of private, corporal and sergeant. In 1899 he enlisted in the Thirty-third United States Volunteer Infantry and served successively as private, corporal, first sergeant and sergeant-major, leaving the service in 1901 to enter the Manila Police Department, where he served first as patrolman, then as roundsman, and finally as sergeant. He left this work in 1909 to join the staff of the Manila Electric Railroad & Light Company.

OSCAR KEESEE

WALTER A. SMITH

Mr. Smith has occupied his present position since 1912. He was born in Ponca, Neb., in 1880 and subsequently moved to South Dakota where he attended the public schools. His practical work began in 1896 in railroad construction and after two years of this he spent a year in Ward's Academy. He enlisted in 1899 in the Thirty-fifth United States Volunteers for service in the Philippines and was discharged by special order in 1901 to permit him to become a member of the semi-military police organization of Manila. In 1905 he joined the construction staff of J. G. White & Company, leaving this in 1905 to join the operating company at the beginning of operation of the Manila Electric Railroad & Light Company. In 1906, after a vacation in the United States, he returned to the Islands and entered the service of the Philippine Railway Company remaining with it for two years. After this, until 1912, he was employed with the Insular purchasing agent.

MANUFACTURERS' ASSOCIATION NOTES

The executive committee of the Manufacturers' Association has decided, in view of the fact that there will be no exhibition in connection with the 1915 convention and because of the adverse business conditions, to reduce the annual dues for 1915 from $30 to $10. The initiation fee will remain at $15.

The association will keep up its active work in the interest of its members for, in spite of the omission of the exhibition this year, there are many things which the association does for its members. Plans are under way for the formulation of a campaign of publicity for those of the member companies which will have permanent exhibits at the Panama-Pacific Exposition; and the interests of the non-exhibiting members will not be neglected.

The association is in touch with the bureau of foreign and domestic commerce of the Department of Commerce and also with the Chamber of Commerce of the United States and through these sources is planning to keep its members informed as to foreign trade opportunities.

Transportation arrangements for the 1915 convention are gradually assuming shape. The transportation committee is planning to send at least four special trains to the convention, three of them originating on the Atlantic Coast.

H. G. McConnaughy, director of transportation, has in preparation the train itineraries. The equipment for these trains has already been secured, and the association is assured of the finest specials that will go to San Francisco. It is the intention of the committee to give the delegates every comfort and luxury and to arrange for a trip which will permit of visits to all the important points of interest between Chicago and the coast.

As soon as the details of the trip are worked out the committee will make an announcement to the members. In the meantime, it can be safely assumed that nothing will be omitted to make the visit to San Francisco one of the most interesting and enjoyable events in the long history of the two associations. Mr. McConnaughy is starting for the coast, as this issue of the ELECTRIC RAILWAY JOURNAL goes to press, for the purpose of arranging many of the details of the trip in person.

PUBLIC SERVICE SECTION

An extra meeting of Section No. 2 was held in Camden, N. J., on March 11 for the convenience of the employees in the southern part of the State. President P. F. Maguire presided and Secretary A. T. Warner also attended. The fundamental parts of the papers by L. D. H. Gilmour and H. C. Donecker, described in the issues of the ELECTRIC RAILWAY JOURNAL for Feb. 20 and Feb. 27, were repeated. While the meetings regularly scheduled for the third Thursday of each month will continue to be held in Newark, at company headquarters, the officers plan to diffuse the benefits thereof throughout the entire system.

COMMUNICATIONS

Maximum Motor Input

NORTH-SOUTH HOLLAND TRAMWAY COMPANY
HAARLEM, HOLLAND, Feb. 8, 1915.

To the Editors:

Referring to the discussion on maximum motor input in your issue of Dec. 19, it will be perhaps of interest to your readers to know that for a direct-current line of 1200 volts which I built in 1910 the following specification was prescribed for the motors:

"After testing the motors with their normal current at one hour rating, they have to be subjected to double this current for five minutes, without flashing or injurious sparking. Furthermore, the motors will be overcharged to a greater extent, to get some information on the sparking at greater overloads."

The motors were of 30 and 80 brake-hp rating for one hour, and were built without any objection by the Siemens-Schuckert Works of Berlin, the Bergmann Electricity Works of Berlin, Brown, Boveri & Company of Baden (Switzerland) and the Electrotechnical Industry of Dikkerveer (Holland). They have stood these tests in every respect.

H. J. MULDER,
Electrical Engineer.

The Company Section Movement

WASHINGTON RAILWAY & ELECTRIC COMPANY
WASHINGTON, D. C., March 6, 1915.

To the Editors:

I have been interested in the editorial discussion in the columns of the ELECTRIC RAILWAY JOURNAL on the company sections of the American Electric Railway Association. The following remarks are based on practical experience in the movement and will, I hope, be suggestive to members of present and prospective sections.

"Company sections" mean another forward impetus to the electric railway industry. We feel it and know it, but can we prove it? Can we set forth facts and arguments in sufficient strength to induce electric railway men in all departments of the industry to join the movement, to become live factors in promoting the reasons for its organization? We must have firm ground to stand on; if we hesitate when we are asked "What benefits do you get from the section?" or "Why should I join the section?" and cannot prove our claims for the movement, then the movement is lost.

The growth of the sections has been rather slow, due no doubt in a great measure to lack of proper tools with which to work. Let us "get busy" and put that vital force into our arguments which will not only get members for our movement but keep them members—and live ones.

We must first be interested and attracted by the meetings of the section; we must have live talks on live railway subjects by live railway men; talks straight from the shoulder. Perhaps the association could arrange an interchange of prominent speakers for meetings of the sections; men who know and whom others would consider it a privilege to hear. Of course, we always have home talent which can discuss local conditions, of interest to those who have their company's welfare at heart.

We must let the members get the benefit of free discussion, making them rely on themselves so they can speak in public both fluently and forcibly.

We must make our meetings attractive in other ways, educationally and socially, by securing good speakers and motion pictures, slides, etc., on subjects of current interest and by utilizing local talent in the line of instrumental and vocal music. We can offer prizes for the best papers on selected subjects, which will encourage employees to express their thoughts.

To conclude, we must first convince ourselves that we are reaping benefits from the company section movement. With that accomplished, the movement will grow rapidly and irresistibly. Let us "start something"; bring forth our arguments in these columns "why we are existing." Let us tell the other railway managers and employees "what they are passing up," and they will become interested, ask for details and finally start new sections.

GEORGE G. WHITNEY,
President, Company Section No. 4.

Filing of Technical Literature

NEW HAVEN, CONN., March 6, 1915.

To the Editors:

I have followed the discussion on the filing of technical data which was carried on in the columns of the ELECTRIC RAILWAY JOURNAL a short time ago. Your readers might be interested in another contribution on the same subject.

Years ago the writer was engaged in construction and operating work and the need for a classification of technical information was not so apparent. In recent years in consulting engineering work, however, the situation would often arise where information covering some specific point was wanted and wanted immediately. Usually what would happen would be that I remembered having some six months or a year before seen the precise information now needed, but for the life of me I could not remember just when or where I had seen it. In other words, it was lost, covered up by the mass of technical information which every engineer is forced to at least run his eye over during the course of a year.

I have always been most closely connected with work relating to the electrification of steam railroads. In order to cover this subject I some time ago arranged to classify all information received, either in the course of daily work, or from the technical press, in such a manner that any item would be quickly available. For this purpose I divided the subject of electrification into nine main divisions and a number of sub-divisions which has gradually grown to about 160. All matter relating to any one sub-division is dropped into a stiff cardboard folder suitably numbered and designated. The main divisions follow the natural divisions of electrification work. For instance, all electrifications must have a source of power. The subject "Power Stations" is then numbered "1" and forms the first main division. In the same way other natural main divisions are "Primary Transmission Systems," "Sub-stations," "Rolling Stock," etc. Anything relating to power stations, therefore, takes the prefix "1"; anything relating to primary transmission systems takes the prefix "2"; rolling stock data takes the prefix "6", etc.

Coming now to the sub-divisions under these main divisions, the main subject "Power Stations" is subdivided into such items as "Capital Costs," "Land and Buildings," "Boiler-room Equipment," "Engine-room Equipment," "Auxiliaries," "Coal Consumption," "Operation and Maintenance," "Cost of Manufacturing Electricity," etc. Each of these sub-divisions has a separate folder and the appropriate prefix "1.1", "1.2", etc. By the use of the decimal system for numbering the folders, the sub-dividing can be carried as far as may be desired.

In order to cover a large number of subjects which cannot properly be classified under any of the natural divisions of electrification, I have formed what is called a "general" main division, which takes the prefix "0," and contains such subjects as circuit breakers, which are used in power stations, in substations, on line construction and on rolling stock. The same is true of insulation or lightning protection. Data relating to insulation, lightning protection, or to the cost or capacity of circuit breakers are therefore classified by themselves under the general main division. A list both of the main divisions and of sample sub-divisions is given below.

While the arrangement shown is entirely an arbitrary one, adapted merely to the writer's personal interest in the subject of electrification, the same general principle can be applied to any branch of engineering. In fact, one of my friends, a professor at one of the large universities whose general subject is "transportation," has grouped and numbered this subject in the above manner, using more than 1000 sub-divisions.

The danger in any classification system of this kind is that it may become top-heavy or unwieldy, or, after a time will contain much matter that is obsolete. It is necessary therefore constantly to be weeding out and conveying to the scrap basket data which have been replaced by more accurate or up-to-date information or which for any other reason have become obsolete. By so doing one can keep this portion of his engineering tools clean and bright and ready for any emergency. In practice the system outlined above has worked out surprisingly well; requiring very little outlay of time to maintain it in good workable condition. If at any time it becomes necessary to investigate some specific subject, such as "freight-yard electrification" or "train resistance," etc., one's store of information is ready for instant use.

WILLIAM ARTHUR, Assistant Engineer,
With McHenry & Murray, Engineers.

[NOTE. The sample lists referred to by Mr. Arthur are given in part below.—EDS.]

MAIN DIVISIONS UNDER STEAM RAILWAY ELECTRIFICATION

(0) General; (1) Power Stations; (2) Primary Transmission Systems; (3) Substations; (4) Secondary Distribution; (5) Track Circuits; (6) Rolling Stock; (7) Miscellaneous; (8) Description of Complete Electrification.

SUBDIVISIONS UNDER GENERAL TOPIC "0"

(0.0) Indexes; (0.1) Lightning Protection; (0.2) Section Switches; (0.3) Circuit Breakers; (0.4) Switchboards and Switches; (0.5) Insulation; (0.6) Efficiencies, General; (0.7) Electrolysis; (8) Electro-Magnetic Disturbances; (0.9) Signals and Signaling; (0.10) Mountain Grades; (0.11) Training of Motormen and Others; (0.12) Freight Yard Electrical Operation; (0.13) Constants for Single-Phase Circuits; (0.14) Spare; (0.15) Miscellaneous—General; (0.16) Terminals; (0.17) Capital Costs—General; (0.18) Personal; (0.19) Crossing Right-of-Way with Wires; (0.20) Comparison of Systems; (0.21) Power Distribution Calculations; (0.22) Depreciation and Obsolesence; (0.23) General Progress; (0.24) Photographs; (0.25) Ratings; (0.26) Lighting, and so on.

SUBDIVISIONS UNDER ROLLING STOCK "6"

(6.1) Capital Costs; (6.2) Traction Mechanics; (6.3) Gears and Gear Ratios; (6.4) Motor Types and Characteristics; (6.5) Speed Time Curves and Data; (6.6) Acceleration and Retardation; (6.7) Energy Consumption; (6.8) Weights; (6.9) Train Resistance; (6.10) Operation and Maintenance; (6.11) Control System Data; (6.12) Brakes and Braking; (6.13) Heating of Trains; (6.14) Spare; (6.15) Single-Phase Rolling Stock Data; (6.16) D.C. Rolling Stock Data; (6.17) Three-Phase Rolling Stock Data; (6.18) Split-Phase Rolling Stock Data; (6.19) Mercury Rectifier Rolling Stock Data; (6.20) Permutator Rolling Stock Data; (6.21) Self-Propelled Rolling Stock Data; (6.22) Steam Locomotives; (6.31) Repair Shed Data; (6.32) Draught and Coupling Gear; (6.33) Mileage Statistics; (6.34) Regeneration; (6.35) Failure Notes; (6.36) Miscellaneous Data; (6.37) Clearances; (6.38) Amount of Rolling Stock; (6.39) Current Collection; (6.40) Brushes and Brush-Holders; (6.41) Forced Ventilation; (6.42) Design of Rolling Stock; (6.43) Spare; (6.50) Descriptions of.

Engineering Considerations in a Proposed Line

ZELIENOPLE, PA., March 6, 1915.

To the Editors:

It is proposed to build a double-track road 150 miles long to connect two cities of 50,000 and 300,000 population respectively and traversing a good agricultural country. I should like to hear from some of your many readers on the following questions: Would you recommend a standard gage and why? Would you use steam, electric or gasoline power and why? What size units would you recommend? Single cars, or motor cars and trailer or electric engine and train? Would you recommend single cars and frequent service or large trains and less frequent service? Would you advise the treatment of ties before placing in track? If so, what treatment?

AN INTERESTED READER.

[NOTE.—Standard gage should certainly be used whether the motive power is to be steam, gasoline or electricity. Narrow gage is warranted only on lines of very light traffic where the topographical conditions are such that the expense of standard gage would be very much greater than that of narrow gage. In the case under consideration this exceptional condition undoubtedly does not occur. It is impossible from the data submitted by our correspondent to advise him as to the proper motive power to use or the extent of the service. It might not pay even to build the road at all.

The proper plan to follow is first to make a study of the probable traffic on the proposed line. The traffic would vary with the population of the intervening country, the community of interest between this population and the terminal cities and between the terminal cities themselves, the extent and character of competing means of communication, etc. The probable traffic, which could be calculated fairly closely by a study of all of these factors, would determine the best schedule, or headway between trains. If the schedule calls for ten trains or cars each way a day or more, as is presumably the case with a double-track line, the chances are that electricity would be the most desirable motive power. With fewer than ten trains a day and little prospect for much early future growth, some system of independent motive power would naturally be considered. Probably gasoline would be best if the traffic was largely passenger, calling for a frequent service, and steam if it was mostly freight and could be carried in a small number of long trains. Of course, if the road was a part of a large steam railroad system, steam would have the added advantage of introducing no change of motive power at the junction of this road and the rest of the system. Before making a definite decision, however, most engineers would make careful estimates of the initial cost, operating expenses of the different motive powers and probable future of the road, especially if the case was near the border line of a choice of powers.

Tie treatment is recommended, as with exposed track the conditions are favorable to rot. The most common method of treatment is by creosote, using either the open or full-cell process.—EDS.]

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

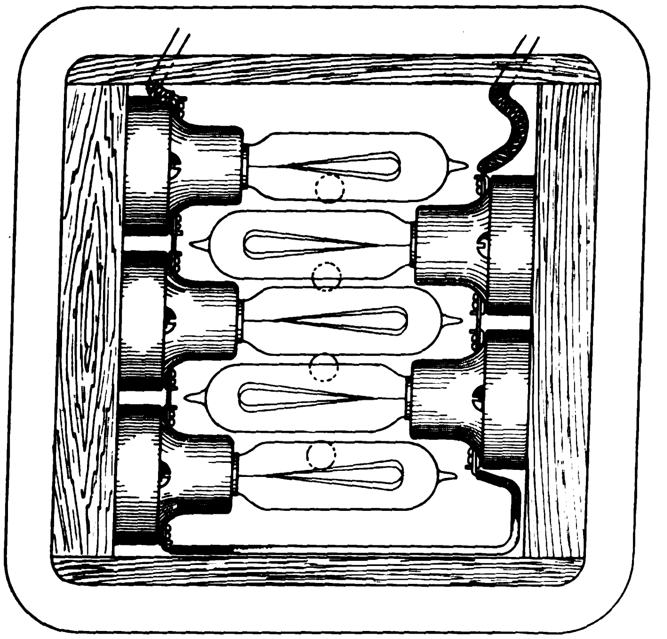
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Portable Lamp Bank for Equipment Tests

BY F. L. HINMAN, MASTER MECHANIC NEW YORK STATE RAILWAYS—SYRACUSE AND ONEIDA LINES

A very convenient device for quickly locating trouble in connection with electric equipment, such as open circuits, grounds, etc., is a portable lamp bank which is small enough to be contained in the inspector's ordinary tool kit and so constructed that it will not be damaged by rough handling.

A portable bank of this kind, which has given excellent results thus far, has been in use on our lines for some time. It includes a whitewood frame 2 in. deep, measuring 4½ in. x 5¼ in. inside. Two sides of this frame are made of whitewood ¾ in. thick, upon which are mounted five No. 675 candelabra receptacles connected in series and each containing a 130-volt lamp. The mounting of the lamps should be as shown on the sketch in order to occupy as little space as possible.



SKETCH OF PORTABLE LAMP BANK WITH COVER REMOVED

MATERIALS REQUIRED

2 pieces 11/16-in. x 1⅞-in. x 3⅝-in. whitewood.
2 pieces 5/16 in. x 1⅞-in. x 6-in. whitewood.
2 pieces 3/16-in. x 7-in. x 7-in. agasote.
5 No. 675 candelabra receptacles.
5 8-cp, 130-volt candelabra base lamps.
50 ft. No. 16 flexible S-B. R. C. wire.
10 No. 8 R. H. brass screws.
12 ⅝-in. No. 5 R. H. brass screws.

Two lead wires, one 15 ft. and one 35 ft. long, made of No. 16 flexible wire are attached to the terminals and brought out through a hole in the frame. Two covers 7 in. x 7 in. made of 3/16 in. agasote are screwed on to the frame in such a manner as to provide a groove ½ in. deep and 2 in. wide around the outside in which the leads can be wound.

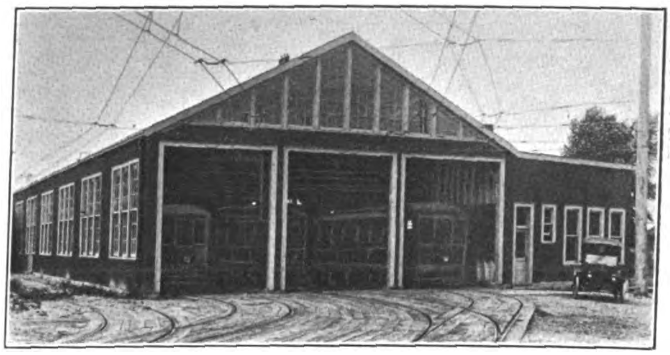
Four ⅜-in. holes are bored in each cover to provide ventilation and to enable the operator to see the light, although the arc drawn by the bank is sufficient to indicate to the operator the condition existing.

In using this device, if it is desired to test for grounds, the short end may be hooked to the line terminal of the circuit breaker. Grounded armatures, fields or controller cylinders can be quickly located by opening the controller and testing to the proper fingers.

Carhouse of Seattle Municipal Railway

BY H. J. KENNEDY, ELECTRICAL AND MECHANICAL ENGINEER

The carhouse of the Seattle Municipal Railway, although a temporary structure, is substantial of its kind, being of heavy frame construction with concrete foundations and pits. It is sheathed with corrugated iron. An illustration shows the front on Third Avenue West. The building is wide enough to contain three tracks, and a fourth track intended for washing cars and for storage is laid outside. The southernmost track under cover is used for inspection and storage purposes and has a pit at one end which is long enough for inspecting one car, and which is intended for extension when the building is extended. The two northerly tracks are repair tracks. The middle track runs over a deep pit long enough for one car, in which is placed a wheel grinder. The pit under the northerly track is long enough for two cars. Adjoining it on the west is a very shallow pit in which men stand when working on the low maximum-traction trucks which are run out from under the car bodies to this portion of the track.



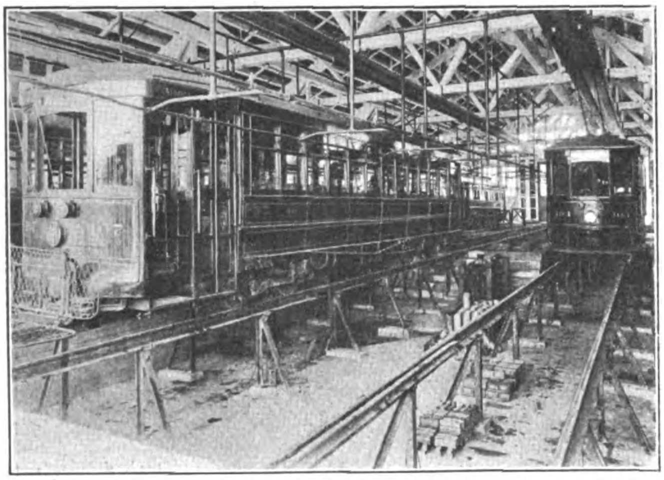
SEATTLE MUNICIPAL CARHOUSE—FRONT VIEW OF BUILDING

The floor of the deep repair pit, which shows in the foreground of the interior view, is 4 ft. 6 in. below the top of rail. That of the truck pit is 22 in. below top of rail, this being also the level of the floor in the shop building to the north of the carhouse. These floors are made continuous by means of a bench 41 in. wide along the northerly side of the deep pit, the edge of which just shows at the right of the interior view. Steps in the concrete at each end of the pits give access to them. However, a man in the deep pit can readily place a part or tool on the shop floor level, or climb to it himself without going to the steps. The arrangement for a shop restricted by such size limitations as is this one is very convenient.

The rails over pits are 7-in., 80-lb., T-section, and they are supported by cast-iron rail chairs which are placed at 8-ft. centers and are made of heights to suit the different pits. The chairs are embedded at their bases in the concrete footings, which are laid with a 1:2:4 mixture. The bulk of the repair work is done on the two northerly tracks, which are 16 ft. center to center and allow plenty of room for working on the cars. The roof trusses are heavy enough to support a car body, and four Yale & Towne 4-ton triplex chain blocks have been installed for lifting bodies off the trucks, enabling the latter to be run out to the truck pit.

On the northerly side of the carhouse are located the offices, machine shop, oil house and toilet wing. All these accommodations are on a small scale, as befits the small mileage. However, they are complete enough to include a trainmen's hall, in which are located seats, table and bulletin board for the trainmen, and a safe with chute door for conductor's turn-ins. There is also a main office with provisions for the operating man, station foreman or dispatcher, and a little office for the master mechanic opens off the shop, the latter having a floor 28 in. lower than the office floor. The south side of the shop opens into the carhouse, so that men and materiads, car motors, etc., may readily pass from one to the other.

The oil-house floor is 18 in. below grade, and the tops of the concrete walls around it are 6 in. above grade. A drain connection with plug is provided in the concrete floor; thus the oil house is itself a concrete tank which can be drained if necessary, and a thorough scrubbing out is facilitated in case of accumulation of oil or grease on the floor. The engine oil used for car lubrication is stored in a Bowser steel oil tank of 120-gal. capacity, with self-measuring pump. Grease is stored in a barrel, and the small quantities of gasoline and kerosene used are at present stored in the cans in which they come. A wagon may be backed up to the oil-room side door and a barrel unloaded onto the track over the tank, rolled either into position over the tank, or to the opposite side of the oil room. Steps from outside give entrance to the end door of the oil room, which has no direct communication with any other room.



SEATTLE MUNICIPAL CARHOUSE—INTERIOR VIEW SHOWING SPRINKLERS AND PITS

The automatic sprinkler system contains 280 sprinklers, of which 120 are in the aisle lines between the car tracks, at a height not over 2 in. below the top of glass in car windows. The remainder are under the roof and in the attached shop and office wings. Separate 6-in. dry-pipe valves are provided for these two branches of the system, being located in a lean-to valve house alongside the carhouse. Air pressure at 35 lb. to 40 lb. per square inch is maintained in the dry pipes by an electrically-driven air compressor having a capacity of 11 cu. ft. per minute. The apparatus is the Globe automatic sprinkler equipment, made by the Sprinkler Company of America.

The lighting system installed in this carhouse is controlled by a semi-inclosed panelboard in the toilet room. One line in conduit is run on each of the seven roof trusses and each has four 100-watt Mazda lamps, located midway between adjacent tracks and between tracks and walls to north and south, respectively. Suitable receptacles are provided for extension cords of desired lengths.

In each pit a conduit is run along the bottom of each rail (being offset to pass around the rail chairs), and at each rail chair are placed alternately 16-cp lamps in wire cages and receptacles for extensions, staggered between the north and south sides of pit, so that at any rail chair a man under a car has a lamp on one side of him and a receptacle on the other. In consequence of the whiteness of the concrete walls and floor, this gives an excellent illumination under the cars, even without using extension cords.

Plans have been prepared for a separate building for the blacksmith shop, which is also intended to house the 3-cu. yd. "Viloco" sand dryer, with bins for coal, green sand, dry sand and smithing coal. The sand dryer, coal and sand bins extend, according to the plans, out under a driveway with trap doors into which wagons can discharge.

A car-wheel grinder of the Q. M. S. type has been purchased for installation in the deep pit in the middle track. The car wheels, while being ground, are turned by their own motor, special rheostats being connected in series with the latter to moderate the speed. For turning the pony wheels of the maximum traction trucks, a series of shafts connected by shifting spur gearing is provided, a removable split sprocket wheel being clamped on the car axle to enable it to be driven. The Department of Utilities in Seattle has been very rigid in enforcing the prohibition of flat wheels in the city, and to meet its desires this extra apparatus was designed. The iron columns of the machine are hollow and are connected by 6-in. pipe underground to an exhaust fan which removes the emery and iron dust from the grinding.

The engineering of location and construction of Division "A" of the Seattle Municipal Railway was under the direction of the Seattle Engineering Department, A. H. Dimock being city engineer. Division "C," however, was constructed by private capital and later taken over by the city, as already explained in the ELECTRIC RAILWAY JOURNAL. The author of this article, as electrical engineer, was in general charge of preparation and execution of specifications and designs, installation, etc., for pole lines, feeder and trolley lines, rolling stock, substation, carhouse and shops, etc. Architectural and drafting assistance on the buildings, and foremen, electricians, etc., were contributed from time to time by the building and lighting departments. The decision to use a double-trolley system was due to the Board of Public Works. When the initial mileage was completed, Division "A" was turned over for operation to the Department of Public Utilities, of which A. L. Valentine is superintendent.

In a recent investigation made by the Department of Health of Chicago, it was found that the heater capacity of some cars was approximately equivalent to that of the passengers when the car was completely loaded. The cars in question had a capacity with all heaters in full operation, of 27,000 B.t.u. per hour, while, when the car was carrying eighty passengers, the total heat given off by them was about 24,000 B.t.u. per hour.

Chart for Use in Transforming Motor Speed Curves for Different Voltages*

BY F. CASTIGLIONI, NEW YORK

It is often necessary to calculate the speeds at which a railway motor will run at one voltage when a speed-current curve for some other voltage is available. If the motor resistance is known this can be done, for any value of current, by means of the formula:

$$\frac{s_2}{s_1} = \frac{E_2 - Ir}{E_1 - Ir},$$

where s_1 is the speed, from the curve corresponding to the voltage E_1 and the current I, and s_2 is the calculated speed corresponding to E_2 and I. This formula simply states that the speed, for any value of current, is proportional to the counter-emf.

This formula can be used in plotting a chart like that shown, by means of which the transformation can be made very quickly.

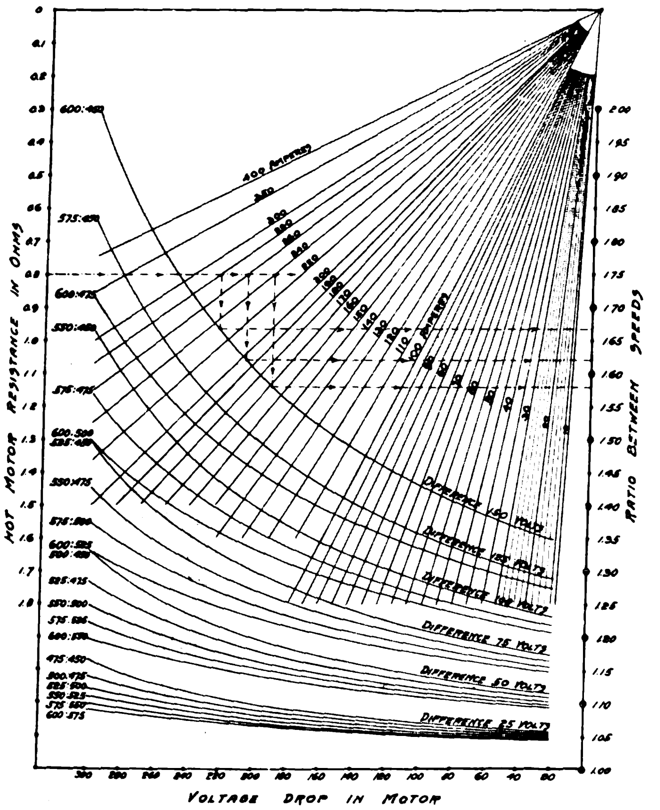


CHART FOR THE TRANSFORMATION OF THE SPEED CURVE OF RAILWAY MOTORS FOR DIFFERENT VOLTAGES

The chart consists of two parts: (1) a set of straight lines plotted between hot motor resistance and Ir drop for a large number of current values; (2) a set of curves plotted between Ir drop and the speed ratio s_2/s_1 or $(E_2 - Ir) \div (E_1 - Ir)$, for a variety of voltage ranges liable to be encountered in every-day work. As there is a definite Ir drop corresponding to each value of I and a definite speed ratio corresponding to each set of values of E_1, E_2 and I, the speed ratio can be quickly calculated from the charts as follows:

Use of the Charts

To determine the speed ratio for, say, a voltage change from 600 to 450 volts at a current value of 280 amp for a motor having a hot resistance of 0.8 ohm, we begin at the 0.8-ohm point on the hot resistance scale at the left and project to the right to the intersection with the 280-amp line. We then project vertically downward to the intersection with the speed-ratio curve and read off the desired speed ratio.

A current-speed curve can be quickly transformed by continuing the horizontal hot-resistance line to intersect a number of the current lines and projecting downward and to the right for each intersection, as indicated by the dot-and-dash lines.

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*This chart is reproduced here on a small scale to show the principle involved. For office use the ELECTRIC RAILWAY JOURNAL will supply larger copies to readers, on request and without charge.

Car-Cleaning Practice

The United Railways of St. Louis have built two car-washing plants at different points on the system, one of these holding four cars and the other six cars at one time. In these plants water is squirted from perforated overhead pipes on to the sides of the cars and is supplied to hoses for interior washing, the cars being tilted so that the wash water drains out of one end of the car into a tank on the floor. The wash water is filtered and used over again, being pumped into overhead storage tanks. Rain water from the building roofs is collected and ordinarily is used for make-up purposes.

In Chicago car cleaning at stated intervals has been considered as of less importance than the sweepings at the end of each run, especially on account of the dirt which may be collected during one trip in stormy weather. The same idea has been carried out to its logical conclusion on the Hudson & Manhattan Railroad, where cars are swept four times a day and are cleaned, including the use of whiting and water on the windows, every forty-eight hours. In one of these four daily sweepings the remarkable record of forty-five seconds per car is maintained as a regular routine. This sweeping is one that is made between 6:30 and 7:30 o'clock in the evening to provide clean cars for the theater crowds. At this time, which is included in the evening rush hour, there is not sufficient equipment to permit holding of cars out of service, and the wait at the terminal is only of ninety seconds duration. When a train comes in, a man enters each car and scatters at one end sawdust that is moistened with disinfectant, sweeping it down the length of the car with a 24-in. broom. This broom is wide enough so that two strokes cover the full width of the aisle. The doors at the end of the car where sweeping is begun are opened when the sweeping has progressed to the middle of the car, so that loading of passengers can begin at the earliest possible moment. The whole sweeping operation requires only forty-five seconds, leaving an equal amount of time for the loading of the end of the car at which the sawdust and dirt are swept out. Wiping of seats, stanchions and windows is done at night when the cars are laid up.

An exhaustive investigation into the subject of exterior washing made in Detroit discloses the fact that improper methods may result in annual damage equivalent to thousands of dollars worth of painting on a moderately large city system. The company has, therefore, systematized its whole procedure of washing, making it a standard practice to keep wash water at a temperature below 80 deg. Fahr.; to supply standard stock soda solution to all stations; to have a rinsing follow the soaping without delay and to wet down each car thoroughly before washing to soften mud and sand collected on it. The use of soda ash is prohibited. It is reported that, in consequence, the cars look much cleaner and brighter and no longer have the "dead" look that characterized them in the past.

In Kansas City the Metropolitan Street Railway Company experimented at one of its carhouses from which seven lines were operated to see whether the selling of waste paper collected in the cars could be made profitable. On the seven lines enough discarded newspapers were picked up each month to average about three tons of waste paper, for which the normal market price was

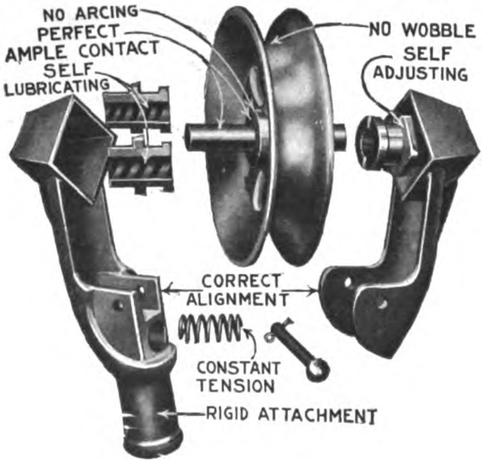
20 cents per 100 lb. For collecting the waste paper each coach cleaner at the carhouse was provided with a burlap sack, and the filled sacks were stored in an old coach, the sale of the paper taking place each month. The car crews also collected waste paper after each trip, storing it temporarily under one of the seats of the cars.

In Detroit the same scheme is carried out, sheet metal receptacles being provided in each carhouse for the storage of the waste paper. In these receptacles are canvas sacks which, when filled, are tied up and taken to the machine shop, where the paper is pressed into 300-lb. bales. The bales are held until a carload has accumulated, at which time the paper is sold, bringing usually about $6 per ton or 30 cents per hundredweight.

Car cleaning at all surface carhouses of the Boston Elevated Railway is conducted according to a regular printed schedule. The semi-convertible cars forming the company's latest standard equipment for surface line operation have their painted work and side glass mopped daily except in foul weather, and daily the vestibule glass is cleaned and mud splashes are removed. The daily work also includes the testing and filling of sandboxes, sweeping of car body, vestibule and steps, removal of heavy dirt by scrapers, and dusting, the last operation being performed not less than two hours after sweeping. The periodical cleaning covers washing of car exteriors after each rainstorm; washing of painted woodwork, dashers and exterior signs every two months; a fortnightly cleaning of monitor glass and a monthly cleaning of headlights. Interior glass is cleaned weekly; curtains, platforms and steps every two weeks, dashers are washed twice a month and painted twice a year, and woodwork and side sills in car body and vestibules and also monitor glass are cleaned monthly.

Trolley Wheel and Harp Run 22,608 Miles Without Lubrication or Adjustment

Several new features have been incorporated in the trolley wheel and harp made by the Traction Appliance Company, Vincennes, Ind. This type of harp, which is known as the "Autograph," includes a well-balanced bronze trolley wheel into which a steel spindle has been inserted with a drive fit to make it integral with the wheel. The spindle in turn fits into outside bearings that provide for self-lubrication and for automatically taking up or compensating for the wear of either spindle or bearings. These functions are accomplished by making the harp in two sections which hinge together and which are held in position by a single pin fastened with a cotter. A coil spring set in pockets at the base of the two parts of the harp exerts a pressure which tends to force the split bearings against the hub faces of the trolley wheel, thus continuously maintaining correct alignment of the wheel and full electrical contact.



HARP RUN 22,608 MILES WITHOUT LUBRICATION OR ADJUSTMENT

The self-lubricating bearings, which are pressed into sockets in the two parts of the harp, are mounted in pyramid-shaped boxes. These bearings are made of bronze and graphitic inserts, a product of the Graphite Lubricating Company. They are self-lubricating and are said to outwear the wheel. The pressure exerted by the spring at the base of the trolley harp insures a snug fit between the bearings and the spindle and also holds the bearings firmly against the hub, thereby providing automatic adjustment. Because of this method of obtaining widely-separated bearing surfaces and high conductivity, this type of harp is said to increase from 75 per cent to 100 per cent the life of any standard wheel. The maker states that the Vincennes (Ind.) Traction Company in a test made with a 5-in. "Autograph" trolley wheel and harp, from April 21, 1914, to Jan. 2, 1915, obtained 22,608 miles without lubrication or adjustment.

Kansas City Tractor and Trailer Truck

The Metropolitan Street Railway Company, Kansas City, Mo., has cut in two its haulage costs per ton for handling rock and gravel for track construction by means of a motor truck including a trailer body pulled by a tractor. Aside from its reduction in hauling cost this outfit will also deliver as much material in a working day as can be handled by a work train, for the truck can be kept constantly at work while the work train would be standing still for loading or unloading. Two interchangeable trailers are employed. They can be attached or detached from the tractor in a minute. Thus the tractor makes a trip while the second trailer is being loaded. The trailers are built with automatic dump-bottoms, and are dumped by means of levers controlled by the driver.

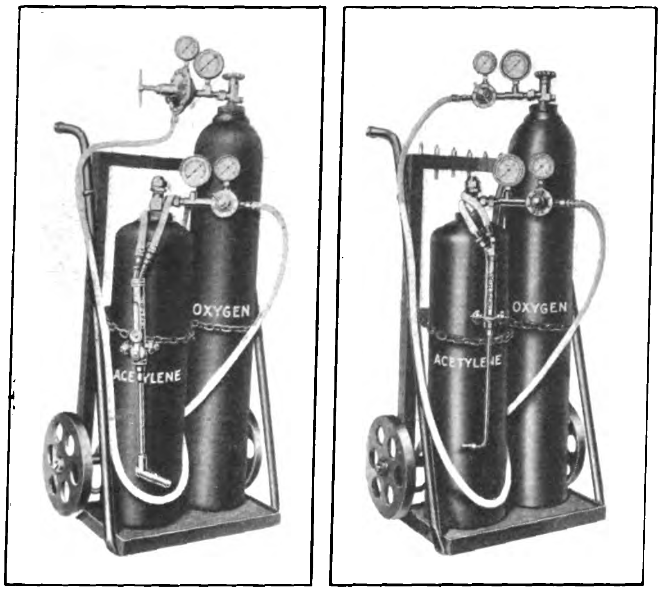
TRACTOR AND TRAILER TRUCK OF THE METROPOLITAN STREET RAILWAY, KANSAS CITY, MO.

The tractor is made by the Knox Motor Company, Springfield, Mass. The trailer body is manufactured in Kansas City by the Bull Dog Manufacturing Company, and is known as the "Bull Dog" trailer. The two trailers in use by the Metropolitan company are the first which the new company has manufactured.

The Westinghouse Electric & Manufacturing Company advises that the type BR frog, described on page 428 of the ELECTRIC RAILWAY JOURNAL for Feb. 27, is not designed for one degree of angle only as might be inferred from the caption. The frog is designed for several degrees of angle.

Oxy-Acetylene Equipment for Wide Range of Service

Oxy-acetylene welding and cutting equipment asserted to possess some exclusive features has recently been placed on the market by the Imperial Brass Manufacturing Company, Chicago, Ill. One of these features is that of thorough and uniform mixing of the two gases employed; another is the close and accurate regulation of both volume and velocity of the gases delivered to the mixing chamber of the torch to maintain either a constant fixed pressure or a wide range of pressures. The successful solution of these features means the elimination of dangerous back-firing, undue consumption of gases and burning of tips.



OXY-ACETYLENE CUTTING AND WELDING OUTFITS

Before entering the mixing chamber of the torch, the oxygen, under high velocity, passes through a spiral groove which imparts to it a whirling motion. The whirling motion of the oxygen causes it to mix thoroughly with the acetylene with the result that a uniform mixture is obtained before the gases reach the combustion point. A saving of oxygen is thus obtained and an increased intensity of welding flame and greater efficiency in cutting.

The welding and cutting torches are fitted with interchangeable tips to cover all ranges of work within the limits of the process. The torches are very simple in design and durable in construction, no solder being used in their manufacture. The needle valves permit fine adjustment and are located so that the operator can make any desired adjustment of the flame with the hand that holds the torch, making it unnecessary to lay aside the welding stick.

The welding tips are made of a special alloy with an extremely high melting point, making it peculiarly adaptable for the purpose and insuring long life. All threading and measurements of these tips are standard, so that in an emergency the user can readily make a new tip for temporary use from ordinary brass rod in any machine shop and go on using the torch until a new tip can be secured from stock or the maker.

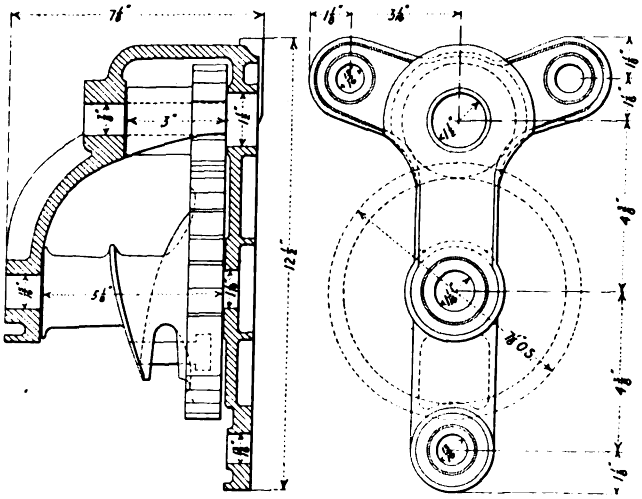
Due to the perfect mixture and accurate regulation of gases obtained with this equipment, the welding flame generated is a long, white, incandescent jet, free from carbons and oxides.

The cutting tips are made of special alloy. Their design is intended to eliminate refractory heat and to prevent the burning out of the tips, as the velocity of the gas passing through the connecting conduits has a tendency to cool the tips. The cutting flame generated by the torch is a very closely confined and accurately proportioned jet of maximum efficiency and makes a clean, quick, narrow cut with the least consumption of gas.

The regulators deliver an absolutely constant, predetermined volume and velocity of gas to the torch, and the movement of the valve with relation to the valve seat, is so limited as to prevent cutting of the seat, thus insuring long life. In cutting operations, under high pressure, the regulators will automatically shut off in an emergency—a safety feature asserted to be exclusive with this maker. The regulators are made in several different types to cover every requirement of service, clean, narrow cut with the least consumption of gas.

A Geared Hand Brake Weighing Only 25 lb.

The great strides that have been made in the development of powerful yet light and durable geared hand brakes are evident in the Type G Peacock brake shown in the accompanying drawing. This brake was brought out as early as 1911 by the National Brake Company, Buffalo, N. Y., for service on the storage-battery cars of the Third Avenue Railway System, New York. Since then that railway has equipped 160 storage-battery cars with the same brake and the New York Railways has followed its example. To-day, therefore, more than 200 storage-battery cars in New York alone use the Type G. The Third Avenue Railway has not been obliged to spend a cent for the maintenance of its brakes, although many of them have been under hard usage for three to four years.



LIGHT-WEIGHT GEARED HAND BRAKE

While the Type G brake complete weighs only 25 lb., its 14:34 gear ratio enables the motorman to develop a chain tension of more than 900 lb. when he exerts a 50-lb. pull on a 12-in. handle. The braking apparatus is also very compact since the platform space required is only 8⅜ in. x 12½ in. The maker advises that this type of brake is particularly suitable for single-truck or double-truck cars weighing up to 25,000 lb.

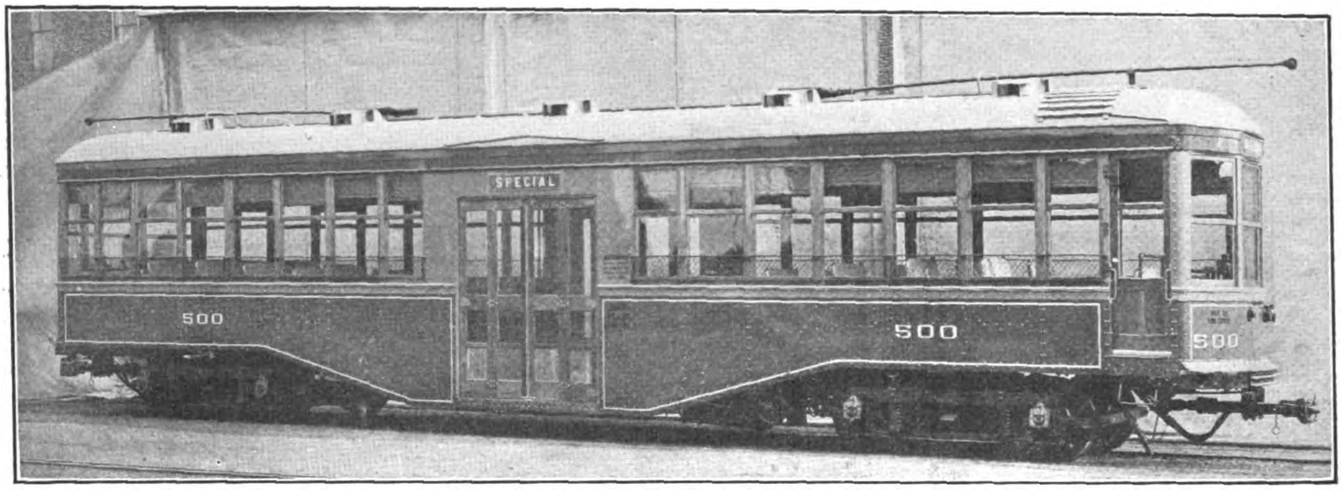
The Metropolitan Street Railway Company, Kansas City, Mo., has supplemented its street car "safety first" placards with similar cards for the carhouses. The series now includes five cards, and each day one of these cards is put in a frame under the clock, on which are the words: "See Safety Bulletin To-day."

Center-Entrance Cars for Wilkes-Barre

The Wilkes-Barre (Pa.) Railway has lately received from The J. G. Brill Company six center-entrance steel cars which are to be operated as prepayment cars from the center of Wilkes-Barre out through three or four suburban towns. Each car seats sixty passengers in the customary combination of transverse seats for the greater part of the car and longitudinal seats at the doorways and corners. At the ends, however, the usual semicircular seating is replaced by a double cross-seat backed against the railing behind the motorman's equipment, by a folding seat placed on the motorman's exit door and by a longitudinal seat opposite this door.

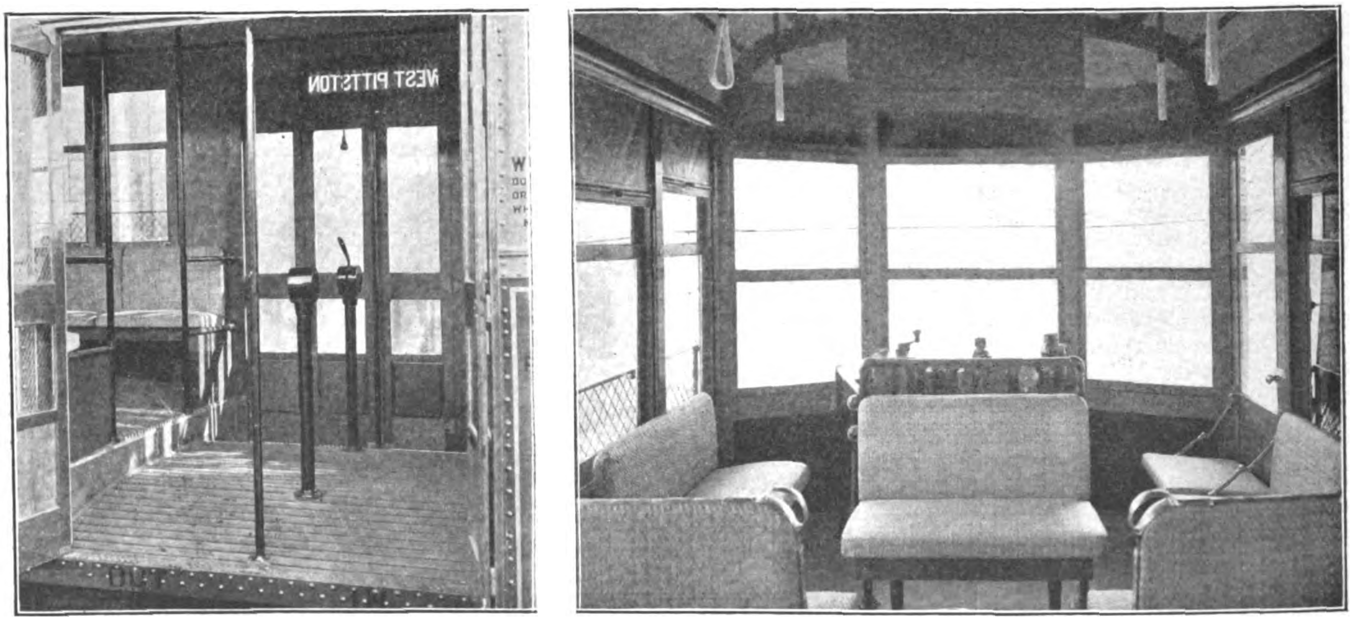
The length of this car is 47 ft. 2 in. over the vestibules and 48 ft. 2 in. over the Hedley anti-climbers; the distance between the truck centers is 30 ft.; the width over the sills, 8 ft. 1¾ in.; the height from the sill to the trolley base 8 ft. 7¾ in. and the height from the top of the rails to the sills 11 in. at the center and 2 ft. 8 in. elsewhere. The underframe is built up of channels and angles, the sides include angles and T-posts with 3/32-in. side plate carried to a height of 2 ft. 5 in. outside of center section and roof is also framed in steel.

The body is mounted on two No. 27 MCB-2X trucks with 30-in. wheels. Each truck carries two Westinghouse 532-B motors. H-L control is used, together with Ackley hand and Westinghouse semi-automatic air brakes. On account of clearance conditions due to the well, two small reservoirs instead of one large one are used. Effective train operation on short curves, such as occur particularly on the city division, is provided by Tomlinson Form 8 couplers.



WILKES-BARRE CAR—SIDE VIEW, SHOWING PARTIAL GLAZING OF BOTTOM PANELS IN CENTER DOOR; ALSO DOOR FOR USE OF MOTORMAN IN THROWING SWITCHES, ETC.

The entrance step is only 11 in. above the pavement. This is followed by a ramp of 4 in. to the center of the well, a riser of 12 in. from the edge of the well to the main aisle and finally a ramp of 11 in. within a run of approximately 11 ft. to the highest point of the floor line. Division railings are not used at the doors. However, a vertical stanchion is provided in the center with rails and stanchions at the edges of the well to aid passengers to reach the upper level most safely. A compact hand control stand for opening and closing the folding doors has been provided, as shown. The door on the right-hand side is operated from the standard on the same side and vice versa, thus shortening the operating levers.



WILKES-BARRE CAR—VIEW AT CENTER, SHOWING RAMP IN WELL, DOOR CONTROL STANDS AND SUPPORTING RAILS; ALSO THE OPEN VESTIBULE WITH CURTAIN ABOVE AND THE FOLDING SEAT ON MOTORMAN'S DOOR

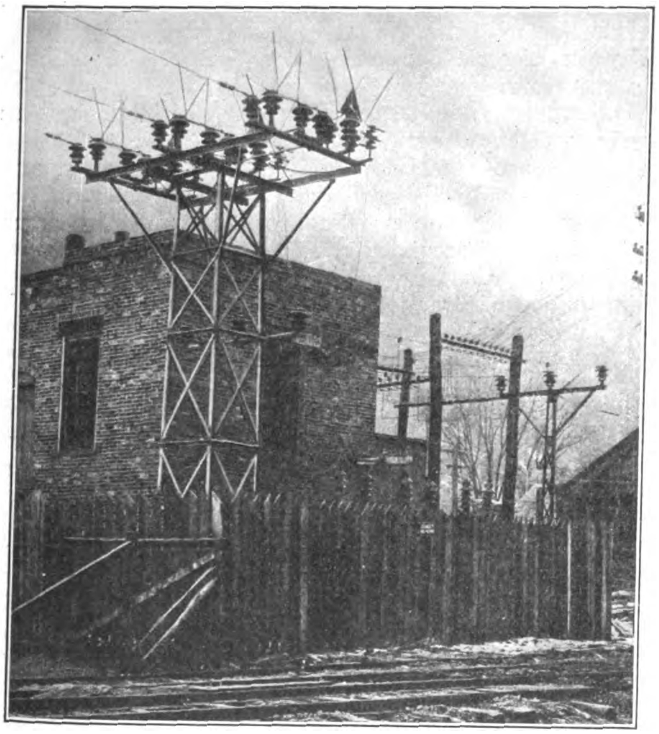
Small Mazda Lamps with Concentrated Filaments

The distinctive features of the concentrated filament Mazda lamps of high wattages have proved so popular that the Edison Lamp Works of the General Electric Company has developed vacuum Mazda lamps of similar appearance in the 25-watt, 40-watt and 60-watt sizes. This concentrated filament construction gives greater vertical distribution of light than the regular Mazda lamps of corresponding wattages. The new lamps will, therefore, be employed where natural distribution of light downward is required.

These lamps will be made in the same sized bulbs as the corresponding regular Mazda lamps, will have the same spherical watts per candle-power efficiency and will have a rated average life of 600 hours.

Outdoor Substation

The outdoor substation illustrated is one of the new designs of the Transmission Engineering Company, Pittsburgh, Pa., and provides for mounting the transformers on the ground. It was installed for the Virginia Western Power Company at Covington, Va. The installation consists of three 100-kw O.I.S.C. single-phase transformers. The transmission system is operated at 44,000 volts and is about 64 miles long.



OUTDOOR SUBSTATION AT COVINGTON, VA.

The transmission line is dead-ended to the steel tower which carries the Burke horn gap switch, lightning arrester and fuse. A steel pole is used to support one end of the high-voltage bus wires over the transformers.

This construction is well adapted where the transformers are too large to be carried on a platform above the ground.

In a recent interview, Maurice Coster, manager of the foreign department Westinghouse Electric & Manufacturing Company, expressed the opinion that if the British government takes over many factories to make war materials directly, according to powers granted by the House of Commons on March 9, many orders for material of a non-military character are likely to come to this country.

Exhibits at Panama-Pacific Exposition

Electric Railway Apparatus Shown in Both the Palaces of Transportation and of Machinery

Under the plan of classification of exhibits adopted by the directors of the Panama-Pacific Universal Exposition at San Francisco, the exhibits of electric railway interest are divided between the Palace of Transportation and the Palace of Machinery. In the former are the exhibits of cars, locomotives, car seats, track, etc., while in the Palace of Machinery are electric motors, power station equipment, machine tools, etc. Several companies have exhibits in both buildings, and others have entries in both groups of exhibits but are exhibiting in one place only. A list of all of the exhibits by manufacturers of electric railway interest in these two buildings would contain nearly as many names as the official catalogue, but the following have been selected as typical.

RAILWAY GROUP IN PALACE OF TRANSPORTATION

American Brake Shoe & Foundry Company, Mahwah, N. J.; railway equipment.
Baldwin Locomotive Works, Philadelphia, Pa.; railway equipment, trucks.
Brill Company, The J. G., Philadelphia, Pa.; railway equipment.
Galena-Signal Oil Company, Franklin, Pa.; signal oils.
General Electric Company, Schenectady, N. Y.; electric locomotives, car-control equipment, etc.
Griffin Wheel Company, Chicago, Ill.; railway equipment.
Hale & Kilburn Company, Philadelphia, Pa.; car equipment.
National Malleable Casting Company, Cleveland, Ohio; railway equipment, couplers, etc.
New York Air Brake Company, New York, N. Y.; railway equipment, brakes, etc.
Nuttall Company, R. D., Pittsburgh, Pa.; gears, pinions, trolleys.
Pennsylvania Steel Company, Philadelphia, Pa.; railway equipment.
Rail Joint Company, New York, N. Y.; railway equipment.
Railway Motor Car Company, Marion, Ind.; railway equipment.
Safety Car Heating & Lighting Company, New York, N. Y.; car equipment.
Service Recorder Company, Cleveland, Ohio; recording devices.
St. Louis Steel Foundry, St. Louis, Mo.; track work.
St. Louis Car Company, St. Louis, Mo.; electric railway equipment.
Taylor-Wharton Iron & Steel Company, High Bridge, N. J.; track work.
Union Switch & Signal Company, Swissvale, Pa.; railway equipment, signals.
United States Steel Products Company, New York, N. Y.; turntable.
Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.; railway equipment, electric locomotives, motors and control devices, etc.

PRIME MOVERS AND ACCESSORIES IN PALACE OF MACHINERY

Babcock & Wilcox Company, New York, N. Y.; boilers, superheaters, stokers.
Busch-Sulzer Brothers Diesel Engine Company, St. Louis, Mo.; internal combustion engines.
Gold Car Heating & Lighting Company, New York, N. Y.; thermostats, pressure systems, ventilators.
Harrison Safety Boiler Works, Philadelphia, Pa.; boil-

ers, feed-water heaters, V-notch meters, steam and oil separators.

Hoppes Manufacturing Company, Springfield, Ohio; feed-water heaters, V-notch recorders, steam and oil separators.

Lagonda Manufacturing Company, Springfield, Ohio; boiler fittings, tube cleaners, water strainers, automatic steam stop and chuck valves.

Lunkenheimer Company, Cincinnati, Ohio; boiler mountings and equipment, whistles, oiling devices, injectors.

McIntosh & Seymour Corporation, Auburn, N. Y.; Diesel oil engines; steam engines.

National Tube Company, Pittsburgh, Pa.; tubes, pipes and fittings.

Nelson Valve Company, Philadelphia, Pa.; valves.

Pelton Water Wheel Company, San Francisco, Cal.; water wheels, centrifugal pumps, recorders.

Pratt & Cady Company, Inc., Hartford, Conn.; valves.

Schaeffer & Budenberg Manufacturing Company, Brooklyn, N. Y.; indicating and recording tachometer.

Westinghouse Machine Company, East Pittsburgh, Pa.; steam turbines, condenser and auxiliaries.

Worthington, Henry R., New York, N. Y.; power pumps.

Yarnall-Waring Company, Philadelphia, Pa.; steam valves.

GENERAL GROUP IN PALACE OF MACHINERY

American Cast Iron Pipe Company, Birmingham, Ala.; pipe.

Chisholm & Moore Manufacturing Company, Cleveland, Ohio; chain hoists, traveling cranes.

Cowan Truck Company, Holyoke, Mass.; trucks for handling heavy stock.

Electrene Company, New York, N. Y.; fire extinguishers.

Falk Company, Milwaukee, Wis.; gears.

International Acheson Graphite Company, Niagara Falls, N. Y.; lubricants.

Joyce-Cridland Company, Dayton, Ohio; lifting jacks.

Lunkenheimer Company, Cincinnati, Ohio; lubricants.

McGraw Publishing Company, Inc., New York, N. Y.; technical periodicals.

Minnesota Manufacturers' Association, St. Paul, Minn.; conveying machinery.

National Brake & Electric Company, Milwaukee, Wis.; air compressors and accessories.

National Tube Company, Pittsburgh, Pa.; pipes and fittings.

Pawling & Harnischfeger Company, Milwaukee, Wis.; excavating machinery and accessories.

Pyrene Manufacturing Company, New York, N. Y.; fire extinguishers.

Robinson & Son Company, Wm. C., Baltimore, Md.; oils and lubricants.

Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.; electric cranes and hoists.

Standard Oil Company, San Francisco, Cal.; lubricants.

MACHINE TOOLS IN PALACE OF MACHINERY

Bliss & Company, E. W., Brooklyn, N. Y.; metal-working machinery.

Carborundum Company, Niagara Falls, N. Y.; grinding materials.

Cincinnati Electrical Tool Company, Cincinnati, Ohio; electrically driven tools.

Detroit Twist Drill Company, Detroit, Mich.; drills, reamers, etc.

Henderson-Willis Company, St. Louis, Mo.; oxy-acetylene equipment.

Jahnke Welding & Manufacturing Company, San Francisco, Cal.; oxy-acetylene equipment.

McLeod Company, Cincinnati, Ohio.; oxy-acetylene equipment.

Superior Corundum Wheel Company, Waltham, Mass.; grinding and abrasive materials.

U. S. Electrical Tool Company, Cincinnati, Ohio; electric drills and grinders.

U. S. Steel Corporation, Pittsburgh, Pa.; collective exhibit tool steels.

ELECTRICAL AND DISTRIBUTION APPARATUS IN PALACE OF MACHINERY

American Bridge Company, New York, N. Y.; steel towers and poles.

American Steel & Wire Company, Chicago, Ill.; electric wire and cables.

D & W Fuse Company, Providence, R. I.; electric fuses.

Economy Fuse & Manufacturing Company, Chicago, Ill.; electric fuses.

General Electric Company, Schenectady, N. Y.; direct current and alternating current generators and motors, meters, switchboards, transformers, lamps, battery trucks, gearing, electric drills.

Gest, G. M., New York, N. Y.; underground electric conduit systems.

Sangamo Electric Company, Springfield, Ill.; measuring instruments, transformers.

Standard Underground Cable Company, Pittsburgh, Pa.; wires and cables, wire braiding machines, etc.

Thomas & Sons Company, R. East Liverpool, Ohio; high and low tension insulators.

United States Steel Corporation, Pittsburgh, Pa.; electric line material.

Western Electric Company, New York, N. Y.; electric generators.

Westinghouse Air Brake Company, Pittsburgh, Pa.; air brakes and compressors.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.; direct and alternating current generators and motors, switchboard instruments, lamps, turbines and accessories, transmission gears, welding display, etc.

Westinghouse Traction Brake Company, Pittsburgh, Pa.; air brakes and compressors.

Field-Control Motor Speeds

In an article in the *Electric Journal*, R. E. Hellmund of the Westinghouse Electric & Manufacturing Company states that in order to accomplish the desired saving in power consumption field-control motors should have a full-field speed below that of the standard non-field-control motors. In general, it will be found that the saving in power consumption will be the larger with a lower speed at full field. But here again it is necessary to compromise to some extent because a very low speed at full field means large increase of flux calling for heavy sections in the motor frame and consequent heavy motor weight. Going too far in this direction would, therefore, mean that the increased motor weight might nullify the gain made by too large a decrease in the speed.

Another important point to be considered in this connection is that the larger the difference between the full field and the short field and their respective speeds, the larger will be the current rush when changing over from full field to short field. Excessive current rushes are not only undesirable because they strain the motor and the electrical equipment in the car, as well as the gears, but also because they would defeat one of the main purposes for using field-control motors, namely, the avoidance of large current peaks. In most cases a difference of about 20 per cent to 35 per cent between the full-field and short-field speeds of a field-control motor at the one-hour rating seems to be the best all-around compromise.

News of Electric Railways

LEGISLATIVE COMMITTEE REPORT

Three Reports Presented by the Committee Appointed to Inquire Into New York Commission

On March 9 three reports in regard to the working of the Public Service Commission for the First District of New York were submitted to the Legislature and Governor Whitman by the legislative committee which had been inquiring into the work of the commission. The majority report, signed by all Republican members, said that "results reasonably to be expected" had not come from the work of the commissioners. A supplemental Republican report says that the commissioners were inefficient, dilatory and neglectful. A Democratic report indorsed their work. A separate communication to the Governor from the majority members of the committee said that the findings of fact in the majority report, if undisputed in effect, constituted neglect of duty on the part of the commissioners. It suggested that the Governor give the members a hearing before taking further action. The supplemental Republican report was signed by Assemblymen Knight and McQuistion and Senator Lawson, who also signed the majority report. Their reason for the supplemental report was summed up by Mr. Knight as follows:

"We worked for three weeks trying to learn whether the commission were deficient. We decided to state our conclusions in our report, notwithstanding the fact that other members of the committee wanted the report to contain only a summary of the testimony so that the Governor could act without any recommendations on our part. In our opinion the resolution authorizing the investigation requires us to draw conclusion from the evidence."

The majority report summary of findings follows:

"In short, your committee finds that the commissioners of the first district have not put in operation the provisions of the public service commission law for the regulation of the public service corporations in a manner to have produced the results reasonably to be expected."

The conclusion of the supplemental report follows:

"From the facts stated in the majority opinion our conclusion is that the Public Service Commissioners of the First District have not been efficient in the administration of the affairs of their offices, have been dilatory in the disposition of complaints, and have neglected their duties, in that they have failed to inforce and put in operation for the benefit of the public, the purposes of the public service commission's law."

The minority report of the Democrats said that the commission was not only overcrowded with work, but that the law contained many "jokers" which favor the corporations regulated by it, and that in spite of these conditions the commission had exhibited "marked efficiency in building the subway system." The Democrats did not see anything serious in the failure, noted by the majority, on the part of the commissioners to give personal attention to many matters coming before the commission. In this connection the Democrats said that "when propositions involving hundreds of millions are in question, the neglect to give personal attention to matters of comparatively small importance is largely excusable."

The report of the majority takes up the general work of the commission and then refers specifically to the work of Commissioner McCall, Commissioners Wood and Cram and Commissioner George V. S. Williams. It concludes:

"As a result of this investigation your committee finds that the complaints of citizens regarding service on transit lines in the city of New York have not received from the Public Service Commission the attention that the circumstances require; that through their failure to enforce their orders, inadequate transit conditions have existed for long periods of time without improvement, viz.: service on the Interborough Rapid Transit and the Brooklyn Rapid Transit lines during the non-rush hours; that they have not changed or improved the system of handling complaints, which system, in our judgment, is inadequate and faulty; that they have not taken sufficient interest in said complaints and in some instances have given little if any support or encouragement to the subordinates of the commission; that as a result of said lack of interest and support the efforts of said subordinates have been in many instances futile and ineffective; that in one important instance, at least, the complainants were led to believe by the commission that their complaints might receive attention, whereas the commission had already determined the case in the negative; that for long periods of time no effective action has been taken to make orders affecting service on transit lines, or to enforce orders already made; that the said commission as a whole was at no time actively operative in enforcing its orders by the three remedies provided by the public service commissions law, resulting in some instances in a condition which the records of the commission characterized as 'violation with impunity' by the corporations. In short, your committee finds that the commissioners of the first district have not put in operation the provisions of the public service commissions law for the regulation of public service corporations in a manner to have produced the results reasonably to be expected."

THE MOON POST-OFFICE BILL

There has been considerable speculation in Washington in regard to the reasons why the annual post-office appropriation bill was killed in the closing hours of the Sixty-third Congress, which adjourned on March 4. In order to avoid a special session for the purpose of providing revenues for the postal service in the next fiscal year the Senate and the House adopted a joint resolution continuing for the coming year the appropriations made for the present fiscal year. One theory advanced in explanation of the unusual action of Congress in continuing by a simple resolution authority to expend about $325,000,000 is that the bill failed because it was apparent that the Senate would not agree to the provisions for a readjustment of railway pay for carrying the mails because these provisions were so drawn as to give the Postmaster-General authority to adjust this compensation in a way that would reduce an expected heavy deficit in postal revenues at the expense of the railroads. Another theory is that the House would not consent to the provisions for a readjustment of the compensation of rural carriers and the absence of a provision to forbid the Postmaster-General from demoting letter carriers to save money. Representative John A. Moon, Tennessee, chairman of the committee on post-offices and post roads, is reported to have said that the resolution to continue the postal appropriations was drawn as a result of a conference of Leader Underwood of the Democrats, Leader Mann of the Republicans, Chairman Fitzgerald of the committee on appropriations, Controller Downey of the treasury department, and financial experts of the treasury. Mr. Moon was quoted in this connection in part as follows:

"This is not to be the end of the matter. When Congress assembles in December the post-office appropriation bill will be introduced practically as it stands in the matters in which reform is demanded. It has cost the government more than $600,000 to secure the information leading up to this legislation, and we are justified in going forward, and we shall go forward."

Ralph Peters, president of the Long Island Railroad and chairman of the committee on railway mail pay representing the railroads of the country, said:

"In standing firmly against the passage of Representative Moon's confiscatory railway mail pay rider in the post-office appropriation bill, the Senate, during the last hours of Congress, performed a notable act of justice. The Moon rider would have made the Postmaster-General sole dictator of what the railroads would be paid for mail transportation. It would have enabled the post-office department, in Representative Moon's own words, 'to force the railroads to carry all your parcel post probably without any additional compensation.' With this obviously unjust measure now out of the way, the new Congress can proceed in a sane and orderly manner to provide the railroads their long-delayed fair payment for carrying the parcel post."

M. L. COOKE ON UTILITIES

Philadelphia Director Criticises Their Policies

Morris L. Cooke, director department of public works, Philadelphia, and acting director of the Utilities Bureau, gave two lectures on public utilities at Harvard University, Cambridge, Mass., on March 4 and 5. He said, in part:

"Among the agencies which force compliance with standard and business practices imposed from the top are the national organizations provided for each type of utility, such as the National Electric Light Association, the Commercial Gas Association, the American Electric Railway Association and others. Practically every worker in these lines who is in good standing with the powers that be is forced to join these organizations, and those who do not enjoy the favor of those at the top are practically barred from membership.

"The National Electric Light Association also works in close harmony with and supports such sexless public opinion forming agencies as the bureau of public service economics, the director of which appeared as a speaker at a public meeting in the City Hall, Philadelphia, devoted to electric light and power, and two weeks later was in Washington, D. C., choosing the 'citizens' who later appeared before a Congressional committee in opposition to the purchase by the government of the street railways in the District of Columbia.

"Last year the American Electric Railway Association gave forth a 'code of principles' which advocated among other things fair returns on capitalization, no matter how extravagantly watered, exclusive State control of the local utilities and the holding company. The same report advocated the creation of a financed bureau of public relations which is to have among its various functions that of 'influencing the sources of public education.' . . . The trend of reaction must have seemed pretty strong to have warranted such a pronunciamento.

"That efforts are already being made to influence the sources of public education is shown by such courses of lectures as those given at the School of Commerce of Northwestern University by William D. Kerr, until recently director of the bureau of public service economics, and more particularly those given under the auspices of the so-called finance forum of the West Side Y. M. C. A. in New York City, where every speaker was the employee of a privately owned and privately operated utility or actively allied, as shown by this schedule. That these lectures were considered wholly 'safe' is shown by the fact that they were all published in pamphlet form and distributed free of charge by a Wall Street investment banking house of high reputation."

Mr. Cooke declared that the public is asked to look upon the deliberations of public service commissions as scientific, while insiders know that the method of State regulation carried on under the most favorable circumstances is a hit-or-miss method. "We have been rushed into this era of State regulation with such rapidity that, humanly speaking, it is impossible for any commission more than to scratch the surface of the field that has been assigned to it." Many public service commission laws have been drafted with a view to giving an unfair advantage to private companies.

"It is a safe statement," Mr. Cooke said, "that a Governor hardly ever appoints a commissioner without at least consulting leading men in corporations to be regulated. Corporations in approving or disapproving candidates use a type of sardonic wisdom which has grown out of their experience." Mr. Cooke declared that he had heard it stated by men in authority that the corporations never objected to the appointment of an honest and able young lawyer if he had little or no practice, because it had been their experience that men so situated could be depended upon not to be too rigorous in decisions against companies. Again, corporations have worked for the appointment of weak-kneed but high-toned advocates of the rights of the people. Another cause operating seriously against regulation is the almost entire absence in practice of accepted theories of valuation. Those who control the utility situation deprecate any effort to establish generally accepted principles of valuation.

Mr. Cooke highly praised Prof. Edward W. Bemis, of whom he said: "He is cordially hated by the big men in the utility industries principally because he is a resourceful and competent witness in rate cases and knows how to meet the experts put forward by the private companies as perhaps can no other man."

STRIKE IN OHIO

The East Liverpool Traction & Light Company, East Liverpool, Ohio, and its striking motormen and conductors reached an agreement on March 9 and operation of the cars was at once resumed. The real question between them was whether the differences that had arisen could, under the contract, be submitted to arbitration, and it was agreed by both sides to leave this to Richard Brooks of Brooks & Thompson, attorneys and representatives of the company. He decided that this and some other questions could properly be submitted to arbitration. The men objected in the first place to the company's placing an extra man on one of the coal trains as motorman and insisted on a regular man. The company refused to make the change, but suggested arbitration. The men claimed that the trouble was not subject to arbitration, and this became the real dispute which finally caused the strike. The company agreed to put a regular man on the front end of the train and the man over whom the dispute arose on the rear end, and this was perfectly satisfactory. C. A. Smith, general manager of the company, said on March 11 that the line was again in regular operation.

PUBLIC SERVICE COMMISSION INQUIRY

The inquiry by the Legislative committee into the work of the Public Service Commission of the Second District of New York was begun at Albany on March 4. Frank H. Mott, secretary to the commission, was the first witness. In no instance had the commission since his incumbency had occasion to push a penalty action against any corporation for failure to obey an order of the commission. The increase in the volume of work of the commission was responsible for the increase in the expenses. Mr. Mott reviewed the work of the commission since he was appointed secretary in June, 1913, and described the manner of conducting hearings. He also presented statistics of complaints, both formal and informal, and the orders issued on these complaints.

At the hearing on March 5 the committee confined itself largely to the case of the commission against the United Traction Company, Albany. Charles R. Barnes, electric railway inspector of the commission, testified that the first complaint against service in Albany was made in 1908. In May, 1912, a resolution authorizing the investigation of the United Traction Company was adopted. After the resolution to inquire into the service had been adopted, James F. Hamilton was appointed general manager of the company and the commission postponed the inquiry to give Mr. Hamilton time in which to put into effect changes which he had in mind. Mr. Barnes had nothing to do with the inquiry regarding the request of citizens for 3-cent fares during the rush hours in Rochester in which the commission refused to grant the request. All matters in regard to service on the electric railways in Buffalo which were formerly referred to Mr. Barnes now went to Devoe P. Hodson, the member of the commission from Buffalo.

Martin S. Decker of the commission was the witness on March 6. The question of the granting of rights to the Canadian-American Power Company was gone into.

At the hearing on March 8 Colonel William Hayward, counsel to the committee, questioned Mr. Decker about the Westchester lighting case. In this particular case rehearings were granted, as the final order of the commission had apparently afforded little relief. Mr. Decker said in general that the delay in some of the cases was not the fault of the commission. He referred to the long process involved in fixing the "reproduction costs" of public service plants for rate-making purposes. There was very little duplication of work by the Public Service Commission for the Second District and the Interstate Commerce Commission. Mr. Decker favored the first district commission having supervision over telephone rates in New York City, but was opposed to giving the first district commission jurisdiction in Long Island and Westchester. The salary of $15,000 a year for each commissioner should not be reduced. A part of the session on March 8 was devoted to the action of the commission in approving the merger of the Syracuse, Lake Shore & Northern Railroad, the Rochester, Syracuse & Eastern Railroad and the Auburn & Northern Electric Railroad as the Empire United Railways.

DETROIT'S PURCHASE AGREEMENT

President Hutchins of Detroit United Says Acceptance of City's Purchase Offer Will Be Urged

Acceptance of the Detroit Street Railway Commission's purchase offer for the lines of the Detroit United Railway within the one-fare zone will be urged upon the stockholders of the company by the board of directors at the special meeting called for March 31, according to a letter which J. C. Hutchins, president of the company, has sent to the commission. The offer of the city is to assume the mortgage bonds of the company amounting to $24,900,000. Mr. Hutchins said in his letter:

"The directors considered this important matter, in realization of the fact that the company's plant account records show an investment on these properties exceeding $35,000,000 and of the further fact that should the principles employed in Cleveland to determine value be applied to the basic figures given you by Prof. E. W. Bemis, these properties have a value of more than $30,000,000. The conditions in Detroit, however, are such respecting the desire of the city to municipalize these properties that the directors are willing to recommend to the stockholders acceptance of your proposal and will do so at the stockholders' meeting, stipulating only that this transaction shall be concluded within reasonable time limits, and, of course, with the understanding that a workable and legal plan for the assumption of the mortgage debt shall be formulated and carried into effect."

After the receipt of the letter the commission announced that the plans for the city acquiring the lines would be hurried so that, if possible, the plan of consummating the transaction could be presented at the meeting of the stockholders. The commission is proceeding on the assumption that the offer will be accepted by the stockholders, and it is desired to get all the legal tangles straightened out in order that the proposition may be submitted to the electors within a reasonably short time after the meeting. The commission stated that on account of questions involved the nature of the proposed agreement between the city and the Detroit United Railway probably would not be divulged until the draft has been completed.

SEATTLE'S OPERATING RIGHTS

The City's Right to Operate a Utility Outside the Corporate Limits Before the Court

Judge J. T. Ronald recently overruled the demurrer interposed by Corporation Counsel James E. Bradford in the case of the State of Washington against the city of Seattle, instituted on complaint of the state bureau of accountancy and inspection and seeking to restrain the city from operating that portion of the Lake Burien Street Railway line known as Division "C" of the municipal system, which lies outside of the city limits. Mr. Bradford argued that the complaint did not constitute facts sufficient for a cause of action. Judge Ronald took the position that it does and the matter will now be tried on its merits. W. V. Tanner, attorney general, appearing for the State and the State board of accountancy and inspection, asks for a permanent injunction restraining the city from operating any portion of the line outside of the city limits, on the grounds that such power has never been delegated the city by the Legislature. More than a year ago, when the Lake Burien line was offered to the city as an unincumbered gift by its promoters, the question of the city's right to operate a railway outside of the city was raised. Mr. Bradford advised the Council that the city had such right and acting upon that opinion the Council accepted the railway and bound itself to operate the line. In overruling the demurrer Judge Ronald held that the operation of the municipally owned system was not necessary to the city's existence and that such a power could be exercised only by virtue of a grant of the Legislature. In conclusion Judge Ronald stated:

"It is most certainly plain that the power of the city of Seattle to tax itself to operate a railway outside of its corporate limits was not expressly granted by the statute, and this being a power not essential to its corporate existence, I am compelled to hold that it is not implied or presumed, and that the power given by the city charter to operate a car line outside the city limits is in conflict with the general law of the State."

MASSACHUSETTS LEGISLATIVE NEWS

The committee on street railways has reported adversely on the bill for the state ownership of street railways. The measure provided that upon the petition of 10 per cent of the legal voters of the State, the question of public ownership should be placed upon the ballot, and upon a referendum in favor of the bill the following Legislature was to prepare a plan for the purchase of the existing lines. The committee on metropolitan affairs has reported in favor of the construction of a station in the Boylston Street subway, Boston, at Arlington Street and has reported adversely in reference to petitions for the construction of a tunnel in Dorchester extending the prospective Dorchester subway. The committee has voted leave to withdraw the petition of Senator Bagley that the Public Service Commission investigate the operation of trains on the Boston Elevated rapid transit lines and of cars in the Boston subways. Other bills acted upon adversely by the committee are one that subway cars be made of metal; that the Washington Street tunnel be extended to Dudley Street and the elevated structure be removed in Boston on that portion of the system, and that the Boston Transit Commission investigate the necessity of further rapid transit tunnels and subways, anticipating the requirements of the next twenty-five years.

TOLEDO MUNICIPAL OWNERSHIP ORDINANCES

The ordinances providing for the issue of $8,000,000 of bonds by the city of Toledo, Ohio, for the purchase of the property of the Toledo Railways & Light Company were brought up in the City Council on the evening of March 8. City Solicitor Thurstin declared that the people had expressed their conviction for municipal ownership and that it was the duty of the members of the Council to carry out their wishes. There are two ordinances, each calling for a bond issue of $4,000,000. One provides for taking over the cars and tracks and the other for taking over the power house and other property of the company. The ordinances were referred to the committee on railways and telegraphs.

PHILADELPHIA MEASURE SIGNED

Mayor Rudolph Blankenburg of Philadelphia has signed the amended Philadelphia transit measure passed by the Councils on March 4 and carrying an appropriation of $6,000,000 for preliminary rapid transit work. The Mayor signed the bill upon the advice of his directors, especially Director Taylor of the Department of City Transit. Director Taylor's recommendation that the bill be approved was based upon the fact that, should a veto be sustained, there would be no hope of the passage of a proper transit ordinance this spring. In that event, the construction of rapid transit lines would be delayed for a year. The Philadelphia *Ledger* said that the action of the Mayor in signing the bill apparently committed the city to the construction of a Broad Street subway without terminal facilities, and with no provision for release of the heavy traffic in the congested business districts, and the construction of 3 miles of elevated structure through farm lands in the Northeast, but that the significant fact was that the passage of the measure did permit the city to begin the necessary preliminary work looking toward the construction of a more complete system in the future.

The Mayor said in part:

"We know that the ordinance is defective, but its defects are not so great that they cannot be remedied when reason shall take the place of folly, when business methods shall have superseded politics and selfish interests, by the passage of future transit ordinances. The ordinance now before me will make it possible for us to take the initial step in this important city-wide improvement, yet will not finally bind us to its improvident features. Such defects can be corrected by popular vote in November next before much harm is done, for the final decision on a comprehensive and sensible plan for city transit rests in the hands of Philadelphia's electors, through the election of a free Mayor and a self-owning Council."

KANSAS CITY INTERURBAN STATION

A committee of the City Council of Kansas City, Mo., on March 1 heard the application of W. E. Halsell and others for a franchise for an interurban station between Fourteenth and Fifteen Streets on Main Street. The company known as the Interurban Terminal Building Company has prepared plans for a six-story building, equipped with elevators, grill room and other conveniences, on a tract 225 ft. x 125 ft. The company is said to have the tentative approval of the site of the board of control of the Metropolitan Street Railway, contingent on the granting of the thirty-year franchise by the city.

The committee of the Council that heard the interurban station project outlined postponed further discussion until March 11. It was pointed out that even if the franchise should be granted and the city should establish an interurban station the interurban railways could not be compelled to use it. While the passenger station would not be used for a baggage terminal, it is thought that if the terminal station proposition is settled soon the railways will come to an agreement on the question of express terminals. Several other sites have been suggested for the interurban passenger station, and in the case of some of them the promoters are willing to do as much as Mr. Halsell and his associates toward erecting the building.

LEGISLATION IN NEW YORK

Among the bills introduced in the Senate recently affecting public utility companies are the following: an act to amend the railroad law in relation to the minimum number of trainmen to be employed in the operation of certain trains; making the operation of trains at grade on certain of the tracks of the New York Central & Hudson River Railroad in the city of New York, a public nuisance, and providing for discontinuing the use by the said company of said tracks at grade and for the regulation and improvement of the railroad terminals that approaches thereto, and of the motive power to be used thereon, and for such purposes to authorize the city of New York to grant real property, rights and privileges to said railroad.

Among the bills introduced recently into the Assembly of interest to public utilities are the following: to compel the interchange of transfers between certain elevated and surface railroads in the city of New York; to amend Section 37 and Chapter IV of the laws of 1891 with reference to the assessment of cost and expense necessary to be incurred for the construction of a rapid transit railroad and for property to be acquired for the construction and operation thereof upon property benefited thereby; making the operation of trains at grade on certain of the tracks of the New York Central & Hudson River Railroad in the city of New York a public nuisance.

TOLEDO BRIDGE ORDINANCE

An ordinance has been introduced in the City Council at Toledo, Ohio, which, if passed, will require the Toledo Railways & Light Company to pay a rental of $35 a day for the use of the tracks on the new Cherry Street Bridge across the Maumee River. Under the same ordinance the interurban roads are required to pay $5 a day for the use of the tracks.

Under a resolution adopted some time ago Director of Public Service Boardman was requested to ascertain the cost of laying the tracks on the bridge with a view to arriving at a basis for fixing the rentals. The length of the tracks on the bridge aggregate 1240 ft. and the cost was $22,500. On Jan. 19, 1915, 1051 city cars and 161 interurban cars passed over the bridge. In his letter to the Council Director Boardman said he believed that the cost of the bridge should also be taken into consideration in fixing the rentals, as the company would have been compelled to build a bridge if the city had not done so. He recommended a charge of $24.36 a day, but this was raised to the higher figure when it went to the Council. The ordinance is to go into effect on Oct. 28, 1915, and the rentals are to be collected monthly. If the local company or any interurban company fails to pay the rentals, the city through its police department is to prevent such company from using the bridge.

PENNSYLVANIA ELECTRIFICATION PROGRESS

According to the annual report of the Pennsylvania Railroad for 1914, the electrification of the main line from Broad Street station, Philadelphia, to Paoli is progressing rapidly and without causing any serious interruption of traffic. The work from Paoli to West Philadelphia is almost completed, including the substations, and the remaining section of the electrification into the Broad Street station is being actively prosecuted. Satisfactory progress has also been made in equipping steel cars now in steam service with electric motors and apparatus in accordance with the original design. It is expected, therefore, to operate the main line suburban passenger trains by electricity about June 1, 1915.

The report states that it is hoped that in 1915 financial conditions will permit the extension of electrification to North Philadelphia and the Chestnut Hill branch, and also the elimination of certain grade crossings on that line. This would relieve the track and yard congestion at the Broad Street station, by transferring to the electric service more than sixty trains on a daily schedule now operated by steam. Further consideration was given during the year to plans for the future electrification of the main line crossing the Allegheny Mountains, from Altoona, the foot of the eastern slope, to Conemaugh, on the western slope, by which it is believed large operating economies can be effected and the heavy freight train movement facilitated.

INDIANA LEGISLATURE ADJOURNS

The Indiana Legislature adjourned on March 8 at midnight. The House on March 3 failed to support Governor Ralston's recommendation that the Public Service Commission be given the right to increase railroad and interurban passenger rates to 2½ cents per mile upon petition and examination of the facts, by killing the Waltz bill which was introduced at the Governor's suggestion. The Senate also killed the Zearing bill, which provided for the control of "jitney" buses by the Public Service Commission. Another measure of interest to the public utilities of the State was Senate bill 316, which extended the time for taking indeterminate permits in lieu of existing franchises from July 1, 1915 (as provided in the public utility commission law enacted May 1, 1913) to July 1, 1917. This was killed by vote in the House on March 6, but on a motion to reconsider introduced on the last day, March 8, was passed by a vote of eighty to four.

The Senate passed the following bills: House bill 110 providing a penalty for the destruction or interference with railroad signals; House bill 492, providing that court service can be made on agent of receiver of a corporation when receiver is non-resident of State; House bill 419, providing a penalty for public service corporations charging rates in excess of published tariffs; House bill 176, which is the compromise workmen's compensation bill as amended in the Senate. A bill was introduced in the Senate on March 3 providing that receivers of insolvent companies may sue stockholders after the funds of the company have been exhausted to pay debts, to secure additional funds to pay indebtedness.

The House killed the following bills: Requiring railroad companies to cut weeds along the right-of-way; bill providing maximum interurban fare of 1½ cents; bill providing that where railroad intersections occur in persons' land they shall have right to construct roadway across right-of-way; bill providing that traction companies shall maintain two toilet rooms in each car; Senate bill providing that newspapers may exchange advertising for railroad transportation.

The House passed the following bills: Senate bill 98, prohibiting public utilities from diverting funds when an order for examination has been made by the Public Service Commission; House bill 171, amending public utility commission act by giving the commission sixty instead of thirty days to take action on railroad tariffs; Senate bill 239, giving Public Service Commission power to order separation of grade crossings in cities of 20,000 population or less; Senate bill 318, amending public utility act to permit railroad companies to give passes to employees who may hold public office.

LEGISLATION IN OHIO

Senator Myers has introduced in the Ohio Legislature a bill which provides that officers of steam and electric railways may build and operate union passenger stations for the use of railroads and interurban railways. Present laws do not provide for this contingency. The Senate has passed the Myers bill which provides that service on receivers of interurban railways shall be valid when made in any county through which the road passes. The House has passed the bill which authorizes the Public Utilities Commission to order high-tension wires placed underground.

The Ott bill has been recommended for passage by the labor committee of the Ohio House. This bill, now somewhat modified in its form, provides for nine hours of work in a limit of eleven consecutive hours and twelve hours of continuous rest for motormen and conductors.

The Smith bill, requiring heat in the vestibules of street and interurban cars for the motormen and conductors, and screens to protect them from dust, has passed both houses and is before the Governor.

Representative Frank Reighard has presented a bill that will do away with the mandatory requirement that the Public Utilities Commission value the property of all public service companies and make such appraisements optional with the commission. The section of the old law will be repealed which requires the commission to make an appraisal on demand of the Council of a municipality where a dispute or disagreement on rates exists. If this bill becomes a law it may affect the proposed valuation of the property of the Cincinnati Traction Company, the franchise of which calls for a revision of fares in 1916.

War Suspends Service.—The Laredo Electric & Railway Company, operating in Laredo, Tex., and Nuevo Laredo, Mexico, is reported to have abandoned service on its line in the Mexican city because of lack of patronage and generally unsettled conditions.

Increase in Return Allowed.—The commissioners of Franklin County have so modified the franchise of the East Linden (Ohio) Electric Railway that it may receive a return of 8 per cent on its investment, instead of 6 per cent, before it is called upon to reduce its rate of fare from 5 cents to six tickets for 25 cents.

Mayor Mitchel on Municipal Ownership.—In an address before the Republican Club in Manhattan, on March 6, Mayor Mitchel of New York, in discussing the question of the new State constitution, said: "I hope to see the new constitution give to cities the right to determine for themselves how far they should go in the direction of acquisition of public utilities."

Oak Park Elevated Suit.—The bondholders of the Chicago & Oak Park Elevated Railroad, Chicago, Ill., have filed a bill in equity in the United States District Court declaring that although the road may have forfeited its rights to the use of the Market Street "stub" structure by accepting various city ordinances, the bondholders have not waived any of their rights, and therefore ask that the city's suit for condemnation be dismissed.

The New Jersey Gas Case.—Argument in the rehearing on the 90-cent gas rate was concluded on March 4 in the Court of Errors and Appeals at Trenton. In the absence of Richard V. Lindabury, counsel for the Public Service Corporation, Thomas H. McCarter, president of the corporation, made the principal argument. Chancellor Walker announced that the case would be taken under advisement in conference. The case involves the question of franchise value and has been referred to previously at length in the ELECTRIC RAILWAY JOURNAL.

Pittsburgh Transit Measure.—Representative A. C. Stein of Allegheny has introduced in the House at Harrisburg, Pa., two bills which are a part of the legislative program of Mayor Joseph G. Armstrong of Pittsburgh. One measure authorizes cities of the second class, Pittsburgh and Scranton, to construct subways for traction lines and pipe galleries and lease them to public corporations. The other authorizes all municipalities to purchase the entire capital stock of bridge companies owning structures wholly or partly within the limits of such muncipalities.

The Seattle Vote.—With the defeat at the polls on March 2 of propositions "A" and "B" providing respectively for the extension of the municipal railway into Ballard and the connection of Division "A" and "C" by motor buses, the municipal railway problem is placed squarely up to the City Council again. Proposition "A" was: "Shall the city purchase and operate auto-cars to connect Divisions 'A' and 'C' of the Seattle Municipal Railways, and incur an expense of not to exceed $50,000 for such purpose?" The result was 16,799 for, 20,923 against. Proposition "B" was: "Shall the city extend Division 'A' of the city car lines on Leary Avenue and other streets and incur an expense not exceeding $100,000?" The result was 18,388 for, 19,015 against.

Service Order in Winnipeg.—The Manitoba Public Utilities Commission has issued six orders affecting the Winnipeg Electric Railway; the first provides for the purchase of fire hose bridges to be carried by the fire apparatus so as to be available for use by the street cars at all times. The second provides for the regulation of employees' watches. The third provides for the inspection and control of waiting rooms and shelters. The fourth provides for destination signs on the front and sides of cars. The fifth requires that cars going to the carhouses shall be indicated. The sixth order relaxes the previous order relating to the measure of protection to be afforded at the St. James Street subway by directing the installation of the General Railway Signal Company's light signal. The company has asked that the commission reconsider the fourth order.

Decision Against Duplication of Plants.—The Supreme Court of California has sustained the right of the California Railroad Commission to refuse the Oro Electric Corporation a permit to do business in Stockton, in competition with the Western States Gas & Electric Company. This decision upholds the authority of the Railroad Commission to prevent destructive competition in the public utility business. The Railroad Commission authorized an interview concerning the decision in which it said: "It means that the policies of the Railroad Commission, based on a State-wide view, cannot be thwarted by purely local considerations, and that henceforth the commission will not necessarily be bound to permit the impairment of an existing public utility service, if it is just and reasonable, by admitting a new public utility into the field unless the interests of the public clearly so require."

Alien Law Legislation.—Under an emergency message from Governor Whitman of New York the Senate on March 8 passed the Spring bill repealing the alien clause in the labor law. Before it was placed on final passage, however, the bill was amended so radically that in its final form it provided for amendment rather than repeal of that clause. The Spring bill as modified would provide that preference should be given to citizen labor over alien, whenever citizen labor can be obtained on public contracts. In its original form the bill merely repealed the alien clause in the labor law and left contractors on public works a free hand to employ any sort of labor they desired. On the same day the Supreme Court of the United States made it plain that its injunction of March 4 meant that the Public Service Commission of New York could not interfere with the employment of aliens by the subway contractors and that the contractors even if they employed foreign labor must be paid. The Chief Justice said: "The purpose of this order is to continue in force the injunction provided for in the judgment of the Appelate Division of the Supreme Court of the State of New York and to continue the same in full force until the final decision of this court in this case, or until the same is modified by order of this court." A move was made at Washington on March 8 for the advancement of the hearing in this case. It is expected that a date in April will be fixed by the court.

National Electric Prosperity Week.—At a meeting of the Society of Electrical Development, Inc., held on March 4 in New York, definite action was taken in connection with the selection of a committee to have charge of the movement which has been inaugurated for the so-called National Electric Prosperity Week. The chairman, E. W. Lord, and the general manager of the society, J. M. Wakeman, were decided upon to select a nominating committee of five men representing the varied interests who in turn are to select twenty-five men who will represent the central stations, manufacturers, jobbers, contractors, dealers and the technical press. One man from each interest will be named as chairman of his division. Messrs. Lord and Wakeman then named as a nominating committee John Williams of the Cities Service Company, representing the central stations; Ray D. Lillibridge of the Wagner Electric Company, representing the manufacturers; E. W. Rockafeller of the Western Electric Company, representing the jobbers; J. R. Strong of the Tucker Electric Construction Company, representing the contractors, and Hugh M. Wilson of the *Electrical World*, representing the trade press. This committee will meet to select the steering committee, which will be composed of men prominent in the electrical industry, representing the General Electric, Westinghouse and other large manufacturers, also the leading central stations, jobbers, contractors and dealers of the country.

PROGRAMS OF ASSOCIATION MEETINGS

Pennsylvania Street Railway Association

At a meeting of the executive committee of the Pennsylvania Street Railway Association held on March 5 it was decided to hold the spring meeting of the association at Pittsburgh on May 11 and 12. P. N. Jones, general manager of the Pittsburgh Railways, and T. B. Donnelly, claim agent of the West Penn Traction Company, were appointed a committee on arrangements. A committee on the program will be announced later.

Illinois Electric Railway Association

The next meeting of the Illinois Electric Railways Association will be held on March 19, at the Hotel Morrison, Chicago, Ill. It is announced that papers will be read by J. M. Bosenbury, superintendent of motive power and equipment of the Illinois Traction System, Peoria, Ill., and by Robert M. Feustel, formerly chief engineer of the Illinois Public Utilities Commission. A list of questions regarding operating problems brought up by some of the member companies has been sent out with the announcements of the meeting, which stated that they will be brought up for discussion.

Western Society of Engineers

At a meeting of the Western Society of Engineers to be held in Chicago on the evening of March 16, 1915, during the week of the convention of the American Railway Engineering Association, the results secured with electrified steam roads will be discussed. W. S. Murray, consulting engineer of the New York, New Haven & Hartford Railroad, will describe the results secured on that road between New Haven and New York, a distance of 74 miles. Edwin B. Katte, chief engineer of electric traction of the New York Central Railroad, New York, will discuss the results secured from electric operation on his road, illustrating portions of his address with lantern slides. R. Beeuwkes, electrical engineer of the Chicago, Milwaukee & St. Paul Railroad, Butte, Mont., will read a paper describing his 440-mile electrification, construction of which is now under way. Several other engineers in charge of similar projects have been invited to take part in the discussion.

Iowa Street & Interurban Railway Association

The fifteenth annual convention of the Iowa section of the National Electric Light Association will be held in Keokuk, Ia., on April 20, 21 and 22. The annual convention of the Iowa Street & Interurban Railway Association will be held in the same city on April 22 and 23. The Iowa Electrical Contractors' Association will also hold its annual meeting at Keokuk some time during this period. The members of the associations will be the guests of the Keokuk Electric Company and the Mississippi Power Company, Stone & Webster properties, and the entertainment will include a banquet given by the manufacturers and their representatives, followed by an illustrated lecture on the development of the Keokuk Water Power. It is intended to charter one of the large Mississippi River steamboats on the last afternoon of the convention for the purpose of a ride up the Mississippi River. Sessions will be held on the boat in the afternoon, and dinner will be served en route. The return to Keokuk will be made at about 11 p.m. It is not intended to hold a regular electrical show, but space will be provided for any salesmen or manufacturers who wish to display their appliances during the convention.

Financial and Corporate

THE INVESTMENT MARKET

From interviews with prominent banking firms in New York City during the last week it has been ascertained that the general condition of the investment market since Jan. 1 has been more favorable than before, although the market during the last two weeks has been a trifle slower on account of depressing international complications.

There seems to be a ready market for good municipal bonds and a strong demand for railroad and public utility note issues. Since the beginning of the year the electric railway notes sold either in full or in most part, have included the following: Winnipeg Electric Railway, 6 per cent one and two-year notes, $1,500,000; Pacific Gas & Electric Company 5 per cent one-year gold notes, $4,000,000, and United Light & Railways Company 6 per cent three-year notes, $1,500,000. Other short term issues now being placed are Puget Sound Traction, Light & Power Company 6 per cent five-year bonds, $557,000; Massachusetts Electric Companies 5 per cent three-year gold coupon notes, $3,000,000, and United Gas & Electric Corporation 6 per cent three-year collateral notes, $5,500,000. A particular late offering of interest is the $7,000,000 of 6 per cent two-year gold notes of the Montreal Tramways & Power Company, Ltd. Advices are that most of these have been sold to new holders.

The electric railway bond market has not been as active as the note market during the last two months, but some issues have appeared, such as the Massachusetts Northeastern Street Railway 5 per cent twenty-year bonds, $707,000; the Middle West Utilities Company 6 per cent ten-year bonds, $500,000; the Pacific Power & Light Company 5 per cent twenty-year bonds, $1,052,000, and the New York State Railways 4½ per cent fifty-year bonds, $3,000,000. The complete sale of the last two issues indicates a strengthening market for the longer issues. This fact is emphasized by the recent placing of $27,000,000 of New York State canal and highway bonds at a higher premium than expected.

These facts tend to indicate an abundant supply of capital awaiting investment, and it is hoped that the trend toward the absorption of new and attractive offerings is only started. The most striking point in connection with the utility sales thus far, however, is that most of them are for refunding purposes. As yet there is a practically complete absence of financing for new undertakings.

WATER VERSUS RAIL TRANSPORTATION

The March trade letter of the National Bank of Commerce, Detroit, Mich., sets forth a striking statement of the attitude of the national and state governments in relation to the steam and electric railroad industries as compared to other transportation industries. This bank states that it is sometimes difficult for an observer to understand why the United States and state legislatures bestow favors upon transportation by water through granting liberal appropriations, while at the same time they are busy enacting laws arbitrarily to regulate and tax transportation by land.

New ship channels are opened, old channels and harbors are deepened, additional lighthouses and range lights are established and maintained at the government's expense, and United States engineers are stationed at the leading ports to study and recommend necessary improvements to be made at the expense of the federal government. Instead of making similar appropriations of funds, however, to reduce grades, straighten curves and tunnel mountains or to maintain block signals, the government and the state legislatures reduce passenger fares, increase taxation, enact full-crew laws and through commissions compel improvements to be made at the expense of the railroads.

Furthermore, the national government has created the Interstate Commerce Commission, representing the shipper, to fix rates for the shippers and to see that the railroads, if they earn any money at all, earn no exorbitant amount. This is in great contrast to the practice followed for water-borne commerce, the rates for which are fixed by the companies themselves and are regulated only by competition. This general condition of affairs has caused railroad credit to drop to a low ebb, and the bank wonders whether or not the railroads are receiving a square deal.

ANNUAL REPORTS

Twin City Rapid Transit Company

The comparative statement of income, profit and loss of the Twin City Rapid Transit Company, Minneapolis, Minn., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Revenues:		
Revenue from transportation	$9,227,602	$8,818,178
Revenue from operations other than transportation	72,043	52,158
Total revenues	$9,299,645	$8,870,336
Expenses:		
Maintenance of way and structures	$419,836	$394,527
Maintenance of equipment	389,660	347,453
Traffic expenses	46,579	40,913
Conducting transportation	3,170,957	2,923,629
General and miscellaneous	811,079	794,119
Total operating expenses	$4,838,111	$4,500,641
Net operating revenue	$4,461,534	$4,369,695
Taxes	$593,078	$586,129
Depreciation	994,072	1,060,000
Total taxes and depreciation	$1,587,150	$1,646,129
Surplus available for fixed charges and dividends	$2,874,384	$2,723,566
Fixed charges	$986,743	$975,311
Preferred stock dividends	210,000	210,000
Common stock dividends	1,250,514	1,206,000
Total fixed charges and dividends	$2,447,257	$2,391,311
Net income to surplus account	$427,127	$332,255

By comparison with 1913, the following increases during 1914 were shown: gross revenue, $429,309, or 4.84 per cent; operating expenses, $337,469, or 7.5 per cent, and net operating revenue, $91,839, or 2.10 per cent. The total single-track mileage of the company is 436.72, and the average total single-track mileage operated during 1914 was 418.78. The gross passenger revenue was $9,194,169, and the gross passenger revenue per single-track mile operated was $21,955.

During 1914 the company carried 184,352,963 revenue passengers, as compared to 175,895,811 in 1913, and in 1914 the transfers redeemed numbered 66,742,000, as compared to 63,914,277 in 1913. Other statistics for the two years follow: operating percentage (taxes included), 1914, 58.4, and 1913, 57.35; operating percentage (taxes and depreciation included), 1914, 69.09, and 1913, 69.3; percentage earned and paid on preferred stock, 1914 and 1913, 7; percentage earned on common stock (after depreciation charge) 1914, 8.05, and 1913, 7.65; percentage paid on common stock, 1914 and 1913, 6.

The amount expended for new construction during the year was $1,730,405, and for renewals, $633,733, or a total of $2,364,138. New track and extensions totaling 24.34 miles were built and put in operation during the year. Furthermore, ten old cars were retired from service and seventy-nine were put in service.

Louisville (Ky.) Railway

A summary of the annual report of the Louisville (Ky.) Railway for the calendar year 1914 follows:

Transportation revenue (city lines)	$3,031,452
Transportation revenue (interurban lines)	555,887
Revenue from mail, trackage, advertising and power (city lines)	135,030
Revenue from mail, trackage, advertising and power (interurban lines)	16,390
Gross revenues	$3,738,759
Operating expenses (city lines)	$1,796,664
Operating expenses (interurban lines)	359,514
State, county and city tax for twelve months (city lines)	269,558
State, county and city tax for twelve months (interurban lines)	31,898
Interest on debt, paid and accrued	606,667
Dividend on preferred stock	125,000
Total operating expense, fixed charges and preferred dividend	$3,189,301
Net income applicable to common dividends	$549,458

The revenues for the fiscal year were somewhat below those of 1913 on account of the general depressed business conditions. In spite of this fact, however, the usual common dividend of $545,650 was disbursed from the net income of $549,458, and $3,808 was carried forward. On account of the extensive improvements undertaken during 1913 the company thought it inexpedient to do much along this line during the last year. With the exception of the new shops, therefore, improvements were limited. The whole physical property of the interurban lines was gone over and placed in better condition for future development. Cables and conduits were built and improved during the year, and considerable street and sewer construction work carried on by the city called for outlay by the company for track work. Much of the machinery in the new power house at Twentieth and High Streets was paid for in 1914, this not having been tested and accepted in the preceding year.

Federal Light & Traction Company

The consolidated comparative statement of income, profit and loss of the Federal Light & Traction Company, New York, N. Y., and its subsidiaries for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Gross earnings	$2,416,960	$2,372,174
Operating expenses and taxes	1,498,684	1,443,234
Net earnings (subsidiary companies)	$918,276	$928,940
Federal Light & Traction Company	29,623	36,640
Total income	$888,653	$892,300
Interest charges	586,155	531,787
Central Arkansas Railway & Light Corporation dividend	84,000	63,000
Federal Light & Traction Company dividend	112,500	150,000
Net income	$105,998	$147,513

Depreciation charges and inter-company earnings, expenses and interest charges are not included in the foregoing statement. During 1914 the gross earnings of the subsidiary companies increased $44,786, or 1.9 per cent, but the operating expenses and taxes decreased $55,450, or 3.8 per cent. The net earnings of subsidiary companies therefore decreased $10,664, or 1.1 per cent. The earnings of the holding company, however, increased $7,017, so that the total income decrease was only $3,647, or 0.4 per cent. Interest charges increased $54,368 and the Central Arkansas Railway & Light Corporation dividend $21,000, while the Federal Light & Traction Company dividend decreased $37,500. Hence the net income decreased $41,515, or 28.1 per cent.

Albany Southern Railroad

The gross operating revenues of the railway and lighting departments of the Albany (N. Y.) Southern Railroad for the fiscal year ended June 30, 1914, were $507,048, or 1.97 per cent. The operating expenses, including taxes, amounted to $381,972, an increase of 13.9 per cent, leaving a net operating revenue of $125,076, a decrease of 22.8 per cent. Retirements and replacements and other adjustments chargeable to fixed capital during the year amounted to $13,069, and the surplus was adjusted accordingly.

During the year the railway department of the company suffered diminishing traffic and increased public demands. When the company attempted to meet the decrease in traffic by cutting down a number of trains, complaint was made to the Public Service Commission and the company was obliged to replace the trains taken off. The company on March 27 put into effect an increase in rates, which was also taken before the Public Service Commission. The officers of the company believe that they can maintain the increase as just and equitable. The last winter was one of unusual severity on account of snow and floods. For maintenance the company spent $55,864, or 11 per cent of the gross operating revenue. The increase of $53,853 in operating expenses was caused by the increase of $16,142 in the cost of conducting transportation, and an increase of $13,149 in general and miscellaneous expenses on account of larger accruals for accidents and damages. In construction and new work in this department the company expended $71,856 during the year. This amount represented one new fifty-ton locomotive, two new steel passenger cars, five new passenger car equipments, paving, new track work and other miscellaneous improvements.

The report emphasizes the fact that the officers are bending every effort to secure equitable tax assessments on the property of the company. Last year the taxes amounted to $44,400, or 8.7 per cent of the gross operating revenue.

Slight reductions in the assessments recently filed indicate that the company is beginning to receive some recognition of the unfairness of the assessments. The actual taxes assessed against the property and paid in the last fiscal year represent an increase of more than 100 per cent within seven years.

EARNINGS OF WASHINGTON COMPANIES

The fourth annual report of the Public Service Commission of Washington, covering the period from Sept. 1, 1913, to Nov. 30, 1914, is mostly devoted to reports of cases decided by the commission and reprints of orders issued by it. During the year the commission disposed of 466 formal complaints and issued 411 formal orders, as compared to 428 and 393 in the preceding period. This is the first report of the commission to contain any financial statements for electric railways in the State. No comparative figures for the preceding year are available to indicate the business condition in the Northwest, but the operating results for the year ended June 30, 1914, are shown by the accompanying table.

TABLE SHOWING MILEAGE AND FINANCIAL FIGURES FOR ELECTRIC RAILWAYS IN WASHINGTON FOR YEAR ENDED JUNE 30, 1914

Name of Company	Total Mileage Operated	Total Operating Revenue	Total Operating Expense	Net Operating Revenue	Total Taxes Paid	Total Number of Passengers Carried	Average Fare per Revenue Passenger
Grays Harbor Railway & Light Company	11.94	$124,300	$76,473	$47,827	$8,280	2,526,469	04.713
Loyal Railway	1.75	....	7,739	475	.....	....	.....
Olympia Light & Power Company	6.03	37,190	30,713	6,476	5,100	780,034	04.806
†Pacific Northwest Traction Company	77.47	471,093	232,399	238,694	37,286	1,327,653	26.999
Pacific Traction Company	24.37	88,305	68,950	19,354	2,738	1,868,875	04.887
Puget Sound Electric Company	65.51	500,632	363,337	137,294	69,633	2,413,055	14.003
Puget Sound International Railway & Power Company	22.06	203,233	137,104	66,128	40,834	4,056,659	58.29
††Puget Sound Traction, Light & Power Company	228.66	3,926,517	2,079,668	1,846,849	601,645	106,214,389	04.658
Seattle, Renton & Southern Railway	24.54	286,728	197,326	89,401	31,596	6,320,641	04.134
Spokane & Inland Empire Railroad	290.42	1,531,650	1,062,704	468,946	150,000	13,762,819	08.289
Tacoma Railway & Power Company	108.06	1,049,659	709,549	340,110	82,358	25,196,765	04.996
Walla Walla Valley Railway	26.50	128,946	91,764	37,182	7,264	1,655,414	06.519
Washington Electric Railway	7.20	1,918	2,107	*188	530	....	.....
†††Washington-Oregon Corporation	20.18	100,857	78,012	22,844	26,154	1,342,664	06.917
Washington Water Power Company, city lines	52.39	803,870	761,983	41,887	67,320	18,495,294	04.923
Washington Water Power Company, interurban lines	23.89	102,785	95,915	6,870	4,390	255,557	02.951
Western Washington Power Company	5.60	30,478	25,401	5,077	566	535,588	04.935
Willapa Electric Railway	5.44	33,656	15,998	17,657	2,109	....	.....
Yakima Valley Transportation Company	39.19	142,800	117,416	25,383	6,583	2,351,978	04.617

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*Deficit.

†Includes Seattle-Everett Traction Company and Whatcom County Railway & Light Company.

††Includes Seattle Electric Company.

†††Includes Twin City Light & Power Company and Vancouver Traction Company.

LOS ANGELES TRANSFER DENIED

Commission Refuses Permission for Los Angeles Railway Corporation and City Railway of Los Angeles to Transfer Properties to The Los Angeles Railway

The California Railroad Commission has issued an order denying the application of the Los Angeles Railway Corporation and the City Railway of Los Angeles for authority to transfer their properties to The Los Angeles Railway. The order provides, however, that the companies may at a later date submit a modification of the present application. Previous references to this application were made in the ELECTRIC RAILWAY JOURNAL of Jan. 31 and Sept. 12, 1914.

Embodied in the present application was a request of The Los Angeles Railway for authority (1) to issue common stock to the par value of $20,000,000 in exchange for $20,000,000 of the capital stock of the Los Angeles Railway Corporation and $5,000,000 of the capital stock of the City Railway of Los Angeles; (2) to execute a mortgage of its properties, and (3) to issue bonds to the face value of $23,544,000 to be exchanged for bonds of the Los Angeles Railway Corporation and of the City Railway of Los Angeles, on outstanding bonds issued by these.

The main question at issue in the application was the value of the two operating companies as compared to the $23,544,000 of bonds to be issued. A valuation of the properties was undertaken in connection with the application, and various estimates of depreciated reproduction value were made, as follows: By the City of Los Angeles, as of Jan. 1, 1913, $14,782,112; by the Los Angeles Railway Corporation, as of Dec. 1, 1913, $24,579,566, and by the engineering department of the commission, as of Dec. 1, 1913, $19,747,767. With regard to the figures submitted by the city of Los Angeles, the engineers who prepared the report stated that it was not prepared for presentation to the commission, and that it was only an engineering estimate. As to the commission's valuation, the decision of the commission says:

"It can fairly be said to be an exhaustive report, and while it is, of course, possible that the final determination of value may increase the figures submitted therein, the commission is not convinced that a showing can be made of a value of applicant's plant equal to the face value of its outstanding bonds."

The commission in its investigation found itself hampered by the absence of many important books of the predecessor companies. In this regard the commission expressed itself as follows:

"The explanation was made that these books had been burned, as it was thought that their usefulness had ended. This does not appear to be a valid explanation. Any man who has served a big public service corporation as long in an official capacity as have certain of the officials of these applicants, either did know or ought to have known the extreme importance of preserving corporate records. The conclusion is justified, therefore, that these books were either destroyed or allowed to be destroyed in order to avoid a public revelation of their contents."

American Cities Company, New York, N. Y.—At the recent annual meeting of the American Cities Company, S. J. Dill, C. H. Hardy, D. D. Curran, Edwin B. Parker and Walter G. Weiss were elected directors to succeed Irving Bonbright, A. J. Hemphill and S. Z. Mitchell, retired, and W. W. Kavanaugh, deceased, and to fill a vacancy.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—Cassatt & Company, R. M. Stinson & Company and Henry & West, Philadelphia, are placing at 98½ and interest, to yield 6.5 per cent, $800,000 of three-year 6 per cent collateral trust notes of the Aurora, Elgin & Chicago Railroad. These notes are dated March 1, 1915, and are due on March 1, 1918, being redeemable before maturity at graded premiums from 101 down to 100¼. They are secured by deposits with the trustee of $1,067,000 of first and refunding mortgage 5 per cent bonds, due 1946, which are a lien on all the property of the company, and upon retirement of an issue of Elgin, Aurora & Southern Traction Company 5's due on June 1, 1916, will become a first mortgage on one-half of the entire property. Following these notes is $3,100,000 of preferred stock giving 6 per cent dividends and the same amount of common stock. The authorization of this issue was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20.

Central Park, North & East River Railroad, New York, N. Y.—The separate answer of the executors of the estate of Thomas Dolan to the suit against Mr. Dolan, P. A. B. Widener and George W. Elkins, in which they are charged with wasting more than $2,000,000 of the assets of the Central Park, North & East River Railroad, was filed on March 5 in the United States District Court in Philadelphia. The principal points of the defense are that these men were not directors during the years when it is alleged they were guilty of neglect of duty; that the transactions complained of as being illegal were ratified by the stockholders of the company when negotiations were being made, and that the statute of limitations of both New York and Pennsylvania bar such claims as presented in the suit (which are denied as a whole). The establishment of the minority stockholders' right to sue the directors was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 16.

Chicago (Ill.) Elevated Railways.—The Chicago Elevated Railways has deferred action on the quarterly dividend of 1½ per cent on the preferred participation shares, due March 1. Similar action was taken on the Sept. 1 and Dec. 1, 1914, payments. Officials of the company say that the preferred dividend was passed March 1 because the surplus earnings of the company this year are being used for improvements. The gross earnings of the company for the first two months of 1915 were 1 per cent more than for the first two months of 1914. The outlook is now said to be quite promising.

Fairmount Park Transportation Company, Philadelphia, Pa.—Samuel M. Clements, Jr., and William L. Chrisman, two members of the reorganization committee of the Fairmount Park Transportation Company, were recently appointed temporary receivers for the company by the United States District Court. On March 8 the appointments were made permanent. It is stated that the proceeding is an amicable one, in order to carry out the reorganization plan of the company. The details of this plan and its acceptance by the stockholders were noted in the ELECTRIC RAILWAY JOURNAL of Jan. 16, Feb. 27 and March 6.

Fort Wayne & Springfield Railway, Decatur, Ind.—Pursuant to a judgment and decree of the Adams Circuit Court of Adams County, Ind., French Quinn, receiver of the Fort Wayne & Springfield Railway, will offer the property of the company for sale on May 4 at the court house in Decatur. The sale is to be free of liens except taxes and the Calhoun Street improvement assessment in Fort Wayne. All bids must be accompanied by a deposit of $1,000 in cash or by certified check.

Hudson & Manhattan Railroad, New York, N. Y.—The directors of the Hudson & Manhattan Railroad have declared an interest payment of 1 per cent on the company's adjustment income bonds for the six months ended Dec. 31, 1914, payable on April 1 at the office of Harvey, Fisk & Sons. This is the same interest rate that was used for previous half-years.

New York (N. Y.) Railways.—The arbitrators who will decide the amount of interest to be paid on the New York Railways adjustment income 5 per cent bonds for the six months ended Dec. 31, 1914, are H. H. Porter, of Sanderson & Porter; James Marwick, of Marwick, Mitchell, Peat & Company, and W. G. Ross, one of the directors of the Montreal (Que.) Tramways. Mr. Porter was chosen by the New York Railways, Mr. Marwick by the trustee of the mortgage, and Mr. Ross, the third arbitrator, by the first two. These are the same experts who arbitrated the question of interest last year. The payment on the bonds for the last half of 1913 was 2.345 per cent, and the total for the year was 3.98 per cent, while the rate for the first six months of 1914 was 1.288 per cent.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—The annual report of the Petaluna & Santa Rosa Railway for the year ended Dec. 31, 1914, shows that the gross earnings decreased from $303,645 to $298,224, while the operating expenses increased from $202,621 to $213,783, consequently giving a decrease in net earnings from $101,023 to $84,440. The fixed charges rose from $58,221 to $60,421, so that the surplus dropped from $42,801 to $24,018. A fire loss of $14,138 in 1914, and other adjustments, further reduced that year's surplus to $11,017. During the year the railway passengers increased from 733,538 to 757,759 and the freight from 61,968 tons to 70,265 tons.

Public Utilities Company, Evansville, Ind.—Announcement has been made by the Public Utilities Company, which is the assignee and vendee of the Evansville & Princeton Traction Company, that the trustees under the mortgage of April 1, 1903, will on April 1, 1915, at the office of the Citizens' Saving & Trust Company, Cleveland, receive at 105 and accrued interest, bonds 71 to 80, inclusive, issued by the Evansville & Princeton Traction Company.

United Railways Investment Company, San Francisco, Cal.—The directors of the United Railways Investment Company have changed the fiscal year of the company to start with July 1, and the annual meeting this year will be held in October instead of May. This will enable the company to issue its annual report in consolidated form for itself and its subsidiaries. A balance sheet and an income statement for the year ended Dec. 31, 1914, will be sent to stockholders this month, but the complete pamphlet report will not be issued until October.

DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, preferred.

Brockton & Plymouth Street Railway, Plymouth, Mass., 3 per cent, preferred.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred, series A.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-quarters of 1 per cent, second preferred.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

West End Street Railway, Boston, Mass., $1.75.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan.,	'15	$144,145	*$136,100	$8,045	$2,989	$5,056
1 " "	'14	152,762	*142,642	10,119	347	9,772
7 " "	'15	1,241,521	*1,060,747	180,775	24,670	156,105
7 " "	'14	1,289,952	*1,058,040	231,912	2,429	229,483

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Jan.,	'15	$425,900	$12,929	$412,972	$40,833	$372,139
1 " "	'14	414,759	3,586	411,174	29,167	382,007
12 " "	'15	3,945,594	126,251	3,819,344	431,667	3,387,677
12 " "	'14	2,417,181	83,215	2,333,966	152,229	2,181,737

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILROAD, CLEVELAND, OHIO.

1m., Jan.,	'15	$93,315	$59,158	$34,157	$32,053	$2,104
1 " "	'14	94,052	60,141	33,911	31,895	2,016

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., Dec.,	'14	$489,345	*$194,720	$294,626	$33,648	$260,978
1 " "	'13	502,473	*209,909	292,564	37,458	255,106
6 " "	'14	2,715,265	*1,117,709	1,597,556	208,283	1,389,274
6 " "	'13	2,741,203	*1,171,218	1,569,985	201,263	1,368,722

INTERBOROUGH RAPID TRANSIT, NEW YORK, N. Y.

1m., Jan.,	'15	$2,878,732	$1,327,436	$1,551,296	$912,571	‡$686,354
1 " "	'14	2,933,870	1,312,684	1,621,186	912,671	‡752,765
7 " "	'15	19,149,437	8,731,614	10,417,823	6,372,390	‡4,376,309
7 " "	'14	18,933,323	8,698,179	10,606,136	6,580,797	‡4,025,339

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Jan.,	'15	$280,839	$181,979	$98,860	$65,758	$33,102
1 " "	'14	270,961	171,291	99,670	64,034	35,635

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEXAS

1m., Dec.,	'14	$162,561	*$87,543	$75,018	$28,698	$46,320
1 " "	'13	184,876	*102,572	82,304	24,052	58,252
12 " "	'14	2,071,099	*1,151,237	919,861	317,503	602,358
12 " "	'13	2,132,200	*1,179,941	952,259	286,918	665,341

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Dec.,	'14	$20,107	*$12,608	$7,499	$7,251	$248
1 " "	'13	26,291	*15,020	11,271	7,062	4,209
12 " "	'14	264,841	*168,793	95,048	86,728	8,320
12 " "	'13	285,758	*182,738	103,020	81,102	21,918

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Dec.,	'14	$717,550	*$415,775	$301,776	$177,741	$124,035
1 " "	'13	790,307	*435,126	355,181	174,407	180,774
12 " "	'14	8,450,974	*5,007,008	3,443,966	2,118,856	1,325,110
12 " "	'13	8,613,599	*5,008,375	3,605,224	2,063,019	1,542,205

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Jan.,	'15	$769,292	$531,540	$237,752	$53,000	$184,752
1 " "	'14	746,006	493,609	252,397	49,615	202,782

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*Includes taxes. ‡Includes other income.

Traffic and Transportation

THE "JITNEY" BUS

Cities and Legislatures Striving for Adequate Regulatory Measures—The "Jitney" Finishes Its Sweep of the Country in Less Than Four Months

The features that stand out prominently this week in connection with developments involving the "jitney" are the veto by the Mayor of Los Angeles of the regulatory measure there and the decision of Judge W. A. Sloane of the Superior Court at San Diego denying the application of the city for an injunction against the Red Star Auto Bus Company and holding that buses are not required to obtain a franchise in San Diego although subject to regulation by ordinance.

The much-revised ordinance to regulate the operation of "jitney" buses in Los Angeles was passed unanimously by the City Council on Feb. 27. On March 3, Mayor Rose vetoed the ordinance, holding that the measure was insufficient and not fully calculated to remedy traffic conditions. The ordinance did not limit the fare to 5 cents. This was regarded as due to the comment of Councilman Conwell, who said: "It is a physical impossibility to operate the cars (the 'jitney' buses) at a profit. The owners tell us that the passengers on the running boards are the profits of the business. The truth is that these passengers are a loss, for they destroy the light cars and cause an expense in repairs and maintenance that would greatly offset the gross revenue. The 'jitney' is here to stay, but its mission is rapid transit de luxe and not a 5-cent proposition."

The Los Angeles ordinance provided in short that permits should be secured from the Police Commissioners; that all applicants take examinations and demonstrate their ability properly to handle cars in the congested districts and give bond in the sum of $5,000; that drivers file photographs of themselves for identification; that all permits set forth routes; that drivers be permitted to deviate three blocks either way to deliver passengers to their homes; that all buses be equipped with non-skid tires and with non-skid chains in wet weather; that in congested districts buses stop 50 ft. from street intersections to discharge or take on passengers and 75 ft. at intersections where street cars turn on or off the street; that the interior of buses be lighted; that regulation signs be carried, showing the route and fares charged; that passengers be permitted to stand on the running board next to the driver's seat; that no color line be drawn, and that hand baggage be held in the laps of passengers.

In his veto message Mayor Rose said that 2093 rent permits for automobiles and 2487 public chauffeur licenses had been issued since April 17, 1914. Before the "jitney" bus started in Los Angeles the total number of automobile permits issued was 350. On Dec. 31, 1914, 600 "jitney" bus permits were not renewed. Since Jan. 1, 1915, 300 had dropped out of business. There were permits, however, at the present time for 700 "jitney" buses. He said that these buses averaged 130 miles a day, which meant about sixteen one-way trips during the rush hours when the traffic was heaviest. In round numbers this meant 11,200 trips every day, equivalent to adding 11,200 vehicles during rush hours to streets already choked with traffic pertinent to the business conducted upon the streets. It seemed to him extremely unfair and unjust to the merchants and taxpayers to inflict this additional burden upon the thoroughfares without their consent, against their wishes and greatly to their detriment. The Mayor recommended the amendment of the ordinance so as to increase the indemnity bond from $5,000 to $10,000 for the reason that while $5,000 might possibly recompense one injured person there was no assurance that injury would be confined to one or even two persons. He further recommended that in the event of the passage of a "jitney" bus ordinance, a special commission should be created to examine applicants for permits.

As previously stated, Judge Sloane at San Diego held that "jitney" buses operating along the streets of that city were not required to obtain a franchise from the city. Judge Sloane held in short that the "jitney" bus does not actually appropriate any part of the highway which it traverses and that it is not therefore subject to the present franchise law. He admitted the power of the Legislature to enact a law giving municipalities the right to require franchises, but said this power was not now vested in the municipalities. He said in this connection:

"It appears to me that the city of San Diego has ample authority under its police power to place practically every restriction and requirement upon the auto bus traffic that would be available under the limitations of a public franchise."

In conclusion the Judge said:

"It would seem, therefore, to be well within the province of the police powers of the city of San Diego to regulate the traffic on the streets not only to avoid congestion and maintain a proper distribution of travel, but to promote and preserve the highest efficiency and safety in the matters of public transportation."

Another important development in connection with the move for the regulation of the bus was the hearing before the Massachusetts Legislative committee on mercantile affairs held on March 4 upon the bill introduced by the Massachusetts Street Railway Association to license private bus lines and place them under the jurisdiction of the Public Service Commission. Bently W. Warren, counsel for the association, outlined the features of the bill, which was summarized in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1915, page 258. The bill provides for licensing automobiles carrying eight or more passengers for hire and secures recovery for damages to passengers, through the jurisdiction of the Massachusetts Highway Commission. A road tax is also included, graduated according to weight. Mr. Warren pointed out that the electric railways represented in the Massachusetts Association desired protection against irresponsible agents of transportation and touched upon the menace of the "jitney" to existing transportation companies, which are responsible agents and cannot do a haphazard business. If the street railway could pick its own hours for operating as the "jitneys" do, the railways would not be seeking legislation. He suggested that if committees could not find time to go into the matter thoroughly before the close of the present session, it might be well to call for an investigation by a recess committee or special commission, with report at the next session. Many representative business men also appeared. In general the speakers declared that they were satisfied with the existing electric railway service in their communities; that the entrance of the "jitney" had proved a menace to the safety of the public, and that the operators of the "jitneys" should be held rigidly responsible in attempting to perform the duties of common carriers.

The demand for proper regulation has been extremely insistent elsewhere. Besides the bill introduced into the Legislature of Indiana and lost, and the bill introduced into the Massachusetts Legislature, just referred to, measures have appeared in the Kansas and the New York Legislatures. The original "jitney" bill in the Kansas Legislature was killed by the railroad committee of the Senate after having successfully passed the House. This measure, amended, has been revised and is expected to be reported out of committee and put on the calendar. In connection with the bill introduced in the Legislature of New York on March 5 it may be recalled that in the annual report of the Public Service Commission for the Second District of New York that commission recommended that auto buses be removed from regulation by it, saying that "a year's experience with auto bus lines has convinced us that the law making them common carriers and subject to the regulations of the commission should be repealed." In this connection the commission said that 142 applications for certificates of public convenience and necessity for these lines had been made to the commission up to Jan. 1 and that not one of them, when the application was in proper form and when the route lay over State or county highways, had been denied. The measure now before the Legislature introduced by Senator Thompson prohibits a belt line, stage route, vehicle line or any vehicle carrying passengers at the rate of fare of 15 cents or less for each passenger within the limits of a city, or in competition with another common carrier which is required by law to obtain the consent of the local authorities of a city to operate over the streets of such city from operating over any street in any city, except New

York City, or from receiving a certificate of public convenience and necessity until the owners of such routes or lines shall have procured, after public notice and hearing, the consent of the local authorities of the city.

It is reported generally that a bill is to be introduced into the State Legislature of Tennessee providing for a State tax of $150 annually on each "jitney" bus operated in Tennessee. Of the proposed tax it will probably be provided that $50 shall go to State highway fund, $50 to the county road fund, and $50 to the city street fund.

The ordinance providing rigid restrictions for "jitney" automobiles and buses has been passed to third reading by the City Council of Portland, Ore. It provides for the regulation of "jitneys "until Sept. 1 on a license or permit basis. After Sept. 1 the measure stipulates as a requirement a franchise from the city if they continue in operation. The special licenses which are to be required will permit the operation on the one route. Licenses are to be revoked for cause. The route is to be designated and operation on other streets is to be prohibited. Streets to be used for "jitneys" are, as far as possible, to be unoccupied by street cars. Changing of routes by any "jitney" driver can be made only on written application sent to the Commissioner of Public Utilities, who is empowered to refuse to license a driver when additional bus service appears not to be needed. The "jitney" must operate continuously every day from 6 a. m. to 12 o'clock midnight except Sundays, when service may start at 7 a. m. The rate of fare is to be not more than 5 cents. No car is to carry passengers in excess of the seating capacity. License fees of $5 a month for a car carrying eight or fewer passengers and $10 a month for a car carrying more than eight passengers are to be collected monthly. A bond for the protection of passengers is to be exacted. The route of each car is to be painted on the windshield and on each side of the car. A fine of not more than $200 or ninety days in jail is to be exacted for violation of the ordinance.

In Louisville the finance committee of the lower board of the General Council is considering an ordinance which would fix licenses to be paid by owners and drivers of buses. According to the first chapter of the measure any person, firm or corporation engaged in the business of carrying passengers via automobiles or other power-driven vehicle in Louisville or who should use his automobile or other power-driven vehicle for such purpose must procure a license for each vehicle. The fee is fixed at $25 a year for a vehicle of a capacity of not less than two or more than six passengers, at $35 for a vehicle with a seating capacity of not less than seven or more than ten passengers, and $50 for vehicles with a seating capacity of more than ten passengers. License tags are to be conspicuously attached to each car. Penalties to be assessed for violations of the measure range from $5 to $10 for each offense.

In Nashville, Tenn., a "jitney" regulatory measure has passed the Board of City Commissioners on its third reading. It contains a number of provisions that are restrictive in the extreme. A license fee of $60 is required. Applicants must first undergo an examination as to their ability and the condition of their cars. Each license holder must deposit a $5,000 insurance policy with the city. Drivers must not smoke or drink intoxicants while on duty, and in cases of a special attraction not more than half of the cars regularly run on any route may be deviated to that service. A maximum fare of 5 cents is allowed and each car must bear a sign indicating in plain letters the route it traverses. To secure a license to operate an automobile and carry passengers, the driver must be eighteen years of age.

The licensing of cars under the new ordinance passed at Fort Worth, Tex., was begun immediately after the measure went into effect. Up to the time the new ordinance became effective 269 "jitney" licenses had been issued.

Recent developments in the public discussion of the ordinance to regulate "jitneys" now pending before the Council of Atlanta, Ga., would seem to indicate conclusively that the real influence behind the spread of the movement is the automobile interests, focused by local dealers, agents and branch managers. Many of these latter are advertisers and the newspapers appear to be sympathetic for their welfare.

The "jitney" has apparently completed its sweep of the country. Starting in Los Angeles the movement spread north and south simultaneously, cars appearing in the States of Washington and Texas about the same time. Then came the invasion of the Southern states, cars appearing in New Orleans, Birmingham, and other cities. The spread of the "jitney" idea is perhaps best instanced by reference to the "jitney" bus item which appeared in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1914. The correspondent of the ELECTRIC RAILWAY JOURNAL at San Francisco said in substance at that time that there had recently been an enormous increase in the number of privately owned automobiles that solicit fares at 5 cents each on the streets of Los Angeles and that the public utilities committee of the city announced it would hold a public hearing on Nov. 27 to consider the matter. Since then the development has been followed from week to week in the ELECTRIC RAILWAY JOURNAL.

Among the cities "Farthest North" that report the installation of "jitney" bus services are Erie, Pa., Buffalo, N. Y., Rochester, N. Y., Portland, Me., and Toronto, Ont. In the South, Richmond is among the additional cities which have been invaded. A few days ago it was announced that the "jitney" service in St. Louis would be augmented by twenty-five "jitneys" placed in operation by the St. Louis Rapid Transit Company, under the supervision of Lee Massingale, for many years associated with the United Railways.

That the service of the "jitneys" broke down lamentably during the recent storm in the Central West is instanced by the report received from the Kansas City correspondent of this paper. The Metropolitan Street Railway of that city had to contend with a fall of snow totaling more than 1 ft. on the evening of March 4 and the following day. There was interruption of traffic early in the evening on some lines, but sweepers kept the tracks clear during the night. On March 5 the greatest difficulty was in the wagon and automobile traffic that obstructed the center of the street where the street railway had cleared the way. The Park Board had cleared many of the boulevards, but snow piled at intersections caused most traffic to stick to the street railway track. The storm kept the "jitneys" indoors during the afternoon and evening of March 4, and on the morning of March 5 only a few of the small cars and none of the large ones ventured out. When the cars did begin to reappear they made for the spaces cleared by the street railways. In this connection the following account from the Kansas City *Journal* of March 5 will be appreciated:

"The heavy fall of snow yesterday and last night did not seriously disarrange the schedules of the 'jitney' service. Those who feared that the drifting snow would make the streets impassable for the cars were unaware of the resourcefulness of the 'jitney' management. As soon as the drifts began to impede the progress of the 'jitneys,' heavy fourteen-cylinder motor trucks, with revolving sweeper attachments, were brought into service and the routes traversed by the different 'jitneys' were soon swept clean. The sweepers were followed by sand sprinkling cars, and inclines and curves were heavily sanded to prevent skidding.

"While passengers shivered in the movable dungeons operated by the soulless Metropolitan Street Railway, it was a pleasure to note that the 'jitneys' maintained a degree of summer heat through the use of electric warmers and toasters. The 'jitney' has again demonstrated that neither rain, nor hail, nor snow, nor callous criticism can keep it in its cozy garage. It can traverse the rain-flooded streets like a duck across a placid pond and it can negotiate a snowdrift like a Norwegian on skis. It is warm in winter, cool in summer, and a joy and a delight forever. If the Metropolitan Street Railway management would desist from sowing the streets with tacks and horseshoe nails and broken glass the 'jitney' management might say, with the late lamented Mr. Dana:

"We may be happy yet,
You bet."

This story was headed "As Written by A. Ananias—Being a Reversed English Account of the 'Jits' and Snow."

Fixed responsibility in the "jitney" bus business, so far as it applies to cities of the first class, is provided in a bill backed by the road and bridges committee which passed the Washington House on March 1. The new act requires a bond of $1,000 to be filed with the Secretary of State upon application for a license, for which a fee of $5 will be charged. No other fee will be exacted during the life of the bond. The bill in no way interferes with future control of the "jitneys" by municipal authorities. The first section of the bill makes it unlawful for any person, firm or corporation, other than a steam, street or interurban railway to transport passengers for hire in any motor propelled vehicle on any public street or highway within the corporate limits of a city of the first class without having first obtained a license.

The auto bus line in Jamaica, L. I., which is included in the Borough of Queens, Greater New York, has suspended service. Jamaica has a population of approximately 100,000 people and it is an important terminal and junction point on the Long Island Railroad. It is served by the lines of the Brooklyn Rapid Transit Company, the New York & Queens County Railway and the Manhattan & Queens Traction Corporation, but the service of all of these lines is through service rather than local. The grant by the New York Board of Estimate of a franchise to the Jamaica bus line was an experimental one, and two cars were operated in a purely local Jamaica service. The line, according to reports, has never succeeded in paying even its running expenses, the operations being handicapped by insufficient equipment.

BROOKLYN TRANSIT INQUIRY

D. A. Marsh, of counsel for the Brooklyn (N. Y.) Heights Railroad and other surface companies involved in the Public Service Commission's investigation predicated upon the report of Joseph Johnson, chief of the transit bureau of the commission, made his final argument on March 8 before the commission, summing up the testimony and the company's contentions in the case. Mr. Marsh presented to the commission a brief in which he said:

"The companies protest on behalf of their stockholders that the present investigation has been wholly superficial and is entirely inadequate as a basis on which to frame a general service order which may jeopardize the corporate property and may even spell financial ruin to those corporations.

"Experienced railroad men, and, we believe, competent men, are doing their level best to give the best possible service in Brooklyn under existing conditions. This has been publicly admitted by at least two of the members of this commission who had sufficient backbone to face criticism and express their honest convictions. It may be interesting to the commission to know that E. G. Connette, president of the International Railway, Buffalo, and formerly in the employ of the commission, in a recent address is reported to have stated, in justification of the service given on his road, as follows: 'With the exception of Brooklyn, we have the most scientific schedule of any road in the country.'

"The transit bureau admitted upon the hearing that in making up its report it had considered neither the effect of the new rapid transit lines now under construction, the variations in travel resulting from the new transfer system, nor the question whether the company was financially able to furnish the service proposed in the report. Neither had standards of service elsewhere been taken into consideration.

"The new transfer system went into effect on June 1, 1914, giving practically universal transfers at all intersections, including the lines of the Coney Island & Brooklyn Railroad, which was a short time before made a part of the Brooklyn Rapid Transit System. As a result of this new transfer system the travel immediately began to shift, and is still shifting."

The December Grand Jury, which had been investigating the Brooklyn Rapid Transit Company, reported to County Judge Hylan on March 6, roundly censured the Public Service Commission, and referred to the instances of inadequate service, but it failed to indict. Judge Hylan said: "If the conditions in this borough do not improve, I shall get the evidence and present it to some future Grand Jury. You must not think I regard your investigation as a fruitless one. The Public Service Commission has been stirred into action; the legislative committee has investigated and the health department has also taken action."

IMPORTANT INTERCHANGE DECISION

The United States Supreme Court, in a decision handed down on March 8, upheld the order of the Michigan Railroad Commission to require the Michigan Central Railroad to make a physical connection with the interurban line of the Detroit United Railway at Oxford, Mich. The decision is interpreted to mean that the Railroad Commission has authority to order physical connections and the interchange of traffic between steam and electric lines throughout the State, a power which has been questioned by the steam railroads up to this time. There are a number of places in the State where physical connections of this kind are desired by shippers in order to facilitate the handling of freight and it is expected that application for such connection where practicable will be made by interested shippers. The electric line affected by the decision runs from Detroit to Flint, and from Oxford to Flint it has been equipped with water tanks and other necessities for locomotive use in order that locomotives may be operated on the division if necessary. The line is suitable for freight car operation in that it runs on private right-of-way entirely except through the villages en route.

CHICAGO SERVICE ORDINANCE

A service standard ordinance for non-rush hours, the provisions of which were printed in the ELECTRIC RAILWAY JOURNAL of March 6, page 486, has been passed by the Chicago City Council. In compliance with the findings of the Board of Supervising Engineers more than a year ago regarding equipment requirements to take care of the increase in traffic in Chicago, the local transportation committee passed an order that a contract be made immediately for the purchase of 168 new cars. In addition it ordered that a contract be made so that fourteen additional new cars will be delivered each month until February, 1916, making a total of 336 cars to be purchased and delivered before that date. In connection with car purchases, a movement has been instigated by the labor unions to require the Chicago Surface Lines to purchase Chicago-built cars. A resolution was passed by the local transportation committee indorsing this policy, and by motion it was decided to hold a conference on this subject between the committee, the officials of the Chicago Surface Lines and the Board of Supervising Engineers to determine what could be done.

CAR-FULL SIGNS IN BROOKLYN

T. S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, notified the board of health that he would comply with orders issued prohibiting overcrowding on the Graham Avenue line. Colonel Williams in a letter declared the order to be illegal and unjust and has requested a hearing at which the company's side can be presented, but promised that the order would be complied with pending the action of the board of health on the hearing.

The company, under protest, put the recommendation into effect on March 8. Large placards were posted on the cars of the Graham Avenue line announcing that the board of health had forbidden the carrying of more than half as manay standees as seated passengers, thus limiting the capacity of the cars to fifty-four. The conductors were furnished with metallic signs to be hung on the gates as soon as a car had fifty-four passengers. They read: "No more passengers on this car, by order of the board of health." The conductors were also instructed to close the gates as soon as the required number of passengers had boarded the car and to use every means except force to prevent that number from being exceeded. Policemen were stationed along the line to see that the public regarded the order. It was generally regarded that many of the patrons who ordinarily use the Graham Avenue line took to the cars of the Flushing and Flushing-Knickerbocker lines, which operate over the same route as the Graham Avenue cars between the Brooklyn Bridge and Broadway. Special precautions were taken by the police to preserve order at the loop at the Manhattan end of the Brooklyn Bridge at which the Graham Avenue and Flushing Avenue and Flushing-Knickerbocker Avenue cars are turned for the trip back to Brooklyn.

Ordinance Against Smoking.—The City Council of Butte, Mont., has passed an ordinance prohibiting smoking in closed street cars. The ordinance provides fines ranging from $5 to $25 for violations.

Examination for Promotion.—An examination of conductors and motormen of the San Francisco (Cal.) Municipal Railway system who are eligible for promotion to the position of inspectors will be held by the Civil Service Commission on March 20.

Near-Side Cars in Buffalo.—Cars of the P-A-Y-E near-side type are now being operated on all except three of the lines of the International Railway in Buffalo, and many similar cars are now in operation on the company's lines in Niagara Falls and Lockport.

Methuen Service Finding.—The Massachusetts Public Service Commission has ordered the Bay State Street Railway to install a double track in Methuen between the intersection of Hampshire and Lowell Streets and Railroad Square, to relieve rush-hour congestion.

Fare Increase Proposal Lost.—On March 5 the Board of Control of Toronto, Ont., refused to concur in the recommendation of Works Commissioner Harris for increasing the fares on the Toronto Civic Railway in order to place the municipal lines on a self-sustaining basis.

Bundle Day in Louisville.—The Louisville (Ky.) Railway on Feb. 25, which was "bundle day" in that city, supplied two cars which stopped before certain of the school houses of the city and gathered up the bundles which accumulated there, delivering them at certain depots on the company's lines where they were assembled for distribution among the poor.

Air Tests in Cleveland.—On the order of Health Officer Ford of Cleveland, Ohio, City Chemist White will investigate the ventilation of street cars and the possibility of their being distributors of pneumonia and grip germs. The records show that there was a very material increase in the number of cases of pneumonia in February over the same month last year.

Reduction in Accidents in Lexington.—According to a statement issued by F. W. Bacon, vice-president of the Kentucky Traction & Terminal Company, Lexington, Ky., there has been only one accident on the city lines of the company since the front-entrance-only system was put into effect last summer, while there were twenty-five rear step mishaps in 1912 and thirty-two in 1913.

Contest of Service Order.—Refusing to obey the orders of the Public Service Commission of the First District of New York directing the operation of additional trains on its road, the Long Island Railroad has served the commission with a writ of certiorari to certify to the Supreme Court the records in the orders for review by the court. The company claims that the orders were unwarranted, unreasonable and arbitrary.

Parcel Checking.—In the principal ticket offices of the Northern Ohio Traction & Light Company, Akron, Ohio, a uniform charge of 5 cents has been established for checking hand baggage or parcels left to be called for. In some instances, a charge of 10 cents was formerly made, and this is the rate prevailing in many places. The accommodation of interurban patrons is the object sought to be attained. The 5-cent charge is expected to do no more than cover the cost of the service.

Adjustment Under Gentlemen's Agreement.—As a result of the so-called "gentlemen's agreement" entered into between E. G. Connette, president of the International Railway, Buffalo, N. Y., and representatives of various business men's organizations, the company has placed additional cars in service during the rush hours in the morning and in the evening. At several points in the downtown section of the city extra cars are stationed so that, if they are needed, they can easily be switched onto the main line of traffic.

Crusade Against Spitting.—A crusade against spitters has been conducted quietly by the board of health of New York since Jan. 1, summons having been served on all found violating the law against this practice. According to the department 239 persons were summoned, and only fifteen discharged in the first two months of the year, the majority being fined from $1 to $5, the total amount received being $192. The detailed statement is as follows: Number of persons summoned to court, 239; fined, 159; sentence suspended, fifty-two; discharged, fifteen; cases pending on March 4, thirteen.

Car Capacity Controversy.—Mayor Church of Toronto, Ont., at the meeting of the Board of Control on March 3 submitted a motion regarding overcrowding on street cars on which the corporation counsel will be asked to report. It deals with three points: first, that the present city by-law allowing 50 per cent of standing room in excess of the seating capacity be repealed; second, that the city oppose the application of the Toronto Railway to the Ontario Railway & Municipal Board for an order confirming this by-law, and third, that the attorney-general be requested to proceed with the indictments against the Toronto Railway for alleged overcrowding.

Rates Under Advisement.—The Public Service Commission of the State of Washington has taken under advisement the suit of the city of Seattle against the Puget Sound Electric Railway, operating from Seattle to Tacoma, to require the company to carry passengers for a 5-cent fare within the limits of Seattle. The contention of the city is that the line should be considered a street railway inside the city limits. The company took the position that it is operating an interurban railroad between Seattle and Tacoma and that the State law does not apply to this case. At present passengers traveling to Georgetown, Davis and other stations on the Puget Sound Electric Railway within the limits of the city of Seattle pay 9, 12 and 14 cent fares based on distances.

Creating Bus Sentiment.—Magistrate Barlow, sitting in the West Side Court in New York, dismissed on March 4 two employees of the People's Five-Cent Bus Company, charged with operating vehicles bearing an advertisement asking for public support of a franchise, in violation of Section 41 of the corporation ordinances. The magistrate decided that the matter was one of civil, not of criminal, procedure. Along one side of the car is painted the following legend: "Why hang on a strap, when the People's Five-Cent Bus Company offers a seat to each passenger in its electric automobiles for a 5-cent fare? The Board of Estimate knows the answer, ask them." On the other side the legend reads: "You may ride in this bus for a 5-cent fare if the Board of Estimate will permit you to use your streets."

Memphis Transfer Case.—The Memphis (Tenn.) Street Railway transfer case has been argued before the Court of Appeals and submitted to that body for its decision. It involves the question whether the railway must issue transfers on street railway tickets sold at eleven for 50 cents. The hearing is on appeal from the lower courts which found for Thomas Dies, commissioner of public utilities, grounds and buildings, in his suit for mandamus. Charles M. Bryan, city attorney for Memphis, argued that under the franchise under which the railway is operating it can be compelled to issue transfers. Luke E. Wright, former secretary of war, for the company, contended that the refusal of the company did not mean violation of any law and that if the company were compelled to issue transfers on the lower rate it could not make expenses.

Safety First League in Louisville.—Organization of a safety first league to include all the employees of the public utility corporations of Louisville, Ky., is expected to result from a joint meeting held in the chapel of the Louisville Railway. There were 300 delegates present from the railway, the Louisville Gas & Electric Company, the Cumberland Telephone & Telegraph Company and the Home Telephone Company. Although definite steps looking toward the formation of the league were not taken, arrangements were made for other meetings. Moving pictures and stereopticon views were explained by A. W. Lee, chairman of the safety first committee of the employee's league of the Louisville Gas & Electric Company. Samuel Riddle, superintendent of transportation of the Louisville Railway, and Frank H. Miller, chief engineer of the company, were the principal speakers. Among the others who addressed the meeting was Donald McDonald, vice-president and general manager of the Louisville Gas & Electric Company.

Personal Mention

Mr. Harro Harrsen, managing director of the Mexico City (Mexico) Tramways Company, spent a few days in New York last week on his way to London where he expects to meet Dr. F. S. Pearson, president of the tramways.

Mr. William Parker, heretofore inspector of the Hamilton (Ont.) Street Railway, has been appointed superintendent to succeed Mr. J. Pearson, who resumes his former position of chief inspector and will, in addition, act as assistant superintendent.

Mr. W. H. Taaffe has been appointed chief of the division of capitalization of the Public Service Commission for the Second District of New York to succeed Mr. H. C. Hopson, who has established himself with offices in New York as a public utility and railway expert.

Lieut.-Col. E. W. Rathbun, president of the Oshawa (Ont.) Railway, was given a farewell by the citizens of Deseronto, Ont., on Feb. 13. He has been appointed to the command of the Sixth Artillery Brigade, and will sail with the second contingent for service in Europe.

Mr. W. R. Hall, manager of the Anniston Electric & Gas Company, Anniston, Ala., has been appointed manager of the North Alabama Traction Company, New Decatur, Ala. Several years ago Mr. Hall was the general manager of the company at New Decatur. He then became general manager of the Sheffield (Ala.) Company. Subsequently he became connected with the Anniston Electric & Gas Company as general manager.

Mr. H. C. Prather has been appointed assistant general manager of the Empire United Railways, with offices in the Electric Railway Terminal Building, Syracuse, N. Y. Mr. Prather heretofore has been local manager of the Rochester Division. Under the new arrangement Mr. Prather's jurisdiction includes the Oswego Division of the Empire United Railways. Prior to becoming connected with the Empire United Railways Mr. Prather was general manager of the Buffalo, Lockport, & Rochester Railway.

Mr. Samuel Gausmann, roadmaster of surface lines of the Brooklyn (N. Y.) Rapid Transit System, has resigned to enter business for himself in Brooklyn as a street railway track and paving expert. He will specialize in preparing estimates, arranging contracts and supervising work in this field. Mr. Gausmann began his railway career with the Middletown & Goshen Traction Company some twenty years ago. He resigned as superintendent of that road in 1901 to go to the Brooklyn Rapid Transit System as foreman in the way and structure department. In 1911 Mr. Gausmann was appointed roadmaster of surface lines.

Mr. E. L. Mathews, hitherto assistant engineer of the way and structure department of the Brooklyn (N. Y.) Rapid Transit System, has been appointed engineer of surface lines. This position is a new office embracing in its scope the duties of roadmaster of surface lines. The latter position was abolished with the resignation of Mr. Samuel Gausmann, as noted elsewhere in this column. Mr. Mathews was formerly engineer of way and structure of the Coney Island & Brooklyn Railroad, to which position he was appointed in 1908. He joined the Brooklyn Rapid Transit System when the company absorbed the Coney Island & Brooklyn Railroad in 1914. Previous to coming to Brooklyn Mr. Mathews was with Newhall & Company, railway contractors, Baltimore, Md., his native State. While with that firm, Mr. Mathews had charge of general construction work in different sections of the country.

Mr. W. O. Woodward, who has been traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., for the last five years, has resigned. Mr. Woodward began his railway career with the Pennsylvania Railroad in 1901, and later became connected with the Lake Erie & Western Railroad, where he served until 1905 in various capacities in the freight department. In November, 1905, he accepted a position in the accounting department of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., and subsequently served in the passenger and freight departments of the company. For a short time Mr. Woodward acted as division freight and passenger agent of the Ohio Electric Railway, at Dayton, Ohio, but returned to the Terre Haute, Indianapolis & Eastern Traction Company. In March, 1909, he was appointed traffic manager of the Indianapolis, Crawfordsville & Western Traction Company, with which he remained until 1910.

Mr. William Clapper, whose appointment as traffic manager of the Inteurban Railway, Des Moines, Ia., to succeed Mr. C. T. Chapman was announced in the ELECTRIC RAILWAY JOURNAL of Feb. 27, is a native of Des Moines and a traffic man with wide experience in the steam railroad field. He began railroad service in June, 1899, as clerk to the commercial agent of the Minneapolis & St. Louis Railroad at Minneapolis, Minn. Mr. Clapper remained in that position until January, 1900, at which time he returned to Des Moines to become chief clerk to the commercial agent of the Wabash Railroad. In 1904 he was made contracting freight agent of that company with headquarters at Des Moines, and in October, 1907, upon the resignation of the division freight and passenger agent, he succeeded to that position, in which he served until March 1, 1915. In the latter position Mr. Clapper had charge of both freight and passenger traffic in Iowa.

Mr. W. P. Strandborg of the staff of the *Evening Telegram* of Portland, Ore., has been appointed to direct the work of the publicity department of the Portland Railway, Light & Power Company, Portland, Ore., which has been re-established. Mr. Strandborg has for fifteen years been in continuous service in the newspaper field in the East and on the Pacific Coast. He has been a member of the editorial staff of the *Evening Telegram* for the last nine years. Among the organizations of Portland of which he is a member are the Portland Ad Club, Portland Press Club, Portland Automobile Club, Progressive Business Men's Club, Portland Transportation Club, the Portland Social Turn Verein and the Elks. He was the founder and is the head of the Ancient Order of Muts. President F. T. Griffiths, of the company, in announcing the appointment of Mr. Strandborg, said that the policy of the company would be to conduct a permanent information service, an important phase of which would be to keep the public advised of the part the company is playing in the study of permanent development of the city and adjoining territory served by the corporation.

Mr. O. A. Honnold has resigned as electrical engineer of the Utah Light & Traction Company, Salt Lake City, Utah, until recently the Utah Light & Railway Company. Mr. Honnold was graduated from Purdue University. After two years in power-house construction and operation with the Citizen's Street Railway, Detroit, Mich., Mr. Honnold in 1896 took charge of miscellaneous engineering and operating work and helped to carry out the consolidation of several power companies and street railways in Salt Lake, Ogden and vicinity. After the late Edward H. Harriman bought out the light, power and street railway interests in 1906, Mr. Honnold did the electrical engineering work and had charge of all electrical construction and reconstruction in connection with rebuilding the old properties. He also had charge of all of the stations and transmission lines and distribution operating departments. In resigning from the Utah Light & Traction Company Mr. Honnold concludes nineteen years of work at Salt Lake, with the exception of two years, from 1900 to 1902, when he was with the Lachine Rapids Hydraulic & Land Company, at Montreal, Can. Between $7,000,000 and $8,000,000 was spent in improvements made on the property under Mr. Honnold's supervision at Salt Lake from 1907 up to 1914. Mr. Honnold expects to spend several months in taking a vacation and will then look after his own interests in the West.

Mr. Charles C. Elwell has been named a member of the Public Utilities Commission of Connecticut to succeed Mr. Theodore B. Ford, Bridgeport. Mr. Elwell at present is engineer of the commission. Mr. Elwell was born in 1855, at Belfast, Me. He was educated in the public schools and at Patten academy was prepared for college. He entered the University of Maine, from which he was graduated in 1878, with the degree of civil engineer. Subsequently he was with the United States lighthouse engineering department for three years, in South Carolina, Georgia and Florida. He began railroading in 1882, with the old New York & New England railroad, now a part of the New York, New Haven & Hartford Railroad in the engineering department. He was also in the employ of the Philadelphia & Reading Railroad for a short time previous to 1891, when he entered the employ of the Baltimore & Ohio Railroad. From 1891 to 1893 Mr. Elwell was engineer of maintenance of way for the latter road, and was stationed at Philadelphia and at Pittsburgh. In 1893 he entered the employ of the New York, New Haven & Hartford Railroad, and served three years as roadmaster, in charge of the New York division, constructing the "four tracks" between New York and New Haven. He was promoted to be superintendent of the Norwich & Worcester, the Air Line, Northampton and Shore Line divisions, in 1895, and he served the road in this capacity until 1908. At this time he was transferred to the electric lines as engineer of the Connecticut Company, and continued in that capacity until September, 1911, when the Public Utilities Commission was formed. The new commission chose Mr. Elwell as its chief engineer and inspector. His appointment as a commissioner has been confirmed.

H. L. BEACH

Mr. H. L. Beach, whose appointment as manager of the Utah Light & Traction Company, Salt Lake City, Utah, was announced in the ELECTRIC RAILWAY JOURNAL of Feb. 29, has had a well-rounded experience in railway operation. Mr. Beach is forty-five years of age. He entered electric railway work sixteen years ago as publicity manager of the Chicago (Ill.) Union Traction Company. Subsequently he was appointed assistant general superintendent of the north and west side lines and later was advanced to the position of general superintendent of the northern division of what is now known as the Chicago Railways. He resigned in 1912 and he became associated with Mr. Bion J. Arnold in connection with the appraisals of the electric railway properties in Toronto, Can., and Kansas City, Mo. Recently Mr. Beach served as traction expert with the Board of Supervising Engineers, Chicago Traction, which position he held until shortly before he was appointed manager of the Salt Lake City property.

Mr. G. Tracy Rogers, who has retired as president of the Binghamton (N. Y.) Railway, embarked with some associates in the street railway business in Binghamton in 1889 and later bought the eight or nine other companies in Binghamton, built up the properties and organized the Binghamton Railway. He was instrumental in building the electric railway through Elmira to Corning and Painted Post, and that road with the Corning & Painted Post Railroad is now known as the Elmira, Corning & Waverly Railroad, with Mr. Rogers as president. Mr. Rogers also bought the property of the Waverly, Sayre & Athens Traction Company. He was one of the original directors and incorporators of the Hudson & Manhattan Railroad and consolidated some of the roads outside of Buffalo into the Buffalo Southern Railway and was connected with the syndicate which bought and owned the Port Jervis & Monticello Railroad. About 1905 Mr. Rogers and Mr. Leo H. Wise bought the property of the Rutland Street Railroad, the Peoples Gas Company and the Chittenden Power Company, Rutland, Vt., and consolidated the companies as the Rutland Railway, Light & Power Company. Later they purchased the Rutland Electric Light Company. Subsequently Mr. Rogers bought the property of the Fair Haven Electric Company and the Carvers Falls Power Company, and after operating the companies independently for a time he consolidated them with the Western Vermont Power Company, which, together with the Rutland Railway, Light & Power Company, was sold to the General Gas & Electric Company. Mr. Rogers was president of the Street Railway Association of New York State for nine years. The Binghamton Chamber of Commerce has adopted a resolution congratulating Mr. Rogers upon his accomplishments and expressing the desire that he continue his residence and activities in that city.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.**—Application for a charter has been made by this company to build a 49-mile electric railway from Ossipee to Durham, via Ossipee, Altamaha, Glencoe, Carolina, Hopedale, Burlington, Graham, Haw River, Swepsonville, Saxapahaw, River Falls and Chapel Hill. Incorporators: Junius Harden, John M. Cook, C. Brown Cox and D. M. Teague. Headquarters: Burlington.

Radford-Willis Southern Railway, Radford, Va.—Application for a charter has been made by this company in Virginia to build a 25-mile interurban railway from Radford to Willis. John L. Vaughan, Shawsville, president; E. F. Strong, Willis, vice-president; W. L. Castle, Willis, secretary, and A. L. McClung, Radford, treasurer. Headquarters: Radford. [E. R. J., Feb. 6, '15.]

FRANCHISES

San Jose, Cal.—The San Jose Railroad has asked the Council for a franchise on Alum Rock Road in San Jose. Sealed bids will be received by the Board of Supervisors until April 5 for said franchise.

Bristol, Conn.—The Bristol & Plainville Tramway Company has asked the Council for a franchise along the center of Park Street in Bristol.

Hartford, Conn.—The New Britain Street Railway has asked the Council for a franchise in Hartford. This is part of a plan to build an electric line between Hartford, New Britain, Plainville and Bristol. [E. R. J., Feb. 27, '15.]

New Britain, Conn.—The Connecticut Company has asked the Council for a franchise on Farmington Avenue, also through Stanley Quarter to Hartford, and through Osgood Avenue and North Burritt Street to Plainville.

St. Augustine, Fla.—The Jacksonville & St. Augustine Public Service Corporation has asked the Council for a franchise for an extension of time of one year on its franchise in St. Augustine. About 7 miles of grade has been completed south from South Jacksonville. [E. R. J., June 20, '14.]

Belleville, Ill.—The East St. Louis & Suburban Railway has received a franchise from the Council for a line on Rock Road, from the old city limits of Belleville to Edgemont.

Lancaster, N. Y.—The Buffalo & Depew Railway has asked the Council for a franchise to extend its lines from its present terminus, through Ellicott Road and Central Avenue to the New York Central Railroad tracks in Lancaster. The petition also asks for the right-of-way north on the Transit Road to extend a line north to Bowmansville.

Brantford, Ont.—The Brantford City Council has asked the Ontario Legislature to confirm a number of by-laws, among them being one for borrowing upon debentures $270,000 for the purchase, improvement and equipment of the Grand Valley Railway.

Brantford, Ont.—The Brantford & Hamilton Electric Railway has asked the Council for an extension of time on its franchise in which to build the branch from Langford to Galt, Ont.

Cornwall, Ont.—The Cornwall Street Railway, Light & Power Company has asked the Ontario Legislature for a twenty-year extension of time on its franchise in Cornwall.

Hamilton, Ont.—The Hamilton Mountain Electric Railway has applied to the Ontario Legislature for an extension of time to build the projected electric line from the Hamilton Mountain Road, Ancaster Township, at the crossing of the Brantford & Hamilton Electric Railway, to Mount Albion, Barton Township, and from the northerly boundary of Hamilton and Caledonia Road to Ryckman's Corners, 3 miles. T. H. Crerar, L. R. E. Awrey, S. B. Thompson, G. E. Armstrong and T. H. Stinson, Hamilton, Ont., are the provisional directors.

Richmond, Va.—The Virginia Railway & Power Company will ask the Council for a franchise for an extension of its line from its terminus at Oakwood Cemetery to Evergreen Cemetery in Richmond.

TRACK AND ROADWAY

Lacombe & Blindman Valley Electric Railway, Lacombe, Alta.—Grading is reported completed on this railway from Lacombe to Rimbey, 37 miles. Nothing has been decided as to when the track will be laid. J. C. Gibson, 56 King Street, West, Toronto, president. [E. R. J., Dec. 12, '14.]

Salt River Valley Electric Railway, Phoenix, Ariz.—Surveys have been completed by this company between Phoenix and Mesa, 18 miles, and between Scotsdale and Phoenix, 12 miles. The company's franchise for the line expired Dec. 21, 1914, and the project has been abandoned on account of financial conditions. C. C. Lewis, Phoenix, president. [E. R. J., Sept. 26, '14.]

Monterey & Pacific Grove Railway, Monterey, Cal.—An extension from Monterey to Fresno is being contemplated by this company.

Redwood City, Cal.—Plans are being contemplated to build an electric railway in Redwood City from the harbor site to the foothills via Redwood, Highlands and Wellesley Park. E. F. Fitzpatrick, Redwood City, is said to be interested. [E. R. J., May 16, '14.]

Connecticut Company, New Britain, Conn.—Arrangements are being made by this company to begin work as soon as the weather permits double-tracking its line on Chestnut Street, Stanley Street and Dwight Street in New Britain. Plans are also being made to lay new track and ties on its lines in Norwalk and vicinity in the spring.

Shore Line Electric Railway, Saybrooke, Conn.—An extension to Attawaugan and vicinity is being contemplated by this company.

Stafford & Monson Street Railway, Stafford Springs, Conn.—As soon as financial arrangements can be made this company will begin work on its 10-mile line between Stafford Springs and Monson. Robert H. Fisk, Stafford Springs, is interested. [E. R. J., Dec. 21, '13.]

Union Railway & Power Company, Chicago, Ill.—Preliminary arrangements are being made and most of the right-of-way has been secured by this company on the line to connect South Chicago and Harvey, Ill., and Hammond and Gary, Ind. Capital stock, authorized, $10,000. Capital stock, issued, $10,000. J. W. Paul, 161 Quincy Street, Chicago, general manager. [E. R. J., May 9, '14.]

Pekin & Petersburg Interurban Railway, Pekin, Ill.—Plans are being made to begin work at once on the reconstruction and extension of this company's lines in Pekin.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—This company advises that it is ready to construct the first division of its line from Peoria to Canton, a distance of 25 miles, and it is now in the market for ties, rails and equipment and would like to figure with grading outfits on the grading. Woolf Tritel, National Bank Building, Peoria, general manager. [E. R. J., Feb. 27, '15.]

Illinois Traction System, Peoria, Ill.—This company is building a spur track at Danville, extending from the main track through Ellsworth Park to the west end of the Mill Street bridge. The new spur will be used for transporting material to the proposed new bridge.

Peoria & Chillicothe Electric Railway, Peoria, Ill.—Surveys are being made by the Allen Engineering Company on this 20-mile line to connect Peoria, Chillicothe, Mossville and Rome. Henry T. Mallen, Peoria, is among those interested. [E. R. J., Feb. 27, 15.]

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—Construction of the proposed electric railway lines to connect Boonville and Chrisney and from Boonville to Lynnville is to begin inside of two months, according to an announcement made at the annual meeting of this company held in Evansville recently. Directors were elected as follows: J. P. Chrisney, Chrisney; T. P. Tillman and James A. Hemenway, Boonville, and J. E. Coe and G. Mulhausen, Evansville. Subsidies for the lines have already been voted. [E. R. J., Sept. 26, '14.]

Charles City (Ia.) Western Railroad.—Active work has been begun on the electrification of this railway. Orders have been placed for 26 miles of copper wire, 1200 poles and 22,000 ties. The extension of the railway, to be carried on at the same time, will be from Charles City in a northeast direction to the edge of the county in Niles Township, a distance of 8½ miles. This is the first step in its extension to Cresco. Bids have been sent to several contracting firms for grading, bridge and culvert work. E. R. Ernsberger, Charles City, general manager.

Worcester (Mass.) Consolidated Street Railway.—An expenditure of $75,000 is to be made in the spring by this company in relaying its tracks and placing the feed wires underground on Main Street in Worcester.

Libby (Mont.) Western Railway.—Preliminary arrangements are being made and it is expected that work will be begun about Aug. 1 on the construction of this proposed 398-mile electric railway to connect Missoula, Kalispell, Libby and Troy, Mont., and Bonners Ferry, Idaho, and Spokane, Wash. The power house will be at Kootenai Falls, Mont., and the repair shops will be located at Libby. Capital stock, authorized, $2,500,000. Capital stock, issued, $100,000. Bonds, authorized, $5,000,000. Bonds, issued, $1,000,000. It is planned to purchase power from the Kootenai Falls Electric & Power Company. Officers: Thomas A. McCanis, Libby, president; Amos L. Thompson, vice-president; P. M. Benard, Kalispell, secretary; Chester A. Adams, Libby, secretary; and Paul D. Pratt, Libby, Mont., treasurer. [E. R. J., March 6, '15.]

Buffalo & Depew Railway, Buffalo, N. Y.—This company has presented a petition to the Town Board of Lancaster asking permission to extend its lines through an additional street in Buffalo and has also asked for right-of-way to extend its line from Lancaster to Bowmansville. A public hearing will be held on March 22.

Brooklyn (N. Y.) Rapid Transit Company.—Pursuant to the direction of the Public Service Commission, First District, this company has obtained bids for supplying the steel for Section No. 2 of the third-tracking of the Broadway elevated railroad in Brooklyn, namely, from Myrtle Avenue to Aberdeen Street. These bids were submitted to the commission by the company, with the recommendation that the contract be awarded to Lewis F. Shoemaker & Company, the lowest bidders, whose price is $37.20 per ton. The total amount of the contract will be approximately $279,000. The commission, upon the advice of its chief engineer, has approved the award of the contract to Shoemaker & Company. The Public Service Commission for the First District has approved the award of the contract for the construction of the first section of the company's elevated extension on Jamaica Avenue from Crescent Street to Myrtle Avenue, to Post & McCord, who will complete the work in one year.

***Gowanda, N. Y.**—Interest in the proposed electric line from Jamestown to Buffalo is revived. Some time ago the rights-of-way from Falconer to Gowanda were mostly secured. Petitions for franchises for the towns of Poland, Ellington, Conewango, Leon, Dayton and Persia are now being prepared. The rights-of-way from Gowanda to Hamburg will be taken up as soon as the weather permits. It is the intention of those who have the matter in charge to hold meetings in the several towns from Gowanda to Buffalo as early as possible. The officers of the organization are J. B. Anderson, Ellington; R. G. Crandall, Kennedy; Franklin E. Bard, Gowanda; Frank N. Rowe, South Dayton; Clarence G. Mead.

Interborough Rapid Transit Company, New York, N. Y.—Installation of equipment for the operation of trains has been begun in the Steinway tunnel. From the Long Island City end high power cables were carried into the tube, and electricians are now at work putting them in place. These cables will carry the wires for lighting as well as for the operation of trains. The contractors are installing it at this time so as to get power for light to complete the laying of the tracks and the installation of the third-rail. The contractors said that the tunnel will be completed very near to contract time, which is about the middle of April, if nothing unforeseen occurs.

North Tonawanda, N. Y.—In accepting the franchise granted by North Tonawanda recently to the International Railway and the Frontier Electric Railway to build a fast service passenger line and fast service freight line, respectively, over the Buffalo, Thousand Islands & Portland right-of-way, from Niagara Falls to Buffalo, which those electric railway companies are to share, announcement was made recently that work on both lines is to begin the coming spring. The officials stated that they hope to have the new roads in operation early next year. Under the terms of the North Tonawanda franchise both companies must have their lines completed and in operation by Dec. 31, 1916.

Cleveland, Alliance & Mahoning Valley Railway, Cleveland, Ohio.—The branch line between Warren and Newton Falls is nearly completed and plans are being made to place it in operation by April 1.

Cleveland (Ohio) Railway.—Plans are being made to extend the East Seventy-ninth Street line from Kinsman Road to the Pennsylvania Railroad tracks in Cleveland. Every mile of track which this company wants to relay this year in Cleveland will be inspected by the Street Railway Committee of the City Council. The company has asked for authority to relay 35,551 ft. of single track at a cost of $262,476 and to resurface 11,871 ft. of roadway at a cost of $38,019.

Hamilton (Ont.) Street Railway.—Plans are being made by this company to begin work early in the spring on the extension on Birch Avenue across Coal Oil Inlet in Hamilton; 10-ft. ties will be used.

London (Ont.) Street Railway.—During the year this company plans to build the following extensions in London: Hamilton Road—double tracking between Horton Street and Mamelon Street; double tracking between Rectory Street and Egerton Street; track extension from the present terminus at Egerton Street to East Street. High Street, South London—Traack extension from present terminus at McClary Avenue to Emery Street. Quebec Street—Dundas Street to Canadian Pacific Railway, new single-track line. Mount Pleasant Avenue, West London—New single-track line from Wharncliffe Road to Francis Street. Dundas Street—Double tracking from fair grounds to Ashland Avenue. H. A. Brazier, city engineer.

Ottawa (Ont.) Electric Railway. — An extension along Bronson Street in Ottawa is being contemplated by this company.

Toronto, Ont.—According to a statement made by Sir Adam Beck, work will be begun soon laying 98 miles of railway northeast of Toronto by the Hydro Electric Power Commission.

Toronto, Ont.—Bids will be received until March 16 for the supply of track material, overhead line material and oak ties required for the construction of the Lansdowne Avenue line in Toronto. Specifications may be obtained upon application at Room 12, purchasing and accounting section, of the Department of Work, City Hall, Toronto.

Westside Electric Street Railway, Charleroi, Pa.—The Mercantile Bridge Company over which this railway company operates, expects to install a wood block floor on its bridge located at West Monessen, Pa. This work will require approximately 5000 sq. yd. of creosoted wood blocks and 200,000 ft. creosoted lumber.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa.—Plans are being contemplated by this company for an expenditure of about $600,000 for double-tracking its system.

McConnellsburg & Fort London Railway, McConnellsburg, Pa.—Preliminary arrangements are being made by this company to build its 10-mile line between McConnellsburg and Fort London. E. J. Post, McConnellsburg, president. [E. R. J., March 6, '15.]

Phoenixville, Valley Forge & Stafford Electric Railway, Phoenixville, Pa.—Steps are being taken by this company towards the completion of the railway to Stafford and also from Valley Forge to Bridgeport, while the line through Phoenixville will be continued to the Philadelphia and Reading stations.

Scranton & Binghamton Railroad, Scranton, Pa.—During the next four weeks this company expects to award contracts for new rails for 20 miles of new track between Nicholson and Montrose, Pa. Work has been completed by this company from Nicholson to within about 2 miles of Brooklyn, and it is planned to have this line completed to Montrose by the fall. This is part of the plan to build an electric line between Scranton and Binghamton.

Hull (Que.) Electric Company. — Citizens of Gatineau Point and of Hull are negotiating with this company to secure an extension of the company's line to Gatineau Point.

Charleston-Isle of Palms Railway, Charleston, S. C.—This company has been authorized to build an extension across the government reservation on Sullivan Island.

Johnson City, Tenn.—Representatives of this city and Jonesboro, which would be connected by a projected electric railway to be constructed at a cost of $80,000 between the two cities, met recently in the interests of the project. Mayor S. E. Miller, Johnson City, presided, and among those who attended were Mayor A. S. Murray, Jonesboro; R. M. May, J. H. Anderson, A. L. Shipley and J. S. Pritchett, all of Jonesboro. [E. R. J., Feb. 13, '15.]

Galveston (Tex.) Electric Company.—Improvements are soon to be made by this company on its Twenty-seventh Street and Thirty-seventh Street lines to the new baseball park in Galveston.

Virginia Railway & Power Company, Richmond, Va.—An extension to connect Petersburg and City Point is being considered.

Charleston (W. Va.) Interurban Railway.—This company expects to extend the Kanawha Valley Traction line as rapidly as possible to Montgomery, W. Va., 25 miles east of Charleston. This line is leased by the Charleston Interurban, which operates it. The line from South Charleston to St. Albans was built by the Charleston Traction Company, but was recently transferred to the Kanawha Valley Traction Company, William E. Chilton, president.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being considered by this company to extend its line from Elkhorn to Delavan.

SHOPS AND BUILDINGS

Des Moines (Ia.) Street Railway.—This company has opened a new office in the Flynn Building in Des Moines.

Ohio Electric Railway, Cincinnati, Ohio. — This company has opened its new passenger station at Fort McKinley.

Ohio Valley Traction Company, Portsmouth, Ohio.—Plans are being contemplated by this company to build a new pressed brick passenger station at the corner of Waller and Ninth Streets in Portsmouth.

Brantford (Ont.) Municipal Railway. — On Feb. 13 this company received the approval of the commissioners in Brantford of plans for a new passenger station to be built on the site of the old power house on Colborne Street opposite Clarence Street, Brantford. Work is to be begun at once.

West Penn Traction Company, Pittsburgh, Pa.—This company has leased the fourth, fifth, sixth and part of the seventh floors of the Benedum-Trees Building in Fourth Avenue in Pittsburgh. This space will be used for offices, the company having decided to establish permanent headquarters for many departments in Pittsburgh.

Wellsburg, Bethany & Washington Street Railway, Bethany, W. Va.—This company has just completed its new carhouse and repair shop at Bethany.

POWER HOUSES AND SUBSTATIONS

San Joaquin Light & Power Company, San Joaquin, Cal.—It is reported that this company, which recently completed an electric power generating plant at The Forks above Springville, will soon begin to build a canal from a point on the Camp Nelson branch of the Tule River 9 miles above the power house, the purpose of the second canal being to furnish more water for the power house. It is said that the present waterfall at the power house creates 3000 hp, whereas the equipment there is capable of generating much more. The canal, if it is built, will necessitate 2 miles of tunneling, the longest tunnel to be 900 ft.

Northern Pacific Railway, St. Paul, Minn.—This company has purchased four 25-kw, 3500 r.p.m., 125-volt Curtis turbo-generator sets with switchboard and accessories from the General Electric Company.

United Traction Company, Albany, N. Y.—This company will add to its substation equipment a 1200-kw synchronous converter and three 440-kv-a. transformers which have been ordered from the General Electric Company.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company will install a 500-kw synchronous converter with 550-kv-a. transformer and switchboard which will be furnished by the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Cleveland (Ohio) Railway has ordered fifty front-entrance, center-exit, semi-steel cars from the G. C. Kuhlman Car Company.

Lehigh Traction Company, Hazleton, Pa., has sent out specifications, through L. B. Stillwell, for ten all-steel center-entrance city cars.

Third Avenue Railway, New York, N. Y., advises that it is not expecting to purchase new cars for its subsidiary, the Yonkers Railroad, as previously reported.

New York State Railways, Rochester, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of March 6 as having issued specifications for forty prepayment, center-entrance cars, has withdrawn its request for bids on these cars and is now asking for bids on one sample car.

Binghamton (N. Y.) Railway has ordered fifty city cars from the Cincinnati Car Company through W. R. Kerschner, its eastern agent. Twenty of these cars, the order for which was reported in the ELECTRIC RAILWAY JOURNAL of March 6, are to be delivered at an early date, fifteen cars about the beginning of next year and the remaining fifteen at a still later date.

Chicago (Ill.) Surface Lines have been ordered by the Chicago City Council to purchase 336 cars in accordance with the terms of their contract with the city, before February, 1916. This order requires an immediate contract for the delivery of 168 cars with an additional contract for fourteen cars each month until the close of the fiscal year, February, 1916.

TRADE NOTES

Esterline Company, Indianapolis, Ind., has received an order from the United Railways of St. Louis for 100 SM-95 "Golden Glow" headlights. This order was secured by F. O. Grayson, of the Grayson Railway Supply Company, St. Louis, Mo., agent.

Hess-Bright Manufacturing Company, Philadelphia, Pa., advises that notwithstanding the reported obstacles to the importation of its ball bearings, it continues to receive great quantities from its Berlin works, the total since Sept. 15, 1914, being 375,000 bearings of assorted sizes.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order for electrical equipment for the cars recently ordered by the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., from the Cincinnati Car Company. The equipment includes four complete, four-motor equipments, with HL control. At the same time a contract was let for four HL control equipments to replace the automatic control on four cars. When the new equipment is installed the company will then have eight cars with HL control and twelve with automatic equipment.

Railway Improvement Company, New York, N. Y., held its annual meeting on March 1, and a number of changes were made in its organization. United States Congressman George W. Fairchild, of Oneonta, N. Y., was elected president to succeed Frank Hedley. John Starets was elected treasurer to succeed J. S. Doyle. T. Channing Moore, New York manager of the International Time Recording Company, was elected director in place of Mr. Hedley, and John Starets was elected director in place of Mr. Doyle. Congressman Fairchild is president of the International Time Recording Company and chairman of the board of directors of the Computing - Tabulating - Recording Company. The changes mentioned are due to the fact that the stock holdings of Messrs. Hedley and Doyle have been purchased by Messrs. Fairchild, Pizzini and Moore. This change makes the Railway Improvement Company more closely affiliated with the Computing-Tabulating-Recording Company and the International Time Recording Company, Endicott, N. Y. The latter company has always built the recorders of the Railway Improvement Company.

ADVERTISING LITERATURE

Bridgeport Brass Company, Bridgeport, Conn., has issued a folder on its "phono-electric" trolley wire.

A. O. Schoonmaker Company, New York, N. Y., has issued a price catalog of its India and amber stamped solid sheet mica segments and mica rings for railway motors.

Blaisdell Machinery Company, Bradford, Pa., has issued an unusually comprehensive catalog describing and containing data on its compressed-air machinery which is especially applicable to the operation of pneumatic tools and drills as used in machine shops.

Gas-Electric Motor Bus Corporation, New York, N. Y., has issued a catalog describing and illustrating its gas-electric stepless motor buses. As shown in the catalog, these buses are made both double deck with two-man operation and single deck, with one-man operation.

Nelsonville Brick Company, Nelsonville, Ohio, has issued a catalog describing its filler stretcher brick for use in paving next to car track rails. The catalog states that this company has shipped 639 miles of this brick for this use, and that in the last five years they have been used in eighty-nine cities, eleven states and in Canada. The catalog contains testimonial letters from the Cincinnati Traction Company, Pennsylvania & Ohio Railway and City Railway, Dayton, Ohio.

Walpole Tire & Rubber Company, Walpole, Mass., has issued a catalog describing its friction tape, insulating compounds, and molded rubber goods of every description. This company recommends its Armalac compound especially for the use of street railway armatures. This material is a neutral permanently plastic insulating compound for reinforcing the insulation for cotton covering of electrical conductors. Its constituents are paraffin wax, the melting point of which is raised permanently by a certain process, and petroleum naphtha. The paraffin base is said to insure permanency of insulation and resistance to moisture under the repeated heating and cooling of the windings in service. Armalac is made especially for street railway use for d.c. equipment, also for a.c. equipment where the pressure is 550 volts or under. It is neither alkaline nor acidulous, and therefore cannot attack copper wire.

Combustion Engineering Corporation, New York, N. Y., has issued a catalog describing and illustrating its Type E stoker. This stoker is of the underfeed type, the coal being fed into the furnace from beneath the fire in such a manner as to effect the distillation of the volatile matter from the coal and insure the complete combustion of the gases which are driven off. The coal is fed by hand labor or coal-conveying machinery into a large hopper and conveyed under the fire by means of the reciprocating sliding bottom of the feed trough which runs the full length of the stoker. The coal is delivered uniformly from truck to rear by the auxiliary pushers, and as it rises in the trough is distributed to the sides of the furnace by means of the moving bars. The burning fuel is constantly carried by the action of these bars to dumping trays along each sidewalk where the resulting ash or clinker is deposited. These trays are dumped by a single motion of the dump lever on the outside of the furnace. As stated in the catalog, these stokers are in use throughout Europe, South America and the United States, burning coking or non-coking coal ranging from 10 per cent to 40 per cent volatile matter and 5 per cent to 30 per cent ash. The catalog contains several illustrations of installations of this stoker under various types of boilers.

NEW PUBLICATION

Central Electric Railway Accountants' Association Pamphlet. 1915. Sixty-six pages. Paper-bound.

This pamphlet of the Central Electric Railway Accountants' Association, issued under date of January, 1915, contains a list of present and past officers, the names of the members of the association, its constitution and by-laws and an index to papers and committee reports published in pamphlets previously issued. A synopsis is presented of the decisions and recommendations of the association in regard to handling interline accounts for both freight and passenger traffic, and reproductions of the standard forms to be used are included. The pamphlet also contains the following papers: "Compiling Operating Expenses," by E. L. Kasemeier; "Some Accounting Problems Not Electric," by W. B. Wright; the presidential address of L. T. Hixson at Dayton, 1914; "Cost Accounting in a Manufacturing Plant," by G. D. Piper, and several citations used by W. H. Forse, Jr., on the subject of depreciation at the Dayton meeting.

Electric Railway Journal

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Sensible Act of Omission

THE outgoing Congress, in refusing to be "Moon-struck" by the influence of the chairman of the house committee on post-offices and post roads, took a most sensible stand. We have commented before in these columns on the viciousness of the confiscatory rider relating to railroad mail pay attached to the post-office appropriation bill by the afore-mentioned chairman, Representative Moon, and we desire now only to compliment our national legislators upon their action. The last resort of the proponents of doubtful legislation is always to attach their proposals, if sufficiently germane to the subject to be legally permissible, to some bill, like an appropriation measure, that seems necessary of passage. Too often, in the rush of the closing hours of Congress, such a method has proved successful—which makes its failure in this case all the more commendable. Naturally it is a matter of regret to us that the post-office appropriation bill itself was killed, but the censure created thereby should be directed solely against the unseemly obstinacy of Mr. Moon and his associates in refusing to withdraw the rider in the face of widespread opposition. One would expect that after such a defeat Mr. Moon would realize the absurdity of his efforts, but this Congressman is of a most peculiar type. After due mental labor he has conceived the idea that railroad influences (not corrupt, as far as he is aware) brought about the failure of the bill, but thus far he has given not the slightest indication of any realization that Congress, in acting as it did, only expressed the constantly growing national disposition to treat common carriers more fairly.

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Old Steel Cars Easily Maintained

THE prominent feature of the article on steel car repair on the Long Island Railroad, published elsewhere in this issue, is that steel construction doesn't need real routine repairs. Steel cars have been in operation on this system for ten years, and that period is certainly long enough to show up any weaknesses which might be inherent in the steel construction. However, all that has been required for the maintenance during that period is a somewhat glorified tin shop in which only one new class of labor is necessitated by the new equipment. This is the structural ironworker, whose experience is largely confined to the handling of pneumatic tools and whose actual work is so infrequent that three skilled workmen are sufficient to care for the maintenance of the framing of some 600 large steel cars. Compared with the number of carpenters required for an equal number of wooden cars this figure is enlightening. As a matter of fact, it seems to be the case that any given repair job is somewhat more costly in steel than in wood, but where the steel car excels is in its ability to do without repairs except under the most extraordinary circumstances. Impacts that would practically demolish a wooden car are not necessarily even severe in the case of steel construction. This is clearly shown by the unusual photographs that have been reproduced in the article in question. The lighter blows which are, however, sufficiently severe and sufficiently frequent to make the upkeep of platform sills and draft rigging a burden with wooden construction, are not noticeable with steel. Summed up, the Long Island's long experience with steel cars constitutes an astonishingly strong argument in their behalf. Although the practice described is on a large railway the principles involved apply with equal force to a system of any size. With the increasing number of steel cars in city and interurban railway service electric railway companies will become used to them, and their proper methods of repair will not seem so complicated as they do now on roads where wooden cars have been used exclusively.

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Signal Maintenance and Reliability

JUDGED by the practice of the ordinary interurban line, the signal-maintenance methods of the New York, Westchester & Boston Railway, described elsewhere in this issue, provide for considerably more attention to the signal apparatus than is usual. Contrary to the common practice of assigning but one maintainer to a district and making him subject to calls, the Westchester organization gives continuous supervision by assigning a night man as well as a day man to each signal district, which contains roughly the equivalent of some forty signals. The low cost of approximately $2 per signal per month which is obtained is clearly due in the main to the limited territory that is covered (less than 9 route-miles for any district), the major part of the maintainer's time being put in on the interlocking plants. To this extent, of course, the physical work of signal maintenance on this line is made easy, but on the other hand, this facility is partly offset, from the ordinary interurban road's standpoint, by the fact that practically all of the signals have two blades. It would seem, therefore, that increased supervision for signals, at least within certain limits, produces direct results, because the Westchester line's operating record of 20,000 signal movements per failure is far beyond the corresponding figure of 4000 or 5000 that may be expected on an interurban line. Still more important is the fact that, during the road's three years of operation, involving some 11,000,000 signal movements, no false-clear indication has occurred. Whether improved reliability of signals is worth additional expense for maintenance is, of course, a question of considerable magnitude, and it has to be decided on the merits of each particular case. But the fact seems to be clearly established that improved reliability is practicable if a railway company desires it and that it does not by any means involve a prohibitive expense.

The Labor Side of Maintenance

THE era of the well-lighted, well-ventilated, safe and otherwise generally attractive electric railway shop is at hand. A number of such shops have been described in recent issues of this paper and an account of another appears this week. Such surroundings are bound to be reflected in lower maintenance costs and in a better attitude of the workman toward his work. While these shops leave little to be desired in the way of comfort and facility, there is not apparent as yet in many shops a strong effort systematically to fit the workman for the use of these facilities. While it is true that electric railway maintenance work has peculiar requirements due to its general complexity, at the same time its variety would seem to be an advantage in developing all-round workmen.

The day of the old-fashioned apprentice system has passed, and nothing has yet taken its place. In electric railway shops the mechanics are drawn from all possible sources, having learned their trades usually in a very unsystematic fashion. Grown men, as a rule, are used as helpers as they are much more immediately useful. The work, particularly in large shops, is greatly subdivided, with numerous specialists in narrow lines. For example, in one extensive equipment department there are sixty-four named jobs, while in another there are forty-nine, a large proportion in both cases involving skilled labor. Fendersmiths and fender repairmen are separate specialists, as are gatesmiths, contact-shoe repairmen, acetylene welders, and so on. In the small shop individuals have somewhat varied work because there is not enough to do in one specialty, and they can pick up all-round skill of an uncertain kind.

While the shop man usually gets less money per day than equally-skilled workers in the building trades, his job is a steadier one, the conditions surrounding him are in many ways better, and he probably earns as much or more in the course of a year. The chief trouble is that there is so little opportunity for a boy to learn a trade, and in much of the work there does not seem to be any trade to learn. If jobs of a similar character could be grouped together so as to form trades, such as electrical equipment repairing and inspection, car machine work, car wiring and conduit fitting, motor repairing, etc., and if some simple apprentice plan could be devised by which boys could learn these, with or without trade-school training, certain apparent advantages would follow.

From the company's standpoint it would be advantageous to be able to shift men from one job to another, say from controller to trolley-base repair, so as to keep the force uniformly occupied. This in some cases would reduce the necessary size of the force. More general work would encourage ambitious boys to enter railway shop service because it would fit them to take jobs elsewhere if work became slack, while the variety would make them more efficient and intelligent workmen.

In the early days the trade guilds looked after the education and training of apprentices. In these times the burden appears to rest upon the employers.

Increased Maintenance Expenses

THE factors that influence operating expenses are many and varied according to the properties examined, but to a certain extent it is possible to generalize concerning this class of expenditures. The following remarks, based on the forthcoming census report for 1912, afford a general idea of the trend of electric railways in regard to a most important part of operating expenses—those for maintenance.

The total operating expenses of electric railways in this country from 1907 to 1912 increased 32.5 per cent, as compared to an increase in operating revenues of 35.7 per cent. On account of changes in accounting classification, not all of the five primary accounts are strictly comparable, but from the fact that maintenance of way and structures increased 62.6 per cent, maintenance of equipment 27.2 per cent, conducting transportation 34.4 per cent, and general and miscellaneous expenses 28 per cent, it is evident that the increase in the cost of maintenance, particularly for way and structures, was especially large. This fact is emphasized by the operating expense percentages based on the total operating revenues. In 1907 the primary operating expense accounts consumed the following percentages of the total operating revenues; maintenance of way and structures, 6.82 per cent; maintenance of equipment, 7.52 per cent; traffic expenses, 0.41 per cent; conducting transportation, 33.74 per cent; general and miscellaneous expenses, 10.12 per cent, and wages, etc., for electric service not before included, 1.47 per cent. In 1912, with the last item included under conducting transportation, the percentages were: maintenance of way and structures, 8.17 per cent; maintenance of equipment, 7.06 per cent; traffic expenses, 0.46 per cent; conducting transportation, 33.42 per cent, and general and miscellaneous expenses, 9.53 per cent.

The most striking facts shown by these figures are the large comparative decrease in the conducting transportation account, the smaller decreases in the general and the maintenance of equipment accounts and the large increase in the maintenance of way and structure account. The operating ratio was 1.44 points less in 1912 than in 1907, but while the three accounts which decreased were lower by a total of 2.84 points, the two which were greater increased by 1.40 points, of which maintenance of way and structures accounted for 1.35 points. From this it must not be inferred that equipment maintenance was skimped during the five-year period. With generally adequate maintenance expenditures for each class of property, it is probable, and quite proper, that the greatest attention was paid to maintenance of way, for the better the track maintenance the less would be the expenses caused by the wear and tear on equipment.

Another interesting point that might be mentioned is the difference in maintenance expense ratios for railways of different sizes. The larger roads showed much larger percentages for maintenance of both way and structures and equipment than the smaller roads, with corresponding smaller percentages for the general and miscellaneous account and for the power subaccount in conducting transportation. It seems that economies in power expense and in the general costs of management accompany growth in size, and that with this there also comes more than relative increases in the amounts used in maintaining the property in an efficient operating state.

Coasting Recorders in New York

WE believe that some very important questions are answered by the results of coasting recorder practice on the Third Avenue Railway System, New York, as detailed elsewhere in this issue. Ever since this and other devices have been brought forward as a necessary means to correct and economical car operation, the electric railway manager has asked: How much will I save in my power bill? How can I judge my men fairly and what will a follow-up system cost? How will the change affect collisions? How will it affect the maintenance of equipment? These are the questions that are answered, in part at least, by experience with 1100 instruments used under a wide diversity of conditions by the New York railway, whose practice is described.

The saving in the energy requirements appears very clearly on the Third Avenue Railway, inasmuch as that company is billed by the central station company with so many kilowatt-hours a month. As we have said lately in our discussions of recording devices for rating the efficiency of motormen, railways that buy energy see the savings of scientific car operation more directly than those which have their own power plants. The Third Avenue figures show a maximum saving of 10 per cent with 83 per cent of the cars equipped with coasting recorders, which corresponds to an indicated saving of 12 per cent with 100 per cent of the cars so equipped.

With the excellent follow-up and educational system that is used by the company, there is every reason to believe that 12 per cent will be exceeded. It should be emphasized here that when the energy requirements for the same months of succeeding years are checked against each other, only the periods covering mild or warm weather may be compared fairly. Otherwise a most unjust conclusion would be drawn from a comparison of the figures for December, 1913 and 1914. As the table shows, the mean temperature in December, 1914, was 32 deg. Fahr., or 7 deg. less than in December, 1913. This greater degree of cold necessitated so much more energy for heating purposes as to absorb the savings that otherwise would have been made by coasting. Seen from another angle, the reduction due to coasting almost offset the addition due to extra heating.

The fair judgment of the motormen is even more important than any saving in energy. The device put on the car must be placed before them in the guise of something that will help them to run a car with the pride of the artisan instead of the indifference of the laborer. And since conditions on no two lines, or even on the same line, are alike, a thorough classification is necessary before men can be judged on a percentage basis. The device itself should show readings that are readily understood by the motorman so that he can anticipate, in a measure, what his record for a given run ought to show. The interest that the Third Avenue men have in reading the coaster tape is not unlike that which the broker has in a ticker tape. We have already outlined in these columns the need for proper classification. Its importance is recognized on the Third Avenue road, for we find that the men are not only divided as to lines but subdivided as to character of run and still further subdivided as to the number of service days per month. Yet all this detail costs but 1.1 cents per man per diem. On a smaller road the cost would probably be greater, but, on the other hand, the company with the smaller energy needs would save more per kilowatt-hour, since it has to pay more for power.

Since some skepticism has been shown with regard to run-down accidents under increased coasting, the collision figures should also be convincing. These, for the period mentioned in the article, show a reduction of 20 per cent. Last is the question of the effect of coasting on the car equipment. Here the follow-up system is of value in checking the men who are doing suspiciously well. Furthermore, all the motormen may be trusted to complain about the "stiff joints" of a car if it does not give the coasting percentages expected. At any rate, the figures on car electrical equipment presented in the article do not bear out the opinions of the pessimist as to increased electrical troubles.

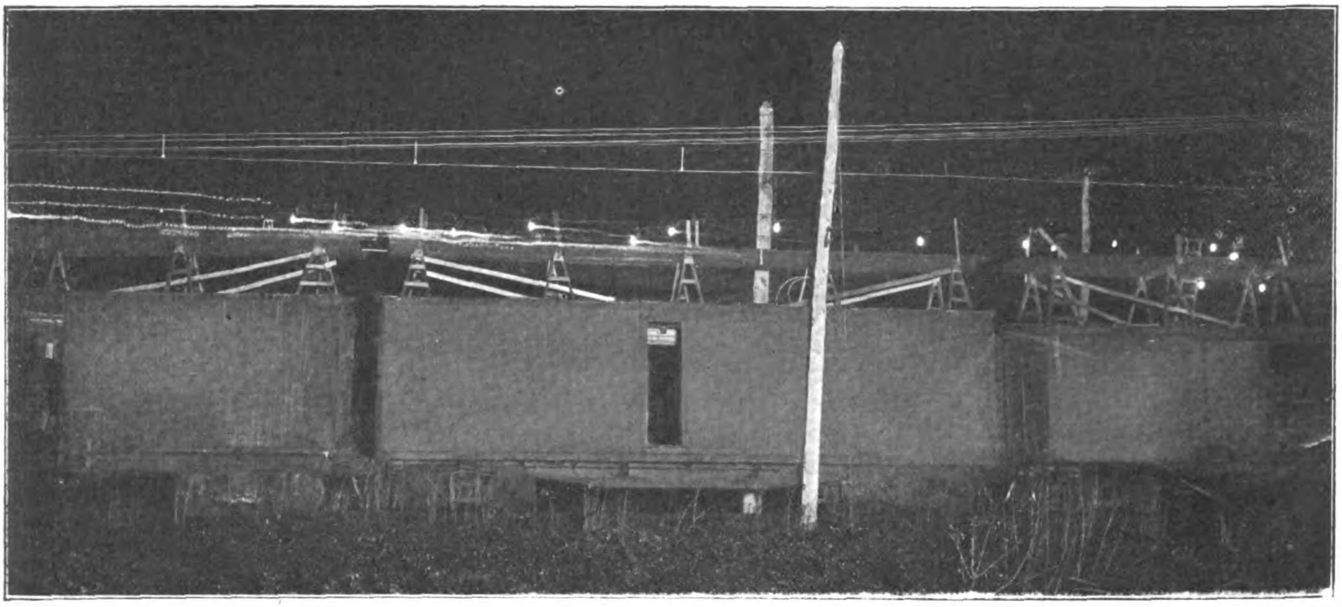
To sum up the lesson of the Third Avenue Railway's work with the coasting recorder: A checking device for use on a car cannot be bought as a piece of mere merchandise and be left to revolutionize car operation unaided. It must be regarded as a tool with which a staff properly organized can analyze men and methods to the end that the railway may be operated with precision in service, economy in energy, care in equipment and justice to the motorman.

FROM A.C. TO D.C. IN THE NIGHT

A Successful Conversion from 6600-Volt Single-Phase to 1200-Volt D. C. Operation Without Interruption of Service—Unit Costs and Descriptions of Special Features, Including Center-Entrance Cars

THE Annapolis Short Line is a strictly interurban railway, as it has no city track connections at either of its terminals. It runs between Annapolis and Baltimore, Md., a distance of 25.3 miles, its total trackage as single track being 32.3 miles. The Annapolis terminal is adjacent to the general offices and shops of the company in the center of the city and near all state buildings, while the Baltimore passenger terminal is at Camden station, the main passenger station of the Baltimore & Ohio Railroad, and three blocks from the heart of the business section. The company also has a separate freight-handling terminal in Baltimore.

This property began operation in 1886 as a steam railroad; in May, 1908, it was electrified for 6600 volts, twenty-five cycles, single phase, and in January, 1914, the present 1200-volt d.c. installation was completed for service. Since June 1, 1912, the property has been under the management of Allen & Peck, Inc., with T. C. Cherry as local manager and David E. Crouse as electrical engineer.



ANNAPOLIS SHORT LINE—NIGHT VIEW OF THE ERECTING PLATFORM FROM WHICH TWO 120-FT. SPANS OF CATENARY WERE CHANGED FROM A.C. TO D.C. DISTRIBUTION AT ONE TIME

The first electrical equipment had been built for a.c.-d.c. operations, but in practice the railway, running as it did over private right-of-way throughout, operated only on alternating current. The Annapolis Short Line was, therefore, in the unenviable position of using apparatus more complex and heavier than necessary, aside from any questions of efficient use of energy and reliability in operation.

One particularly notable improvement which has followed the change to 1200 volts direct current is a reduction in the weight of the electrical equipment per car from 33,175 lb. to 18,920 lb.

Following the advent of the new management a study was made of the situation with the result that 1200-volt equipment was decided upon. The care with which this study was undertaken could not be better shown than by the following table, which presents the last a.c., the estimated d.c. and the actual d.c. operating costs per car-mile:

	A.C. Cost 6 Months July 1 to Dec. 31, 1912	Allen & Peck, Inc., Estimate of D. C. Cost	Actual D.C. Cost July 1 to Sept. 30, 1914
Way and structure	$0.0401	$0.0270	$0.0383
Equipment	0.0375	0.0160	0.0118
Traffic	0.0081	0.0100	0.0080
Transportation	0.1563	0.1060	0.1159
General	0.0781	0.0740	0.0594
Total	$0.3201	$0.2330	$0.2334

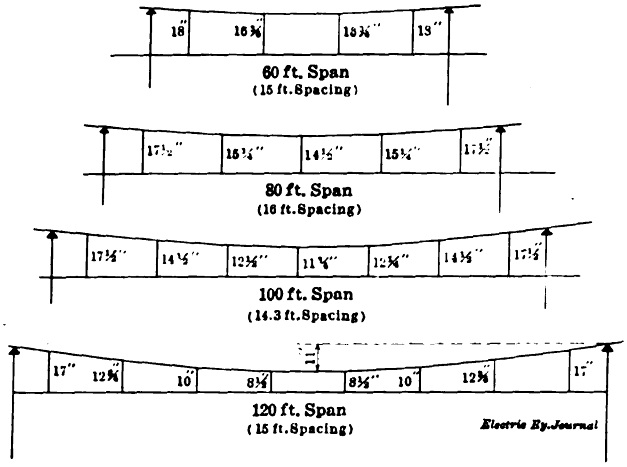
The foregoing classification follows the I.C.C. plan in which traffic is understood to include solicitation, superintendence and advertising, while transportation includes motive power.

PLANNING AND CARRYING OUT THE WORK

A most striking feature of the change-over from 6600 volts a.c. to 1200 volts d.c. was that the work had to be done between 1 a. m. and 5 a.m. and left in such shape that operation during the following day would not be interfered with in any way. Another even more striking feature was the care with which every step of the work was planned in advance.

The work was laid out in the following fashion:

First, a chart, Table I, was made, showing every pole number and the spacing between these poles as numbered. Then the numbers of hangers of given lengths for each span were tabulated and laid out, as shown in Table II and the accompanying drawing. A detailed tabulation was also made of the steady sticks required at each station, as included in Table I.



ANNAPOLIS SHORT LINE—CATENARY LINE CONSTRUCTION SHOWING HANGER SPACINGS

To follow up the work the management used a progress chart which showed every pole and the length of every span. As the steel trolley was run a red crayon line was drawn vertically between the poles so equipped, a white crayon was drawn to show the progress of feeder wire, a pink crayon line the progress of the transmission and a yellow line the progress of bonding. The date was written alongside each section. In Table III different styles of lines replace the colors.

TABLE I—TROLLEY AND TRANSMISSION POLES, ETC., ANNAPOLIS TO BALTIMORE

Miles	Station	—North Bound— Pole No.	—North Bound— No. Steady Sticks	—South Bound— Pole No.	—South Bound— No. Steady Sticks	
0	Annapolis	0				Single track.
			32			
0.7	West Annapolis	44				Single track.
			25			
1.4	Wardour	77				Single track.
			16			
1.73	Severn Draw	93				Single track.
			6			
1.9	Severn Side	100				Single track.
			41			
2.9	Winchester	151				Single track.
			29			
3.9	Arnolds'	201		204		Double track.
			16		15	
4.5	Joyce Station	227		227		Double track.
			32		24	
5.3	Revels'	272		236		Double track.
			41			
6.3	Jones' Station	323				Single track.
			25			
7.2	Round Bay	367				Single track.
			12			
7.8	Boone	390				Single track.
			18			
8.3	Robinson	418				Single rack
			56			
9.9	Earleigh Heights	491				Single track.
			32			
10.4	Pasadena	541				Single track.
			40			
11.8	Elvaton	581		585		Double track.
			41		46	
13.3	Marley	647		664		Double track.
			53			
14.8	Saunders' Range	722				Single track.
			26			
15.4	Glen Burnie	764				Single track.
			46			
17.1	Wellham	841				Single track.
			31			
17.9	Woodlawn	882				Single track.
			18			
18.4	Shipley	907				Single track.
			19			
18.9	Linthicum	934				Single track.
			43			
19.9	Pumphrey	983				Single track
			46			
20.95	Powder house	1033	30	1033	40	Double track.
21.2	Baltimore Highlands	1044				Double track.
22.0	Cliffords	1085		1085		Double track.
			33		31	
22.9	Fish House Tower	1131	24	1131	20	Double track.
23.25	Westport Power House	1152		1152		Double track.
23.39	Westport Tower	1166		1160 1175		Single track.
			30		30	
24.45	B. & O. (Russell St.)	1224		1216		Double track
			42			
25.3	Balto. (Camden Sta.)	1277				Single track.
		Total	903	Total	206	

1109 Steady Sticks.

TABLE II—CATENARY LINE CONSTRUCTION SHOWING NUMBER OF HANGERS ORDERED

No. Spans	Length Span, Ft.	Hangers Length, In.	No. Hangers Needed	No. Hangers Extra	Total No. Hangers
891	120	17	891	14	905
	120	12¾	891	12	903
	120	10	891	12	903
	120	8½	891	12	903
	120	8½	891	12	903
	120	10	891	12	903
	120	12¾	891	12	903
	120	17	891	12	903
373	100	17½	373	9	382
	100	14½	373	8	381
	100	12¼	373	8	381
	100	11¾	373	14	387
	100	12¼	373	8	381
	100	14½	373	8	381
	100	17½	373	18	167
149	80	17½	149	9	382
	80	15¼	149	16	165
	80	14½	149	32	181
	80	15¼	149	16	165
	80	17½	149	18	167
158	60	18	158	31	189
	60	16¾	158	30	188
	60	16¾	158	30	188
	60	18	158	31	189
Totals 1571			11,116	384	11,500

The work of conversion was begun on Oct. 12, 1913, and completed on Jan. 4, 1914, in time for the opening of the Legislature at Annapolis.

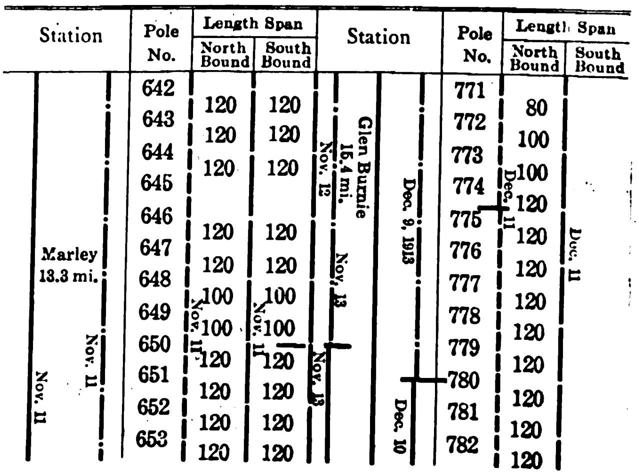
The work gangs operated with two steam locomotives. One of these hauled the reels from which the steel wire was strung and secured to the passenger with tie wires; the other locomotive hauled six freight cars, on the top of which a continuous platform equal to two pole spans in length was erected. The men on this train removed the old hangers and installed the new ones. The speed of the work was high owing to the fact that the supply man had a chart which showed him just what length and number of hangers were needed step by step.

As the line, of course, was dead during these operations light had to be obtained from an outside source. This light was therefore generated from a gasoline-electric set mounted in one of the freight cars, as illustrated. Part of the bonding was also done at night with a machine of the Electric Welding Improvement Company.

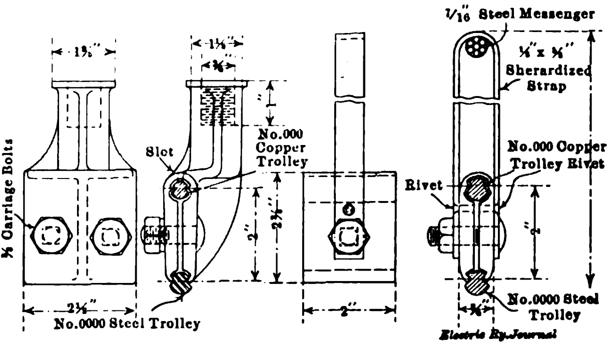
CHANGES IN THE TROLLEY AND FEEDER LINE

The original trolley line was a bracket type catenary with wooden strains or steady sticks for the alignment of the trolley on every pole at curves and at every other pole on tangents. The poles on tangents were spaced 120 ft. and on curves from 100 ft. down to 60 ft. The messenger was of 7/16-in. Siemens-Martin steel, the hangers were of ¼-in. solid pipe spaced 10 ft. and the trolley was of No. 000 grooved copper.

TABLE III—PROGRESS CHART OF EACH STYLE OF LINE, INDICATING KIND OF WORK DONE


Nov. 11
Nov. 11
Nov. 11
Nov. 11
Nov. 13
Nov. 12
Nov. 13
Dec. 9, 1913
Dec. 10
Dec. 11
Dec. 11

Station	Pole No.	Length Span North Bound	Length Span South Bound	Station	Pole No.	Length Span North Bound	Length Span South Bound
	642	120	120		771	80	
	643	120	120		772	100	
	644	120	120	Glen Burnie 15.4 mi.	773	100	
	645				774	120	
	646	120	120		775	120	
Marley 13.3 mi.	647	120	120		776	120	
	648	100	100		777	120	
	649	100	100		778	120	
	650	120	120		779	120	
	651	120	120		780	120	
	652	120	120		781	120	
	653	120	120		782	120	



ANNAPOLIS SHORT LINE—STEADY STRAIN TROLLEY CLAMP AND RECONSTRUCTED CATENARY SUSPENSION

In examining the line for the forthcoming operation at 1200 volts d.c. it was found that five to six years' operation of 3,313,314 car-miles at 6600 volts with sliding pantographs had worn down the copper to about 50 per cent of its original section. Experience indicated the desirability of using a steel contact wire while retaining the conductivity advantage of copper, but the old wire was evidently too weak to carry a second wire together with the necessary clips. The new double-galvanized steel wire, which is of No. 0000 size, is therefore carried directly from the messenger by means of hangers spaced 15 ft. apart.

The new hanger comprises a standard malleable iron duplex clamp with a full loop of ¾-in. x ⅛-in. strap over the messenger. This type of hanger gives a smooth under-running wire for the pantograph. One hanger in each span is of bronze in order to secure a good bond between the present steel contact and original trolley wire. The special clip, shown in an accompanying drawing alongside the hanger, was installed at the ends of the steady sticks to take care of the double wire.

One mile of the steel construction described was tried out for a year before the entire line was equipped. This installation was the first on a d.c. railway to show that a sliding steel shoe could collect ample current from a steel wire for cars of the weight and speed suitable for high-class interurban service. This change accomplished the object of transferring the faster rate of wear to the easily-renewed pantograph shoe for, after two and one-half year's operation of 863,903 car-miles, the wear on the original steel wire is but 0.002 in. The slight flattening from wear actually is advantageous in promoting the life of the pantograph shoe.

The addition of the steel contact wire reduced the clearance to the head of the rails by 2 in., making the present figure 21 ft. 10 in. The relative position of the messenger was not changed except in taking up the slack due to the extra weight of the steel trolley wire. A few additional anchors were placed in the line to keep the trolley from running out.

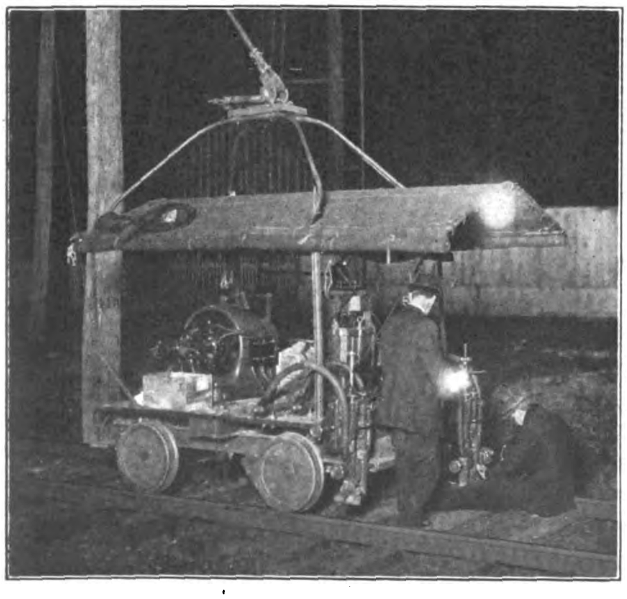
The insulators of the original line were retained, as they were to be applied to a lower voltage. The a.c. arresters were also retained except that their gaps were cut down from ¾ in. to ¼ in. These arresters have a fuse in circuit with a tripping device which opens the circuit mechanically and blows the fuse. A few Garton-Daniels 1200-volt d.c. arresters, General Electric ME and Westinghouse arresters are also in use. The arresters are installed at every other feed tap. The latter are located about 1000 ft. apart. The section breaks installed in the trolley every 5 miles are of the original hickory design.

The alignment of the trolley wire was changed to come over the center of the trucks instead of the center line of the car.

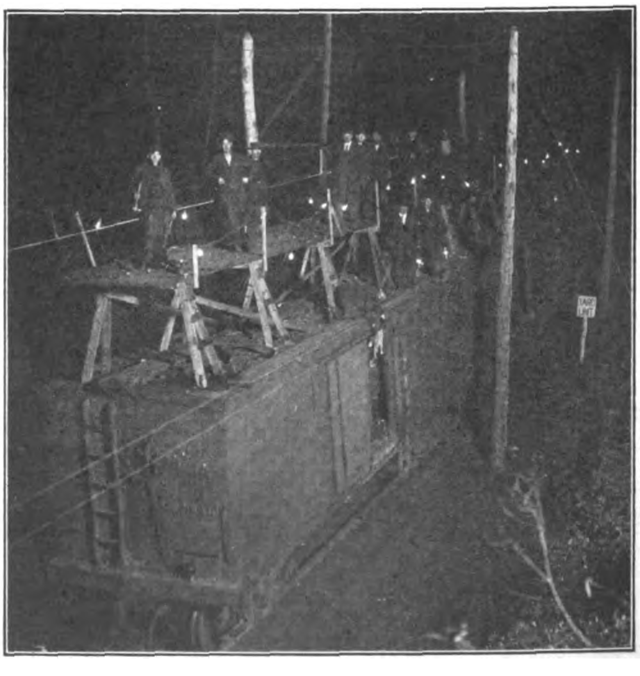
An aluminum feeder of 477,000 circ. mil between Westport and Annapolis is the only addition to the low-tension system outside of the trolley suspension itself. This fact is of significance since it shows the difference in distribution efficiency existing between 6600-volt a.c. and 1200-volt d.c. on a 25-mile interurban road with no change in substation location. Roughly speaking, the distribution circuit as originally built had about 64 per cent less conductivity than the present combination of old copper trolley, new steel trolley and aluminum feeder.

The steady sticks would not serve as originally mounted owing to their lack of clearance. A longer shank was, therefore, needed on the hanger to get sufficient distance between the messenger and trolley and to enable the steady stick to be mounted at an angle that would give 8 in. clearance from the pantograph horn in a vertical plane. The steady stick brackets are now made for horizontal as well as vertical swiveling of the stick, thus eliminating stick breakage.

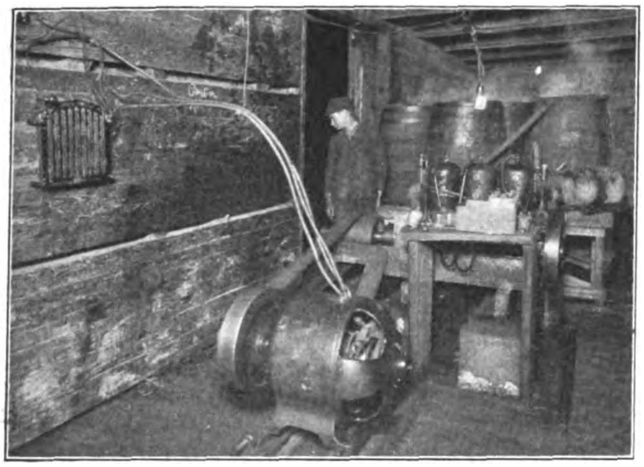
With 6600-volt a.c. operation the cars coasted with lowered pantograph over the crossings with 600-volt



ANNAPOLIS SHORT LINE—BRAZING BONDS AT NIGHT DURING THE CHANGE-OVER PERIOD



ANNAPOLIS SHORT LINE—PREPARING TO WORK FROM FREIGHT CAR PLATFORM AT NIGHT



ANNAPOLIS SHORT LINE—GAS-ELECTRIC CAR SUPPLYING LIGHTING CURRENT FOR THE NIGHT RECONSTRUCTION

lines near Baltimore at speeds as high as 25 m.p.h. Now the crossing is so arranged that for a distance of 50 ft. on each side of the intersection 600 volts is used instead of 1200 volts. The cars, therefore, go over with all lights burning and at half speed but under full control and with no danger of stalling at the crossing. Two accompanying illustrations show how the respective trolley wires of the interurban and city cars were made to permit the riding of the trolley wheel across the bronze strip of the interurban.

COSTS OF FEEDER, CATENARY AND SUBSTATION

The cost on a unit basis of the feeder and catenary work follows, all as per the detailed bills of material reproduced, as in Table IV.

Cost of 477,000 circ.-mil aluminum cable, 23.5 miles: Material, $16,790.78, or $714.20 per mile; labor, $2,516.59, or $107.40 per mile; total, $19,307.37, or $821.60 per mile.

Cost of No. 0000 grooved steel galvanized trolley, 32 miles of track: Material, $13,543.01, or $423.22 per mile; labor, $5,760.22, or $180 per mile; total, $19,303.23, or $603.22 per mile.

Cost of bonding No. 0000 7-in. EU-5 electric weld, 32.25 miles of track, 10,500 joints: Material, $6,680.03, or $207.13 per mile; labor, $2,390.58, or $74.12 per mile. Including the bonding car the cost per joint was as follows: Material, 63 cents; labor, 23 cents; total, 86 cents. Excluding the bonding car, the cost was as follows: Material, 39 cents; labor, 23 cents; total, 62 cents. The incidentals in connection with the catenary feeder and transmission job (noted later) are as shown in Table V.

TABLE IV—BILL OF MATERIAL FOR CATENARY.

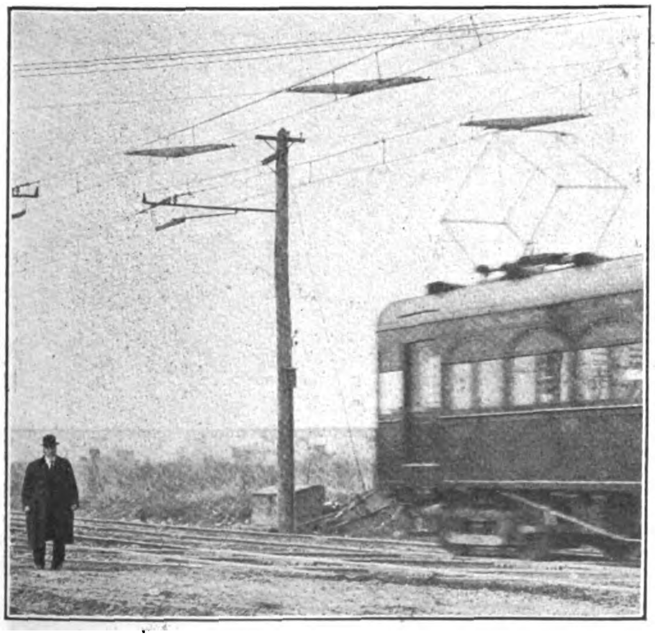
32	Miles No. 0000 Grooved steel double galvanized trolley wire.
1200	Steady stick clamps.
34	Splicing ears.
50	Feed-in clamps.
100	Steady sticks.
	120-ft. Span.
1862	Length 8½-in. duplex catenary hangers.
1862	Length 10-in. duplex catenary hangers.
1862	Length 12¾-in. duplex catenary hangers.
1862	Length 17-in. duplex catenary hangers.
	100-ft. Span.
357	Length 11¾-in. duplex catenary hangers.
714	Length 12¼-in. duplex catenary hangers.
714	Length 14½-in. duplex catenary hangers.
714	Length 17½-in. duplex catenary hangers.
	80-ft. Span.
186	Length 14½-in. duplex catenary hangers.
372	Length 15¼-in. duplex catenary hangers.
372	Length 17½-in. duplex catenary hangers.
	60-ft. Span.
188	Length 16¾-in. duplex catenary hangers.
188	Length 18-in. duplex catenary hangers.

BILL OF MATERIAL FOR FEEDER

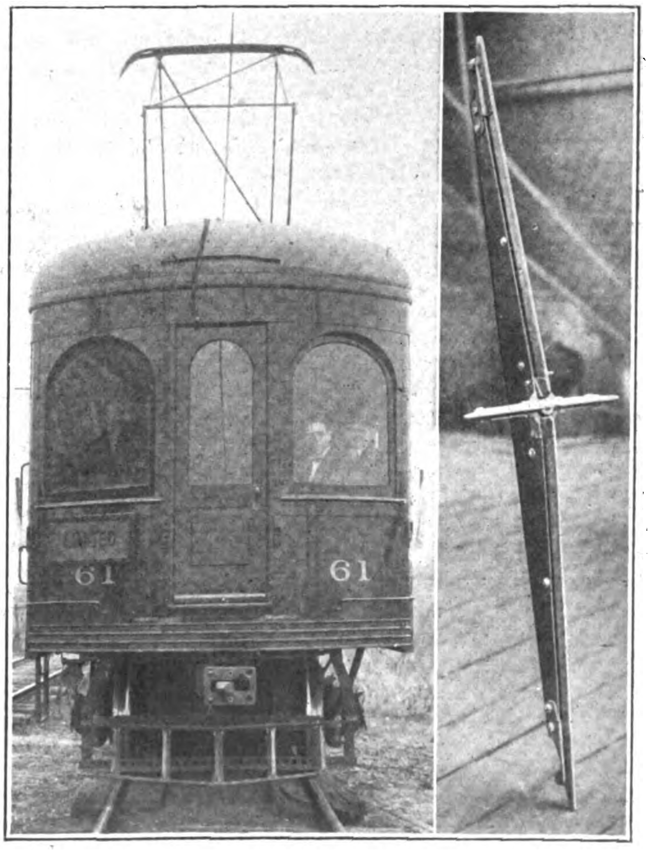
23.5	Miles nineteen-strand feeder cable 477,000 circ. mils.
1170	Feed wire insulators.
1170	Iron side brackets.
3600	½-in. x 4-in. Lag screws.
	Three-piece compressing joints.
6	Extra dowel pins.
2	Eye bolts.
47	Parallel grooved feeder taps.
5	Compression dead ends.
1	Hydraulic press with dies.
12	Single piece compressing joints.
	No. 2 tie wire for feeder.

TABLE V—TYPICAL TOTAL COST STATEMENT

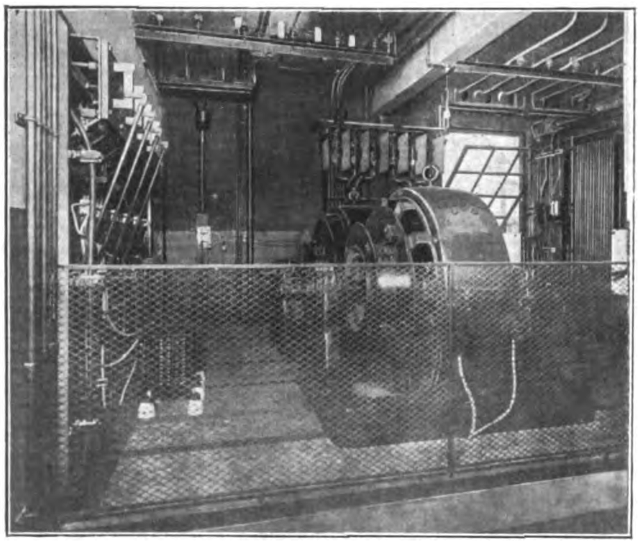
	25.3 Miles	Per Mile
Job No. 111	$2,454.95	$97.03
Labor	1,911.05	75.53
Material	543.90	21.49
Liability insurance	177.17	7.00
Engine rental	172.62	6.82
Drafting material	113.72	4.49
Casualties	54.79	2.16
Law	15.00	0.59
Telephone calls	10.60	0.41



ANNAPOLIS SHORT LINE—SHOWING SUSPENSION AT CROSSING OF 1200-VOLT AND 600-VOLT LINES



ANNAPOLIS SHORT LINE—OBSERVATION END OF CAR; 1200-600-VOLT CROSSING PIECE



ANNAPOLIS SHORT LINE—INTERIOR OF SUBSTATION AT WESTPORT

The original substation spacing has been retained for operating reasons. For example, the Westport station near Baltimore is cut out at night so that the entire load may be carried from Jones substation. The Westport substation is located 1.5 miles from Baltimore at the power house of the Consolidated Gas, Electric Light & Power Company, from which this company purchases electric energy. The Jones substation is 17.5 miles from Westport and 6.3 miles from Annapolis.

The Jones substation, which was constructed in 1914, is a one-story structure built up of 13-in. brick walls on a concrete foundation and with a concrete and three-ply asbestos roof. Its over-all dimensions are as follows: Length, 45 ft. 2 in.; width, 30 ft. 8 in., and height from ground line, 20 ft. 6 in. The present equipment in this station consists of two 300-kw oil-insulated self-cooled transformers, 13,200 volt primary 765 volts secondary three-phase twenty-five cycles; two 300-kw rotary converters with 1200-volt d.c. side; low-equivalent type lightning arresters for the 13,200-volt lines; electrolytic arresters for the 1200-volt d.c. feeders; hand-operated oil switches and two 25-kw 13,000/6600-volt transformers. The latter are used for supply lines to the shops and for an accommodation lighting and power service to a few small towns along the right-of-way.

A number of interesting features of the Jones substation will be noted from the accompanying drawings and other illustrations. In the first place it will be seen that the station is large enough for a third main transformer and rotary. A prime feature in the design was to keep the incoming high-tension and the outgoing low-tension lines as far apart as possible. The a.c. lines come in at one corner to the oil switches, whence they drop from the switching gallery to the transformers beneath, passing from the transformers via fiber conduits to a tunnel which extends under the rotaries. The d.c. feeders pass from this tunnel to the busbars and thence go out at the opposite corner of the station.

Owing to the layout described the starting panels had to be placed between the transformer and rotary instead of on the switchboard.

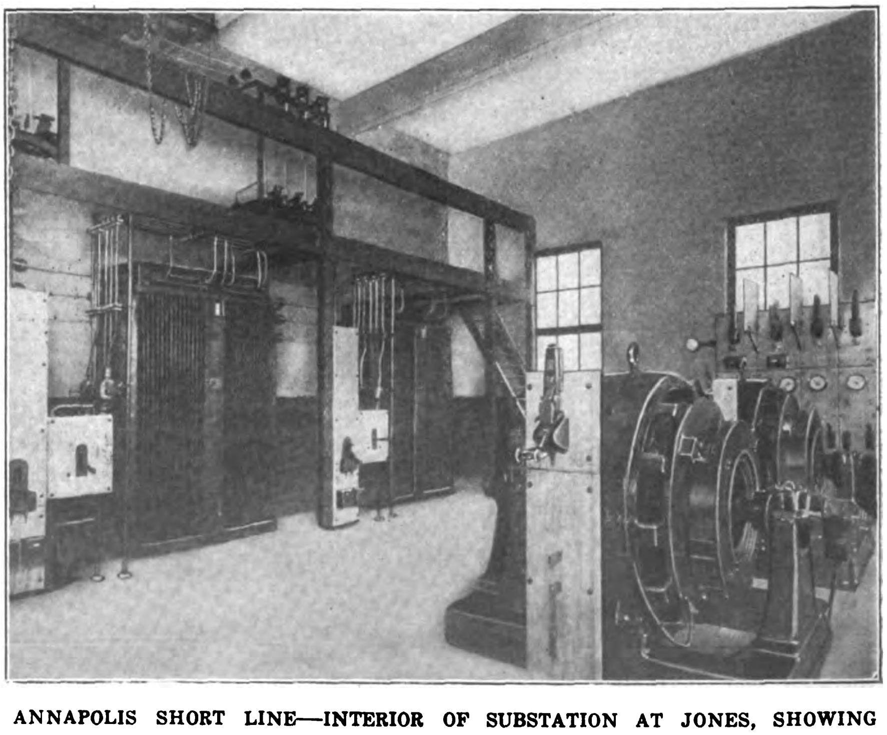
In operating this station at first some annoying flashovers occurred on the rotaries. These have been minimized by moving the feeder taps which are nearest the station to a distance of 2 miles instead of 1 mile. The frames of the rotaries were also insulated by placing treated hardwood bases below them and connecting the frames to ground through high resistance. Another safety feature is the provision of an oil drain for the transformers as a guard against fire. This drain takes the form of a brick gutter in the floor.

To start a machine, the operator closes the high-tension oil switch which has manually-operated remote control connection to the gallery. Next he throws the starting switch to a position which will give half voltage on the rotary. While doing this he stands at a place, as illustrated, from which he can see a voltmeter on the swinging arm of the switchboard to determine the polarity. If the polarity is wrong he corrects it with the field break-up switch, then throws the starting switch to the full voltage position and finally closes the negative switch on the panel at the machine.

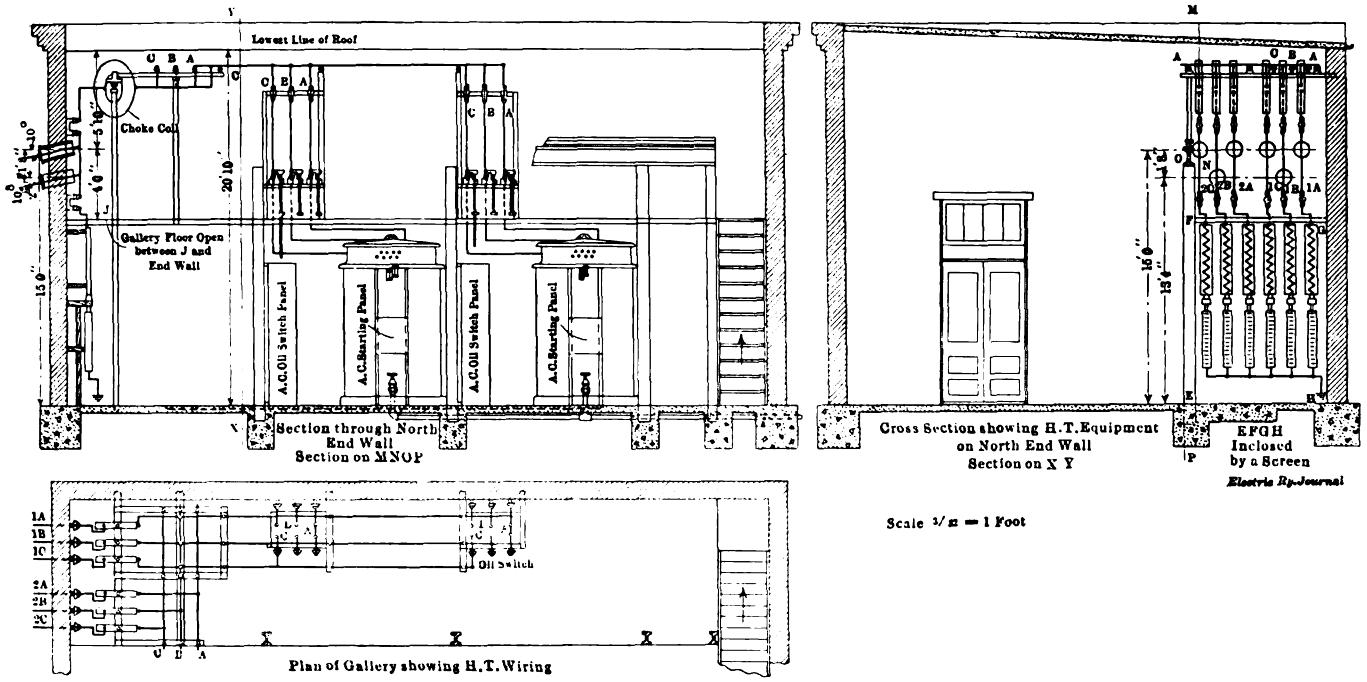
The total cost of the Jones substation, inclusive of land costing $200, was $5,430.49, or $6.03 per kw on the basis of 900-kw capacity. The cost of the land and material was $3,435.19, or $3.81 per kw, and of labor $1,995.30, or $2.22 per kw. This cost included the main busbar structure, conduit and all fixtures inside and outside the substation, but did not include apparatus or conducting material. The gallery erected for the high-tension switching apparatus is supported on one of the two rows of steel columns which carry a track for a 10-ton Maris crane.

The apparatus in the Westport substation is a duplicate of the Jones installation except that the oil switches are electrically operated and that there are no auxiliary transformers. The reasons for electrical operation of switches here are the facts that the power company's apparatus is of that type and that the switches are much further from the operator.

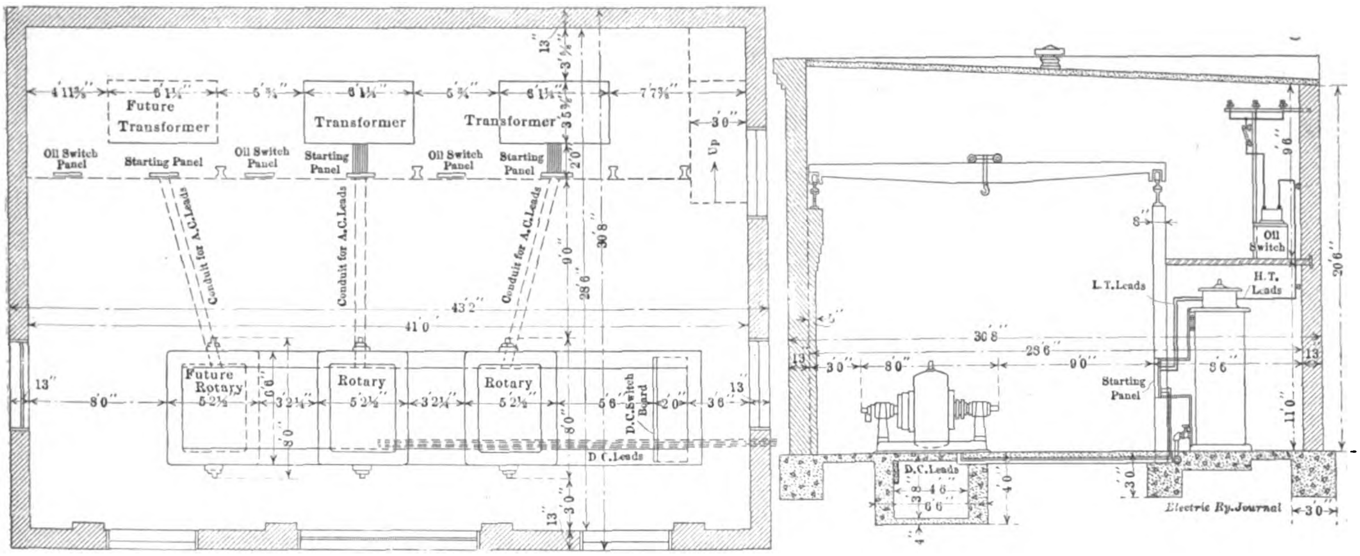
An unusually interesting log sheet is prepared daily by the operators at the Jones substation. In addition to the reports of interruptions, transformer tempera-



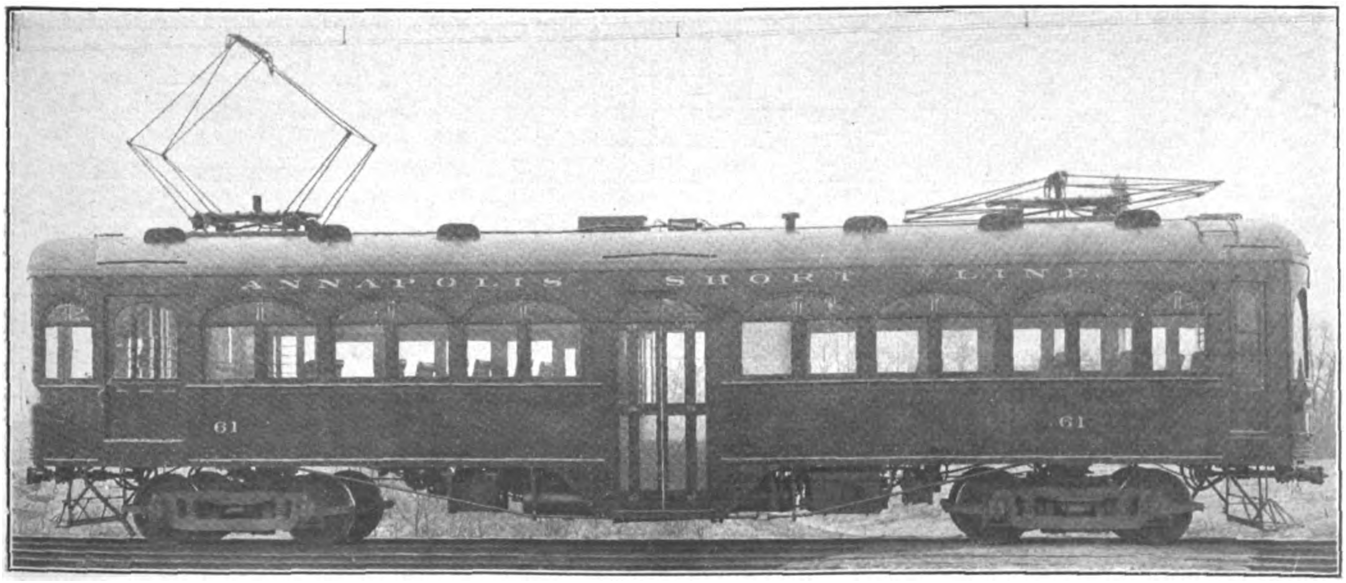
ANNAPOLIS SHORT LINE—INTERIOR OF SUBSTATION AT JONES, SHOWING HIGH-TENSION EQUIPMENT; SWITCHBOARD BEHIND ROTARIES


Lowest Line of Roof
C B A
Choke Coil
5'10"
4'0"
20'10"
15'0"
Gallery Floor Open between J and End Wall
A.C.Oil Switch Panel
A.C.Starting Panel
Section through North End Wall
Section on MNOP
Cross Section showing H.T.Equipment on North End Wall
Section on X Y
15'6"
13'6"
EFGH Inclosed by a Screen
Electric Ry.Journal
Scale 1/8 = 1 Foot
1A
1B
1C
2A
2B
2C
Oil Switch
Plan of Gallery showing H.T.Wiring

ANNAPOLIS SHORT LINE—ARRANGEMENT OF ELECTRICAL EQUIPMENT IN THE JONES SUBSTATION


Future Transformer
Transformer
Transformer
Oil Switch Panel
Starting Panel
Oil Switch Panel
Starting Panel
Oil Switch Panel
Starting Panel
Up
3'0"
Conduit for A.C.Leads
Conduit for A.C.Leads
Conduit for A.C.Leads
43'2"
41'0"
28'6"
30'8"
9'0"
Future Rotary
Rotary
Rotary
D.C.Switch Board
D.C.Leads
8'0"
13"
Oil Switch
H.T. Leads
L.T.Leads
Starting Panel
30'8"
28'6"
9'0"
20'6"
11'0"
D.C.Leads
Electric Ry.Journal

ANNAPOLIS SHORT LINE—FLOOR PLAN AND SOUTHERN-END SECTION OF JONES SUBSTATION


ANNAPOLIS SHORT LINE
61
61

ANNAPOLIS SHORT LINE—CENTER-ENTRANCE CAR WHICH WAS ADOPTED FOR THE 1200-VOLT SERVICE TO GET GREATEST CAPACITY AND QUICK INTERCHANGE OF PASSENGERS

TABLE VI—MONTHLY POWER RECORD, ANNAPOLIS SHORT LINE

1914 Month	Car-Miles	A. C. Kw-Hr. Purchases	Less A. C. Kw-Hr. Disposed of	D. C. Jones	D. C. West-port	D. C. Total	A. C. and D. C. Effic.	A. C. Kw-Hr. per Car-Mile	D. C. Kw-Hr. per Car-Mile	Stops	Aver. Mean Length Run	D. C. Watt-Hr. per Ton-Mile	A. C. Watt-Hr. per Ton-Mile
Nov.	60,283	268,440	262,478	125,980	110,660	236,640	90	4.35	3.91	20,512	2.9	97	108
Dec.	59,425	262,410	255,609	124,980	109,160	234,140	91	4.30	3.91	20,472	2.9	97	107

TABLE VII—TYPICAL HEADS OF TWO DAILY POWER RECORD CARDS

Jan. 1	Hour Peaks in Kw-Hr.	Reading of A. C. Watt-Meter	Total Kw-Hr.	Car-Miles	Kw-Hr. per Car-Mile	Stops	Mean Length of Run-Miles	Watt-Hour per Ton Mile
	580-560-640-340	123,864	8220	1907	4.31	589	3.2	107

Jan. 1	Westport D.-C. Read.	Kw-Hr.	Jones D. C. Read.	Kw-Hr.	Total A. C. Kw-Hr.	Power Line A. C. Reading	Kw-Hr.	Total A. C. to D. C. Kw-Hr.	Total D. C. Kw-Hr.	Effic.
	152,830	3440	358,710	3720	8390	29,750	170	8220	7160	89 per cent

tures, power readings and defects, individual and combined graphs are made up in the manner illustrated. The top of the sheet shows a curve of total a.c. kilowatt-hour peaks at Westport, the power-purchasing point, superimposed on a curve of total a.c. load in kilowatt-hours. Below these are shown pairs of curves comparing the d.c. load and d.c. capacity of each substation, then follows a graph showing the loss in transmission and conversion, and finally the graphs representing the working periods of the different rotaries.

TABLE VIII—BILL OF MATERIAL FOR TRANSMISSION

35	Miles seven-strand aluminum transmission wire No. 0.
	McIntire joints.
1 set	McIntire twisting clamps.
6	Aluminum tap-off joints.
	Aluminum tie wire No. 2.
850	6-ft. cross arms, 3¼ in. x 4¼ in.
1700	28-in. braces.
400	14-in. bolts.
200	16-in. bolts.
800	14-in. bolt washers.
400	16-in. bolt washers.
1700	⅝-in. x 5-in. bolts.
1700	⅝-in. x 5-in. bolt washers.
850	½-in. x 3-in. lag screws.
1686	Transmission insulators.
1686	Transmission insulator pins.

The records of the individual substations comparing load and capacity are of value to the operators in showing them how efficiently they are using their rotaries to secure good machine load factors.

The efficiency of conversion from alternating current to direct current is very high, ranging from 90 per cent to 92 per cent. For example, the following estimated performance of transmission and guaranteed efficiency of apparatus at the Jones and Westport substations was made on the record of energy consumption obtained for the months of July, August, September and October, 1914, appear in Table IX:

TABLE IX—ESTIMATED EFFICIENCY, TRANSMISSION, 98 PER CENT

Westinghouse Company's guaranteed efficiency—Jones	
Lowering transformers	97.5 per cent
Rotary converters	94.0 per cent
Total a. c. to d. c.	89.9 per cent
Westinghouse Company's guaranteed efficiency—Westport	
Lowering transformers	97.5 per cent
Rotary converters	94.0 per cent
Total a. c. to d. c.	91.6 per cent*

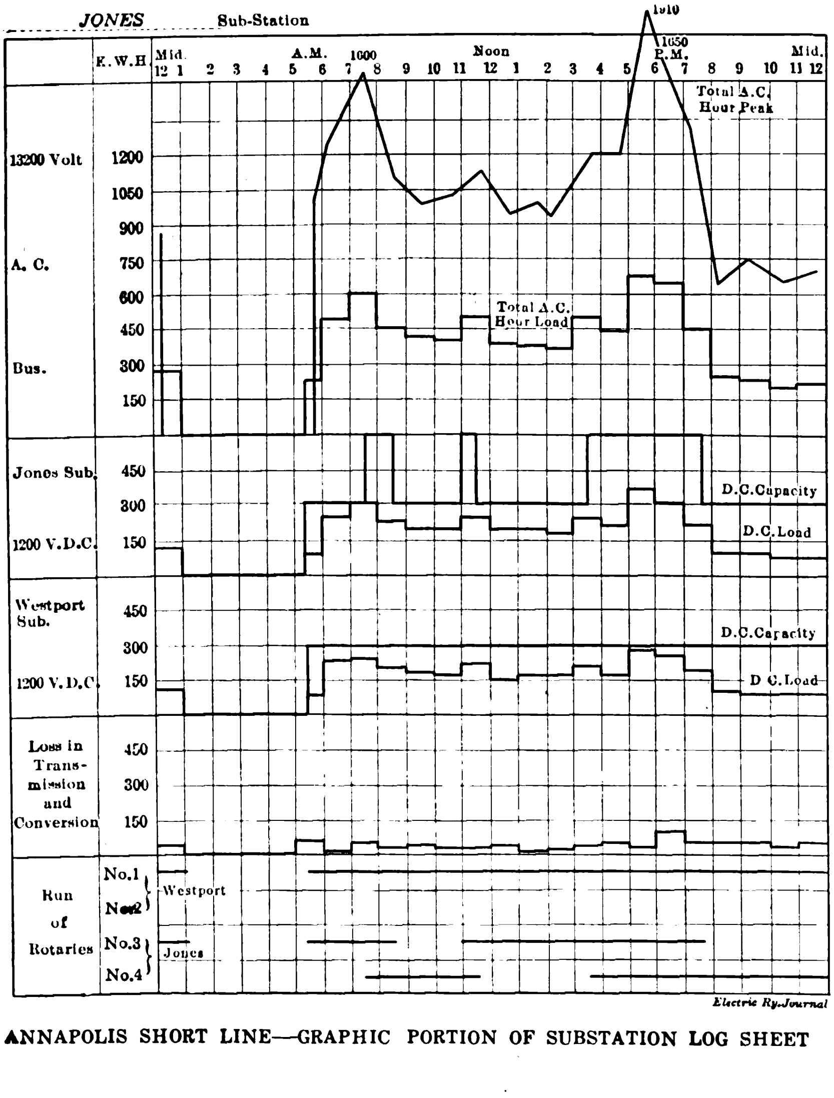
*No transmission allowance required.

The Westinghouse efficiencies given for apparatus were equalled in service due to the very good machine-load factor. The average load factor at each substation was 55 per cent. The power record, which is presented in Table VI on this page, shows how closely the watt-hours per ton-mile follow the average mean length of run, that is to say, when proper allowance is made for stops. These figures were obtained before coasting instructions and ampere-hour meters were introduced with beneficial results.

Power data from the substation log sheets and other sources are recorded daily on cards which are ruled for half a month. Typical heads of the two cards used and actual figures for the first day of this year are shown in Table VII near the top of this page.

TRANSMISSION SYSTEM

As the Westport substation is located in the plant of the power-selling company, the transmisson lines extend only for the 17.5 miles between Westport and Jones. The original transmission system comprised two single-phase lines of No. 2 copper mounted on one cross-arm. To make the same pole line carry the present three-phase system in duplicate a cross-arm for two wires was added below the original arm and wires. Each of the new transmission circuits is of No. 0 (105,530 circ. mil) steel-cored aluminum wire, the size being the equivalent of No. 2 copper and the coring permitting approximately the same sag as copper. The wires are mounted in triangular arrange-



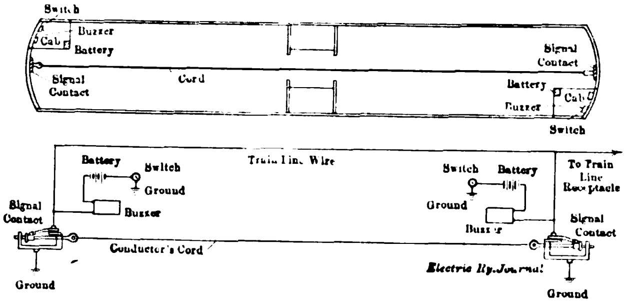
ANNAPOLIS SHORT LINE—GRAPHIC PORTION OF SUBSTATION LOG SHEET ment on 35,000-volt O.B. porcelain insulators. The iron grounding wire for lightning protection is mounted on the top of the poles and is grounded to the rails every tenth pole, equivalent to a distance of 1200 ft. Telephone interference is minimized by giving each wire two complete turns in the 17.5 miles of run.

The cost of changing over the transmission system was as follows: For materials covering 35 miles of new aluminum wire, or 17.5 miles of track, $8,913.68; for labor, $3,024.85. The bill of material is presented in Table VIII on page 548. In considering labor cost it should be remembered that the work was done at night.

ROLLING STOCK

The original rolling stock was of the usual end-platform type and of heavy wooden construction, some with steel underframes. In changing over the line it was felt that much of the benefit would go unappreciated by the public if there was no apparent improvement in the cars. The management decided that in the first place new cars of all-steel construction should be used, in the second, that they should be lighter than the a.c. cars and, finally, that they should be of center-entrance type.

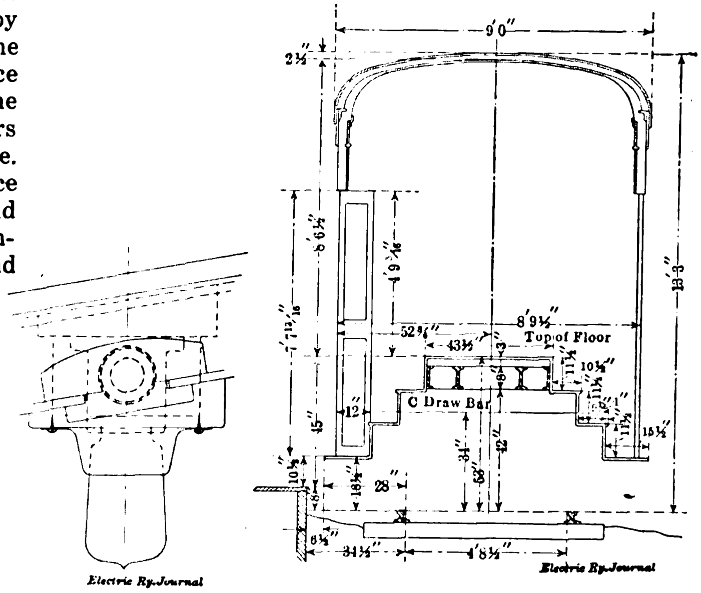
As the accompanying plan shows, the center-entrance car is divided into a main compartment, toilet and motorman's cab on one side, and into a smoking compartment, baggage compartment, heater room and motorman's cab on the other side. With the center-entrance arrangement no passenger has any good reason for going into the baggage compartment, while ladies are never obliged to go through the smoking section. Furthermore, the conductor stands in the center of the car at all times in the best possible location to maintain supervision. Another advantage of the center entrance, which is of real importance at the short stops of "limiteds," is that the rate of passenger interchange is higher because people can go in and out at the same time. In accordance with State regulations, colored passengers are directed to take the seats at the rear.



ANNAPOLIS SHORT LINE—DIAGRAM OF BUZZER SIGNAL CONNECTIONS, ETC.

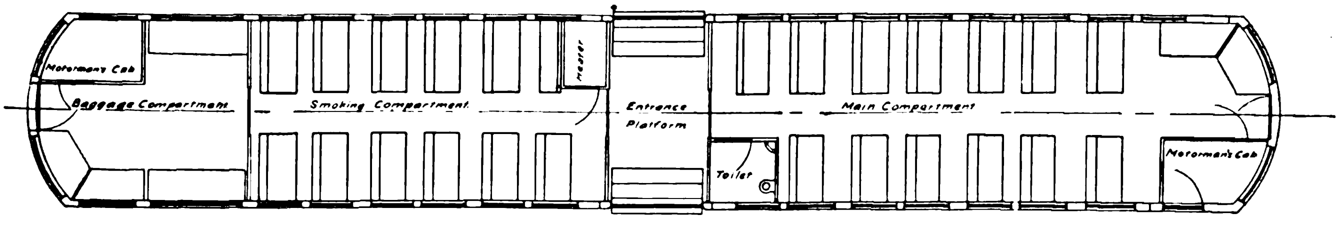
Since the car is operated double-ended it was desirable to know in advance whether a car of the width proposed would allow ample room for the conductor and passengers if stairways were provided on opposite sides of the center platform; also if the treads and risers would be comfortable for women and other passengers. Hence before deciding upon this feature a model platform was built and a number of people were invited to walk up and down the steps and to walk by each other in opposite directions on the platform. As shown in an accompanying drawing, these tests indicated that a platform 43½ in. wide with three risers of the uniform height of 11½ in. and treads of the widths marked on the drawing would give satisfactory passenger interchange conditions. The same plan was followed in connection with the motorman's cabs, a dummy with standard control apparatus therein being constructed to ascertain the most satisfactory minimum clearances. The results are indicated in the general plan, from which it will be seen that room was left for an observation window at the main compartment end, while the similar layout of sash at the baggage compartment end is especially welcome when this section is used as a post-office car.

The new Wason cars are 55 ft. long, 8 ft. 9 in. wide, 15 ft. 6 in. high to top of lowered pantograph, and weigh 80,300 lbs. They seat fifty-two passengers each. The trucks are Brill MCB-2X of 6-ft. 6-in. wheelbase with 36-in. rolled steel wheels. The underframe includes 10-in. 15-lb. channels for the side sills, four intermediate 8-in. 18-lb. I-beams and cross connections of 5 in., and 6-in. 8-lb. channels. At the center of the car all longitudinal members are interrupted except the center intermediate sills. To take care of this a plate 11 ft. 6 in. x 38 in. x ¼ in. thick is riveted to these center sills and also to the cross-members nearest the platform. Additional diagonal bracing is also provided. The important members of the framing are the T-posts for sides and roof and the side sheathing of No. 10 steel plate. The arch roof is of wood with twelve Automatic ventilators. The floors in the passenger and motorman's sections are also of wood covered with elastic tiling. The interior finish is mahogany with agasote ceilings, in the passenger sections.

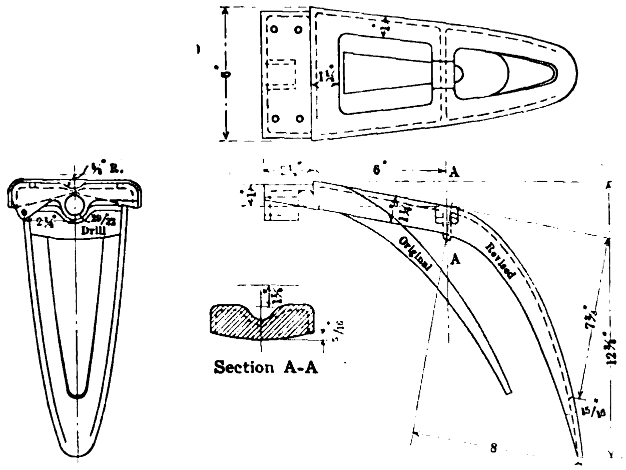


ANNAPOLIS SHORT LINE—LIGHT SOCKET; STEP ARRANGEMENT FOR CENTER-ENTRANCE CAR

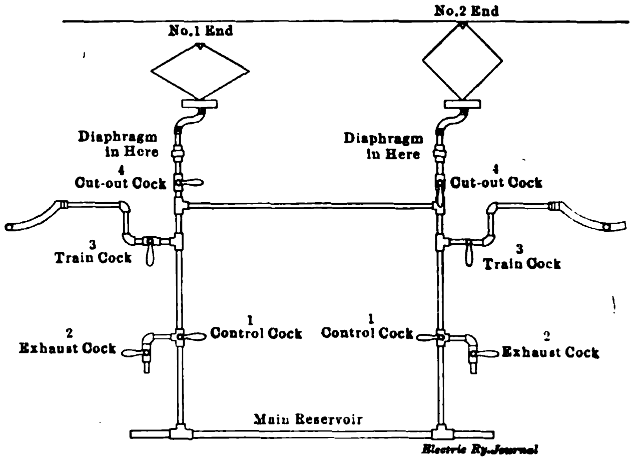
The cars are furnished with four 75-hp commutating pole motors Westinghouse 317-A-4 geared 20:69. They are wound for field control, the change from full field to short field being made by means of four switches



ANNAPOLIS SHORT LINE—PLAN OF DOUBLE-END CENTER-ENTRANCE PASSENGER AND BAGGAGE CAR



ANNAPOLIS SHORT LINE—REVISED COLLECTOR



ANNAPOLIS SHORT LINE—PANTOGRAPH AIR CONTROL

in the unit switch group. The control is the motor builder's HLF design with resistance to cut down the line voltage to 210 for the switch group magnets. No dynamotor is used, the Westinghouse D2K compressor being operated directly on 1200 volts, while the lamps are wired ten in series at 120 volts each. These lamps are mounted in Mogul sockets with condulets. The arrangement illustrated on page 549 places the conduit as far back from the headlining as possible and secures a sightly appearance.

The signal system is of the buzzer type, which was adopted in preference to bell signals because it may be used for instantaneous signaling throughout any number of multiple-unit cars.

The Westinghouse AMM brake has the straight air feature for single-car operation and automatic for train service. It includes the Type J slack adjuster. The air sanders are Ohio Brass "Universal" design and the hand brakes are of Peacock type.

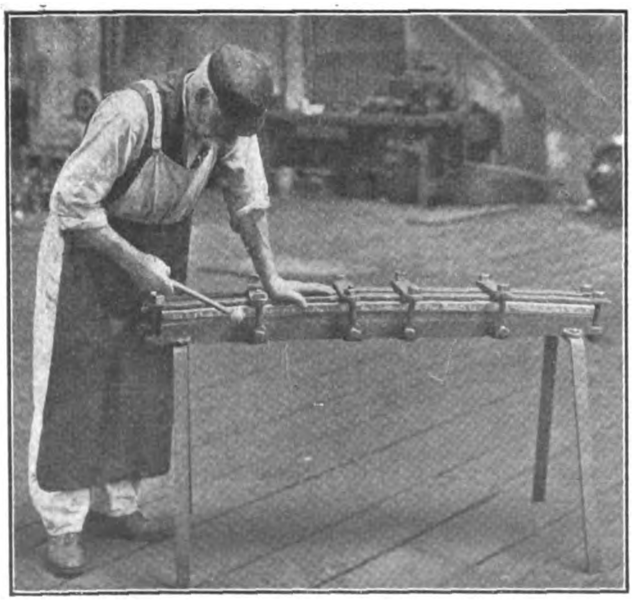
Instead of using the heavy M.C.B. coupler with accompanying draft rigging and anchorage casting the company adopted the Tomlinson radial coupler which saves 1400 lb. per unit. Hedley anti-climbers are used.

The cars carry two sliding pantographs. Only one pantograph is used at a time except when the other serves as a sleet cutter. These collectors are equipped with sheet steel shoes bearing against the wire with a pressure of 10 lb. to 15 lb. Experience indicates that grease grooves are unnecessary.

The shoe is built of 1/16-in. sheet steel 6 in. wide, 4 ft. long and flanged ¾ in. on each side. This, the only part which requires renewal, costs about 26 cents in labor and material for its average life of 1000 car-miles. Templets are used for the manufacture of shoes. As shown in an accompanying drawing, the aluminum pantograph horns have been altered in shape after they have been received from the maker to permit greater contact area for the shoe where oscillations are unusually heavy.

The pantographs are now arranged for straight air operation whereas they were formerly manipulated through combined air and magnet control. All locking devices have also been eliminated. Assuming that a man is to operate a car from the No. 1 end his first act would be to open the exhaust cock at that end and to close the exhaust cock at the No. 2 end. He could then close the train cocks at both ends of the car. Next he would open the cut-out at the No. 1 end and close the cut-out cock at the No. 2 end.

In every-day service the motorman does not have to go through this sequence of operations. But one pantograph is used each day, and all of the preparatory steps are cared for by the yard inspector. Hence, in regular service, the motorman has to change the exhaust cock only. He closes this cock in the cab from which he is not operating and opens it in the one from which he is going to operate. He is then ready to bring the pantograph into service by means of a three-way cock. Hose connections permit the operation of all active pantographs in a train from one cab.



ANNAPOLIS SHORT LINE—FORMING PANTOGRAPH SHOE

ANNAPOLIS SHORT LINE—PANTOGRAPH SHOE COMPLETED

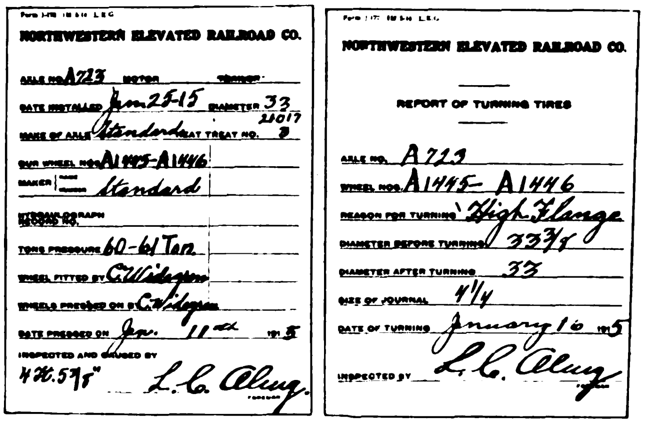
CHICAGO ELEVATED SHOP PRACTICE

Some of the Practices and Kinks Employed in Removing the Causes of Equipment Defects and Reducing Maintenance Costs

THE mechanical department of the Elevated Railroads of Chicago, in pursuance of a general policy of removing the cause of defects, in addition to devoting attention to the reduction of the cost of making repairs, has obtained most satisfactory and gratifying results with limited shop equipment.

WHEEL PRACTICE

In fixing a wear limit for steel wheels it was realized that, while there is a point at which flange wear may be limited to reduce to a minimum the amount of metal lost in turning, this consideration alone cannot determine the wear limits at which wheels should be removed from service. A practical wheel defect gage also must allow for reasonable wear on track special work. Following an investigation of many contours of worn wheels, and of the wear on rails, switches and frogs at a number of locations on the system and accurate measurement of wheels, switches and frogs at points where derailments occurred, the gage shown on page 553 of this issue was adopted. On this gage five limits are provided, namely, thin flange, low flange, high flange, pointed flange and straight flange. The dimensions of these limits are indicated, and the method of application of the different limiting points is shown in one of the illustrations.



Form 1-15 10 5-14 L.E.C.

NORTHWESTERN ELEVATED RAILROAD CO.

AXLE NO. A723 MOTOR TRAILER
DATE INSTALLED Jan 25-15 DIAMETER 33
21017
MAKE OF AXLE Standard HEAT TREAT NO. 3
OUR WHEEL NOS. A1445-A1446
MAKER Standard
HYDRAULAGRAPH RECORD NO.
TONS PRESSURE 60-61 Ton
WHEEL FITTED BY C. [illegible]
WHEELS PRESSED ON BY C. [illegible]
DATE PRESSED ON Jan. 11th 1915
INSPECTED AND GAUGED BY
4 H. 5 7/8" L. C. Aluy
FOREMAN

Form 1-17 10 5-14 L.E.C.

NORTHWESTERN ELEVATED RAILROAD CO.

REPORT OF TURNING TIRES

AXLE NO. A723
WHEEL NOS. A1445- A1446
REASON FOR TURNING High Flange
DIAMETER BEFORE TURNING 33 3/8
DIAMETER AFTER TURNING 33
SIZE OF JOURNAL 4 1/4
DATE OF TURNING January 16 1915
INSPECTED BY L. C. Aluy

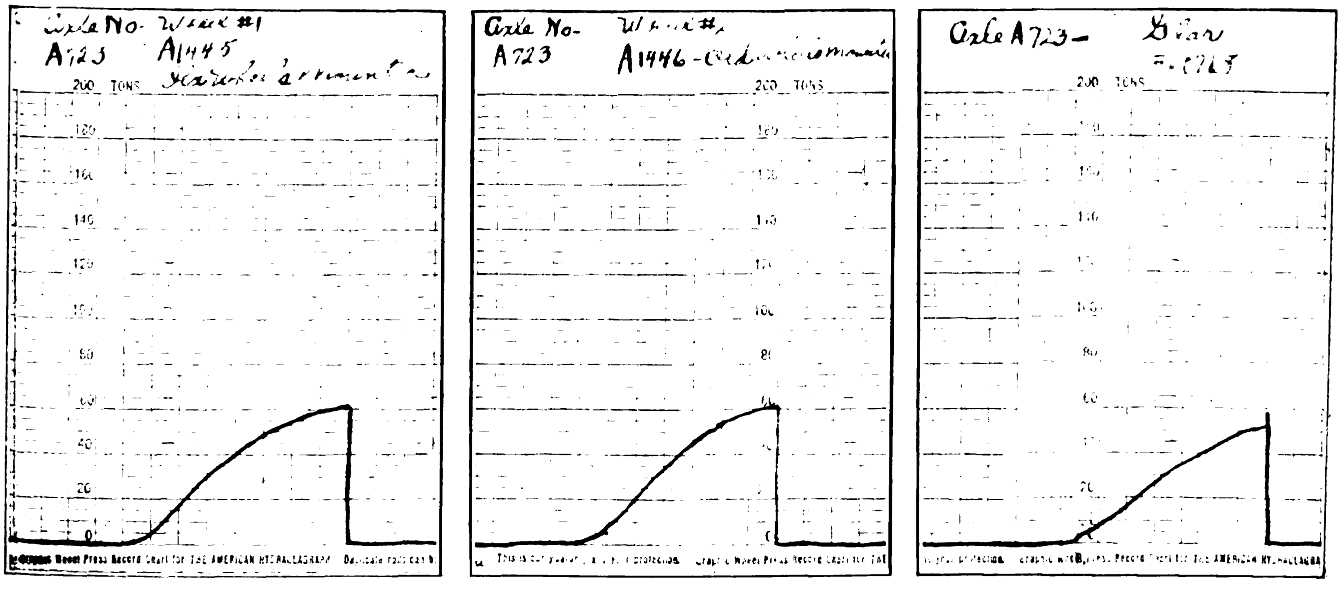
CHICAGO ELEVATED—WHEEL AND AXLE RECORD; WHEEL TURNING RECORD

In order to furnish some definite working standard, minimum and maximum pressures for pressing wheels on axles have also been adopted for the various sizes of axles. A hydraulagraph record is taken for each wheel at the time it is pressed on an axle, and this becomes a part of the permanent shop records. The maximum and minimum pressures adopted for the various axle diameters are as follows:

Diameter of Axle at Wheel Fit, in.	Minimum Pressures, Tons.	Maximum Pressures, Tons.
4	40	60
4½	45	65
4¾	45	65
5	50	75
5¼	50	75
5½	55	80
5¾	55	80
6	60	90
6¼	60	90
6½	65	95
6¾	65	95
7	70	100

WHEEL AND AXLE RECORDS

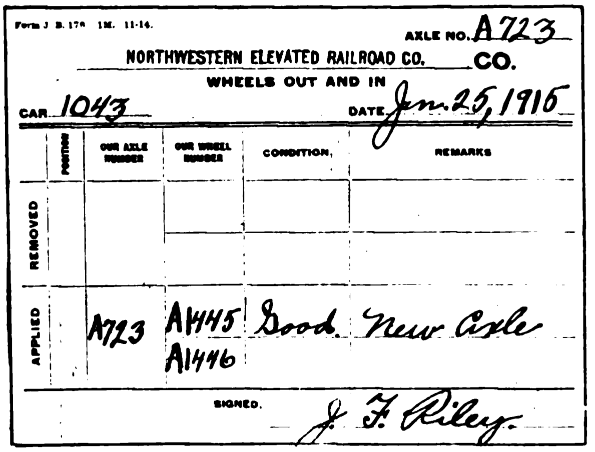
Wheel and axle records are filed by axle number in an envelope which contains the records of all wheels and gears fitted to an axle during its life in service. Each envelope contains a hydraulagraph record of the wheel and gear fits, a turning record, a record of the position of the axle under the car from which it was removed and a record of the car number and the position of the axle when it is again restored to service. In addition to the axle number on the face of the record envelope, the size of the axle, the type (whether used on a motor or a trailer), the date on which it was put in service and the name of the manufacturer are shown. These axle and wheel records are then filed under the car numbers. To distinguish between axles in service and those in the shop, a separate file is kept for the latter. Records of the operations necessary to fit a new



CHICAGO ELEVATED—TYPICAL HYDRAULAGRAPH RECORDS OF WHEELS AND GEARS axle or to renew wheels are prepared by the foreman in charge of boring mill, wheel lathe and wheel press.

EMERGENCY METHODS OF REMOVING WHEELS FROM AXLES

In the few cases where the pressure required to remove a wheel from an axle exceeds the capacity of the 200-ton wheel press, a gas heater is used to expand the wheel until the press will remove it. This heater consists of 1¼-in. pipe burner curved to fit the tire, several sizes being provided to fit different sizes of wheels. Holes drilled on the inside of the burner rings permit the flame to play on the tire, and a smaller burner of the same size of pipe is used to heat the hub. These burners are connected into the shop gas and compressed air systems through a mixer located at the junction of the air and gas pipes and the burner ring. For the most obstinate cases approximately fifteen minutes are needed to heat the wheel to the required temperature.



Form J B. 178 1M. 11-14.

AXLE NO. A723

NORTHWESTERN ELEVATED RAILROAD CO. CO.

WHEELS OUT AND IN

CAR 1043 DATE Jan. 25, 1916

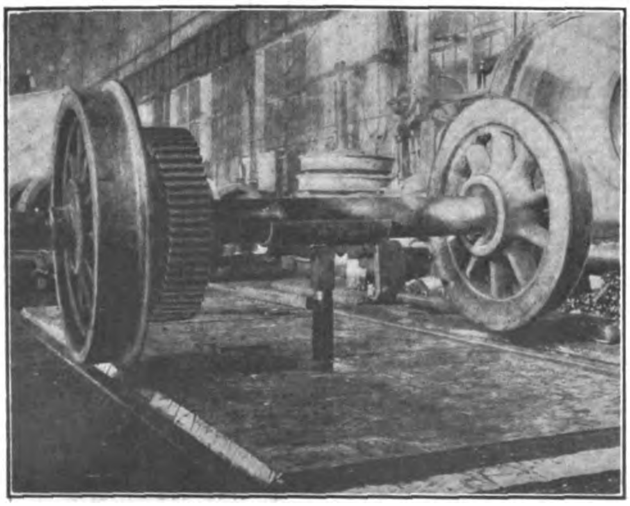
	POSITION	OUR AXLE NUMBER	OUR WHEEL NUMBER	CONDITION.	REMARKS
REMOVED					
APPLIED		A723	A1445 A1446	Good.	New Axle

SIGNED. J. F. Riley.

CHICAGO ELEVATED—RECORD OF WHEEL APPLIED

WHEEL HOIST

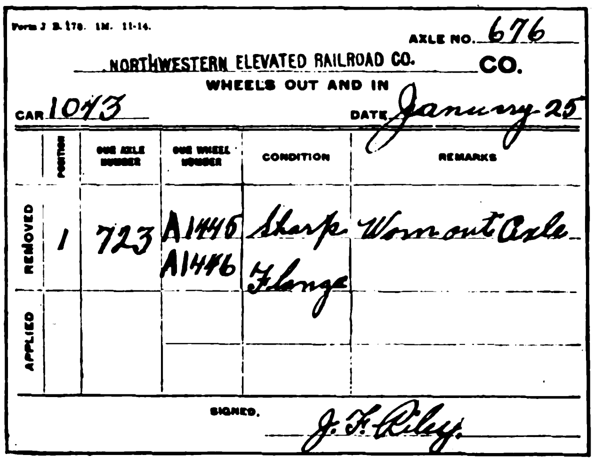
As the shop tracks parallel the axis of the wheel lathe, it is necessary to turn the wheels by hand or with the overhead bridge crane before they can be rolled between the lathe centers. To facilitate this operation, an old 10-in. x 12-in. brake cylinder was mounted in a pit beneath the shop floor and connected into the shop compressed-air system. A hollow piston was fitted to this brake cylinder so that the hoist saddle which received the axle could be inserted for turning a pair of wheels and then removed to keep the track and floor clear. The air control valve is operated by a key which is inserted in position only when the hoist is in use.



CHICAGO ELEVATED—WHEEL AND AXLE-TURNING HOIST

AXLE TESTING OUTFIT

When cars are overhauled all axles are carefully examined and receive an impact test on both journals. The axle is set on two substantially-built horses placed just inside the wheel hubs, and, in this position is thoroughly cleaned and examined for flaws with a magnifying glass. If none is found, an axle-testing tool, consisting of a saddle striking block fitted with a babbitted bearing to prevent scarring, is set in position on the end of the journal. This striking block then receives four blows from a 12-lb. hammer, the axle being turned 90 deg. with each blow. If there is a flaw which is not evident under the magnifying glass, the sledge-hammer blows are quite certain to bring it out, its presence being indicated by thin film of oil which appears along the crack. This simple method of locating flaws in journals and axles has resulted in the removal of several defective axles from service.



Form J B. 178. 1M. 11-14.

AXLE NO. 676

NORTHWESTERN ELEVATED RAILROAD CO. CO.

WHEELS OUT AND IN

CAR 1043 DATE January 25

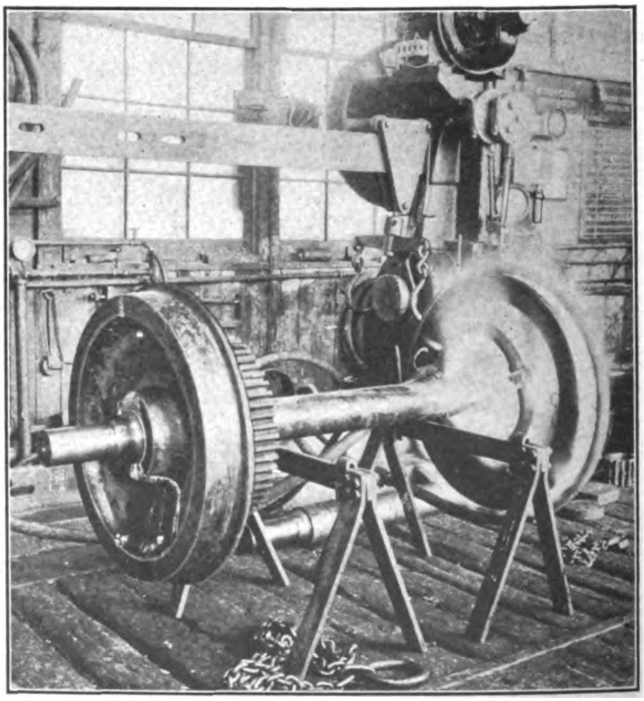
	POSITION	OUR AXLE NUMBER	OUR WHEEL NUMBER	CONDITION	REMARKS
REMOVED	1	723	A1446 A1446	Sharp Flange	Worn out Axle
APPLIED					

SIGNED. J. F. Riley.

CHICAGO ELEVATED—RECORD OF WHEEL REMOVED

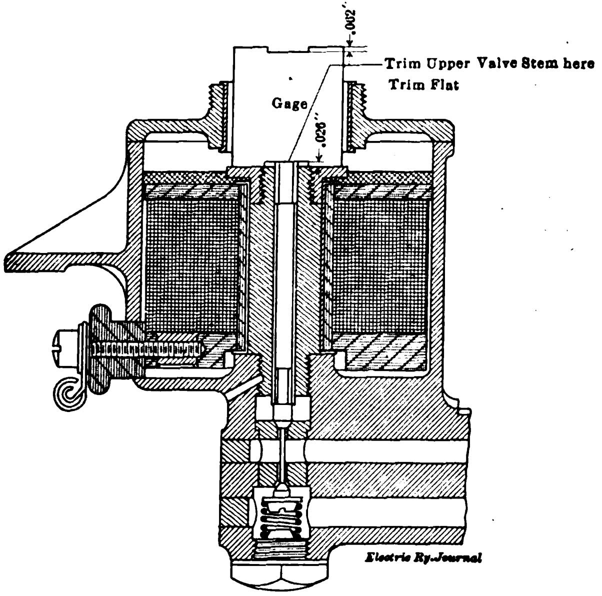
METHOD OF MOUNTING PINIONS

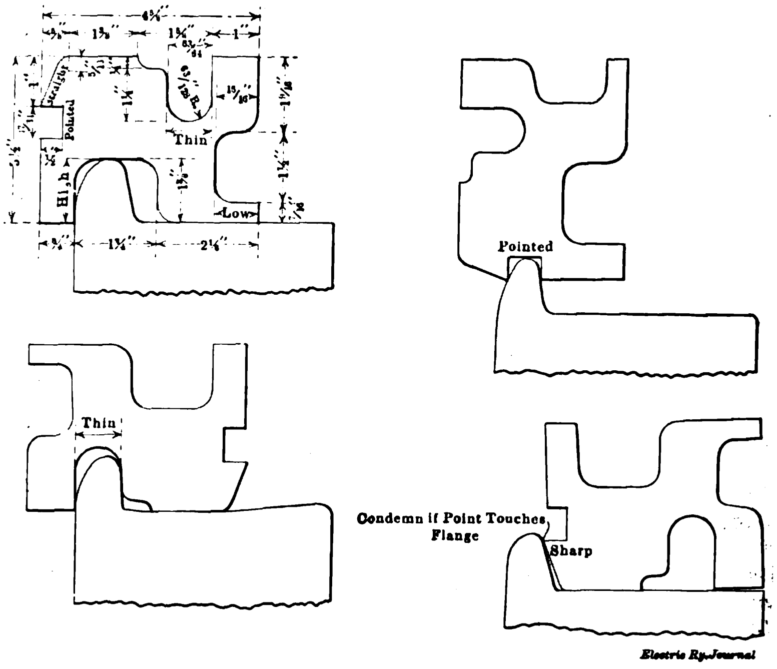
The first operation in mounting a pinion is to prepare the key for a driving fit on the armature shaft.



CHICAGO ELEVATED—VIEW OF WHEEL HEATING OUTFIT

Keys are required to fit snugly against the sides of the pinion keyways but not as tightly as on the shaft. After a key has been fitted, the pinion is slipped on the shaft to insure clearance between the key and the bottom of the pinion keyway. A "feeler" gage, 1/64 in. thick, is used to determine the keyway clearance, and it must pass the entire length of the keyway. The taper fits of pinion and shaft are compared by chalk-marking the shaft. A pinion may not be thrust against the collar at the back end of the shaft fit, since this introduces unusual stresses and may cause loosening.





CHICAGO ELEVATED—GAP GAGE FOR SHORT VALVE STEM; APPLICATION OF WHEEL-DEFECT GAGE

After a pinion has been fitted to the shaft, it is heated in boiling water for twenty minutes. After treatment by the boiling process, it is placed upon the shaft and tapped lightly into place, and the nut is applied to keep it from backing off. After the nut is in place the pinion is again tapped with a sledge hammer, and any movement is followed up with the nut. The pinion is not forced into place by hard blows as this introduces internal stresses when the metal cools, greatly decreasing its ability to resist service shocks.

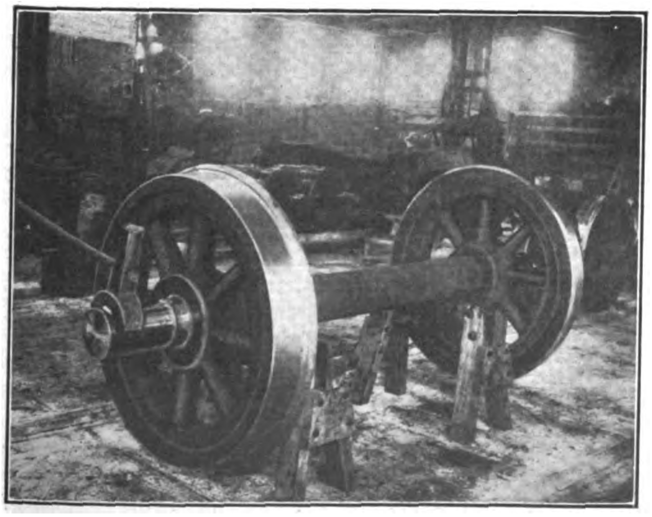
WATER-COOLED MANDREL BABBITTING MOLDS

The water-cooled babbitting molds used in this company's shops have greatly increased the output. A set of these is shown in an accompanying illustration. Running water is so connected to the molds that there is sufficient flow of cold water to cool the mandrels during molding operations. While the molds are out of service, they are coated with heavy petroleum grease to keep them in good condition.

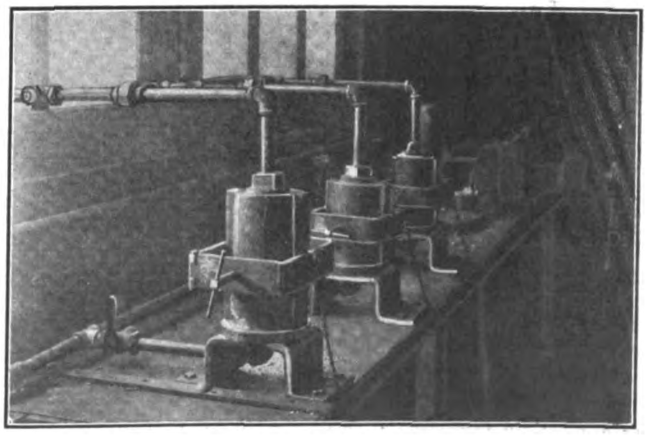
A strap-iron collar with two setscrews is fitted to each mandrel and serves to fasten the bearing shells in position while the babbitt is being poured. After the babbitt has been poured cold water is allowed to circulate through the mandrel to chill and harden the bearing surface. An excellent bearing surface is obtained without the blisters often produced by heated mandrels. The greatest advantage of the use of this method lies in the increased output, for, as compared with the use of a mandrel not water-cooled, the water-cooled mandrel has made it possible to increase the output of bearings eight to twelve times.

MOTOR TESTING

All motors are thoroughly tested after they have been completely assembled on the shop floor before being returned to service. This test, which is made primarily to determine the condition of the bearings, lasts for an hour, the motor being operated at the maximum speed attained in service. Inaccuracies in bearing sizes and fits, as well as damage to bearings or armature



CHICAGO ELEVATED—AXLE-TESTING SET



CHICAGO ELEVATED—WATER-COOLED BABBITTING MOLDS shafts in assembling, are indicated thereby. Motors which do not develop hot bearings at speeds from 750 r.p.m. to 800 r.p.m. may run hot at 1400 r.p.m.

In this test the current is controlled by resistance between limits of 90 amp to 400 amp, which permits a 175-hp motor to be run as a shunt motor at its maximum service speed. The shunt connection allows full line voltage to be applied between brushes, and this serves as a final check on the condition of the armature. Finally, the motor receives a 1200-volt a.c. breakdown test, before going into service.

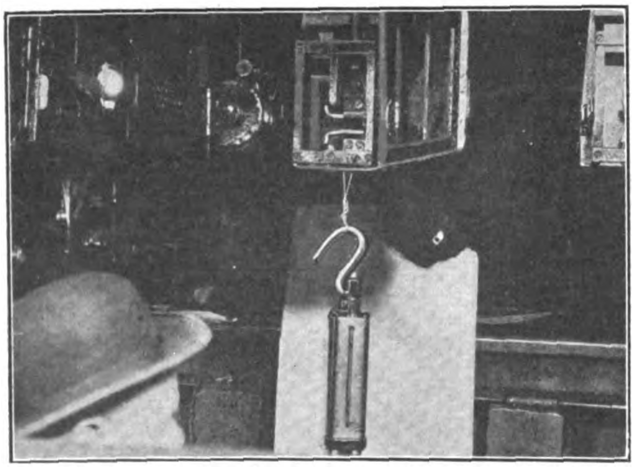
AIR COMPRESSOR TEST

After compressors are overhauled they are connected to the shop air supply system and are operated for at least twelve hours. While thus under test they are inspected and adjusted. As the compressors are controlled automatically during the test run, the operating conditions are analogous to a service test.

MULTIPLE-UNIT-CONTROL TESTING OUTFIT

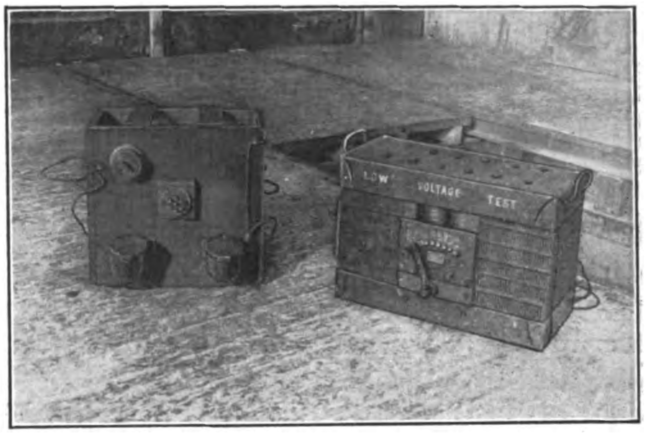
Control equipment is usually tested only at line voltage, sight being lost of the fact that under normal operating conditions the voltage at the car sometimes drops to two-thirds or less of the substation voltage. For this reason the control repairmen of the Elevated Railroads are equipped with a voltage-control rheostat with resistance sufficient to reduce the line voltages to 300 or 350, for use between substations or at the end of a line where failures occur most frequently. By reproducing low-voltage conditions a repairman is able to determine whether the failure was due to this cause.

The rheostat is shown at the right in the cut in the next column. It is a perforated steel box with handles, in which a set of ordinary car heater coils is mounted. On a slate base fastened to the side of the box is a rheostat arm with contact points so tapped into the heater-coil circuits as to give a range of voltage from 250 to 450 in 25-volt steps. To conduct a test this outfit is arranged with one end of the heater circuit connected through a switch and fuse to the trolley, and the other end is grounded on the track rail. A third wire leading from the rheostat arm is then connected to the main switch in the car. All of the heaters and the compressor may not be in operation at the time the test is made, since the rheostat is of insufficient capacity to operate them. After the testing outfit has been connected in this manner, the circuit breaker is tripped and reset on low voltage, the reverses are thrown and the car control is run up on one-half line voltage.



CHICAGO ELEVATED—SPRING BALANCE IN CONTACTOR TEST

If the control repairman is unable to locate defects by varying the voltage on the contactors, the pressure is reduced to 350 volts and the control is notched up to a position in which the maximum number of contactors is in service. An ordinary spring balance is employed to test the contactor pull if necessary. Very obstinate cases of trouble have been discovered in this way. In making the test the hook end of the spring balance is fastened to the contactor switch mechanism. In this position the repairman reads the force required to pull out the contactor plunger. If the contactor coils are not short-circuited, a condition which the rheostat tests should show, the contactor, as a rule, will pull out at about 75 lb., providing the brass bushing and air-gap washer in the contactor are not unduly worn. This test indicates contactors which have worn air-gap washers or bushings. Contactors requiring a force of 100 lb. or more to pull them out are quite certain to cause trouble in service. Cases have been found where the air-gap washers were worn through and a 250-lb. force was required to move the contactor plunger.



CHICAGO ELEVATED—CONTROL AND JUMPER TEST SETS

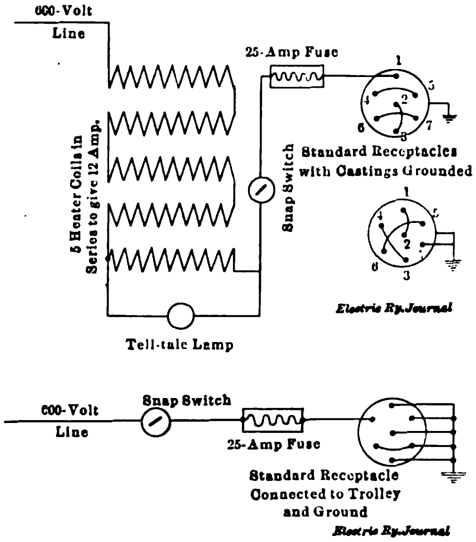
Pneumatic control is also tested with the voltage-varying rheostat. If any particular magnet fails to operate in this test, the inspector resorts to his valve gage as a means of checking or adjusting the air-gap. This gage is shown on page 553. In making this check adjustment, the magnet cap and armature are removed, and the gage is inserted with the 0.026-in. slot over the end of the upper valve stem. With the gage in this position and the switch closed the valve should be tight, showing that the final gap is more than 0.026 in., if the valve is in good condition. By inverting the valve gage so that the 0.062-in. slot may be pressed over the valve stem, the lower valve should not blow, a condition indicating that the final gap is not more than 0.062 in. If the gap is too long the upper valve stem is trimmed, and if too short the upper valve stem is stretched by peening, or a new valve stem is inserted.

TRAIN LINE AND JUMPER TEST SET

A unique outfit for testing 600-volt control train line and jumpers, as used in Chicago, is shown at the left in the cut in this column. Essentially it consists of a transite-lined wooden resistance box with handles, containing two circuits, one for testing for open circuits and grounds, and the other for testing for short circuits. Circuit diagrams appear in the next column.

The method of inspection employed in these tests is this: After the ends of the jumper have been blown out they are connected to the two receptacles on the test set cabinet, shown diagrammatically. The current is turned on through a snap switch, and the jumper is twisted and shaken. If, during this operation, smoke or sparking is observed, or the pilot lamp on the top of the cabinet flickers, it is an indication that there is an open circuit or a ground to the plug casting.

In testing for short circuits, one end of the jumper is inserted in a third receptacle on the test cabinet, which is in the circuit shown in the lower diagram. The jumper is twisted and shaken in the short-circuit test, and short-circuited wires are indicated by smoke, sparking or the blowing of the fuse in the test circuit. One jumper circuit is tested at a time, the jumper plug being removed and rotated until each of the seven circuits has been connected to the live terminal. When jumpers are found to be in good condition, they are cleaned, the fiber ends are shellacked, and the cables and receptacles receive a coat of insulating paint. In a similar manner the train-line control cables for motor and trail cars are tested, two special jumper cables being provided for this purpose, one 8 ft. long and another 52 ft. long.


600-Volt
Line
25-Amp Fuse
1
2
3
4
5
6
7
5 Heater Coils in Series to give 12 Amp.
Snap Switch
Standard Receptacles with Castings Grounded
Tell-tale Lamp
Electric Ry. Journal
600-Volt
Line
Snap Switch
25-Amp Fuse
Standard Receptacle Connected to Trolley and Ground
Electric Ry. Journal

CHICAGO ELEVATED—DIAGRAMS OF TEST CABINET CIRCUITS

All jumpers and motor-control circuits are tested every month, and to designate the month, the receptacle lid and jumper head are painted a color corresponding to a month of the year. All jumpers are numbered, brass tags fastened to the cable showing the numbers. These are used in compiling records of tests.

As the life of a jumper cable is between two and one-half and three years, all are renewed after this period of service.

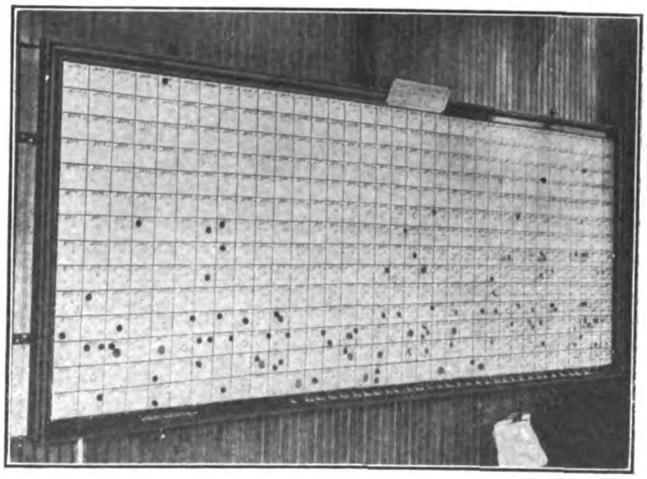
TROUBLE BOARD RECORD

The trouble board which is shown in one of the accompanying illustrations was devised to keep track of the work of six divisions involving repairs in any one of six shops. Its purpose primarily was to obtain a record of troubles at each division headquarters, so that incipient defects might be cared for and a special effort made to remedy the cause of defects which occur in the same equipment more than once. This board, in connection with the interchanging of reports of car repairs between division headquarters, makes possible a record of every case of trouble. Each terminal shop keeps a daily log-book of cars repaired. Copies of the records are exchanged among the divisions, a separate record being made for cars from each division. From these records, as well as from those returned by each division shop force, the trouble board is maintained. Each day the foreman's clerk records upon it the information contained on all repair reports for cars operating out of his division tags of different colors and dates.

The board contains a number of squares representing the different car numbers, and in each square are two, three or five hooks. Each hook is used for a certain class of trouble, and each record tag is dated the day the trouble was remedied. The squares containing two hooks are for trailers, one hook being for brake, and the other for bearing trouble. The squares containing three hooks are for trailers with control equipment, one hook being for brake, another for bearing, and a third for controller trouble. The squares containing five hooks are for motor cars, with one hook set aside for controller, another for motor, another for brake and compressor, and the fourth for bearing trouble. The center hook is for "no trouble found," or to indicate that the car has been overhauled.

Since each hook is used for a certain kind of trouble, the weaker parts of the equipment may be readily discerned, and if more than two tags representing one kind of trouble are mounted on the same hook of a particular car, it is inspected thoroughly to find a remedy. When a special effort has been made, a white tag is hung from this hook, the regular tag for the trouble record being red. If the same trouble is reported for the third time, the car is ordered out of service and to the main repair shops, where it is overhauled if necessary. When, as frequently occurs, trouble is repeated and no cause for it is found by the inspectors, a record is kept of it by a tag placed on the center hook of the particular car in question. When four tags representing "no trouble found" appear on the center hook, an expert is assigned to locate the defect.

This system enables the foreman to call the inspection-shop foreman's attention to the defect, and he in turn instructs the inspectors to give particular attention to the defect in question. In this manner inspectors are also educated up to the requirements of the service. Whenever a defect has occurred and two weeks have elapsed without its being repeated, the tags are removed from the board. A yellow tag, hung on the center hook, is used to indicate that a car has been overhauled. Like the other tags, this one bears the date on which the overhauling was completed.



CHICAGO ELEVATED—TROUBLE BOARD FOR 490 CARS

The trouble board also gives the division-shop foreman a comprehensive view of the condition of the equipment under his care, and automatically the defects which are repeated are indicated. The number of tags on a trouble board is an indication of the repair force efficiency, and at the same time the trouble-detecting ability of the various inspectors may be readily observed by the way in which they keep the board clear of tags. As shown in the accompanying illustration, a small shelf is provided along the base of the board, which is divided into thirty-one compartments, each containing tags of a particular number to indicate the day of the month.

SPRINGFIELD SHOPS AND CARHOUSE

Economical Use of Space and Provision for Convenient Handling of Cars Are Features of the New Plant of the Springfield, Ohio, Railway

EXTENSIVE improvements in the plant of the Springfield, Ohio, Railway Company, a subsidiary of the American Railways Company, are now nearing completion. These include new shops and carhouse which have been built on a site superior in every way to the site of the old ones, which were on low ground subject to flooding. While some of the maintenance work of the Springfield Railway is now done and will continue for the present to be done in the shops of the People's Railway Company at Dayton, about 25 miles away, the new shops have been constructed with a view to handling all of this work ultimately. For the present, one motor-driven 36-in. lathe, one motor-driven 24-in. shaper, one power hack saw, one wet grinder, one dry grinder, with a few small tools, work benches, etc., have been purchased. These, with the tools from the old shop, will be sufficient to care for ordinary up-keep.

There are at present 37¼ miles of single track in Springfield, and the rolling stock consists of sixty-nine cars of all classes. Ten new semi-steel cars of steel girder construction were delivered the first of the year, making twenty of this type now in service. The railway serves a territory with a population of slightly more than 50,000.

GENERAL LAYOUT

The shops and carhouse occupy a lot 190 ft. in width and averaging more than 900 ft. in depth, the shops being at the back of the lot, while at the front a large space is left for future expansion of the carhouse. The general layout is shown in the accompanying block plan, which is designed to call attention to the following features: The carhouse containing ten tracks and separated into a six-track and a four-track section by means of a brick curtain wall; the shops and storeroom, forming three sides of a rectangle; the heating plant centrally located.

The track layout is designed to furnish storage space and reasonable facility for moving cars from this carhouse to the shop department. The shops are at the rear of the carhouse, and a track loop skirts the east, west and south property lines, passing around the building.

THE CARHOUSE

The carhouse, 119 ft. x 234 ft. in size, has the following among other features of special interest:

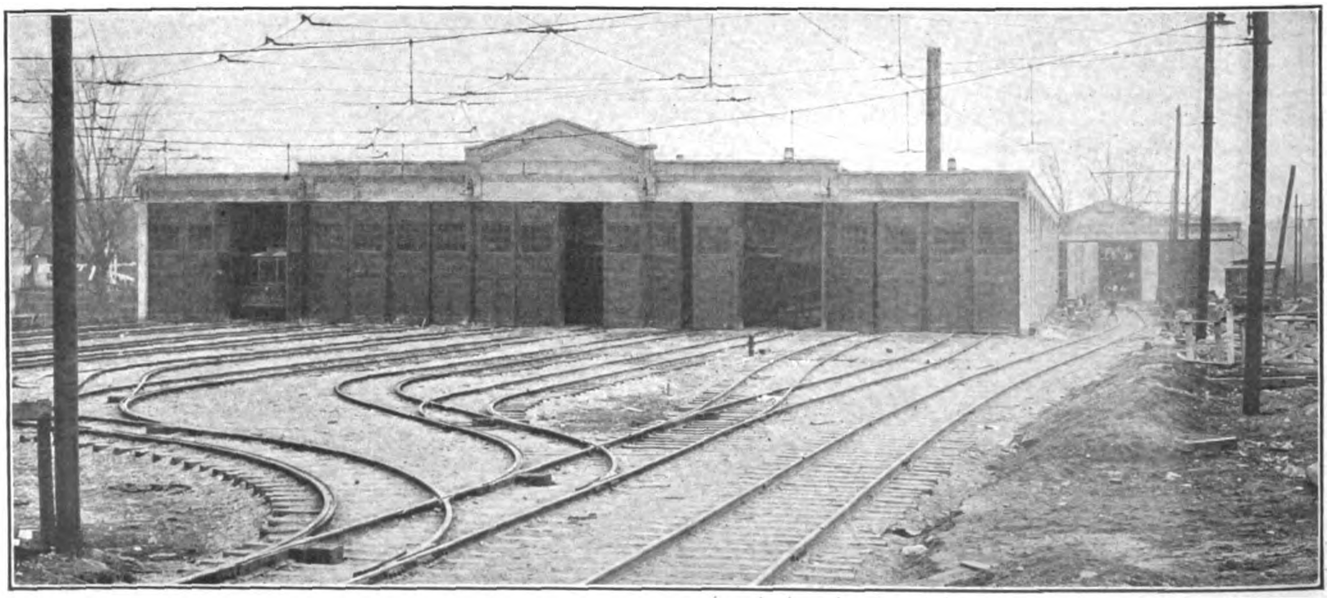
The building is divided into two-track bays by 2-in. curtain fire walls suspended between columns from the roof girders by steel straps. The wall comes down to within 8½ ft. of the floor. It is of concrete, plastered on both sides of a metal lath foundation, framed and supported as shown in detail in an accompanying illustration.

About two-thirds of the floor area is taken up with pits between which are reinforced concrete runways mounted on cross piers 12 in. thick spaced 12 ft. on centers. These piers also support the rails which form an integral part of the runway floor slabs. T-rails weighing 106 lb. per yard were used to furnish girder support for the cars between piers. The inner rails of parallel tracks are held to gage by tie rods on 4-ft. centers, and the floor slabs are molded down to their bases as shown in an illustration.

The floor slabs, which are well crowned, are 5 in. thick in the center. Concrete corbels cast solid with the floor slabs, engaging with the bearing projections on the piers, serve to keep the slabs in place. The concrete floor throughout the carhouse is surfaced with the Master Builders' hardener surface.

The roof of the carhouse is of 3-in. concrete slabs covered with a roofing cement known as Armorcote, applied directly to the concrete. This material has not been used on such large buildings before. It is a plastic, bituminous material. The frame of the building is of steel with 9-in. brick walls. Excepting in the outside walls, the steel work is exposed.

The north end of the carhouse is closed with wooden, swinging doors. While this plan appears somewhat re-

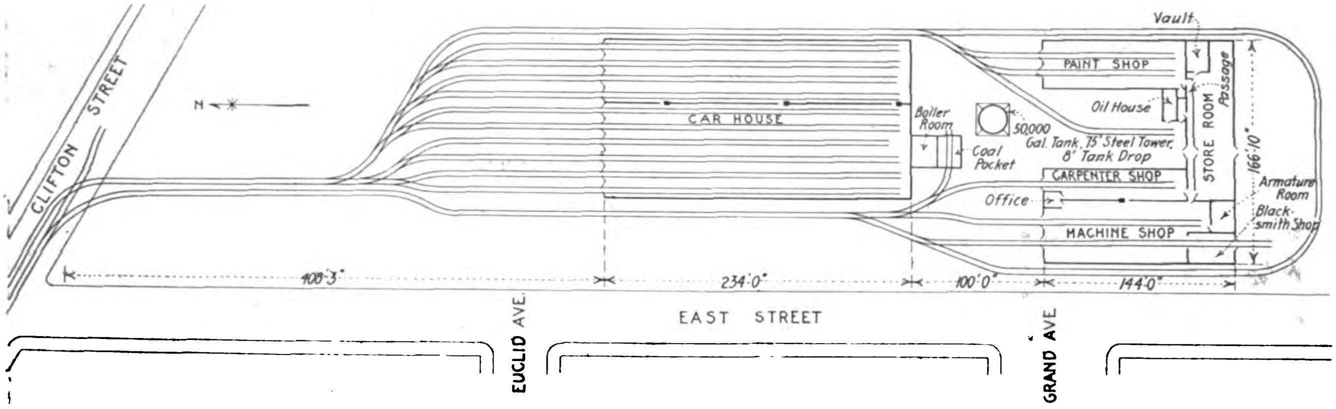


SPRINGFIELD SHOPS—VIEW OF CARHOUSE, WITH SHOPS IN BACKGROUND actionary it has been used here because the construction, with exposed steel work, is not strictly fireproof and it was considered essential to have doors that could be broken out easily if necessary.

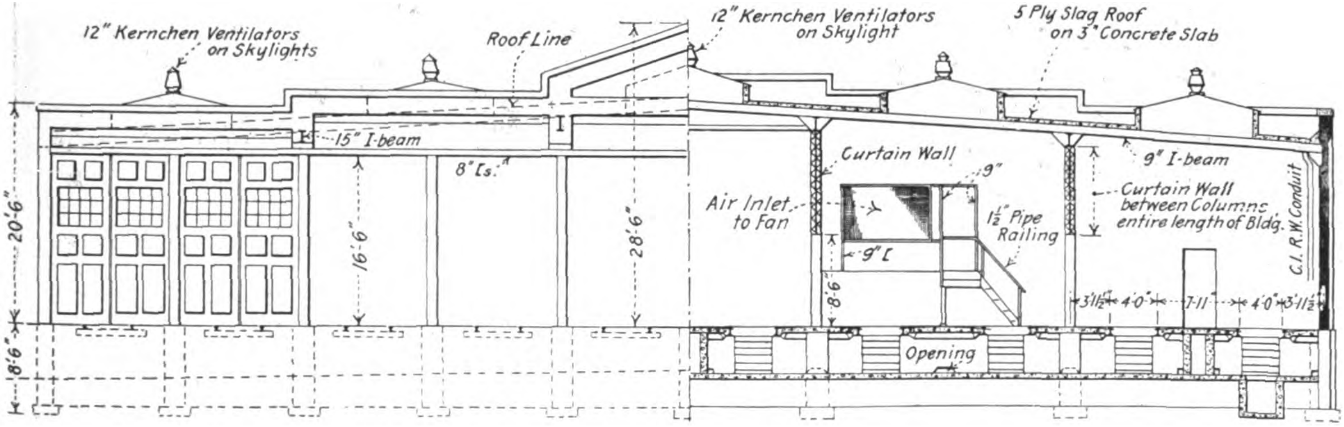
THE SHOPS

The shops are placed at the rear of the lot and are housed in a U-shaped building, of which the storeroom occupies the central portion, the paint shop one wing and the carpenter and repair shops the other. The storeroom is large enough to house supplies in sufficient quantities for the several departments of the company. A passageway along one side not only gives access to the storeroom but provides an inclosed passageway between the two wings of the shop building. By this arrangement the storeroom is readily accessible from all shops and at the same time is conveniently located for receipt and delivery of supplies to team trucks or supply cars. A platform for the latter purpose is placed on the south side.

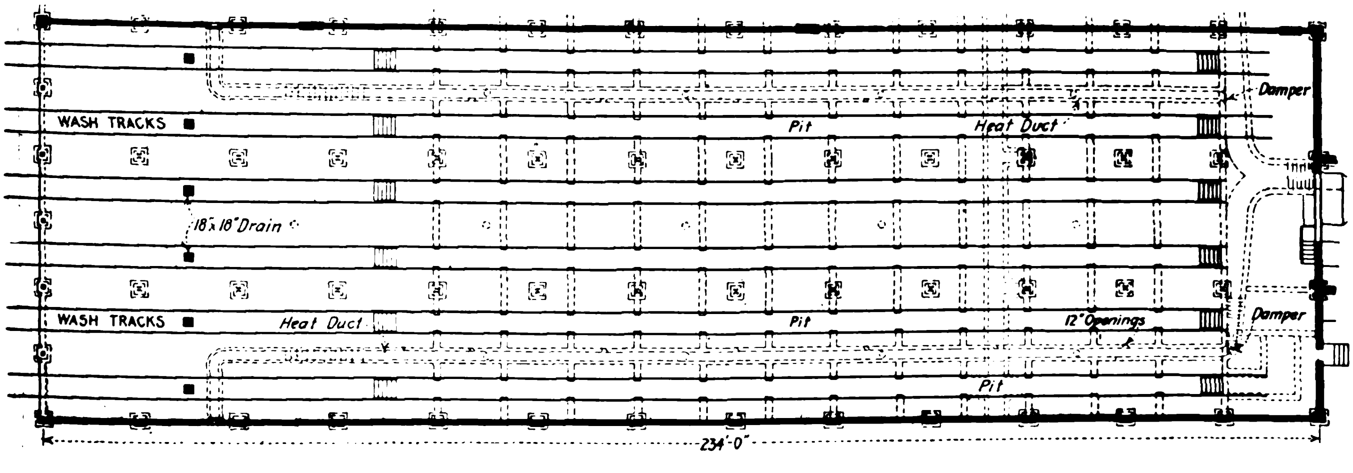
The storeroom is fitted with steel shelving, and at one end a fireproof vault for the storage of inflammable material, other than oil and paint, is provided. Oil and paint are stored in a separate room located in the angle formed by the paint shop and the storeroom. This paint and oilroom is inclosed with fireproof concrete walls and is located where it is reasonably well isolated for fire protection, but convenient for the handling of supplies, a track spur reaching the door. It is subdivided into a large oilroom, a paintroom and a closet opening into the paint shop for the storage of a day's supplies. The oilroom contains nine tanks, made by the American Oil Pump & Tank Company, with standard fittings and a convenient hoisting and track arrangement for rolling barrels over the tanks for filling purposes. The shelving in the paintroom is of steel check


CLIFTON STREET
N
CAR HOUSE
Boiler Room
Coal Pocket
50,000 Gal. Tank, 75' Steel Tower, 8' Tank Drop
Vault
PAINT SHOP
Oil House
STORE ROOM
Passage
CARPENTER SHOP
Office
MACHINE SHOP
166'10"
Armature Room
Black-smith Shop
400'3"
234'0"
100'0"
144'0"
EAST STREET
EUCLID AVE.
GRAND AVE.

SPRINGFIELD SHOPS—GENERAL PLAN OF PROPERTY


12" Kernchen Ventilators on Skylights
Roof Line
12" Kernchen Ventilators on Skylight
5 Ply Slag Roof on 3" Concrete Slab
15" I-beam
8" [s.
20'6"
16'6"
28'6"
8'6"
Curtain Wall
9"
Air Inlet to Fan
1½" Pipe Railing
9" [
9" I-beam
Curtain Wall between Columns entire length of Bldg.
C.I.R.W. Conduit
3'1½"
4'0"
7'11"
4'0"
3'1½"
8'6"
Opening

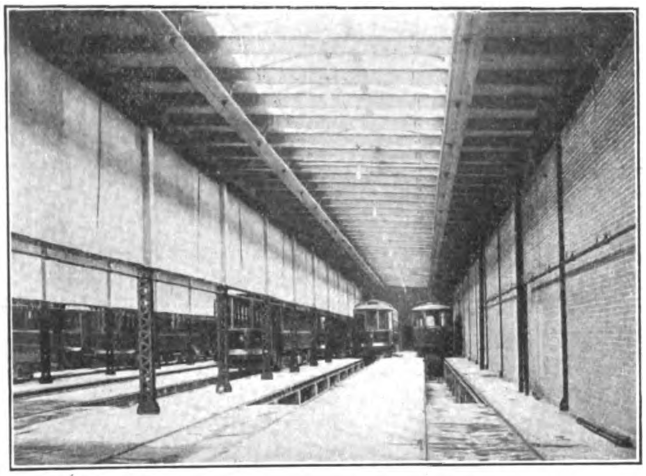
SPRINGFIELD SHOPS—HALF ELEVATION AND HALF VERTICAL SECTION OF CARHOUSE


WASH TRACKS
Pit
Heat Duct
Damper
18"x18" Drain
WASH TRACKS
Heat Duct
Pit
12" Openings
Damper
Pit
234'-0"

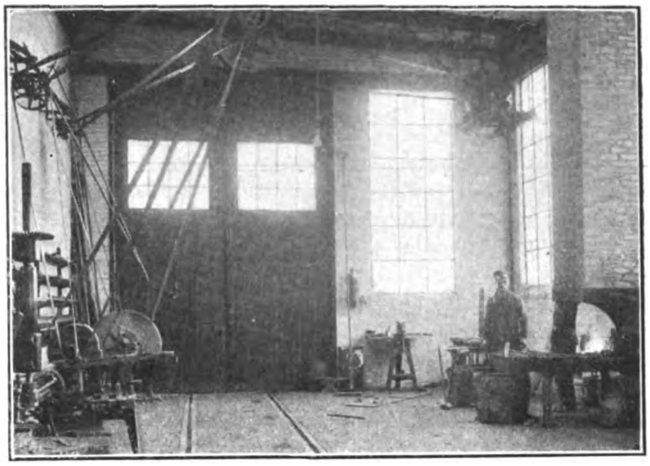
SPRINGFIELD SHOPS—PLAN OF ONE BAY OF CARHOUSE plates riveted to skeleton steel brackets supported from 2-in. x 2-in. x 1/4-in. angle irons attached to the walls.

In the machine shop there are two tracks, one of which is served by a Columbia electric car hoist and a Columbia wheel drop. These types of hoist were described in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 19, 1914, page 535. The wheel drop in the Springfield shops is driven by means of a crank, spur gear and chain instead of the motor drive described in the above-mentioned article.

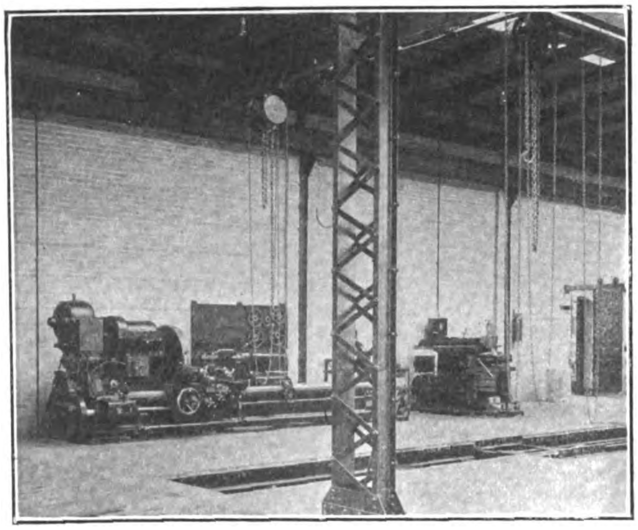
Each track is served by two light I-beam cranes equipped with two 4-ton chain hoists on each crane.

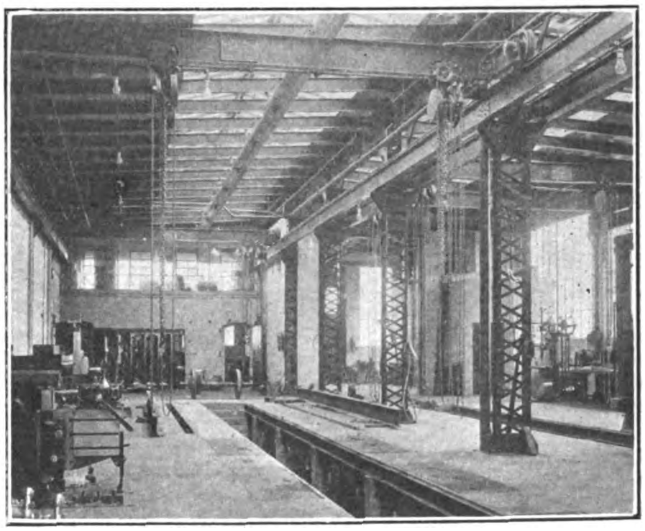


SPRINGFIELD SHOPS—VIEW IN CARHOUSE

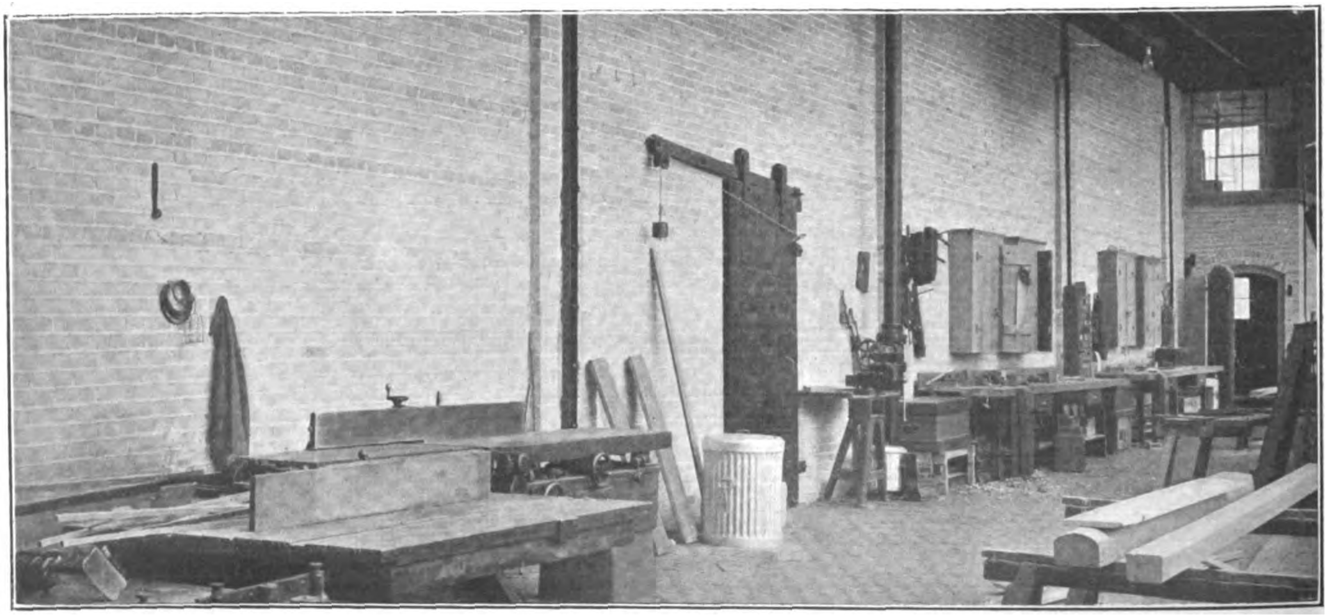


SPRINGFIELD SHOPS—VIEW IN BLACKSMITH SHOP





SPRINGFIELD SHOPS—TWO VIEWS IN MACHINE SHOP



SPRINGFIELD SHOPS—VIEW IN WOOD SHOP

Practically all of the track in this shop and the adjacent wood shop is over pits. The machine, wood and paint shops and the storeroom are floored with hexagonal wood blocks. Special attention was directed by the designers to the location of shop toilet rooms, which are distributed so as to be accessible and to simplify the plumbing. The foreman's office, which is placed with its center line a continuation of the partition between machine and wood shops, is elevated and inclosed with glass, giving a direct outlook into both shops. The armature room is partitioned off from the rear of the machine shop, and over it is the drafting office.

All of the shop bays are brilliantly lighted through steel-framed windows, filling all of the span between columns. They are steam heated from the boiler plant described below.

TRACK AND OVERHEAD CONSTRUCTION IN YARD

The two tracks entering the property from Clifton Street fan out into twelve tracks in front of the carhouse. The special work here is somewhat similar to that employed by steam roads, being of the standard short manganese construction. The switches and frogs are of manganese centers with rolled rail bolted on arms, the centers being cast in the shortest possible lengths with wing extensions ground to fit the various sections of rail on one side with a standard angle bar on the other. This construction has been used by the American Railways for some years for certain locations, particularly around carhouses. It insures long wear life and, being of standard T-rail construction, is not extremely expensive. The special work was furnished by the Indianapolis Switch & Frog Company, Springfield, Ohio.

The trolley wire construction over this special work is supported from cross cables to provide a completely clear entrance way. These cables are carried on very heavy tubular steel poles and span the entire twelve tracks. The overhead construction is rendered adjustable by a liberal use of turnbuckles.

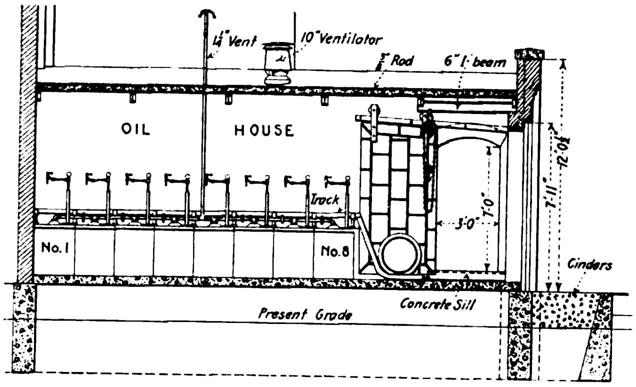
HEATING AND VENTILATING PLANT

The boiler plant has been designed with special reference to convenience in handling fuel and ashes. It is located in a 20-ft. x 23-ft. building and the boiler floor is 12 ft. below the carhouse floor level. Adjacent to it is a coal storage pocket with its top on ground level. A spur track leads directly over this pocket. Another rectangular well alongside the boiler room foundation walls houses an ash conveyor and a bucket elevator, which takes the ashes from a pit in one corner of the boiler room floor and discharges them into an elevated spout.

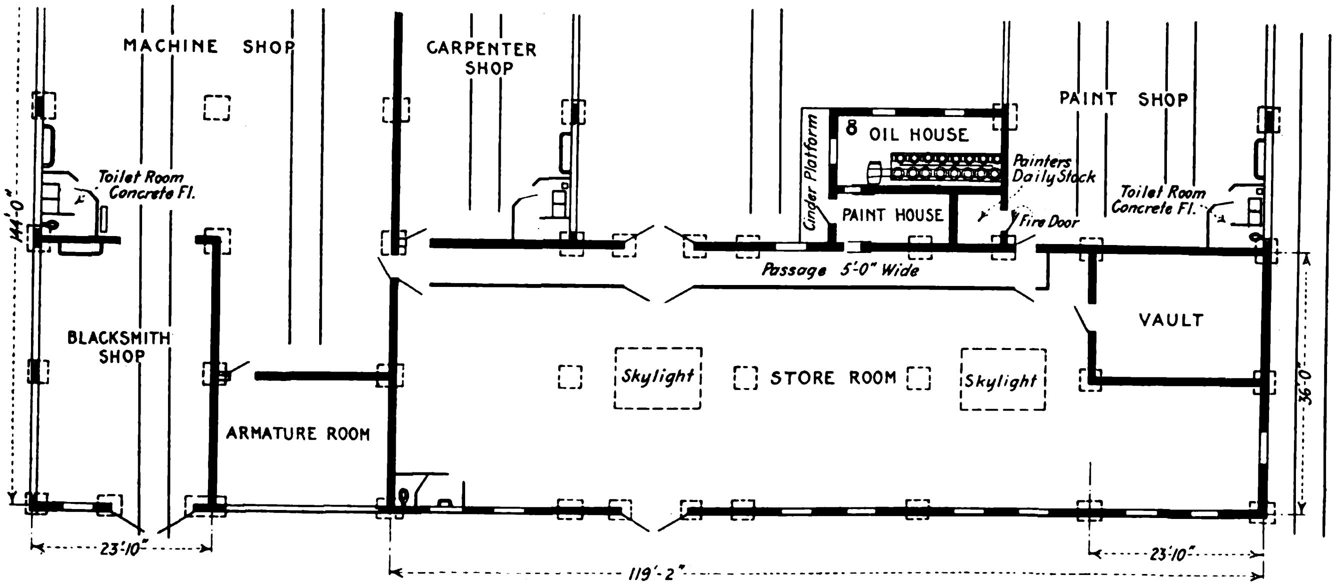
The heating equipment consists of two 100-hp "Economy" boilers, which supply low-pressure steam to the shop buildings for direct radiation and to the carhouse heater, which is for indirect heating.

An indirect radiation heating system supplies heat to the carhouse. The air is forced through concrete ducts located on the pit floor under the runways and provided with side openings at frequent intervals. The warm air is thus uniformly distributed over the pit floor, rising through the pit openings. Beyond the pit section the ducts terminate in large wall openings a short distance above the floor.

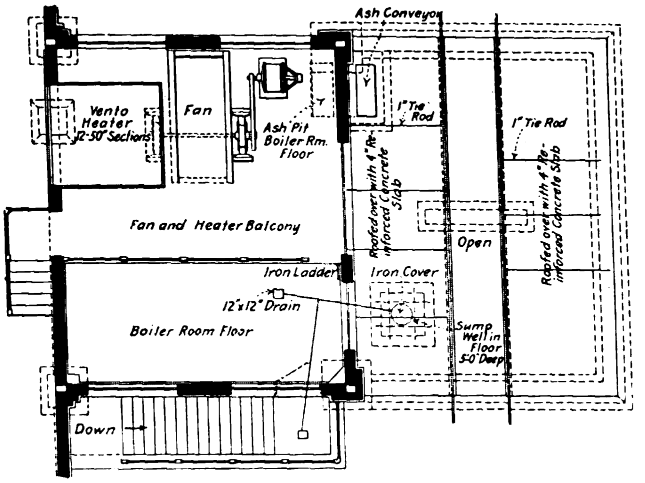
The fan, of the B. F. Sturtevant No. 12 multivane type, is located on a balcony in the boiler house which adjoins the carhouse on the south. It is driven by a 15-hp d.c. motor, is 58¼ in. x 30$^{13}/_{16}$ in. in size and its speed is 168 r.p.m. These data indicate a delivery capacity of 32,000 cu. ft. per minute against a 1-in. head. Air is drawn from the carhouse through a 7-ft. x 9-ft. screened opening in the south wall and through a "Vento" heater containing 2430 sq. ft. of heating surface. The heater is supplied with low-pressure steam from the boilers. The fan discharges vertically downward into the main duct.



SPRINGFIELD SHOPS—VERTICAL SECTION OF OIL ROOM



SPRINGFIELD SHOPS—PLAN OF STOREROOM AND IMMEDIATE VICINITY


Ash Conveyor
Vento Heater 12-50" Sections
Fan
Ash Pit
Boiler Rm. Floor
1" Tie Rod
1" Tie Rod
Roofed over with 4" Reinforced Concrete Slab
Roofed over with 4" Reinforced Concrete Slab
Fan and Heater Balcony
Open
Iron Ladder
Iron Cover
12"x12" Drain
Boiler Room Floor
Sump Well in Floor 5-0 Deep
Down

SPRINGFIELD SHOPS—PLAN OF BOILER ROOM AND COAL STORAGE

The heating system furnishes excellent ventilation, which is supplemented by means of 12-in. Kernchen ventilators mounted on the Anti-Pluvius skylights and placed 50 ft. apart.

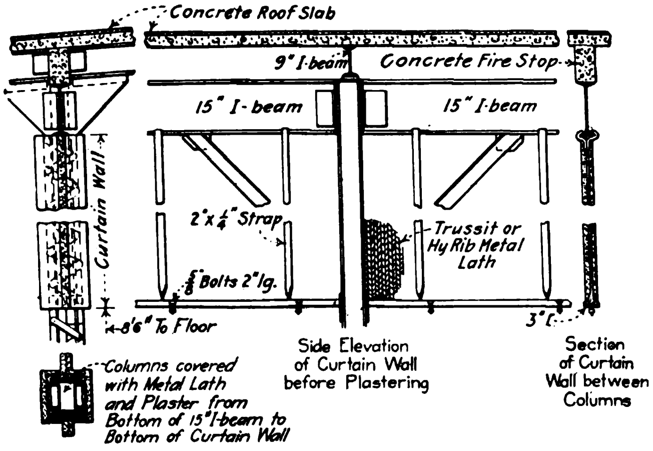
CARHOUSE, SHOP AND YARD LIGHTING

There are no wall openings admitting light to the carhouse, but a good distribution of skylights provides ample natural illumination. These are arranged in five rows, one over each pair of tracks. The rows extend over the entire length of the pits and partly over the washing floor. The latter is also partly lighted from glazed panels in the north-end doors.

The artificial lighting of the carhouse, as well as the shops, is provided entirely by incandescent lamps operating in series groups of the 550-volt railway circuit. These groups contain either five or twenty lamps each. The general lighting of the buildings requires seven circuits of 80-watt, 28.6-volt Mazda lamps, twenty in series on each, with film cut-out sockets to cut out and short-circuit burnt-out lamps. These lamps are kept burning all night.

The auxiliary lighting, which includes pits, offices, toilet rooms, individual machines, etc., is from series circuits of five 40-watt Mazda lamps each. The pit lighting is arranged so that by using a three-point switch and a plug receptacle one lamp may be cut out and a lamp on an extension cord connected in its place for use in inspecting cars, trucks, motors, etc.

All circuits are controlled from a switchboard located in the foreman's office, which is separated from the shops by fire doors and has an outside exit. On this board are the usual circuit breakers, switches, meters, etc. All wiring is in conduit, and lamps are protected with guards.


Concrete Roof Slab
9" I-beam
Concrete Fire Stop
15" I-beam
15" I-beam
Curtain Wall
2"x¼" Strap
Trussit or Hy Rib Metal Lath
⅜ Bolts 2" lg.
8'6" To Floor
3" [
Side Elevation of Curtain Wall before Plastering
Section of Curtain Wall between Columns
Columns covered with Metal Lath and Plaster from Bottom of 15" I-beam to Bottom of Curtain Wall

SPRINGFIELD SHOPS—DETAILS OF CURTAIN WALL

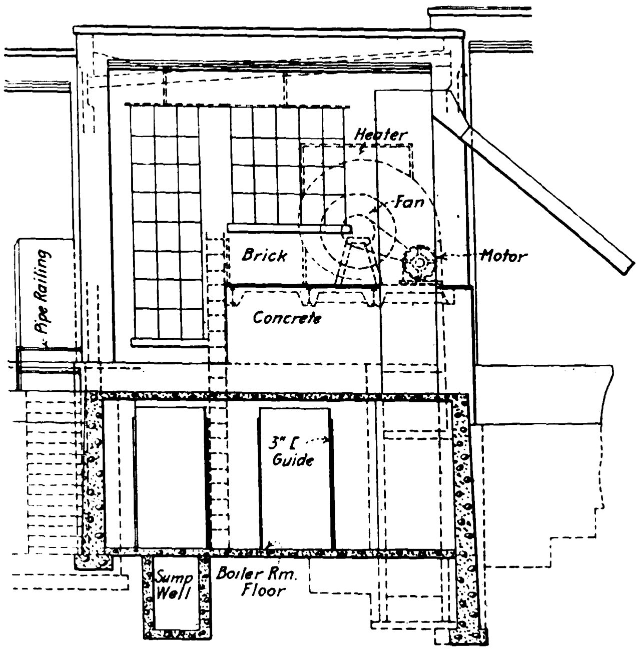
The lighting of the yards and around the buildings is included in the general scheme with twenty 80-watt lamps in series on each circuit. All fixtures are permanently fastened either to steel poles or to the buildings, out of reach of trolley poles.

FIRE PROTECTION

An 8-in. fire line connects with a 6-in. main on Clifton Street and runs nearly to the back of the lot, where a 50,000-gal. storage tank is located. From the main line 6-in. branches cover the property thoroughly, with outside hose houses and inside outlets.

In addition, the carhouse is provided for by means of a sprinkler system comprising rows of roof sprinklers over all tracks and a row under each curtain fire screen. A limited number of sprinklers are also distributed in the shops and storeroom.

As stated earlier, the Springfield Railway, of which George C. Towle is general manager, is a subsidiary of the American Railways. Mr. Towle is located at Dayton. The designs for the new plant were made in the offices of the latter company in Philadelphia, Pa., under the direction of C. G. Keen, engineer of maintenance of way. The superintendent of construction in charge of erection was Andrew Schmittauer.


Heater
Fan
Motor
Brick
Pipe Railing
Concrete
3" [Guide
Sump Well
Boiler Rm. Floor

SPRINGFIELD SHOPS—VERTICAL SECTION OF BOILER ROOM

Collect Fares on Former Free Service Line

After twenty-two years of free service, the Louisville (Ky.) Railway has begun to collect fares on what is known as its "Goss Avenue loop," which has been maintained as a feeder for the Shelby Street line. Four cars have been operated on it. Several reasons prompted the company to change the status of the loop line. Though service was free, the cars were used more or less as a convenience by the people of the section and in a number of cases those who suffered accidents brought suits for damages against the company. Lastly the "jitney" has been meeting the loop cars and getting many of the passengers they discharged at the end of the Shelby Street line. The "jitney" is not responsible for the change, but was one of the circumstances considered in making it.

SIGNAL MAINTENANCE METHODS

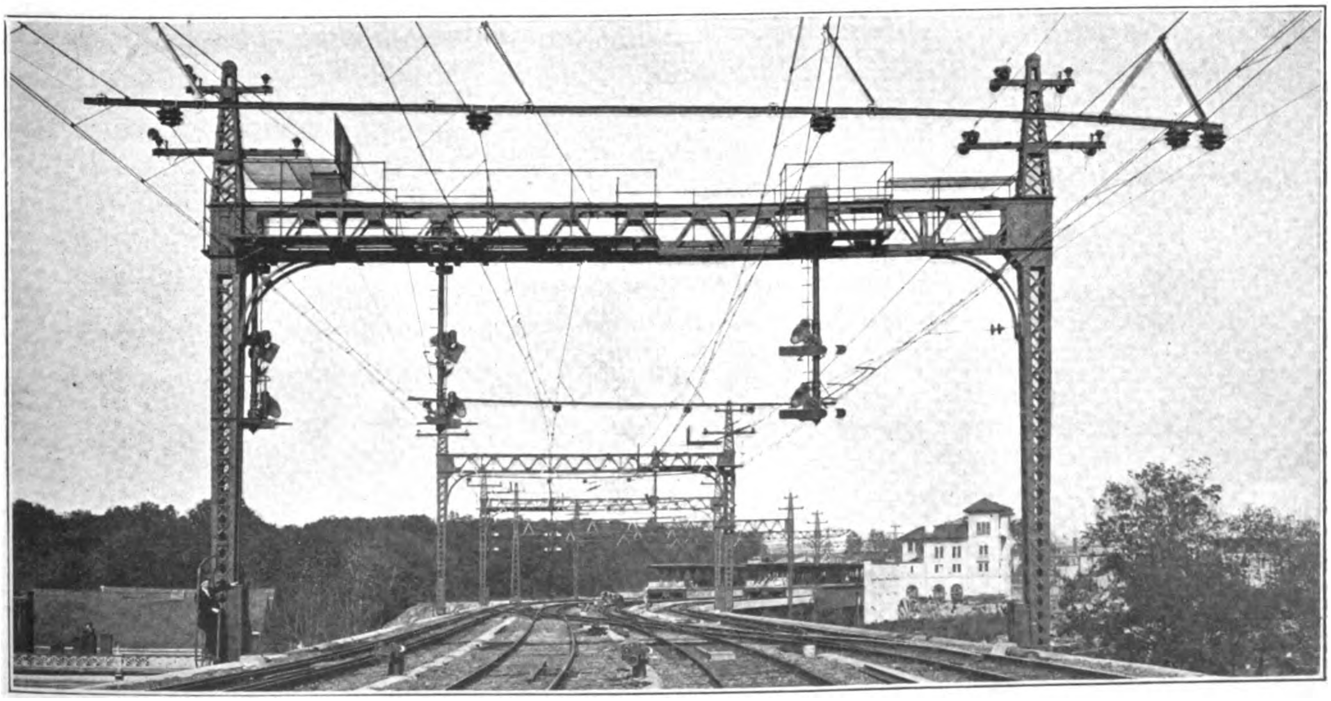
On the New York, Westchester & Boston Railway Ten Men Maintain Four Interlocking Plants and 110 Semaphore Signals at an Efficiency of 99.995 Per Cent

THE operating records of the signals of the New York, Westchester & Boston Railway show results that are typical for a high-speed suburban railway with moderately dense traffic. For the past year the record has been of the high order of 20,000 movements per failure. In the following paragraphs the maintenance methods are outlined, together with the scheme of organization, cost of maintenance and causes of signal failures.

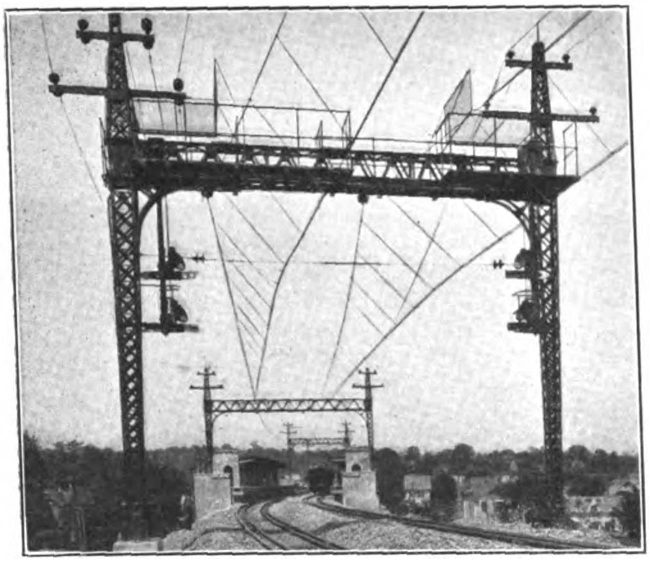
The line, which has been described in previous issues of the ELECTRIC RAILWAY JOURNAL in considerable detail, has four tracks that extend between West Farms junction on the New York, New Haven & Hartford Railroad, to Columbus Avenue in Mount Vernon, a distance of about 7 miles. At Columbus Avenue a two-track line extends eastward to North Avenue in New Rochelle and another two-track line extends northward to White Plains, the two branches having respective lengths of approximately 2¼ miles and 9 miles. At 180th Street, about 1 mile north of West Farms, is a thirty-five-lever interlocking plant with twenty-one working levers, from which are operated double cross-overs that serve the main car storage yard and the repair shop. At Columbus Avenue there is a twenty-nine-lever interlocking plant with twenty-two working levers serving the two branches, and the end of each one of the branches is an interlocking plant to provide for switching movements of cars at the terminal. The plant at New Rochelle has a seventeen-lever machine with eleven working levers and that at White Plains has a twenty-nine-lever machine with twenty working levers. All interlocking plants are operated by power and have electrically-operated dwarf signals and semaphore signals. The latter are controlled by the track circuits in advance as well as by the interlocking levers, so that when the main-line switches are lined up the main-line signals within the limits of the interlocking operate semi-automatically, or, in other words, the signals are cleared by the lever and return to horizontal automatically after the train has passed.

The road is divided into blocks approximately 4000 ft. long, and practically every one of the signal mechanisms has two blades, one of which serves as the distant indication for the block in advance, and the other as the home indication. Sixty-cycle current is used owing to the fact that the propulsion current is of twenty-five-cycle frequency. The apparatus throughout is of the Union Switch & Signal Company's make. Two-position semaphores are used in all cases (except for four light signals in a short tunnel) and most of them are suspended from the catenary bridges. The semaphore arms are center-pivoted, and are counter-weighted to return by gravity to horizontal, each having a movement of 60 deg. from this position. The sempahore signal mechanisms are of the Union Switch & Signal Company's "Style B," the two arms on each mast being operated by the same motor and transformer that actuate two slot-arms, giving independent operation for each blade. The dwarf signals which govern slow-speed and reverse movements in the interlockings are of the simple solenoid type and require very little attention.

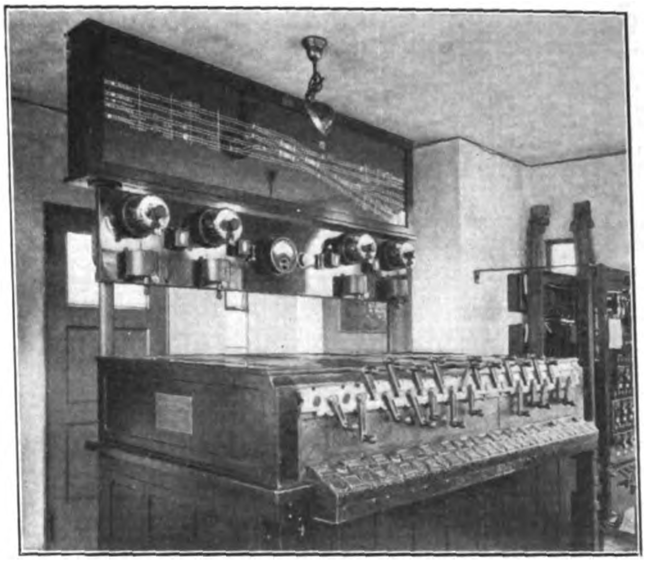
Power for operating the signals, switches and track circuits is obtained from the main feeders carrying 11,000-volt current. The signal current, which is delivered at 2200 volts, sixty cycles, single phase, has its change in frequency effected in a substation located at Columbus Avenue which contains two frequency chang-



WESTCHESTER SIGNALS—AUTOMATIC AND INTERLOCKED SIGNALS AT CROSS-OVER SOUTH OF 180TH STREET INTERLOCKING PLANT



WESTCHESTER SIGNALS—TYPICAL SEMAPHORE SIGNALS ON CATENARY BRIDGE FOR DOUBLE TRACK



WESTCHESTER SIGNALS—ELECTRIC INTERLOCKING MACHINE FOR SWITCHES AT COLUMBUS AVENUE JUNCTION

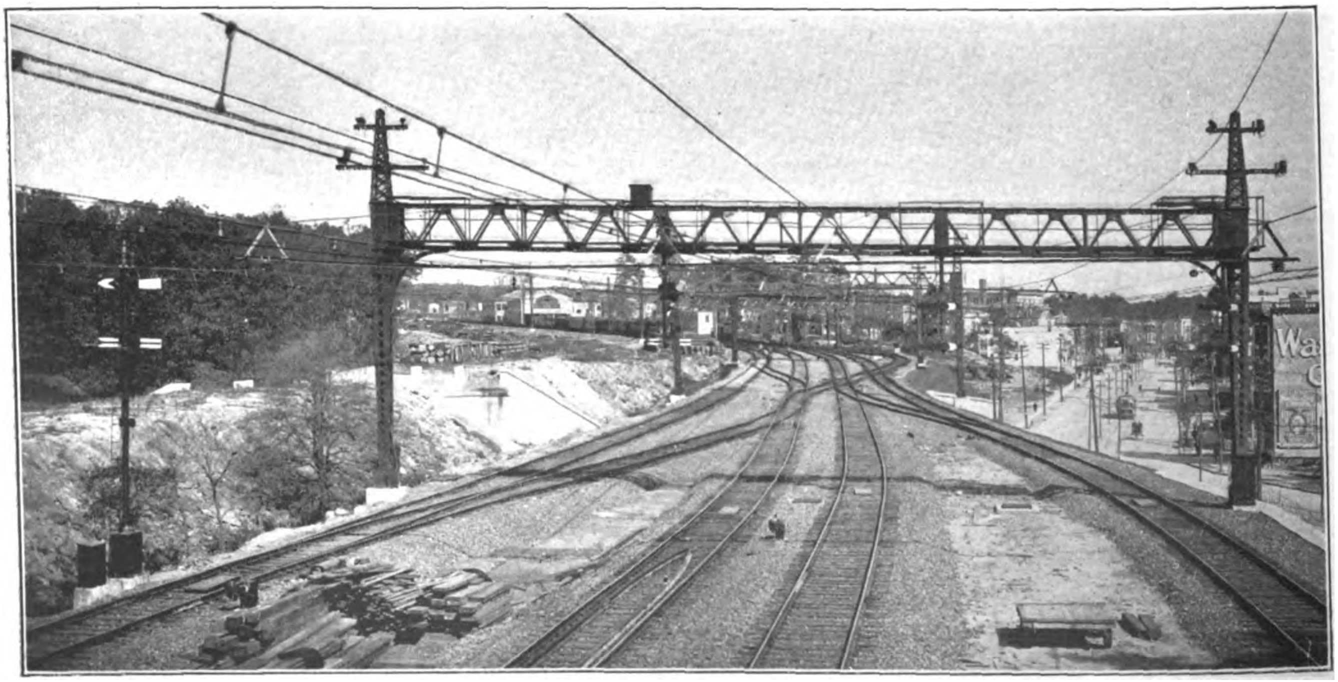
ers, each consisting of a 37-kw single-phase generator, mounted on the same shaft and driven by a three-phase induction motor.

ORGANIZATION

Altogether there are 110 semaphore signals on the line and these, together with the four interlocking plants that are in continuous operation, are kept up by a force of ten maintainers. The signal organization is headed by F. Zogbaum, engineer of maintenance New York, Westchester & Boston Railway, who has general supervision of the track overhead lines, buildings and other permanent equipment of the company, and to him the general foreman of signals, C. E. Arnold, reports direct. Under the general foreman of signals are nine maintainers, one maintainer's helper, and one substation foreman. Of the maintainers, eight are assigned to definite sections of the road, while one is called a "relief man" who works at any point on the line where his services are required and who takes the place of any maintainer that is laying off. The helper works under the orders of the relief man.

Six of the signal maintainers work twelve-hour shifts, one day man and one night man being assigned to each of three sections into which the road is divided. One of these sections includes the interlocking at 180th Street station and all signal apparatus between 180th Street and the West Farms junction, giving a total of eighteen high signals and 0.80 mile of four-track route in addition to the interlocking plant and dwarf signals. The second section includes the North Avenue Tower in New Rochelle and all signal apparatus on the New Rochelle branch as well as the signal apparatus south of the Columbus Avenue interlocking plant as far as the territory covered by the previously described section. This gives forty-six high signals and 7.63 miles of route to be maintained in addition to the small interlocking plant at New Rochelle.

The third section includes the White Plains interlocking plant and the signal apparatus on the White Plains branch which is maintained as follows: The day maintainer covers from White Plains to a station 6.64 miles south and has twenty-six high signals to inspect. In addition to his regular work of inspection and repair,



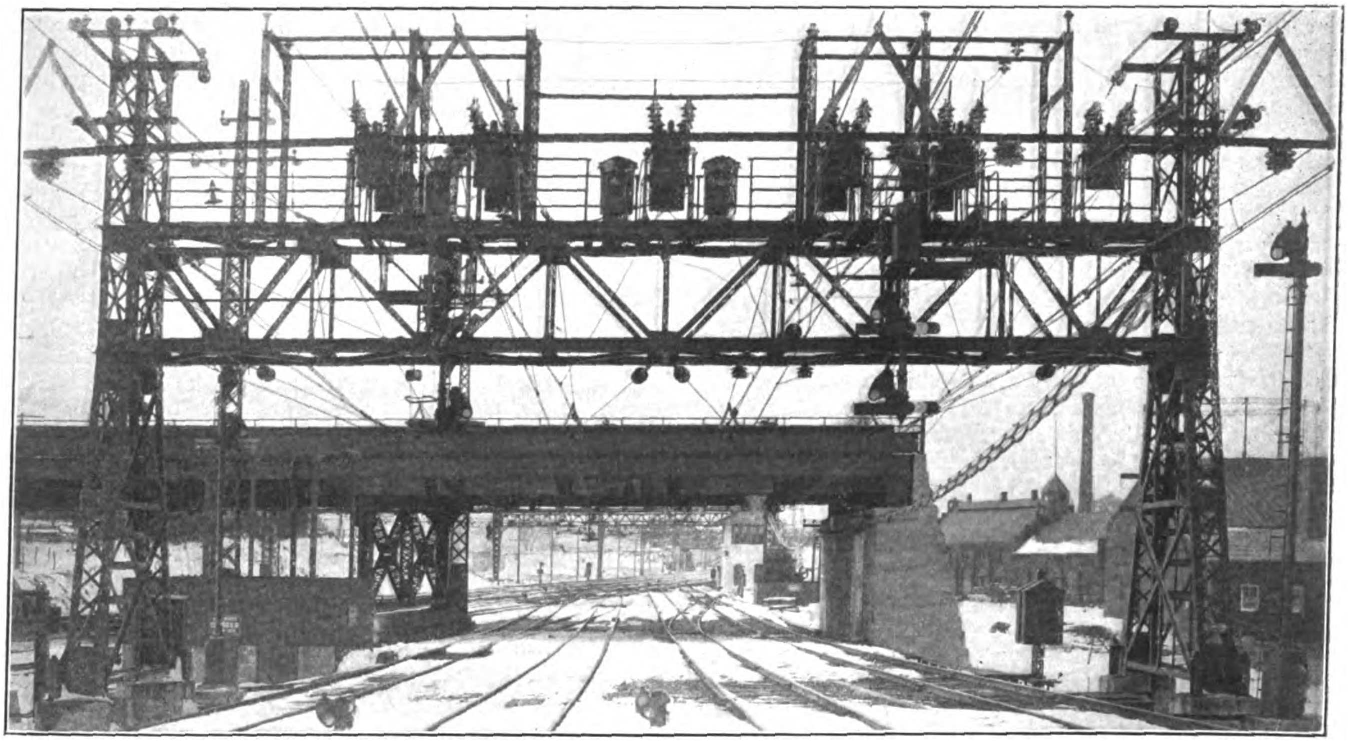
WESTCHESTER SIGNALS—CROSS-OVERS AND STORAGE YARD SIDING NORTH OF 180TH STREET INTERLOCKING PLANT this maintainer answers calls in case of trouble between the south end of this section and the limits of Columbus Avenue interlocking, 2.28 miles further south, including eight additional high signals. The night maintainer covers the entire section from White Plains to the limits of Columbus Avenue interlocking and thus is responsible for a route of 8.82 miles and thirty-four high signals. The above-mentioned section of 2.28 miles of route and eight high signals is normally maintained by the day maintainer at the Columbus Avenue interlocking plant.

These three sections include the entire road with the exception of the interlocking at Columbus Avenue, and this plant is maintained by three men who act also as substation operators, one of them being the previously-mentioned substation foreman. These men work ten-hour shifts, and there is an overlap of four hours between 1 p. m. and 5 p. m. when two men are on duty at this point. This overlap provides an opportunity for the maintainer to inspect and repair the automatic signals within the previously-mentioned section, 2.28 miles north. This man, however, is not subject to calls from this territory, as the emergencies are cared for by calls upon the maintainers at White Plains.

The work of the signal maintainers listed above is confined generally to inspection and the lightest kind of repairs. Heavy repairs are done in all cases by the relief man and his helper. The latter work includes all replacements and any work which requires the removal of apparatus to the maintainer's shop which is located at the 180th Street station.

A telephone system has been installed on the railway company's line in underground ducts, and the repairs on this are kept up by one man who is separate from the signal maintenance department and who reports direct to the engineer of maintenance. This telephone repairman does all the repairs to wiring and apparatus, very little material being sent to the manufacturer for overhauling. In case of heavy cable work, the repairman is assisted by electricians from the line department, as such work is only occasional in character.

This telephone system is used for train dispatching as well as intercommunication between stations. The train dispatcher's wire runs to each tower and, in addition, connects into outlying phones located at station platforms and on catenary bridges between stations where the distance warrants it. The telephone system is of the Western Electric inter-calling type and is arranged with a number of selector relays. Twelve per cent of the telephone line mileage consists of seven-pair, No. 19 gage cable; 33 per cent, fifteen-pair, No. 10 gage cable; 46 per cent, twelve-pair, No. 10 gage cable, and 9 per cent, ten-pair, No. 10 gage cable. There are twenty-five P. B. X. phones, seventy jack-box phones, which include stations, towers and outlying telephones, and twelve magneto phones, making a total of 107 phones of all types. The power used for the telephone system is obtained from a central storage battery which is charged by the same motor generator that is used for charging the signal batteries, the motor generator receiving power from the signal mains.



WESTCHESTER SIGNALS—VIEW OF JUNCTION WITH NEW HAVEN TRACKS SHOWING SIGNALS MOUNTED ON SECTIONALIZING BRIDGE AND ON INDEPENDENT MASTS

INSPECTION METHODS

As mentioned above, the work of the maintainers who are assigned to certain districts is confined to inspection, and it is the rule of the road to examine everything once each month, although the electric locks on the interlocking machines are tested once each week. In making inspections the maintainers travel over their district on the regular trains, which are operated on a very short headway. No gasoline speeders are used because of the short distances to be covered. The night men who work between the hours of 1 a. m. and 5 a. m., when no trains are run, are assigned each day to work that will keep them in one locality, so that there is no necessity for their moving about when the trains are not running.

Whenever failures occur they are reported at the end of the run by the motorman to the dispatcher, who communicates with the proper maintainer and has the signal repaired at once. It is the endeavor, however, to make the inspection sufficiently thorough so that failures may be anticipated, and in the regular routine the relays are tested by tilting them over to see if they move freely, the impedance bonds are examined for heating and the transformers are opened to see how much oil they hold and whether taps are in good condition.

As an aid to the maintainers the maintenance department has recently published a book of permanent instructions for the proper maintenance of switch and signal apparatus. This book contains such items as the following: "The signal apparatus should be carefully inspected and cleaned, especially movable parts of the mechanism, care being taken to see that these do not get tight from lack of lubrication or gummed from the use of too much oil. The bearings should be oiled at least once a month, the oil should not be applied too lavishly and any surplus must be wiped off. Wire connections on binding posts should be examined to insure that the wires are not ruptured, and it should be observed that all connections to moving parts have proper freedom and do not have sharp ends that are likely to catch in other parts of the mechanism. Slot contacts and the roller should be wiped once a month with a piece of cloth or chamois skin. Relays that are found to be working improperly should be removed for test and inspection. When a relay is turned partly over all the contacts should make simultaneously and when energized with the normal operating current, as shown on the label, there should be about 1/32-in. slide in the contact points. The springs of the contact fingers may lose tension and cause the contact to get out of alignment. The armature should have about 1/64-in. end-play on the trunnions. Efforts to adjust a relay should not be made under any circumstances."

Unbalancing is treated as follows: "With a.c. track relays unbalancing of the track circuit above a certain amount is liable to cause the relay to open or to prevent it from making up. This may be caused by a defective power return, such as defective bond or broken rail. It will generally be manifested by excessive heating of the relay and track transformer. Unbalancing is liable to cause warping of the relay frame, owing to the excessive heat of long duration. The power return should be looked after where there is any indication of unbalancing."

A general rule book of the maintenance department is also published. This includes rules for the guidance of the signal foreman and for the signal maintainers with regard to traffic, such as that signals must be kept in a horizontal position while repairs are being made; that during severe storms of sleet or snow signal maintainers are required to assist in keeping switches, signals and interlockings in proper working order; that when trackmen are laying new rail or making changes in the track that affects track-circuit or interlocking connections the maintainer must be present to see that the rails are properly bonded and that the interlocking connections are restored; and the like.

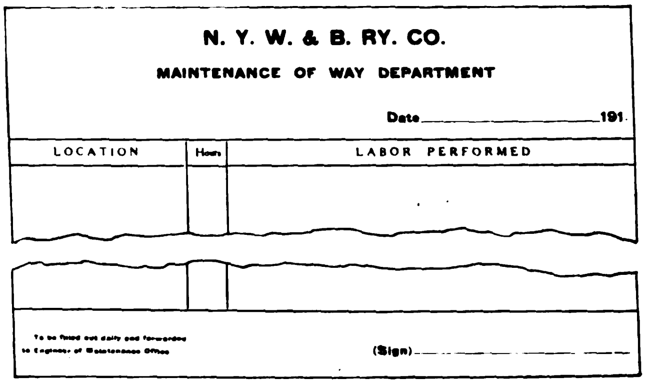
REPAIR METHODS

As mentioned before all repairs aside from inspection and such work as making wiring connections, cleaning and oiling apparatus and similar operations are done by one maintainer, called the relief man, and one helper. The relief man is located in a small shop at the 180th Street station, where the more delicate pieces of signal apparatus are repaired. The heavier parts of the mechanism which involve machine or blacksmith's work are repaired in the near-by car-repair shop.

All of this repair work is done by the railroad company's forces and none is sent out to the manufacturer with the exception of the manufacture of such small special parts as detector locks for the interlocking, slot-arm latches, etc., whenever these are needed for replacement. In general, all repairs are effected by replacing the defective parts with others in good condition, the piece requiring repairs being removed and brought to the shops. In this connection it is interesting to note that the installation is of such high grade and the maintenance methods so thorough that no apparatus has been in need of anything more than really minor repairs during the three years that it has been in operation. No relays have required complete rewinding, nor have there been any serious failures resulting in extended damage to signal mechanisms, motors or transformers. Even the blades for the semaphore arms, which are made of wood and covered with enamel paint, have not yet required repainting.

The relief man and his helper, in addition to making repairs and relieving maintainers who may be off duty, are assigned to all construction work that is done on the line. Since the road was constructed two spur sidings have been installed and equipped with switch indicators. These switch indicators, together with the electric locks and other accessories, were supplied by the Union Switch & Signal Company, but the scheme was laid out by the railway company, and since the installation of this system for outlying switches the operation has given satisfaction in every respect.

Repair material is kept in the general storehouse of the railway company at 180th Street, rather than in the signal maintainer's repair shop. The material on hand consists of one complete signal mechanism for a two-blade signal and one for a single-blade signal. There is also one of each of the two styles of switch movement that are installed in the interlockings. For the automatic signal equipment there are four double-rail transformers, one single-rail transformer, two line transformers and two track circuit transformers. There are six line relays, ten track relays, and eight d.c. relays for the interlocking plants, together with four impedance bonds. This equipment has been found to be more than necessary for making prompt repairs, although there are 483 relays in operation on the line.



N. Y. W. & B. RY. CO.

MAINTENANCE OF WAY DEPARTMENT

Date ______________ 191

LOCATION	Hours	LABOR PERFORMED

To be filled out daily and forwarded
to Engineer of Maintenance Office

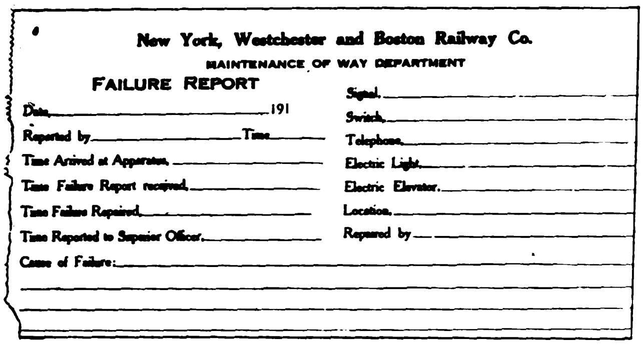
(Sign) ______________

WESTCHESTER SIGNALS—DAILY WORK REPORT MADE BY MAINTAINERS

The signal maintainers are required to make out daily and forward to the engineer of maintenance statements of the work that they have done during the day. These statements are made out on the form reproduced in the accompanying illustration. In addition each signal maintainer turns in a report of the regular monthly inspection which he is required to make. This is also shown in one of the accompanying cuts. The general signal foreman is required to make a thorough inspection of the line in general every two months. This report provides for a division of the 18 miles of line into six sections, and for each section the following items are covered: Signal ladders, signal platforms, signal-platform trap doors, sectionalizing boxes for interlockings, locks on transformer housing, feeder protection screens, danger signs at substations and danger signs at tower transformer locations. As shown by the list of items, this report is largely for the purpose of safety to the employees and to the public. The results of the weekly inspection of the interlockings by the maintainers are shown on cards which are turned into the office of the engineer of maintenance and filed in a card index.

MAINTENANCE RECORDS AND COSTS

As before mentioned, when failures occur they are, as a rule, first discovered by the motormen, who report them to the dispatcher at the end of the trip. The dispatcher communicates with the proper maintainer, who proceeds at once to the defective signal and remedies the difficulty. As soon as the failure is overcome the maintainer fills out a form in duplicate, as shown in the accompanying illustration, the original being sent to the office of the engineer of maintenance. The carbon is sent to the general foreman of signals, who makes a further investigation in case this appears to be necessary. These failure reports are checked against the train detention reports which are made up by the transportation department and they serve as a basis for the daily report which is made by the engineer of maintenance to the president of the road with regard to the operation of all of the apparatus covered by his several departments.



New York, Westchester and Boston Railway Co.
MAINTENANCE OF WAY DEPARTMENT
FAILURE REPORT

Date____________191
Reported by____________Time______
Time Arrived at Apparatus____________
Time Failure Report received____________
Time Failure Repaired____________
Time Reported to Superior Officer____________
Cause of Failure:____________

Signal____________
Switch____________
Telephone____________
Electric Light____________
Electric Elevator____________
Location____________
Repaired by____________

WESTCHESTER SIGNALS—FAILURE REPORT FORM MADE OUT BY SIGNAL MAINTAINERS

Table I shows the causes of signal failures occurring during the last three months on record. In this a failure is considered to be any improper operation of a signal, but is considered independently of the number of trains that are stopped by the defective signals.

TABLE I—CLASSIFIED SIGNAL FAILURES ON NEW YORK, WESTCHESTER & BOSTON RAILWAY

	Nov.	Dec.	Jan.
Fuses blown	..	..	1
Power off and low voltage	4	1	1
Relay contact not making	..	2	1
Friction clutches on switches	..	1	..
Broken wires	2	..	1
Creeping switch points	..	..	..
Brakes on signal motors	..	1	1
Slot armatures	6	1	..
Lights burned out	1	..	2
Resistance coils burned out	..	..	..
Unknown and other causes	8	5	5
Motor contacts	..	..	1
Grounded wires	1	3	2
Car derailments	1	..	..
Snow	..	..	1
High-tension fuses	..	1	..
Resistance tube in track circuit	..	1	..
Totals	26	15	16

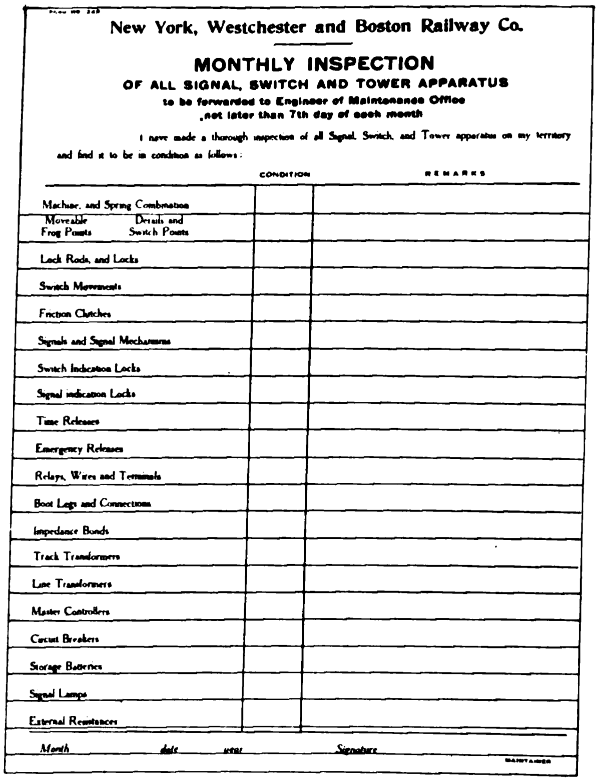
TABLE II.—TRAIN DELAYS CAUSED BY SIGNALS, NEW YORK, WESTCHESTER & BOSTON RAILWAY

	Failures	Delays	Minutes
March, 1914	15	0	0
April, 1914	20	20	89
May, 1914	19	27	125
June, 1914	10	1	8
July, 1914	11	34	114
August, 1914	27	102	309
September, 1914	21	23	48
October, 1914	10	1	3
November, 1914	26	2	8
December, 1914	15	10	71
January, 1915	16	1	3
February, 1915	14	1	2
Total for year	204	222	780

The record of trains stopped appears in the detention report of the transportation department, the signal department being concerned only with the operation of the signal as a piece of mechanism. No false-clear condition has occurred on the road since it began operation three years ago.

Table II shows the number of signal failures by months occurring during the current year, as well as the train delays that were caused by the signals. In this table the large number of delays that appear in May were due to grounded signal feeders and therefore were not all directly chargeable to signal mechanism. The large number of delays appearing in August were also due to grounded signal feeders as well as to high-tension fuse boxes and therefore were not chargeable to signal mechanism, although technically they had to be so charged.

All told, during the year 1914 there were 204 failures and 4,200,000 signal movements, corresponding to a figure of one failure to 20,700 movements, or an efficiency of 99.995 per cent. This applies to all semaphore signals whether within limits of interlockings or otherwise but does not consider dwarf signals. The number of signal movements as stated for one year's operation includes the number of complete operations of each of the blades of each two-blade signal. The costs of maintenance for the signal department are subdivided between interlocking plants and two-blade automatic signals that are outside of the limits of interlockings, these being $1.95 per two-blade automatic signal per month, and $5.01 per interlocking function per month. The latter figure covers the whole function, consisting of the lever, the interlocking, the switch, the switch operating mechanism and the governing signal complete. The costs of supervision as well as labor and material are included in both figures. The total cost of maintenance per track mile is $23.67 per month, and the cost per function (either automatic signal or interlocking) is $3.32 per month, including all functions of the signal substation.



New York, Westchester and Boston Railway Co.

MONTHLY INSPECTION
OF ALL SIGNAL, SWITCH AND TOWER APPARATUS
to be forwarded to Engineer of Maintenance Office
,not later than 7th day of each month

I have made a thorough inspection of all Signal, Switch, and Tower apparatus on my territory and find it to be in condition as follows:

	CONDITION	REMARKS
Machine, and Spring Combination		
Moveable Frog Points / Details and Switch Points		
Lock Rods, and Locks		
Switch Movements		
Friction Clutches		
Signals and Signal Mechanisms		
Switch Indication Locks		
Signal indication Locks		
Time Releases		
Emergency Releases		
Relays, Wires and Terminals		
Boot Legs and Connections		
Impedance Bonds		
Track Transformers		
Line Transformers		
Master Controllers		
Circuit Breakers		
Storage Batteries		
Signal Lamps		
External Resistances		

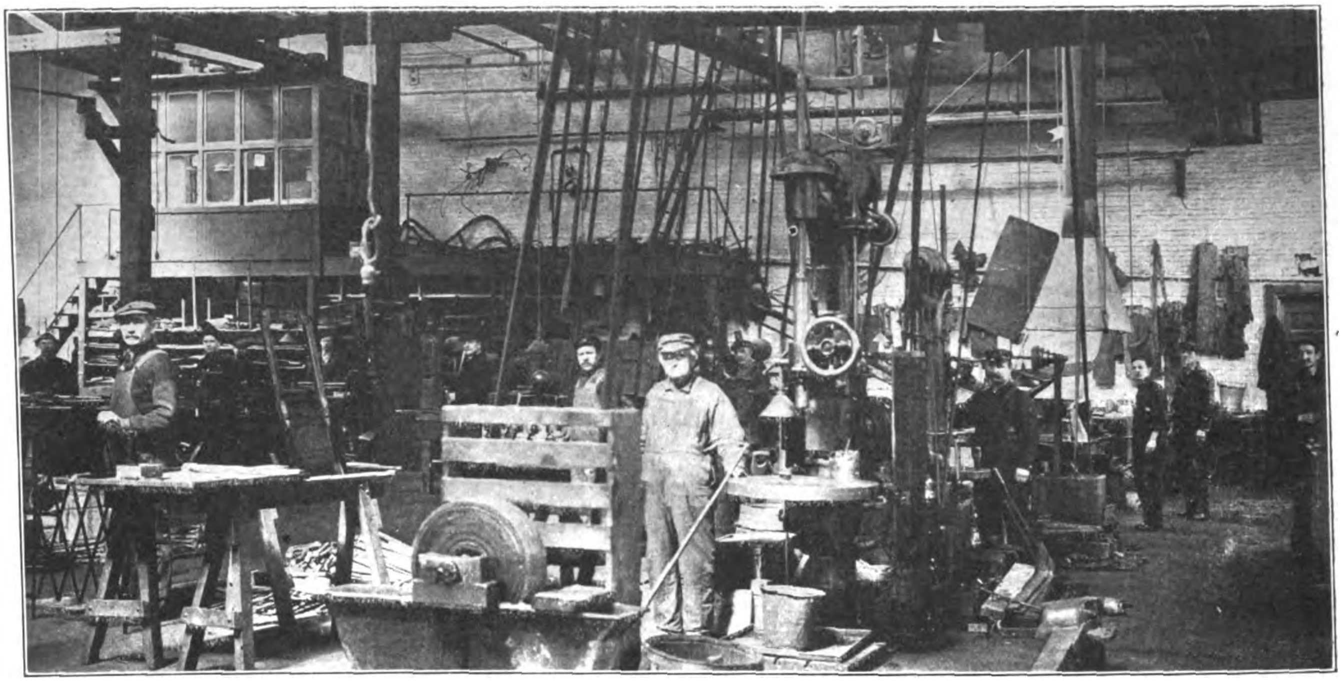
Month date year Signature
MAINTAINER

WESTCHESTER SIGNALS—MAINTAINERS' MONTHLY INSPECTION REPORT

STEEL CARS ON THE LONG ISLAND

Ten Years' Experience with All-Steel Construction Has Shown That Deterioration Is Practically Negligible and That Routine Repairs Are Minor in Character

STEEL cars have been in service on the Long Island Railroad since operation of the electric zone began on July 26, 1905, and, owing to the ten years of service that the original cars have undergone, they afford an excellent example of the lasting qualities of steel construction. In so far as the framework of the car bodies is concerned, the steel cars generally have required less repair work than the wooden cars on the same line. All of the cars are in first-class condition, and it is the expectation of the management that they will last much longer than wooden ones, although the life of a wooden passenger car on the same road is between twenty and thirty years. Summed up, the experience of the Long Island Railroad in maintaining steel cars has been very satisfactory, and an account of the nature of the repair work that has been found to be necessary and of the methods followed for its accomplishment should be of interest to those considering the purchase of steel cars for heavy interurban service.



LONG ISLAND STEEL CARS—VIEW IN SHEET-IRON SHOP SHOWING POWER-DRIVEN MACHINE TOOLS

CHARACTER OF THE STEEL EQUIPMENT

The 134 cars that were originally placed in service on the Long Island Railroad's electric zone were described in the ELECTRIC RAILWAY JOURNAL for Aug. 11, 1906. They were of the side-girder type of construction with composition floors and roofs, having a length of 41 ft. over corner posts, a total weight of 82,000 lb. and a seating capacity of fifty-two. These cars were operated in trains with wooden trailers.

In 1909 a new type of steel motor car was introduced, this being 54 ft. 6 in. over corner posts and having 5-ft. vestibules, measured over the couplers, the doors being 3 ft. wide. These cars weighed 107,000 lb. each, seating seventy-two passengers. Two hundred of them were purchased during 1909 and 1910, together with some baggage cars, but because of differences in coupler and platform heights they could not be operated in trains with the original 41-ft. cars, nor with the wooden trailers, and they have been used separately in all-motor-car trains.

The later type of car is equipped with two 225-hp motors mounted on one truck, and these give an acceleration of 1 m.p.h.p.s. with a maximum speed of approximately 54.5 m.p.h., the gear ratio being 25:48. The motors of the original cars are of 200 hp. with a gear ratio of 25:58, as the cars are designed to haul trailers. These motors give the same acceleration as in the case of the larger cars but the maximum speed is approximately 47.5 m.p.h.

The electric zone on the Long Island Railroad constitutes but a part of the total mileage, although the maintenance of all of the equipment of steam locomotives, coaches, rapid transit cars and trolley cars comes under a single department that is headed by G. C. Bishop, superintendent of motive power. On the lines at the east end of Long Island, which are operated altogether by steam, the passenger-coach equipment was originally of wood, although steel construction is displacing this rapidly at the present time. Both the steel and the wooden cars are repaired in the same shop, and this affords an excellent opportunity for comparing the work required for the different types.

ORGANIZATION AND EQUIPMENT FOR STEEL CAR REPAIRS

When the electric zone began operations in 1905 the car repair shop had been in operation for some time. The road, therefore, was prepared to handle wooden car equipment, and the organization for this purpose was complete. But with the introduction of the large number of steel cars required for the electric zone it became necessary to provide a new class of workmen to make repairs that were peculiar to steel construction.

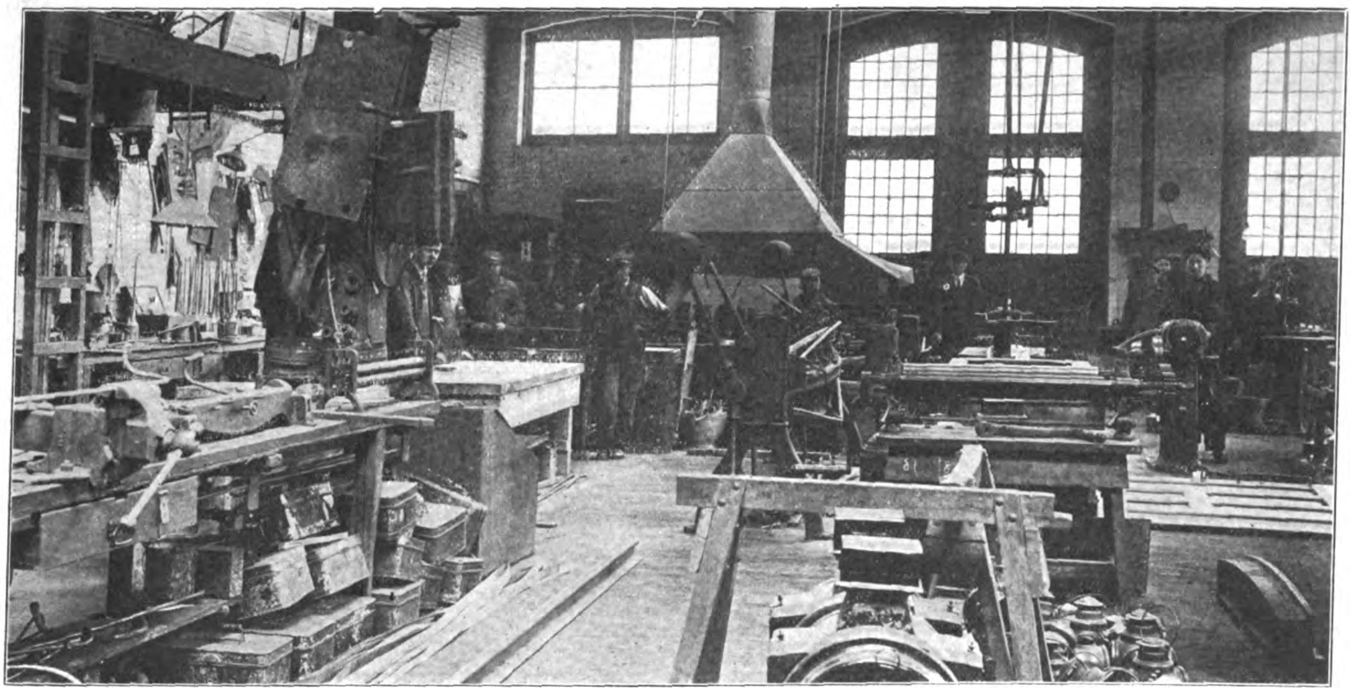
These steel-car repairers were put on about one year after the receipt of the steel cars. The original gang consisted of two structural iron workers and their helpers, experienced men being employed because they were familiar with the ordinary operations involved in riveting and in working structural shapes and plates. The helpers, however, were recruited from the existing shop force, and it was found that after these men had worked under the direction of the experienced gang leaders for a comparatively short time they acquired a considerable degree of proficiency in the use of the steel-worker's tools. Later on, as the original leaders drifted away, they were replaced by car repairers who had become experienced in handling steel. At the present time the force is composed of three workmen and their helpers, of whom all were broken in to the work in the railway repair shops.

These men are classed as iron workers and they are included as part of the tin-, pipe- and sheet-iron-shop force that makes repairs upon the steam locomotives, passenger coaches and electric cars that are served by the general repair shop. This force, it may be said, is drawn upon as necessity arises for repair work on the steel car bodies, so that these six men do not cover all of the work that is needed but represent only the specially trained men that have had to be developed with the introduction of the steel car. At the present time approximately 600 steel cars are cared for at the repair shop and of these about two-thirds are used in the electric zone service.

Generally speaking, the steel car on the Long Island Railroad has involved the use of a number of new hand tools but practically no new machine tools, a large cornice-brake being the only one of the latter that was needed. This was purchased for the purpose of making up sections of the thin steel, about 1/32 in. thick, that is used for the door sheathing and for the interior finish of the car.

In all cases it has been found economical to use power-driven hand tools wherever they can be operated. All riveting is done pneumatically and drilling is done either by compressed air or by electric drill. Since the new forms of welding apparatus have been available the electric welder has been used to some extent, and the oxy-acetylene flame also is used extensively both for cutting and for welding on account of its convenience in handling. In general, however, riveting is used for all heavy repair work in preference to the weld on account of its greater reliability. A certain amount of soldering is done on the light-steel sheets of which the interior finish and the doors are made up, although this is being gradually discontinued because it does not hold well, the weld being preferred for all except temporary work. The fuel-oil torch also is used for emergency repairs and where bending of heavy members has taken place. There have been several cases of distortion of the center sills, to which, on the Long Island's steel car, the center plates are attached, there being no real body bolsters. Under these circumstances it has been found possible to heat the sills in place, and either jack them or hammer them into alignment.

The sand blast is used to a limited extent, but whenever rusting of any part of the framework of the car has taken place the blast is applied only locally to clean off the surface and leave it in suitable condition for inspection and repainting of the metal underneath.



LONG ISLAND STEEL CARS—VIEW SHOWING END OF SHEET-IRON SHOP ASSIGNED TO TINSMITHS' WORK

CHARACTER OF ROUTINE REPAIR WORK

Aside from painting, which it may be said costs about the same for wood as for steel on the Long Island Railroad, the routine repairs for the framework of the steel car bodies are almost negligible. This, however, is not intended to include that which may be classed as car-body equipment, such as doors, door-operating mechanisms, windows, interior trim and the like. In general the actual cost of any job, such as reflooring platforms or renewing doors, is cheaper with wood than in steel, but heavy repairs are required more often on the wooden cars, and this offsets the cheaper repairs.

The repairs to some types of the steel doors constitute a very material item of the routine repair expense, as it has been found that rainwater works down between the glass and the beading at the lower edge of the door sash and is trapped in the space between the two thin sheets forming the door stiles and door rails. The result is that rusting occurs from the inside of the door outward, appearing at joints or at the edges of the panels or other places where the metal is subject to distortion or vibration. Approximately speaking, twenty-five doors have to be rebuilt by being equipped with new stiles and bottom rails in the course of a year, owing to deterioration from this cause.

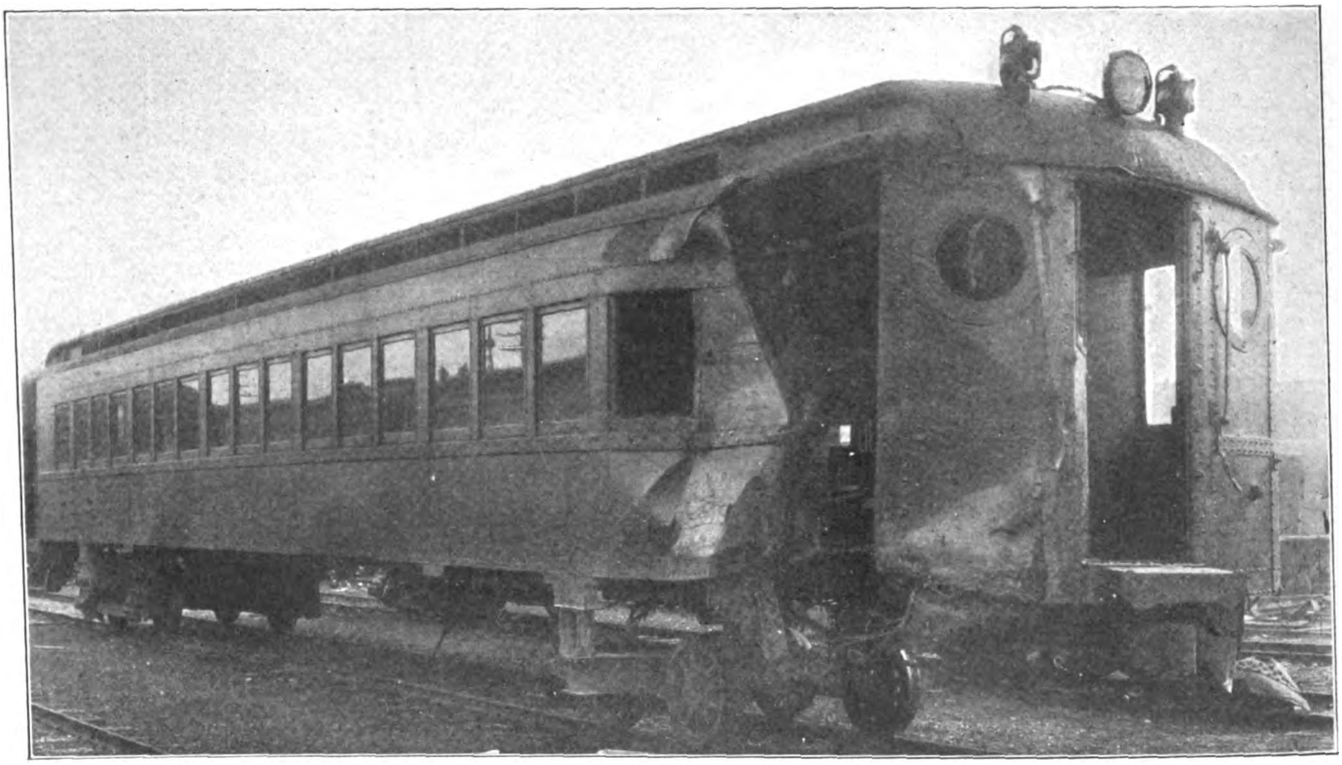
A certain amount of work also is done on the steps, which are subject to damage owing to occasional contact with obstructions inside of clearance lines. The steps, including the treads, are made up by hand in the sheet-iron shop, the frames being flanged as required over a form. About fifteen step replacements are required during the course of a year, and about two dozen new step-treads also are required.

Very little heavy repair work is required in the course of the routine repair work. Side sheets, however, are occasionally damaged by contact with obstructions, about two such repair jobs being required in twelve months. These repairs are made by cutting off the rivet heads and punching out the rivets that hold the damaged section of side sheathing to the posts, sills and belt rail and riveting on a new sheet in its place. Three or four cases of leaking roofs also occur during the course of a year and these are repaired by oxy-acetylene welding after determining the location of the leak by removing the headlining. Fifty of the earlier cars have the roof joints riveted and soldered, and in these each joint was provided with a cover piece in the form of a U-shaped strip of metal to provide for expansion and contraction of the roof. These joints have not given any trouble, but all later car roofs have welded joints.

A certain amount of deterioration of the sheathing of the vestibule corner and end posts occurs through rusting at the floor line. Rusting is accelerated at this point because of the salt solution that is tracked onto the platform by passengers during the winter owing to the use of rock salt for melting ice on station platforms and steps. It should be noted that the cars have trap-door vestibules in which the trap doors are down for the greater part of the time, so that corner posts are subject to the above-mentioned action of salty water during the winter to about the same extent as the vestibule center posts. The same cause has produced extended rusting of the platform sheathing and platform sills of the earlier cars, but this does not appear on the later cars which have heavier platform members.

The trap doors for one of the several orders of steel cars were made up of flanged steel plates filled with monolith cement, this being covered with a rubber tread, and it has been found that the cement, when in contact with water, produced a salt which caused rapid deterioration of the steel frame. In consequence, the railway company is making a regular practice of replacing all of these trap doors with new ones that are made from diamond tread steel plate and that have no filling of any kind, the edges of the plate being bent over on a form to provide additional stiffness. At present, in fact, two men are working steadily upon the manufacture and installation of the new trap doors.

The floors of the Long Island cars, it may be said, are made up of ferro-inclave plates of Toncan metal that is also covered with monolith cement, and it is known that the same rusting is taking place on the floors as on the trap doors. The action, however, is not so rapid in this case and it is expected that the floors will last as they are for some time to come.



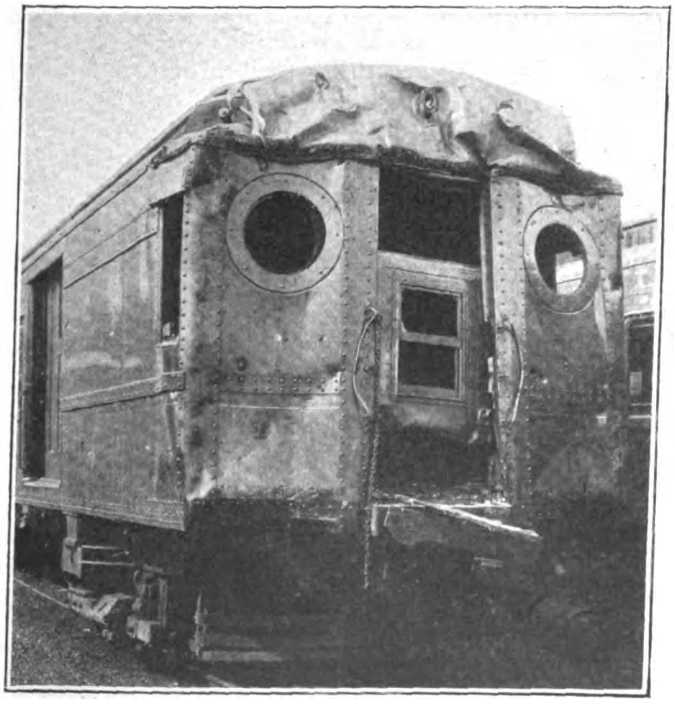
LONG ISLAND STEEL CARS—PASSENGER CAR CORNERED BY FREIGHT TRAIN WITHOUT HAVING GLASS BROKEN EXCEPT AT POINT OF IMPACT

In painting the steel cars about the same process is followed as with the wooden ones. Somewhat less work is required for the filler coats of the former, in fact, because of the smoother and more regular surface upon which the paint coating is spread. Until some two years ago, however, the interior painting of the steel cars displayed a marked tendency toward the development of numerous fine cracks which detracted materially from the appearance of the surface. This was traced to the practice that had been developed in wooden-car painting wherein a hard, quick-drying varnish was used for interior work. The hard varnish was insufficiently elastic to meet the exaggerated expansion and contraction that was inevitable with steel sheathing on railroad cars owing to their exposure to sudden and extreme temperature changes, and the result was a checking of the film of paint.

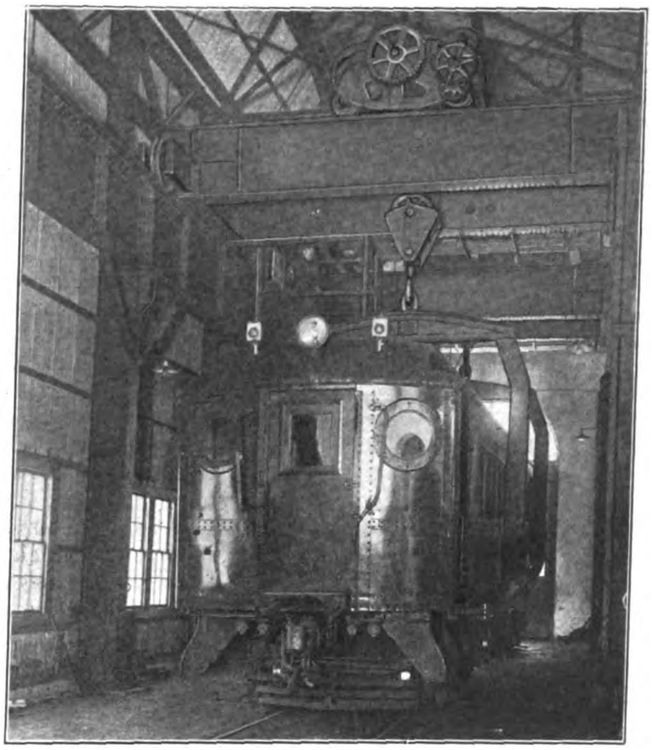
For this reason the Long Island Railroad has used "Valspar" varnish on its newer coaches, both inside and out, because of its extremely high elasticity. The cars that have been varnished with the new material have been in service for about eight months, and as no sign of checking has occurred, notwithstanding the fact that the service has extended over one winter, it is believed that this has solved the difficulty.

UNUSUAL REPAIRS

Owing to the high degree of efficiency under which operation is conducted on the Long Island Railroad, as well as to the sufficiency of the steel car equipment, the matter of unusual repairs, as distinguished from the routine involved by normal wear and tear, comes up but seldom, and very little experience has been attained along these lines. The engraving on page 568, however, shows the result of a steel passenger train running into the side of a stationary freight train at a speed of about 15 m.p.h. This crushed in the corner of the first car of the passenger train and slightly damaged the platform of the next car. The leading truck of the first car, however, was pushed under the car, breaking off all of the electrical equipment mounted on the underframe, and at the same time the truck itself was damaged to such an extent that it had to be replaced. Including all of this the cost of the repairs amounted only to about $3,600. The time that elapsed until the repairs were completed was just two months, and this included some five weeks' delay waiting for new pressed-steel pieces to be furnished by the manufacturer, the actual work of replacement taking less than three weeks. These parts, it may be said, could have been made by the railroad company, if necessary, although at a considerable expense because of the fact that they would have had to be formed by hand instead of being pressed. Equipment for pressing out parts, such as installed by the manufacturer, manifestly would be unprofitable for the railroad company to install owing to the extremely infrequent use for it.



LONG ISLAND STEEL CARS—RESULT OF USE OF REINFORCED VESTIBULE POSTS, THIS CAR WITHSTANDING DIRECT IMPACT AT 50 M.P.H.



LONG ISLAND STEEL CARS—PAIR OF 40-TON ELECTRIC CAR HOISTS INSTALLED FOR DISMANTLING STEEL CARS

The conclusion drawn from this collision was that the body end-sheet, which had been expected to tie the roof and the floor of the car together, tore loose and permitted the corner of the car to be crumpled up. The main point of weakness, of course, is the pocket for the side door of the vestibule, these doors sliding back and forth in the manner customary with rapid-transit equipment and not swinging in accordance with steam road practice. In consequence, the company decided to rivet the body end-sheet more securely on later cars and to provide additional vertical reinforcement at the vestibule ends. In this particular case the repairs were effected by cutting out the damaged side sheets at the first joint back of the crumpled portion, and by replacing the sheet together with the cast-steel end sill, the vestibule corner post, the body corner post and the roof sheets over the vestibule.

As a consequence of the above-mentioned decision the more recent steel cars purchased by the company were built with 9-in. channels flanking the vestibule end posts. As yet there has been little definite experience with the strength of the reinforced design because of the general absence of collisions. However, in the one case in which the new design has been tested it gave striking evidences of strength. This is shown by the accompanying engraving, which gives a front view of a car with the heavy vestibule posts after it had hit a car of the original design. The impact was between a two-car train moving at about 30 m.p.h. and a five-car train moving at about 20 m.p.h. Considerable damage was done to the car with the lighter end construction, and it had to be repaired by having the end cut off and having a new end built on in its place. The side sheets were cut at the joints nearest to the line where the car was undamaged, and the center sills, side sills and belt rails were spliced with riveted joint plates.

It should be noted that the car that received the least damage was a combination baggage car without a platform at the end where the impact took place. In consequence, the corners were supported directly by the side sheathing as there was no drop step between the body and the end sill, such as was the case in the opposing car. It is an interesting fact that the center sill of the opposing car was not crumpled, but was bent up slightly instead. This sill was projected into the baggage compartment of the car with the heavy end construction, between the vestibule centerposts. These stripped the end sill and other projecting members from the center sill, indicating that the columnar strength of the center sill exceeded the strength of attachment of the transverse members connected to it. The center sills are built up of two 9-in. 15-lb. channels spaced 16¾ in. apart, with a top plate ¼ in. x 26 in. and two bottom plates ⅜ in. by 24 in. For 26 ft. at the middle of the car only one bottom plate is used.

This great strength of center sill is largely due to the previously mentioned fact that the Long Island Railroad steel cars are constructed without body bolsters. Instead, there is the box-girder center sill which is framed into the body end sill and which extends beyond it to support the platform. The center sill is also framed into a crossing, called a cantilever, that is located several feet back of the position normally assumed by the body bolster. The center plate is fastened to the center sill midway between the body end sill and the cantilever. and, therefore, the center sill acts as a beam extending between the cantilever and the body end sill. The primary object sought by this construction is the rigid support of the overhanging platform and draft gear, and, judging by above-mentioned experience, this object has been fully attained.

CONVENTION OF THE A. R. E. A.

At the Chicago Meeting of the American Railway Engineering Association There Were Presented Committee Reports on Electricity, Ties, Wood Preservation, Fences and Other Subjects

Those reports of particular interest to electric railways which were presented at the sixteenth annual convention of the American Railway Engineering Association, have been abstracted and are published herewith. The convention was held at the Congress Hotel, Chicago, March 16-18, 1915, and, as has been the custom, the National Railway Appliances Association held its exhibition in the Chicago Coliseum and Armory during the same week.

Roadway, Track and Ties

The committees on roadway and track reported progress, the latter stating that a sub-committee had held a joint meeting with the standardization committees of the Manganese Track Society and the Manganese Steel Foundry Society and had adopted their recommendations for special work specifications. In order that the costs of treated and untreated ties could be compared on the same basis, the committee on ties recommended several formulas for adoption and publication in the manual. These included a method of calculating the total annual cost of any tie when the following factors were known:

C = first cost of tie in place;
R = rate of interest;
n = life of tie in years.

$$\text{Total annual cost} = \frac{CR(1+R)^n}{(1+R)^n - 1}$$

Wood Preservation

The use of coal tar in creosote was considered by the wood preservation committee to be desirable. Commercial and economic conditions made advisable the conservation of the creosote supply, and one of the most feasible means of augmenting the available output of domestic creosote was by the proper addition of refined coal tar. Solutions of refined coal tar and creosote properly mixed and filtered were superior to ordinary mixtures of refined coal tar and distillate oil, and did not reduce the depth of penetration.

Allowable limits of water in creosote were also investigated by this committee, and as a result it recommended the adoption of specifications stating that the use in treatments of creosote containing up to 3 per cent water was permissible. Where the quantity exceeded 3 per cent, proper allowance should be made, and under no circumstances should timbers be treated with oils having more than 6 per cent water.

The report of the committee on buildings included recommendations regarding the best uses for various kinds of roofing materials and sketches of typical floor constructions for shops. Under the subject of roof materials, it was stated that the built-up roof was especially valuable for flat surfaces and could be made as heavy as desired. Regarding ready-made roofing, the report stated this has a better value for steeper roofs than for those of small pitch. It averaged much cheaper than the built-up type and most of those now in use required occasional recoating to obtain a fair life. Slate made a good roof if properly watched but it could not be walked upon without danger to the slate. Tile of good quality gave equally good results and had not the disadvantage of breaking so easily under foot. Its principal value, however, was from an architectural standpoint and when properly protected and fastened could be recommended for roofs with pitches of 6 in. to 1 ft. or more. Asbestos shingles were also recommended for railroad structures. Large cement tile, reinforced and laid without sheathing directly on the roof purlins, was regarded as a good roof for shops and freight houses. Owing to the high cost of maintenance, the average metallic roof coating was not recommended on permanent buildings.

Fences and Crossings

The committee on signs, fences and crossings presented data on the economy of concrete and metal as compared with wood for fence posts, which had been collected from seventy-two roads, and it was concluded that their use had not yet passed the experimental stage so far as life was concerned. General results, however, had been sufficiently satisfactory to cause a number of railroad companies and private concerns to construct plants for the manufacture of concrete posts on a large scale. Where suitable timber was plentiful and cheap there was no economy in the use of concrete unless its life was much longer than is now estimated.

This committee's report also contained the following statements regarding galvanized wire fencing: The rapid deterioration of modern woven galvanized fence wire is caused by the coating of zinc being too thin and of an uneven thickness. A second coating of zinc should be applied to electrically welded fencing after it is manufactured. For right-of-way fences a hinged metal gate is recommended. The width of farm gates should not be less than 12 ft., depending upon the size of agricultural machinery in use in the vicinity, or as required by the laws of the states through which the railroad operates. The minimum height of farm gates should be 4 ft. 6 in. from the surface of the roadway. Farm gates should be hung so as to open away from the track, and, if hinged, should swing shut by gravity.

Concrete for fence posts was stated to be a practical, economical and a suitable substitute for wood. Reinforcements for them should be placed as near the surface as possible, ½ in. from the surface being the best location. Posts should taper from base to top and should not be less than 5½ in. at base and 4 in. at top.

Concrete should consist of one part cement and four parts of run of pit gravel; or one part cement, two parts sand and four parts crushed stone of low absorption, or screened gravel. Gravel or crushed stone should not be less than ¼ in. or more than ½ in. in size. Concrete should be of a quaking consistency. Molds should have a jogger or vibratory motion, while the concrete is being placed to compact it and smooth up the surface of the post.

Concrete posts should not be made outdoors in freezing weather. They should not be exposed to the sun, and, to aid curing, should be sprinkled with water the first eight or ten days after being made. Molds should be carefully oiled or soaped to prevent concrete sticking to them. Posts should be cured for not less than ninety days, when cured naturally, before being set or shipped and should be carefully handled and packed in straw, sawdust or other suitable material for shipment.

This committee's report also contained the following recommendations regarding track construction and flangeway at paved street crossings and in paved streets. (1) Treated ties should be used, laid on a bed of crushed rock, gravel or other suitable material, not less than 8 in. in depth, placed in about 3-in. layers, each to be thoroughly rammed to compact it. (2) Vitrified tile drains not less than 6 in. in diameter, with open joints, leading to nearest point from which efficient drainage may be obtained, or with sufficient outlets to reach sewers or drainage basins, should be laid on either side of and between tracks, parallel with ballast line and outside of ties. (3) Girder rail of 141-lb. weight and 9-in. depth or similar section, with suitable tie-plates and screw-spikes, should be used. Tracks should be filled in with crushed rock, gravel or other suitable material, allowing for 2-in. cushion of sand under finished pavement. (4) Ballast should be thoroughly rammed as it is installed to prevent settlement of paving foundations. Two inches of good, sharp sand should be placed on top of ballast. (5) Paving must conform to municipal requirements, granite or trap rock blocks preferred. Hot tar and gravel should be poured into the joints as a binder.

GRADING OF LUMBER

The committee on grading of lumber found that the rules which were adopted several years ago for Northern pins and hemlock were no longer standard. It had been found wholly impracticable to purchase lumber under the rules at present printed in the manual, and the committee unanimously recommended that they be rescinded. With the co-operation of the Northern Hemlock & Hardwood Manufacturers' Association, a new set of rules were drawn up for hemlock and were presented as information. The committee also stated that the grading rules for Southern yellow pine did not sufficiently define the quality of the wood, and that there was no practical means for definitely distinguishing between long-leaf pine, short-leaf pine and loblolly pine after timbers had once been manufactured from the trees. It was recognized, however, that it made little practical difference from what species of pine a structural timber was cut, so long as certain density requirements were met. In view of these considerations it had been proposed that the rules for the grading of yellow pine timber be revised. This work had been undertaken by the committee on grading of timbers of the American Society for Testing Materials, which was working jointly with the various manufacturing organizations interested.

REPORT ON ELECTRICITY

The work of the committee on electricity was largely that of reconciling the differences between this association and other associations interested in the subject of clearances, standard specifications for overhead transmission line crossings and the study of electrolysis. During the year the committee investigated the question of modifying the limiting clearance line for rolling equipment so as to give additional space for automatic train stops or other permanent way structures. Out of a total of 196 replies to inquiries, 140 showed no encroachment on the proposed clearance diagram, and the information covering the encroachments reported had been included in the diagram. This information, together with the proposed clearance diagram, has been laid before the American Railway Association and the American Electric Railway Engineering Association and will come up for adoption at their next meetings. The diagram in question was shown in the ELECTRIC RAILWAY JOURNAL for Oct. 12, 1912, on page 857. The committee asked for the adoption of the diagram as recommended clearance lines for equipment and permanent way structures adjacent to third-rails and for third-rail structures. It also recommended the adoption of specifications for crossings of wires and cables of telegraph, telephone, signal and other circuits of similar character over steam railroad rights-of-way. The committee also recommended the adoption of the revised edition of the specification for overhead crossings of electric light and power lines, with the understanding that the national joint committee would take up the question of additions or changes in this specification previously suggested by this association at its 1912 convention.

The committee on ballast recommended a ballast section with 24-ft. roadbed for single track on tangents. Slopes should be sodded up to the top, but not beyond. Regarding the proper depth of ballast of various kinds to insure uniform distribution of loads on the roadway, the committee again unanimously recommended the test outlined in the 1913 and 1914 committee report.

Carbon Brush Troubles

At the Cleveland A. I. E. E. meeting which closed yesterday E. H. Martindale, engineer National Carbon Company, discussed the subject of commutation with particular reference to the brushes of stationary machines. He suggested the use of lead pencils from *2B* to *8H* for testing brush hardness, stating that a pencil softer than the brush will mark it, while one harder will scratch it. He did not specify the hardness suitable for each class of service. He recommended for railway motors brush pressures of from 4 to 8 lb. per square inch and one-half these values for stationary machines.

Mr. Martindale divided the causes of brush trouble into five classes, thus: Field; armature; commutator, including brush rigging; external electrical, and external mechanical. He listed the evidences of trouble in each case as a means of diagnosis and suggested the corresponding remedies. In connection with commutator slotting he advocated undercutting the mica about 3/64 in., cautioning against leaving strips or particles of mica flush with the commutator. On slotted commutators brushes with no abrasive action may be used and their use will result in long life of the commutator and brushes. A non-abrasive brush is not necessarily a soft brush, as one of the hardest brushes made in this country is rapidly becoming standard.

Interstate Commerce Commissioner C. C. McChord is authority for the statement that in twenty years the trespassers killed on railways in the United States totaled 86,733 and the injured 94,646, or 181,379 casualties in all, equal to the entire population of the city of Columbus, Ohio.

COASTING RECORDERS IN NEW YORK

The Number of Kilowatt-Hours Required for Standard Cars on the Third Avenue Railway Has Been Reduced for One Month as Much as 10 Per Cent—Accidents Also Show Big Decrease

EARLY in 1911 the Third Avenue Railway System, New York, installed 100 coasting recorders on its Broadway line, choosing that route in order to try out this device under the most unfavorable conditions. As the sequel shows, the company was right in its preliminary analysis, for to-day, with all the Manhattan lines of the Third Avenue Railway equipped with coasting recorders, the pionéer line does not show as good coasting performances as the others.

Nevertheless, the tests on the Broadway line proved so satisfactory compared with the preceding conditions that following an experience of two and one-half years the company decided during the year 1914 to equip all of its Third Avenue, Union and Westchester lines, city and suburban, with Rico coasting recorders. The sole exception is in the case of the storage-battery cars. The entire order amounted to 1100 recorders costing $110,000.

Comparative records of coasting ability were begun systematically on May 1, 1914, with the organization of the efficiency department for that object. The Broadway-Kingsbridge and 125th Street lines were first taken over, and others were added from month to month as their recorders were installed. In fact, the last suburban lines are just being added to the record system.

While it would have been possible to equip the entire system in less than the nine months actually required since the main order was placed, it was considered more economical to do it gradually and in synchronism with other car changes. During this period, in fact, the open-vestibuled cars were converted to the fully-vestibuled non-bulkhead type. Thus, the wiring for the coasting clock was installed at the same time as the circuits for the McWhirter door closing and car starting mechanism.

No additional men are required at the carhouses or shops on account of these recorders. The extra staff is represented solely by the efficiency department, which consists of the head of the department, his assistant and seven clerks for a total of 1100 recorders. The cost of keeping the records is about 1.1 cents a day per motorman.

The recorders are of the Railway Improvement Company's standard type except that they were altered slightly to permit installation upside down for the convenience of the motorman in making the registration and getting his record slip. The recorder is mounted on the archway left after the removal of the bulkheads. As it is energized only by current from the propulsion motors acting as generators during coasting periods, the possibility of false records is practically eliminated.

MANNER OF MAKING AND KEEPING RECORDS

Besides operating these recorders the Third Avenue Railway System uses the terminal clocks of the same maker. Therefore, the first duty of the motorman is to record his departure from the terminal by inserting his running-time envelope in the terminal timeclock. The envelope, as reproduced, shows the division, line, run number, date, motorman's name and recorder key number. It also shows the order of the trips.

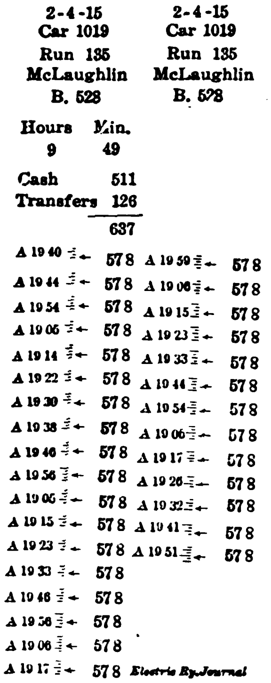
EFFICIENCY DEPARTMENT ENTRANCE

SCIENTIFIC CAR OPERATION—OFFICE OF THE EFFICIENCY DEPARTMENT WHERE ALL COASTING RECORDS ARE KEPT AND CALCULATED

After registering his time the motorman inserts his key in the coaster. This second registration shows his badge number, card number and the "minute" position of the recording wheel. Since the total number of minutes shown does not exceed sixty, the motorman must register in at the end of every half trip, otherwise only the coasting time in excess of sixty minutes would be shown. The registration every half trip also is intentional as this forcibly reminds the motorman of the need for economical operation.

On leaving the car the motorman removes the record tape for the run and also inserts his running-time envelope in the terminal timeclock. Thus his envelope

Sloan's
Liniment


2-4-15
Car 1019
Run 135
McLaughlin
B. 528

Hours Min.
9 49

Cash 511
Transfers 126
637

A 19 40 578
A 19 44 578
A 19 54 578
A 19 05 578
A 19 14 578
A 19 22 578
A 19 30 578
A 19 38 578
A 19 46 578
A 19 56 578
A 19 05 578
A 19 15 578
A 19 23 578
A 19 33 578
A 10 46 578
A 19 56 578
A 19 06 578
A 19 17 578

2-4-15
Car 1019
Run 135
McLaughlin
B. 578

A 19 59 578
A 19 06 578
A 19 15 578
A 19 23 578
A 19 33 578
A 19 44 578
A 19 54 578
A 19 06 578
A 19 17 578
A 19 26 578
A 19 32 578
A 19 41 578
A 19 51 578

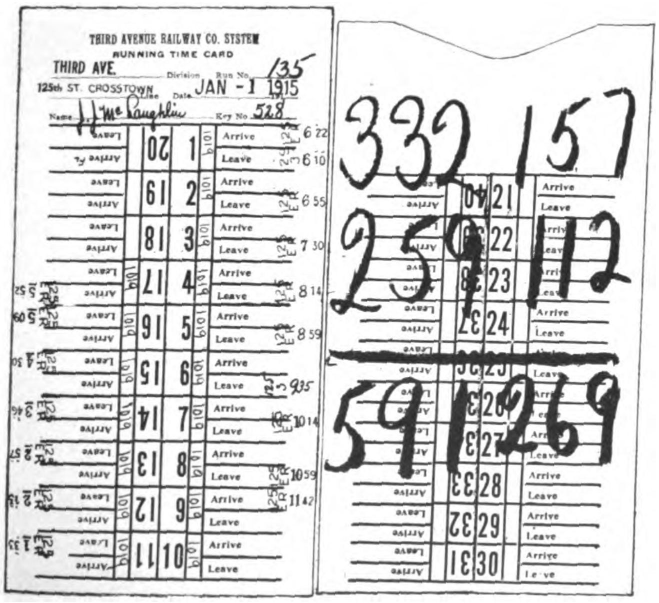
Electric Ry. Journal

SCIENTIFIC CAR OPERATION—RINGING IN AT THE TERMINAL CLOCK; TWO TAPE RECORDS OF A DAY'S WORK

for the day bears a complete record of his running times while the tape shows the corresponding coasting times. The tape is placed in the envelope and handed to the depot receivers, who in turn forward the data to the efficiency department.

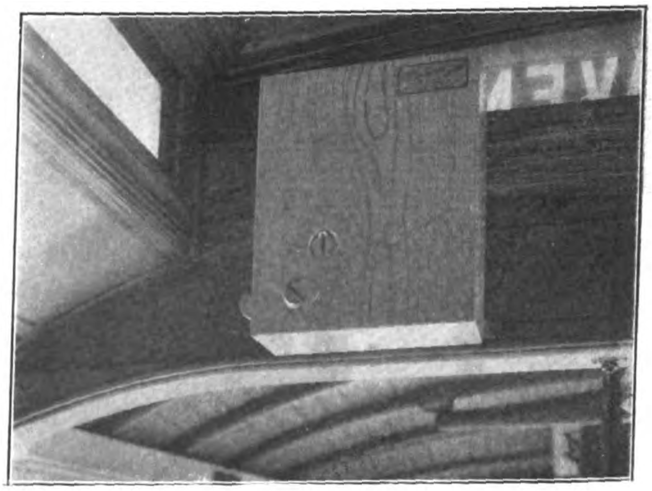
The motormen soon learn to read the tape intelligently. Their interest in the records is particularly manifest when they get a lower reading than usual. In such cases their opinion about the car is expressed by notes written on the tape in succinct if not always elegant language. On the other hand, exceptionally good records are accompanied by a phrase like "This car is a hummer." All complaints are referred to the superintendent of equipment as possibly worth special attention at the next inspection of the car.

The original tapes are filed in the daily envelope, the unstamped side of which carries the separate and totaled number of run and coasting minutes. These first additions are the only ones made without a machine. At the end of the week both sets of figures are integrated in a Burroughs machine and the percentage of coasting time is computed. The weekly record reproduced shows the motorman's badge number in the upper right-hand corner, the run-minutes in the left-hand column and the coasting minutes in the right-hand column. Both columns are added simultaneously. For the convenience of the reader the day corresponding to each performance has been added. The monthly record is similar, showing the record for each of the four weeks and the fraction remaining. The percentage of coasting time is calculated with a slide rule.


THIRD AVENUE RAILWAY CO. SYSTEM
RUNNING TIME CARD
THIRD AVE. Division Run No. 135
125th ST. CROSSTOWN Line Date JAN - 1 1915
Name J. J. McLaughlin Key No. 528

332 157
259 112
591 269

SCIENTIFIC CAR OPERATION—FRONT AND BACK OF RUNNING TIME ENVELOPE; THE BACK SHOWS THE RUN, COASTING AND TOTAL MINUTES



SCIENTIFIC CAR OPERATION—POSITION OF COASTING RECORDER ON BULKHEAD ARCH

The object in making weekly records is to give both the men and the management the chance to see the effects of weather and traffic conditions while the memory of such conditions is fresh in the minds of all. Again, the daily and even the weekly records show big fluctuations in the runs of the same man, but when compared by months the order of merit changes little so far as the regulars are concerned.

At the end of each week the records for the motormen of each line are made up in the order of merit as expressed in percentage of coasting time. The record pertaining to a given division is posted only in the depots of that division but a set of records covering every division is forwarded to the department head, the chief instructor and other executive officers interested in the effect of coasting on power, equipment, and traffic. The road instructor for each division also gets a record covering his men. This record is his guide for the investigation of operating characteristics of motor-

WEEK ENDING JAN. 7

	Running Time	Coasting Time	Badge Number 52
Jan. 1	591	26	
Jan. 2	599	27	
Jan. 3	633	24	
Jan. 4	578	25	
Jan. 5	585	24	
Jan. 6	600	26	
Jan. 7	562	27	Per Cent Coasting
Total for week	4,148	183	44.2

SCIENTIFIC CAR OPERATION—RECORD DAY BY DAY

MONTH OF JANUARY

	Running Time	Coasting Time	Badge Number 52
Total for			
Week ending Jan. 7	4,148	183	
Week ending Jan. 14	3,061	151	
Week ending Jan. 21	3,016	166	
Week ending Jan. 28	2,415	115	
Three days ending Jan. 31	1,722	86	Per Cent Coasting
Total for month	14,362	703	49.0

SCIENTIFIC CAR OPERATION—ONE MONTH'S RECORD, WEEK BY WEEK, OF RUN AND COASTING MINUTES

COASTING RECORD 125TH STREET CROSSTOWN LINE, WEEK ENDING JAN. 7, 1915.

Day Runs

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	McLaughlin	528	44.2	13	Skinner	880	33.8
2	McDermott	569	41.0	14	Martin	759	33.7
3	Lynch	599	39.5	15	Lyons	687	33.7
4	Keegan	856	38.8	16	O'Connor	600	33.3
5	McCourt	848	38.7	17	Yochman	623	32.9
6	Mullins	818	37.5	18	Conroy	512	32.6
7	Melia	886	37.1	19	Van Tassel	628	32.1
8	Murray	744	36.7	20	Greene	836	31.0
9	Jessup	871	35.6	21	Coogan	869	30.9
10	Ryan	557	35.4	22	Block	583	28.0
11	Creegan	850	35.2	23	Scanlon	769	27.7
12	Gillespie	504	34.8				

Average, 37.8; previous week's average, 38.6; highest previous average, 38.6.

Highest week's record to date: McLaughlin, 528, 47.2 per cent, week of June 14, 1914.

Relief Runs

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	Reddy	622	45.7	15	Heaney	896	35.4
2	Quinn	761	44.2	16	Girard	544	34.4
3	O'Neill	510	44.0	17	Ryan	626	34.2
4	Howe	829	42.3	18	Spellman	780	34.1
5	Lombard	740	42.2	19	Callery	561	33.7
6	Flaherty	556	39.7	20	Allen	686	33.7
7	Donohue	743	38.3	21	Mallon	552	33.2
8	Brown	587	37.5	22	Williams	809	32.6
9	McCourt	848	37.4	23	Conlon	679	32.6
10	Smith	678	37.2	24	Nasdal	573	32.1
11	Stevenson	593	36.9	25	Dwyer	736	31.6
12	Allen	830	36.4	26	Lynch	589	31.2
13	Creegan	647	36.1	27	Parks	797	30.3
14	Hogan	659	35.7	28	McDermott	750	30.1

Average, 37.0; previous week's average, 36.3; highest previous average, 36.7.

Highest week's record to date: Howe, 829, 45 per cent, week of Dec. 7, 1914.

Night Runs

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	Quinn	761	47.3	3	Audette	763	35.4
2	Hlousek	784	35.6	4	Brennan	828	33.7

Average, 41.2; previous week's average, 43.8; highest previous average, 46.

Highest week's record to date: Hlousek, 784, 50.6 per cent, week of Dec. 14, 1914.

Average all classes, 37.5; previous week's average all classes, 37.9; highest previous average all classes, 37.9.

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men with supernormal or subnormal records. Formerly these instructors coached only the new men.

That the men may be compared on a fair basis the runs are classified into day, relief and night runs. In examining the weekly record it will be seen that the night runs of the 125th Street line show the highest percentages of coasting, 41.2 per cent, as might be anticipated from non-congested track. The senior motormen with day runs averaged 37.8 per cent during the same week, with the leader reaching a maximum of 44.2 per cent compared with 47.3 per cent by the best night man. The average of the relief men is 37 per cent, or only 1.8 per cent less than the day men, while the top man actually did 45.7 per cent, or 1.5 per cent more, coasting than the top day man. The weekly record also shows the premier performances of preceding weeks, the fall-back for the week of Jan. 7 being the effect of bad weather.

The monthly record which divides the men according to employment for more or less than twenty-one days per month, in addition to the classification as to runs, proves clearly enough that the ability to coast tends to improve as the motorman has more opportunities to get the "feel" of the run. Thus, despite some exceptions to the rule, it will be seen that the day men who worked more than twenty-one days in January did 3.1 per cent more coasting. The relief men of more than twenty-one days' service also did 2.7 per cent more coasting than the relief men of less than twenty-one days' service, while the night men oftener employed did 2.2 per cent more coasting.

Aside from the records already described weekly summaries with comparisons for other weeks are prepared to show the average coasting performances for each class of run on each of the five divisions. The proportion of men who have attained various percentages is also shown for each class of run and each division. A similar record is made up for the month. From this last record a summary is prepared to compare the average coasting ability of all men under each of the five superintendents, together with comparisons with other months. Thus, not only the motormen but also the superintendents are trying to improve their records. In fact, the order of merit by divisions has changed several times. At the present time Mr. Carrigan is superintendent of the West Farms lines, Mr. Murphy of the Third Avenue, 125th Street and Kingsbridge lines, Mr. Reynolds of the Kingsbridge division, Mr. McDonald of the Manhattan lines not under Mr. Murphy, and Mr. Wheeler of the Westchester division.

REDUCED ENERGY CONSUMPTION

The value of the coasting recorder is shown by the reduction in energy consumption for the last six months of 1914. It is true that during practically the same period many of the cars were changed from carbon to tungsten lighting and that about 200 cars were equipped with Perkins roller bearings. There is no question, however, that the major portion of the saving is due to the coasting recorder. Compared with the same

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125TH STREET CROSSTOWN LINE—MONTH OF JANUARY, 1915.

Day Runs—Men Working Twenty-one Days and Over

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	McLaughlin	528	49.0	7	Coogan	869	36.8
2	Skinner	880	44.6	8	Van Tassel	628	36.3
3	Keegan	856	44.0	9	Criegan	850	36.1
4	Conroy	512	42.0	10	Jessup	871	35.7
5	Martin	759	38.9	11	Yochman	623	34.8
6	Gillespie	504	37.8				

Average, 39.6.

Men Working Less Than Twenty-one Days

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	McInerney	798	52.3	13	McCormack	898	34.5
2	Farrell	884	44.5	14	Murray	744	33.7
3	Lynch	599	42.5	15	Black	583	33.5
4	McCue	691	42.1	16	McPherson	827	33.5
5	Mulcahy	738	42.0	17	Ryan	557	32.5
6	O'Neill	510	41.8	18	Costello	853	32.2
7	Olsen	883	41.5	19	Mills	551	31.7
8	Reddy	622	38.1	20	Green	836	31.6
9	Melia	886	37.4	21	Manning	550	30.0
10	O'Hara	574	36.6	22	Peters	560	29.9
11	O'Connell	845	35.5	23	Mullins	818	27.1
12	Lyons	687	34.6				

Average, 37.6; average for class, 39.1; previous month's average for class, 37.1; highest previous average for class, 37.1.

Highest month's record to date: McLaughlin, 528, 49 per cent for this month.

Relief Runs—Men Working Tenty-one Days and Over

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	Howe	829	43.0	5	Girard	544	36.6
2	Brown	587	41.1	7	Mallon	552	36.5
3	Donohue	743	40.9	8	Nasdal	573	33.2
4	Williams	809	37.2	8	Parks	797	33.2
5	Allen	868	36.6				

Average, 37.6.

Relief Runs—Men Working Less Than Twenty-one Days

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	McDermott	569	47.5	14	Curry	637	34.6
2	Stevenson	593	44.5	15	Quinn	761	34.5
3	Istvanko	717	44.2	16	McBride	865	33.1
4	Keegan	856	43.0	17	Allen	830	33.0
5	Elder	874	42.2	18	McDermott	750	32.9
6	O'Neill	510	42.0	19	Ferry	536	32.4
7	McDonald	655	39.5	20	Costello	853	32.3
8	Beagon	631	39.2	21	Conlon	679	30.7
9	McGuire	673	37.5	22	Sheehy	635	30.3
10	Scanlon	769	35.9	23	Murray	744	29.8
11	Halloran	699	35.4	24	Creegan	647	26.8
12	Sullivan	627	35.1	25	Green	835	[illegible]
12	Spellman	780	34.9	26	Roche	535	24.4

Average, 34.9.

Average for class, 37; previous month's average for class, 36.3; highest previous average for class, 36.3.

Highest month's record to date: Howe, 829, 43 per cent for this month.

Night Runs—Men Working Twenty-one Days and Over

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	Hlousek	784	41.1	2	Audette	763	33.4

Average, 36.8.

Men Working Less Than Twenty-one Days

Date.	Motorman.	Minutes.	Per Cent.	Date.	Motorman.	Minutes.	Per Cent.
1	McCourt	848	44.2	4	Mooney	833	34.2
2	McDermott	569	38.2	5	Halleran	699	31.8
3	Mulkern	722	36.4	6	Lynch	589	28.9

Average, 36.6.

Average for class, 36.7; previous month's average for class, 44.3; highest previous average for class, 44.3.

Highest month's record to date: Hlousek, 784, 49 per cent for October, 1914.

Average all classes, 38.1; previous month's average all classes, 37.4; highest previous average all classes, 37.4.

WEEKLY AVERAGES

The averages were:	Week Ending Jan. 7	Week Ending Dec. 28	Highest Previous	Increase (+) Decrease (—) as Compared with Previous Week	Increase (+) Decrease (—) as Compared with Highest Previous
Third and Amsterdam Avenues:					
Day runs	32.3	33.3	34.9	— 1.0	— 2.6
Harlem tripper	31.6	31.8	33.3	— 0.2	— 1.7
Relief runs	30.9	31.8	33.9	— 0.9	— 3.0
Night runs	33.4	35.0	37.5	— 0.6	— 4.1
All runs	31.9	33.0	34.9	— 1.1	— 3.0
125th Street Crosstown:					
Day runs	37.8	38.6	38.6	— 0.8	— 0.8
Relief runs	37.0	36.3	36.7	+ 0.7	+ 0.3
Night runs	41.2	43.8	46.0	— 2.6	— 4.8
All runs	37.5	37.9	37.9	— 0.4	— 0.4
Broadway-Kingsbridge:					
Day runs	35.8	35.5	36.6	+ 0.3	— 0.8
Relief runs	35.5	35.2	36.8	+ 0.3	— 1.3
Night runs	31.1	33.7	37.5	— 2.6	— 6.4
All runs	35.4	35.0	36.6	+ 0.4	— 1.2
All lines	33.0	33.7	35.3	— 0.7	— 2.3

The following shows the proportion of men attaining various percentages in coasting:

	Over 40 per cent	Bet. 30 and 40 per cent	Under 30 per cent
Third and Amsterdam Avenues:			
Day runs	2	74	24
Harlem tripper runs	0	55	45
Relief runs	0	61	39
Night runs	7	67	24
All runs	2	67	31
125th Street Crosstown:			
Day runs	9	82	9
Relief runs	18	82	0
Night runs	25	75	0
All runs	14	82	4
Broadway-Kingsbridge:			
Day runs	7	78	15
Relief runs	11	74	15
Night runs	0	100	0
All runs	9	76	15
All lines	6	69	25

MONTHLY COMPARISONS BY DIVISIONS

	Month of January (1915)	Month of December (1914)	Highest Previous	Increase (+) Decrease (—) as Compared with Previous Month	Increase (+) Decrease (—) as Compared with Highest Previous
Mr. Carrigan	35.0	33.6	33.6	+ 1.4	+ 1.4
Mr. Murphy	34.1	34.2	34.2	— 0.1	— 0.1
Mr. Reynolds	33.9	32.0	32.0	+ 1.9	+ 1.9
Mr. McDonald	30.2	31.7	31.7	— 1.5	— 1.5
Mr. Wheeler	29.5	33.2	33.2	— 3.7	— 3.7
System average	32.7	33.1	33.1	— 0.4	— 0.4

The following shows the proportion of men attaining various percentages in coasting:

	Over 40 per Cent			Between 40 and 30 per Cent			Under 30 per Cent		
	Jan.	Dec.	Highest Prev.	Jan.	Dec.	Highest Prev.	Jan.	Dec.	Highest Prev.
Mr. Carrigan	11	6	7	51	52	52	38	42	87
Mr. Murphy	10	8	8	75	79	79	15	13	62
Mr. Reynolds	8	6	4	52	45	45	40	49	71
Mr. McDonald	4	8	5	29	49	49	67	43	90
Mr. Wheeler	11	22	22	30	28	28	59	50	50
System per cent	8	8	8	50	58	58	42	34	73

MONTHLY AVERAGES

The averages were:	Month of January	Month of December	Highest Previous	Increase (+) Decrease (—) as Compared with Previous Month	Increase (+) Decrease (—) as Compared with Highest Previous
Third and Amsterdam Avenues:					
Day runs	33.4	33.9	33.9	— 0.5	— 0.5
Harlem tripper	32.3	32.6	32.6	— 0.3	— 0.3
Relief runs	32.7	32.8	32.8	— 0.1	— 0.1
Night runs	34.3	36.2	36.2	— 1.9	— 1.9
All runs	33.3	33.7	33.7	— 0.4	— 0.4
125th Street Crosstown:					
Day runs	39.1	37.1	37.1	+ 2.0	+ 2.0
Relief runs	37.0	36.3	36.3	+ 0.7	+ 0.7
Night runs	36.7	44.3	44.3	— 7.6	— 7.6
All runs	38.1	37.4	37.4	+ 0.7	+ 0.7
Broadway-Kingsbridge:					
Day runs	36.4	36.0	36.0	+ 0.4	+ 0.4
Relief runs	36.3	36.0	36.0	+ 0.3	+ 0.3
Night runs	33.3	33.0	35.1	+ 0.3	— 1.8
All runs	36.2	35.9	35.9	+ 0.3	+ 0.3
All lines	34.1	34.2	34.2	— 0.1	— 0.1

The following shows the proportion of men attaining various percentages in coasting:

	Over 40 per cent	Bet. 30 and 40 per cent	Under 30 per cent
Third and Amsterdam Avenues:			
Day runs	4	86	10
Harlem tripper runs	0	78	22
Relief runs	4	76	20
Night runs	7	70	23
All runs	4	79	17
125th Street Crosstown:			
Day runs	32	62	6
Relief runs	26	63	11
Night runs	25	63	12
All runs	29	62	9
Broadway-Kingsbridge:			
Day runs	14	70	16
Relief runs	13	75	12
Night runs	50	50	0
All runs	15	72	13
All lines	10	75	15

ENERGY USED FOR TRACTION THIRD AVENUE RAILWAY LINES IN MANHATTAN, EXCLUSIVE OF STORAGE-BATTERY CARS

	Kilowatt-hours	Miles	Kilowatt-hours per Car-Mile	Per Cent Reduction	Per Cent Coasting Mileage	Per Cent Indicated Saving
			July			
1913	3,961,640	1,154,009	3.43			
1914	3,750,273	1,157,223	3.24	5.5	74	7.4
			August			
1913	3,799,051	1,116,294	3.41			
1914	3,676,392	1,139,035	3.23	5.3	77	5.9
			September			
1913	3,699,858	1,057,012	3.50			
1914	3,571,930	1,103,653	3.23	7.7	76	10.1
			October			
1913	3,897,706	1,084,328	3.60			
1914	3,691,178	1,138,459	3.24	10.0	83	12.0
			November			
1913	3,787,303	1,065,569	3.76			
1914	3,603,024	1,061,651	3.39	9.8*	83	11.8
			December			
1913	4,164,633	1,116,650	3.73			
1914	4,085,015	1,087,478	3.75	0.5*	83	...

*The decreased saving and seeming loss are due to greater heat requirements, although the percentage of coasting improved. The average mean temperature for November, 1914, was 44 deg. Fahr. or 3 deg. less than November, 1913; that for December, 1914, however, was 32 deg. Fahr. or fully 7 deg. less than for December, 1913. The heavy drop to such a low temperature, of course, demanded the maximum heater output. Further, the precipitation for December, 1914, was 4.01 in. compared with 2.40 in. in December, 1913.

The foregoing figures are gross outputs of energy measured at the d.c. busbars of the substation.

months of 1913, the successive monthly decreases in kilowatt-hours per car-mile on the Manhattan lines are 5.5 in July, 5.3 in August, 7.7 in September, 10.0 in October and 9.8 in November. In July only 74 per cent of the system was equipped with recorders, which accounts largely for the smaller savings first shown. By December, 1914, 83 per cent of all cars covered in these power statistics were equipped with recorders.

EFFECT ON ACCIDENTS AND EQUIPMENT

No consideration of car recorders would be complete without a determination of the effect of increased coasting on front-end collisions and on the electrical and braking equipment. The reductions due to the coasting campaign alone cannot be segregated, partly because during the last half of 1914 the near-side stop was adopted and the cars were fitted with automatic starting equipment. However, for the months of September, October and November, 1914, the numbers of vehicle collisions and knock-downs on the Manhattan lines were 885 and 176 respectively, compared with 1092 and 214 for the same months of 1913—a reduction of 20 per cent.

So far as car equipment is concerned, the figures for the coasting recorder installation period also show a decrease in the cost of maintenance. For motor and control maintenance alone, including, however, the mileage of the Union Railway cars, the figures per 1000 car-miles are as follows:

MOTOR AND CONTROL MAINTENANCE COST PER 1000 CAR-MILES

	1913	1914
July	$1.131	$1.324
August	1.733	1.360
September	1.631	1.607
October	2.370	1.527
November	1.700	0.985
December	1.214	1.805

MANGANESE STEEL SPECIAL WORK

Experience of Several Companies on the Pacific Coast with Solid Manganese and Insert Manganese Steel Special Work

ALTHOUGH this paper has published several articles on the experience of electric railways with solid manganese and insert special work most of the information has been based on returns from roads east of the Rocky Mountains. These data can now be supplemented by information in regard to the Pacific Coast states, obtained by this paper through its San Francisco office, and while the returns from the canvass have not been as complete as could be desired, such information of interest as could be collected is presented below.

Manganese steel has been used in track special work on the Pacific Coast under widely divergent conditions and in conformity with varied construction standards. Naturally, both satisfactory and unsatisfactory results are reported in different quarters, but as more careful observations are made and more data become available as to the effect of heavy traffic on the different types of construction, certain general conclusions have been reached, and many of the street railways are adopting certain construction standards based on their experience with solid manganese and insert special work.

EXPERIENCE IN VANCOUVER

In Vancouver, B. C., both solid manganese and insert special work have been used by the British Columbia Electric Railway, with the result that in 1911, after nine years' experience with insert special work and five years' experience with solid manganese, the decision was reached to abandon insert work altogether in favor of solid manganese. This was decided after repeated difficulties with loose plates, with arms breaking off, with chipping at point of intersection and cupping where the open-hearth rail joined the insert, while on the other hand very little difficulty and long life attended the use of solid manganese crossings in the same service.

As typical of results with insert special work manufactured by different companies, it may be cited that a certain iron-bound insert type junction was installed in 1904 under traffic amounting to 800 tons per rail per hour (eighteen-hour day). This was in bad condition six years later and should have been replaced then but was kept in service two years longer. At the end of this time it was entirely worn out and literally ready to fall to pieces under normal traffic. Between 1902 and 1909 eight junctions and fourteen cross-overs of the insert type were installed, and all showed the several types of failures already mentioned to greater or lesser degree.

In solid manganese this company has installed some fifty-three layouts of all sizes since 1906 and twelve cross-overs using solid manganese switches, mates and frogs. The traffic over these installations varies from 200 to 1550 tons per rail per hour (eighteen-hour day) and to date not a single solid manganese piece in any one of these has had to be renewed, nor is there prospect of renewal being required soon. The only solid manganese renewals which this company has ever had to make were in two steam over-electric crossings, not included in those mentioned above, where the traffic was very heavy, being 2500 tons per rail per hour (eighteen-hour day). Of the eight cross-overs in each of these two installations, which were placed in 1906, the first renewal was made in 1912, and to date a total of five pieces have been renewed in the one installation and four in the other. The points of intersection have not yet broken in these heavy traffic cross-overs, and the breaking of the casting arms which required the renewals mentioned is considered to be due to poor foundation which extends to a considerable depth and could not be improved.

The success with solid manganese work which this company has had is attributed largely to the care taken to secure solid foundations under the crossings. This work is carried out as follows: The special work is laid on ties spaced 3 ft. center to center and blocked up to grade to admit 8 in. of concrete under the ties. The concrete is mixed in the proportion of one to seven and is tamped under the ties and up to 2 in. below the base of the rail. At the same time a wood block is embedded in the soft concrete between each two ties, under the rail, with the top of the block also 2 in. below the base of the rail and flush with the top of the concrete.

This concrete is permitted to set from six to ten days, according to weather, and then the rail support is shifted to the wood block which was set in the concrete, by means of wedges driven between the block and the rail. These wedges are then bored with an auger and the rails spiked down to them and the block beneath them. This takes the weight of the rail off the ties. The spikes in the ties are then slightly drawn and the ties pounded down to the concrete bed, as the traffic will probably have caused slight vertical movement of the tie in the soft concrete while it was setting. The rails are then shimmed up on the ties with tie plates of the required thickness and then spiked in place. This method eliminates any movement as the result of installation under traffic and supports the rail on the tie and block alternately every 18 in. The remaining concrete is then placed and brought up to the required paving level.

An electric welder has been in use for about a year on the Vancouver system and has repaired insert special work with moderate success. It has been very useful where cupping in the rail head has occurred but cannot be used to repair loose arms. Points of intersection in the solid manganese crossings have not failed frequently, but in those cases where failure did occur it is reported that the welder effected a satisfactory repair.

In summing up experience with the two types of special work, the British Columbia Electric Railway has concluded that the best practice is to use solid manganese switches, mates, frogs, crossings and connecting rails for the heaviest traffic. For moderate traffic the specification should be for solid manganese switches, mates, frogs and crossings with open-hearth connecting rails, while, for light traffic, the desirable construction is regular hard cast-steel switches, mates, frogs and crossings and open-hearth rails, or built-up work of open-hearth rails.

In this summary it is also pointed out that seven separate pieces are necessary in making up a manganese insert frog of iron-bound construction and that at least four different metals are involved. Moreover, although the purpose of the insert is to eliminate wear at points of intersection, its presence really creates uneven wear at the four points where the manganese joins the open-hearth steel because the latter wears more than fifty times faster than the former.

PUGET SOUND CITIES

In both Seattle and Tacoma the Puget Sound Traction, Light & Power Company is using for the greater portion of its special work, cast-bound manganese center construction with bolted-down, speltered-in inserts. In Seattle there are a few solid manganese crossings, chiefly at intersections with cable lines, and some standard built-up work using T-rails, the latter being the standard for steam over electric crossings. This company also uses an electric welder for building up broken off intersections and reports that it has obtained fairly successful results.

In general the insert work has proved satisfactory, but there has been some trouble with inserts coming loose, and the company would prefer solid manganese construction at the same price as insert work.

EXPERIENCE AT PORTLAND

At Portland much the same conditions obtain as at Seattle, except that the Portland Railway Light & Power Company uses solid manganese for steam-over-electric crossings and at certain intersections where the street railway traffic is particularly heavy. In general, good success is reported with solid manganese special work with a few exceptions where crossings of improper design were installed and which were later overcome by a redesign prepared by the manufacturer. For example, the crossings with the Southern Pacific Railroad at one point developed cracks in the groove at the point of the frog. These appeared soon after the crossings were installed, and some of the cracks grew to a length of 8 in. under service of less than four weeks. After two and one-half years, when the cracks had reached a length of 14 in. to 18 in., the crossing was pronounced unsafe and was replaced. On one of these castings about 4 in. of the end of one arm had broken off and, altogether, the crossings were admitted to be defective by the manufacturers and a proper allowance for this was made.

Sixteen standard solid manganese crossings were put in service by the Portland Railway, Light & Power Company at steam-and-electric intersections. Experience with these indicated that the points of the frog should have had more reinforcing metal to take the hammer blows, for six of the sixteen broke all the way through at the point of the frog when the other parts of the crossing indicated that possibly two years more wear could have been expected. It was noted in these and in other crossings that both in solid manganese and insert work the wear for the first month was greater than for the entire year following, from which it was inferred that the castings were not as hard at the surface as underneath.

A rigid concrete foundation is not considered successful under manganese crossings for heavy steam traffic, this company reports, because it has been found that the concrete may break under one part of the crossing and remain rigid under another part. In one case, this kind of a foundation failure caused an arm of the crossing to break off at the end of the casting, a break which was practically impossible to repair. Concrete foundations might be successful, it was thought, if the concrete was allowed to set for two or three weeks before operating over it, but no opportunity was found for experimenting with this theory. The most successful foundation for heavy service crossings was found to be not less than 2 ft. of well-drained crushed rock under well-seasoned 10-in. x 10-in. ties with tie plates large enough to drill and spike through, and the whole surfaced with 5-in. crossing plank shaped to fit the crossing.

Electric welding on solid manganese has not been considered a success by the Portland Railway, Light & Power Company, and this is attributed to the difficulty of getting a flux bar with enough manganese in it to obtain a proper fusion with the broken or worn parts. Arrangements are being made to use flux bars of manganese steel, with which better success is expected. However, by the use of a steel containing a small percentage of manganese, two apparently successful welds were made in solid manganese frogs which had been badly chipped at the points. Three pounds of metal were required to make the repair on each of these, and after being in service for ten months the welds were in fair shape. These crossings were on electric lines only. The usual difficulty with electrically welded solid manganese crossings has been that the metal usually parts along the line of the weld, lasting only long enough to be badly battered.

SAN FRANCISCO AND BAY CITIES

The greater portion of special work used by the United Railroads in San Francisco is of insert construction with keyed-in inserts on spelter base. Solid manganese is specified for replacements under the heaviest traffic, and for lighter service the removable centers are considered most economical. Although no fixed rule is observed in determining which type is to be specified, it may be said of their practice that where 25-ton cars pass more often than on an average of two-minute intervals, solid manganese is specified, and where the traffic is lighter than this the insert work is considered suitable.

The United Railroads have had some insert special work in service for six years which, their engineers state, gives every indication of having a total life of fifteen years. Eight years is regarded as about the minimum reasonable life for insert work. Sixty manganese insert special work pieces that failed only three years after laying were replaced by the steel company. The United Railroads have had some trouble with inserts coming loose. An electric welder is used for repairing breaks at intersections and for building up cupped-out places.

The San Francisco Municipal Railway uses solid manganese special work throughout its system, a 105-lb. rail being standard. Considerable unusually heavy construction has been put down, but most of this has been in service such a short time that conclusions as to service cannot yet be drawn.

In Oakland three types of special work are used by the San Francisco-Oakland Terminal Railways; built up T-rail construction, manganese inserts, and a few solid manganese crossings. Occasional loose plates in the insert special work are reported, and there has been some chipping off at intersections, the latter being repaired successfully with an electric welder.

SOUTHERN CALIFORNIA

For the downtown districts of Los Angeles, about 90 per cent of the special work layouts on the system of the Los Angeles Railway are of solid manganese. This company has prepared standard designs for the special work on its entire system, and double-web sections are specified on all solid manganese work, thus involving about 40 per cent more steel than would be required by manganese insert work of single-web construction. For light traffic and in outlying districts insert construction is used.

Solid manganese has been laid where the Los Angeles Railway intersects the Pacific Electric system or steam railroads. On steam road intersections, however, there has been considerable difficulty on account of corners breaking off, and the use of solid manganese special work is being discontinued, in replacements, in favor of built-up standard T-rail crossings with a structural steel foundation set in concrete. On parts of its system, where traffic is comparatively light, this company is now specifying cast-steel body manganese inserts. Solid manganese is used, however, for most crossings, frogs, switches and mates to obviate trouble with insert plates coming loose.

The Pacific Electric Railway has prepared a standard double-web design for solid manganese crossings which is given a specially strong reinforcement. It claims that not a single failure of these crossings has occurred. On crossings of less than 40 deg. it uses the built-up type of anvil face crossings, that is, manganese inserts which are the full depth of the rail and are bound all around by rolled rail. It uses no shallow or speltered-in inserts whatsoever on account of their coming loose, and it has never been able to keep them tight for more than two or three years. All switches, mates, frogs and crossings of solid manganese under the heaviest kind of traffic have given good service when they have been reinforced in accordance with this company's standard method. The average car weighs 35 tons and in some places these are run on a half-minute service. These cars are all equipped with M.C.B. standard wheels and no risers are used in the special work flangeways. In addition to the solid manganese design this company also uses special work built up of standard rolled T-rails. Both the Los Angeles companies use an electric welder in repairing broken-off intersections with success.

The San Diego Electric Railway uses 7-in. single web solid manganese special work for heaviest street railway traffic, with frogs, switches and mates also of solid manganese. For steam-over-electric crossings it uses double-web solid manganese specials of built-up, standard T-rail construction. This company claims to have obviated trouble with the breaking off of intersections by specifying unusually high risers in the flange grooves of all crossings so as to lift the wheel treads off the rail head at these points. These risers are cast integral with the crossings and are not renewable. Their life varies with the traffic, but when they wear down the crossing does not necessarily have to be renewed.

GENERAL SUMMARY

An analysis of the trouble which Pacific Coast companies have experienced with solid manganese and insert special work might be summed up as follows:

Most of the difficulty with solid manganese special work would be eliminated if proper foundry methods were always used and the crossings were properly reinforced. Formerly a common complaint was that castings were not properly tempered and the corners were too brittle, also where foundry work has been carelessly done, segregated metal sometimes collected at the intersections, thus weakening these points, or cracks occur in the flangeways. Recent experience would indicate, however, that the foundries are overcoming these defects almost entirely.

Insert special work seems to be very often liable to difficulty with loose plates, and engineers agree that it is usually impossible to renew a manganese plate on a spelter bearing in the field so that it will stay tight permanently. There is also the liability of arms breaking off which does not occur in solid manganese castings. The corners of intersections seem to chip off under about the same conditions in both solid and insert special work, but as the electric welder is generally reported to repair both satisfactorily, this is not so serious a difficulty as are the other two. Solid manganese and insert special work layouts are expected to have about the same life, so far as wear is concerned, when the plates remain tight.

Finally it might be said that in addition to obviating trouble with loose plates and broken arms, the solid manganese special work has the advantage that long tapering risers in the flange grooves can raise the wheels so that they roll on the flanges at the intersections, reducing the noise and lengthening the life by lessening intersection failures. With market conditions as they have been recently, the cost of standard single-web design solid manganese special work has been almost the same as for insert work where the single-web design is used, and under these conditions the preference is generally for the solid manganese castings.

Harder Rails Suggested as Preventative of Corrugation

In a paper on "Rail Corrugation and Its Causes," presented Feb. 24 before the Institution of Civil Engineers, London, England, S. P. W. D'A. Sellon reviewed different theories and investigations on the subject. In his opinion the evidence seemed to show that a comparatively small increase in the compressive strength of the steel will prevent corrugation, which he defined as the failure of the rail table under the stresses imposed upon it. The only remedy, of course, was a harder steel. The current British standard specification for tramway rails prescribed the proportion of carbon in the steel as 0.40 to 0.55 per cent, a rather wide range, of which the upper point only just encroached on the hard side for steel made by the Bessemer process, while for open-hearth material this percentage gave a comparatively soft steel.

The cold flowing of the rail surface, detruding into the groove, or to the outside of the railhead, was a general concomitant of corrugation and had been noticed as a frequent precursor of this trouble. It seemed desirable, therefore, that the rail steel should not have a high degree of ductility. It appeared that rails which conform to the British standard specification might have too low an elastic limit and too high a measure of ductility. The essential points to be specified were mechanical properties corresponding with the working stresses imposed upon the rails.

The first point was compressive strength. The British standard specification prescribes an ultimate tensile strength of not less than 40 tons per square inch, and as tensile strength and compressive strength were generally about equal in mild steel, this might be taken as the intention of the specification in respect of compressive strength. Probably steel with an ultimate tensile strength of 50 tons to 60 tons per square inch would be found hard enough to resist the destructive stresses. Neither flowing nor crushing should occur at less than 60 tons per square inch, although no figures should be fixed until proved by experiment to be adequate.

It was obvious that in obtaining the desired mechanical qualities it was necessary to avoid brittleness, to keep the metal sufficiently tough to enable rails to be curved by the usual methods and to use metal capable of being drilled. However, some additional cost of labor to secure more careful bending, and perhaps more expensive drills of special steel, could well be afforded if corrugation and excessive rates of wear could be avoided. It was probable that the tup test would have to be modified to suit steel with the desired properties, but rail breakage was so rare on street railways with a continuous concrete substructure that there was evidently a large margin of safety in that respect. Therefore, a less severe tup test should suffice. In any case, the tup test represented nothing to which the street rail was exposed in the course of its work.

ELECTRIFICATION DISCUSSED

At Meeting of Western Society of Engineers on March 16, Papers on Electric Operation of Steam Railroads Were Presented by C. A. Goodnow, W. S. Murray, George Gibbs and E. B. Katté

AT a meeting of the Western Society of Engineers held at its club rooms in Chicago, March 16, papers discussing the operating results of electrification of steam railroads were presented by W. F. Murray, consulting engineer New York, New Haven & Hartford Railroad; Edwin B. Katté, chief engineer Electric Traction, New York Central Railroad; C. A. Goodnow, assistant to president Chicago, Milwaukee & St. Paul Railway, and George Gibbs, consulting engineer for the Pennsylvania and Norfolk & Western Railways. Messrs. Murray and Goodnow were unable to attend the meeting in person, Mr. Goodnow's paper being read by E. H. Lee, vice-president Chicago & Western Indiana Railroad, and Mr. Murray's paper by E. T. Howson, engineering editor *Railway Age Gazette.* The papers by Messrs. Gibbs and Katté are abstracted on another page of this issue.

Since the electrification of the Chicago, Milwaukee & St. Paul Railway was merely under construction, Mr. Goodnow's paper was devoted largely to a description of the character of the work undertaken, all of which has appeared from time to time in these columns. He expected that the Milwaukee electrification would result in important economies not only because an entire engine division was to be electrified for the first time, but also because it would become possible to abandon the intermediate engine terminals and yards within the electric zone which had been required under steam operation. The saving in fuel was also an important factor.

In Mr. Murray's paper it was stated that more than 40,000,000 ton-miles trailing load were handled during the month of January, 1915, by the New Haven electric locomotives, this total tonnage being made up of fast, slow and local freight movements. Records of the wattmeters on the locomotives indicate that for fast freight the kilowatt-hours per 1000 ton-miles of trailing load are on the order of 30; for slow freight, 30; and for local freight, 85. These show that an electrical ton-mile requires half as much fuel as a steam ton-mile.

With regard to the handling of classification and switching yards by electric motive power, Mr. Murray said that in 1,000,000 electric switch-engine-miles there had been but one failure. The introduction of the electric engine had increased the speed of the switching yards very greatly, and this increase of speed had been secured with a ratio of electric engines to replaced steam enginees varying from 4:6 to 6:10.

With reference to the mercury-arc rectifier, Mr. Murray stated that the car which was in commercial operation on the New Haven Railroad had been giving most successful service and that it had solved the problem of the production and maintenance of the vacuum tube, both commercially and electrically. The possibilities accruing from such a result could be epitomized in the statement that while the economies of transmission by the single-phase system justified the utilization of a heavier and less efficient motive power, the rectifier to-day permitted railways not only to secure the economies gained in this transmission but to operate beneath the contact wires of such a system the more efficient and lighter d.c. apparatus. As a concrete and practical application of this result, the a.c. motive power now in use on the New Haven would be increased 25 per cent by the application of the rectifier.

With regard to administration, he said that past experience on the New Haven Railroad had shown the necessity for a complete understanding of the difference between the operation of a steam and an electric property. There was no necessity for any general change in an existing steam-operated organization, but the methods pursued in producing a ton-mile of any character upon a steam basis must be abandoned when the drawbar pull comes from electricity. The error of holding a steam master mechanic responsible for an electric engine-mile of any character is patent, and equally patent is the error of holding a steam railroad shopman responsible for the maintenance and repairs of electric engines.

DISCUSSION

In the discussion which followed the reading of the papers it appeared to be the general belief that electrification could be brought about only by proving the economy of its adoption over steam operation on a given line. Density of traffic was the main factor that had accounted for the present development of the art, and if a traffic density sufficient to warrant electrification did not obtain, it would be folly to consider it. Regarding the electrification of the Norfolk & Western, C. S. Churchhill, chief engineer of that road, stated that the economies of electrification had been first considered in 1905. At that time electrical engineers were unable to show any other saving than that of reducing the number of men necessary to operate the trains. After a month's operation on the present electrified division it had been found that the number of men could not be reduced, but that the remarkable development in the efficiency of the electrical generating units and distribution system had made possible other savings which had been far greater and had made electrification of the Norfolk & Western particularly economical. In order to check the economy of electric over steam operation a log of steam-engine train costs for the electrified engine division had been kept, and consequently the Norfolk & Western had figures with which it might definitely calculate results of electrification.

W. F. M. Goss also took part in the discussion and stated that although he was unable to give out any information regarding the Chicago terminal electrification, he wanted to leave the thought with the members and guests of the society that the proposed electrified zone would include more track than the total miles of electrified steam roads now in existence in the rest of the world. He ventured the statement that if the Chicago terminals were electrified more electric locomotives than there were now in existence would be required.

Bion J. Arnold spoke of the remarkable development in the efficiency of the steam locomotive during recent years. The problem of electrification now resolves itself into one of relative efficiency of operating units or trains rather than the relative efficiency of the two types of locomotives, since they were about at par at the present time. Regarding Mr. Katté's paper and particularly referring to the operating costs, Mr. Arnold predicted that if the electrified zone of the New York Central was extended, the costs would be greatly reduced and the whole electrification would prove to be economical. He stated that the extension of the New Haven electrification had made possible greater economies. He also predicted that good results would be obtained from the electrification of the Chicago, Milwaukee & St. Paul Railway. Regarding the Chicago terminals, Mr. Arnold stated that, although he doubted the practicability of electrifying the existing terminals as an economical proposition, he did believe that if they were rearranged, systematized and grouped so that the unified property could be utilized to its fullest capacity, there would be a complete change in the aspect as regards electrification.

Others taking part in the discussion included J. C. Mock, signal engineer Michigan Central Railroad, and E. W. Herr, vice-president Westinghouse Electric & Manufacturing Company.

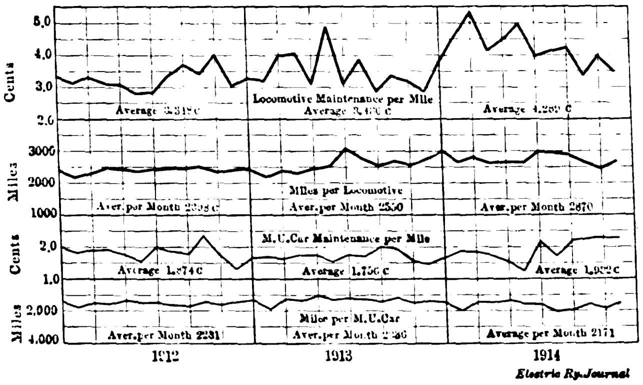
MAINTENANCE COSTS ON THE NEW YORK CENTRAL

BY E. B. KATTÉ, CHIEF ENGINEER ELECTRIC TRACTION NEW YORK CENTRAL RAILROAD

The electric locomotive service of the New York Central Railroad in New York includes switching in yards and terminals, hauling shop trains for a distance of about 6 miles, and a main line express and local service on one 34-mile division and on another 24-mile division. The average cost for locomotive maintenance, including inspection, repairs, renewals, cleaning and painting varies from month to month, but the average cost, covering a period of eight years, is not far from 3½ cents per mile. The maintenance during the past year has been about 4 1/3 cents per mile, the increase being caused by the renewal of driving-wheel tires on the first thirty-five locomotives that were purchased.

The suburban service in the vicinity of New York City is handled by multiple-unit trains consisting of from two to eleven cars. Maintenance, including mechanical and electrical repairs, inspection, renewals, painting, etc., excluding only sweeping and window cleaning, has averaged somewhat less than 2 cents per car-mile. The cars are all-steel, 60 ft. long. They seat sixty-four passengers and weigh 57 tons. There is one motor truck under each car that is equipped with two 200-hp motors, giving a maximum speed of 54 m.p.h.

The New York Central Railroad Company has a special type of under-running third-rail, which is believed to afford greater protection from accidental contact than any other type. Its chief characteristics are, first, a wooden sheath inclosing the live third-rail, except on the bottom or contact surface, and, second, an insulated support so hung as to afford flexibility to prevent strains due to the up and down movement of the supporting ties under traffic. The cost of maintaining this protected third-rail is higher than for the usual type of third-rail, and the large amount of construction work in progress adjacent to the third-rail has increased the maintenance cost above normal. The average cost has been about $26 per mile per month on the main line and $40 for yards and terminals, including track bonding and cable connections, both positive and negative. As a general statement, it may be said that the cost of maintaining the three-phase, high-tension, overhead and underground lines is about $8 per circuit-mile per month, and the d.c. cables cost about $13 per cable-mile.



NEW YORK CENTRAL EQUIPMENT—MAINTENANCE COSTS OF ELECTRIC LOCOMOTIVES AND MOTOR CARS

The price paid for coal in New York averages from $2.50 to $3 per short ton, and power stations in this vicinity are operated on three eight-hour shifts, in place of the more common twelve-hour shifts. Under these conditions, 11,000-volt, three-phase, twenty-five cycle current measured at the busbars of the Port Morris Power Station averages between 0.45 cent and 0.50 cent per kilowatt-hour for operating, labor and materials. When fixed charges are added, the cost averages about 0.75 cent. The transmission and transformation losses, together with all fixed charges, will bring the average total cost of current, delivered to the third-rail shoes, to about 1.75 cents per kilowatt-hour.

As a measure of the reliability of electric equipment, it may be said that during the year 1914 the average

ELECTRIC ZONE TRAIN DETENTION RECORD FOR 1914. NEW YORK CENTRAL RAILROAD

	Train Minute Detention																								Mileage			Av. Miles per Min. Det.			
	Electric Power Trouble							Electric Locomotives							Multiple Unit Cars										Locos.	M. U. Cars		Locos.	M. U. Cars		
			Trans. Line																												
Month	Power Station	Substation	11000 Volts	600 Volts	Third Rail	2200-Volt Signal Line	Total	Fuses	Contactors	Reversers	Misc. Elec.	Brakes	Misc. Mech.	Total	Fuses	Contactors	Relays	Control Jumpers	Misc. Elec.	Brakes	Hot Boxes	Misc. Mech.	Total	Total for All Causes	Total	Electric Zone	Total	Total	Elec. Delays	Mech. Delays	Total for All Causes
January		11			5		16	36	18		86	5	124	269		13			27	21	5	43	109	394	188,314	459,989	475,607	700	11,500	6,893	1,685
February			157			35½	192½	21	4	22	60	8	193	308	2		7	5	76	26½		35½	152	652½	166,740	409,701	423,680	541	4,552	6,834	905
March			47			3½	50½		9	24	9	4	65	111	2				7½	41	22	40	112½	274	175,555	459,250	474,219	1581	48,342	4,604	2,371
April									50		54	3		107			3		17		18½	9	47½	154½	164,136	462,703	478,300	1534	23,135	17,393	4,158
May		3	133		25	14	175	4		60	4	19		87		5	4			48		3	60	322	166,034	471,724	489,234	1908	52,414	9,593	2,035
June			260		6½	12	278½			10	65		14	89					2	32	95	3	132	499½	165,851	449,854	465,339	1863	224,927	3,589	1,264
July		12				194½	206½	5	32		9	7	19	72				3	18		16	13	50	328½	185,656	441,956	461,564	2579	21,045	15,916	1,970
August					3	70	73				41		37	78	3					6		13	22	173	185,659	403,266	420,018	2380	134,422	22,106	3,501
September									14	12	14			40				3				13	16	56	180,548	412,802	429,728	4514	137,601	33,056	10,898
October						13	13	5	6		113½	4		128½					12			7	19	160½	165,670	451,312	467,138	1289	37,609	66,734	3,943
November									39		83	9	13	144	38				25		22	9½	94½	238½	155,860	421,944	437,350	1082	6,698	13,884	2,487
December					9	121	130				32		10	42						62½			62½	234½	166,230	458,451	474,426	3958		7,591	2,732
Total		26	597		48½	463½	1135	71	172	128	570½	59	475	1475½	45	18	14	11	184½	237	178½	189	877	3487½	2,066,253	5,302,952	5,496,603	1400	19,457	9,093	2,169

Note:—Locomotives—Number of Detentions, 94; Miles per Detention, 21,981.
M. U. Cars—Number of Detentions, 108; Miles per Detention, 50,894.

mileage per locomotive per detention was 22,000, while the multiple-unit cars averaged 51,000 miles per detention. The train detentions due to electric power troubles totaled 840 minutes for the year. To this aerial lines contributed most largely, with 535 train-minutes; the third-rail caused 244 minutes' delay, and sub-stations twenty-five minutes. The power stations have never caused a minute's delay during their eight years of operation.

Mr. Katté also presented the accompanying chart and table on costs, shown on page 580, and presented views of the equipment.

ELECTRIFICATION ON THE NORFOLK & WESTERN RAILWAY

BY GEORGE GIBBS, CONSULTING ENGINEER

The Norfolk & Western Railway, an important trunk line with a large business in coal, has electrified a section of line that is known as the Elkhorn grade in the Pocahontas coal region. The tonnage on the road is very heavy, and this produces a favorable condition for electric traction. The electrified section includes about 30 miles of heavy grade along the western slope of the Allegheny Mountains and covers practically the entire gathering division for that particular coal-field.

The coal trains over these heavy grades are hauled by Mallet engines which operate only on the gathering division, three engines being required to haul the train at a speed of 7 m.p.h. or 8 m.p.h. In a tunnel on the division this speed is reduced to about 6 m.p.h., the tunnel being of limited cross-section so that difficulties with smoke have been intensified. The line is a very crooked one throughout the division. While the scheduled weight of the trains is 3250 tons now, with Mallet service, this is cut down in winter time to 2900 tons in order to get the trains over the division.

When electrification was first considered it was apparent that the use of a third-rail was impossible. That narrowed the problem to a consideration of high voltage systems, and an analysis of the cost and expense of operation resulted in the adoption of the single-phase system. On account of the enormous amounts of power which had to be applied to each train it was desirable to keep the amount of current as low as possible by adopting the highest possible voltage.

The single-phase power is converted on the locomotive into three-phase power and is used with three-phase motors. By this arrangement there is obtained the advantage of a rugged electrical machine together with a single overhead conductor, the latter being important in complicated yards and on crooked lines. The three-phase motor is not adapted to other classes of railway service, as it is essentially a one- or two-speed motor. It is not suitable for main line service requiring speed, but it is eminently satisfactory for tonnage work on heavy grades on account of its rugged characteristics.

With this system the speed of the train will be maintained irrespective of the load and the grade at any speed at which the motors are set. If the speed is exceeded by coasting down grade, with the train pushing the locomotive, the motors automatically return the current to the line at normal voltage and this power may be used in propelling trains up grade.

For this service there are provided twelve locomotives. Each is equipped with eight three-phase motors, arranged with eight-pole and four-pole combinations to produce 14 m.p.h. and 28 m.p.h. respectively. The total length of the locomotive is 105 ft. over all and the diameter of the driving wheels 62 in. The weight is 270 tons, with 220 tons on the drivers. The drawbar-pull varies from 114,000 lb. during acceleration at the 14-mile speed, to 86,000 lb. when operating at this speed uniformly on a one per cent grade, but on a recent test a locomotive developed a tractive effort in excess of 170,000 lb., indicating, however, a coefficient of adhesion which cannot be assumed in practice. The maximum guaranteed accelerating tractive effort for a locomotive is 133,000 lb.

At the present time about half of this section of the road, including the entire heavy grade division, has been operating for about a month, and the experience thus far encountered indicates that the anticipations are to be realized in obtaining a remarkably successful installation. The trains accelerate promptly and without jerking on the heavy grades. On a 2.5 per cent down grade the trains are held at a speed not to exceed 14 m.p.h. As soon as the speed exceeds the 14-mile limit the current drops to zero, then mounts up in the opposite direction and there is returned automatically to the line an amount of power probably in excess of 2000 kw.

The acceleration of these heavy trains, as regards the amount of power required, is impressive. Preliminary tests indicate a development of 11,000 hp on one train during the acceleration period and 8000 hp when running at uniform speed. These figures are probably in excess of any amount of power delivered on a single train anywhere in the world.

Mr. Gibbs' paper concluded with a brief account of the electrification of the Pennsylvania main line between Broad Street Station, Philadelphia, and Paoli, a distance of 20 miles. This installation was described in the ELECTRIC RAILWAY JOURNAL for April 18, 1914.

Electrolytic Corrosion Discussed at British I. C. E. Meeting

At a recent meeting of the Institution of Civil Engineers H. E. Gerbury outlined the general principles of pipe corrosion, with and without railway stray currents, quoting conditions in Sheffield by way of illustration. He stated that, as current density and current duration are the most important factors, potential readings are somewhat misleading. Where a comparatively high difference of potential exists there is, as a rule, less injurious current passing. This is largely due to the counter-emf of polarization. In Sheffield, when the tramway system and generation station have been shut down, differences of potential up to 0.66 volt have been observed on pipes. Incrustation in the bore of pipes is often caused by local electrolytic action. This growth might be started as a speck of rust, thus forming with the iron a galvanic couple, the oxide being electronegative to iron. The electrolyte might be created by the secretions of animalculæ or other acids. This nucleus would then establish a closed circuit, and the growth would continue by the increased bulk of oxide acting as a shell to retain the electrolyte.

Ferro-manganese and the European War

Ferro-manganese, which has come to play an important part in street and electric railway special work, frogs and crossings, is sold under severe conditions by England during the present war. English producers require that American buyers must obligate themselves not to ship steel to Germany, Austria or Turkey, or even to countries contiguous thereto except through London. It is said that some buyers have declined to agree to these stipulations, while others, because of the large amount of business on hand, have been forced to do so in order to keep their plants in operation.

RAILWAY SIGNAL ASSOCIATION MEETS

Requisites Which Were Presented for Automatic Block on Single Track Were Considered Ample for Train Operation by Signal Indications Alone

At the winter meeting of the Railway Signal Association, which was held at the Auditorium Hotel, Chicago, on March 15, reports were presented by the standing committees on mechanical interlocking, power interlocking, automatic blocks, standard designs, electric railway and a.c. signaling, and storage-battery and charging equipment. Special committees on lightning protection and contract forms also made reports.

The committee on electric railway and alternating current signaling presented a report of progress only, stating that it was bringing up to date a series of descriptions of new and extended installations. The report added that alternating current signals were increasing in number greatly and that it would be doubtful whether the committee could present descriptions of all existing installations at the annual convention next fall. Specifications were being prepared for impedance coils, and an investigation was being conducted upon the subject of inductive effect between signal circuits and adjacent electric circuits, as well as upon the hazards due to the paralleling of high-tension and low-tension lines.

The committee on automatic block included in its report a statement of circuit requisites for single-track, "traffic direction," automatic block signaling. These proposed that the control of signals should be such as to provide: (1) That stop, caution or proceed indications should be given for following movements as on double track; (2) that two trains meeting at a passing siding should first receive caution indications before reaching stop signals; (3) that protection for switches and switching movements should be given as on double track; (4) that neither a single cross nor any combination of grounds or breaks should cause the energization of the controlling or signal-operating devices; (5) that two opposing signals governing into the same block should not display proceed indications simultaneously authorizing trains to move opposing each other; (6) that two opposing signals should not display the proceed indication simultaneously authorizing two trains to move from meeting points opposing each other where operating conditions would permit.

The committee reported that it had agreed on the above requisite as a whole, but that there was, however, a difference of opinion as to the scope of the requisites. The sub-committee handling this work was of the opinion that one set of requisites should cover all single-track signaling, while a majority of the whole committee favored the application of these requisites to "traffic direction" signaling only, with another set of requisites to cover each of the automatic signal systems now in general use and known to be giving satisfactory operation. No further circuit plans had been prepared since the convention in September, as the committee considered it advisable to wait until a definite expression of opinions had been obtained from the association concerning the proposed requisites.

The chairman of the sub-committee in charge of the work offered the following additional requisite for the consideration of the association: "That the giving of a proceed signal at the entrance to a block should be dependent upon the signal governing the same block in the opposing direction indicating stop."

Discussion

During the discussion each of the above-mentioned requisites was read and discussed at length, tentative circuit plans having been presented which fulfilled their requirements. Exception was taken to requisite No. 2 because it was believed that it did not necessarily provide for a caution indication for a train at a stop at a station when an opposing train had started from a siding in advance. In response to this criticism G. H. Dryden, Baltimore & Ohio Railroad, advised that this requisite was covered in the circuits presented, which provided that when trains were actually running toward each other they first received a caution indication before a final stop signal. Mr. Dryden explained requisite No. 3 by stating that a train which was doing switching should be protected by stop and caution signals in the rear. In all cases an opposing train or a following train, as well as a train that might be using the switch, should receive correct indications by which to stop.

Requisite No. 4 was made the subject of considerable discussion and was characterized by President T. S. Stevens as the most important requisite presented. Objection to this was made on the ground that some combinations of grounds might result in a false indication under the present method of signal-line construction which provides for one common return. This point brought out the fact that the requisite provided for metallic circuits for the control of each relay. Objection was made to this because of the increased expense entailed. Some of the members were not at all sure but that a combination of grounds might result in a signal giving the wrong proceed indication even if metallic circuits were used. In explanation one of the members of the committee stated that the tentative plan designed to meet this requisite required only four line wires to be used between passing sidings, while with the present methods of signaling five are generally used. Upon this basis the expense entailed to meet this requisite was believed to be less than that required under the present method of installing signal line wires. The committee was not unanimously agreed on this clause, some believing that the requisite could not be met under all conditions. The committee as a whole, however, had approved the requisite because it wanted a scheme of single-track signaling which would be as safe as it could be made. In answer to a criticism regarding the wording of the requisite a member of the committee advised that it had been so constructed as to leave an opening for invention.

Discussion of requisite No. 5 was brief, but the consideration of requisite No. 6 brought out a number of interesting points. The first one raised was that this clause provided for a preliminary or traffic-direction feature which would mean that the first train arriving at a station would hold a train at an adjacent station irrespective of its class. This criticism, a member of committee stated, was covered by the last five words of the clause which qualified it to the extent of stating that "where operating conditions will permit." W. H. Elliott, New York Central Railroad, objected further to this requisite because he believed that signal systems should be so constructed as to permit trains to enter a block without traffic-direction control by circuits. He considered it would be better practice to leave this feature for the operating department, which could establish such regulations as it might require. Another objection to this requisite was that it might prevent the use of tracks to their fullest capacity and thus add to the expense of operation.

In response to these criticisms Mr. Dryden advised that the Baltimore & Ohio Railroad had 130 miles of single-track automatic block signaling where the siding overlap was in use. The division superintendent of the section so signaled had stated that he had experienced no more difficulty in the operation of his trains with the siding overlap after the trainmen and dispatchers had been properly educated than if it had not been provided. This scheme was deemed desirable because it assured that trains would meet only at sidings if the trainmen disregarded orders or rules and operated only on signal indications. At this point Mr. Dryden went on record with the interesting statement that, with minor improvements, an installation such as provided by the tentative plans might be operated by signal indications alone. He believed that trains could be safely handled by the signals over single-track railroads when telegraph and telephone communication had failed. In fact, that was one of the conditions toward which the committee was proceeding.

In response to this statement it was remarked that the members of the association agreed that railroads could be operated safely with signals alone, but it was believed that this was aside from the work of the committee, which should confine its efforts to the recording of commonly accepted and known practice. One member stated that he had made a close study of the subject of siding overlaps and had decided that it could not be used except in very exceptional places without detriment to the operation of some trains. Another member stated that the recommendations presented by the committee were so far-reaching that it seemed advisable for the board of direction to pass upon them before the committee proceeded further with its work. In response to this Mr. Dryden, chairman of the sub-committee which prepared and presented the requisites, stated that he had received instructions to prepare typical circuits for single-track blocking, but in pursuance of this work had found that the method of operating single-track signaling was so different on various railroads that it was practically impossible to co-ordinate them. Upon motion at this point the association decided that the committee should proceed further along the lines set out in the requisites, but should confine itself to the work of standardizing common practice. Before closing the discussion of this subject a second motion was presented and carried which directed the committee to confine its efforts to accepted and general practice and not to delve into the realms of invention.

"ELECTRIC RAILWAY HANDBOOK"

Professor Richey's Book Has Just Been Published—Embraces Every Branch of Electric Railway Engineering

A tremendous mass of electric railway engineering data has been intelligently selected and co-ordinated in Professor Richey's "Electric Railway Handbook," just issued by the McGraw-Hill Book Company, New York. Within one pocket volume of 832 pages there has been compressed the gist of thousands of articles and papers hitherto scattered in past issues of technical periodicals and association proceedings. It would be a mistake, however, to look upon this handbook as a mere historical digest. A conscientious effort has been made to bring the facts down to date wherever possible, and in many cases the matter is absolutely new. For example, the cost data on electric shovels were supplied to the author directly by the users. Another departure from many other handbooks is that labor-saving tools and other maintenance practices have been included wherever practicable.

The scope of the book embraces every branch of electric railway engineering, except a detailed consideration of those power problems that are common to generating plants as a whole. On the other hand, adequate treatment is included of any questions that peculiarly affect railway power plants and distribution.

In the first chapter, that on roadbed and track, the author does not give the detailed calculations found in books exclusively devoted to track, but does give in a readily understood form just the data that the electric railway track engineer most often requires. He also presents construction costs and many hints on the most economical ways of handling work. The standards of electric railway track construction in many different cities are conveniently summarized in tabulated form. Rail standards and composition, rail joints, special work, steam railroad crossings and automatic switches are also taken up.

The chapter on buildings deals with a peculiarly difficult subject since so many of the existing carhouses and shops were planned before the consolidation of the local properties. The varying degrees of home manufacture by different railways and their use of steel or wooden cars also make difficult any conclusive comparisons of relative areas and layouts. However, the plans reproduced are of value even if they do no more than attract attention to some points that might otherwise have been overlooked. Included in the construction data are a number of minor but useful points on the best location of certain facilities like oil rooms, construction of trolley troughs, etc.

The next chapter, that on train movement, is evidently written for the engineer rather than for the maker of time-tables, although the factors that make up a schedule and samples of graphic interurban schedules are presented in the introduction. As a matter of fact, the greater part of this section is devoted to speed and power considerations, including studies of train resistance.

In the fourth chapter, that on railway motors, methods for comparing and selecting motors are explained. The treatment of gear ratio is particularly timely in view of the fact that some companies have found it desirable to change their gear ratios on account of changes in operating conditions. This chapter includes a discussion of shop practices and testing. The following two chapters are devoted to controlling apparatus and current-collecting devices.

In the chapter on trucks the author has presented a number of diagrams of the principal types of trucks, specifications of the A. E. R. E. A., covering wheels and axles, etc. Journal boxes and lubrication are also treated, including a description of the semicircular journal brass for high-braking pressures. This chapter is followed by one on braking, which opens with considerations of shoe pressure, rate and time of stop, and then describes the principal types and comparisons of brakeshop designs, including standardization, comparisons of hand and air brakes and calculation of brake rigging.

Under "rolling stock" the author discusses the question of weights as affecting operating costs, and describes representative types of city, interurban and rapid transit cars. Train operation, heating, lighting and ventilation are also treated. No attempt is made to take up the design of cars from the structural engineer's standpoint. This chapter also has some comparative data on locomotive design and a brief reference to motor buses.

Under "transmission and distribution" the author has taken up all forms of overhead and underground construction, including standard specifications, construction costs and a treatment of electrolysis. The final chapter is on signals and communication. This subject is developed from the simplest types of trolley contact signals to the most elaborate type for high-speed, short-headway service. Automatic train stops, cab signals, crossing signals and the functions of the telephone are also included.

PAINTING CARS IN TWO DAYS

The Hudson & Manhattan Railroad Has Extended the Use of Baking Enamel to Exterior Painting by Developing a Portable Oven

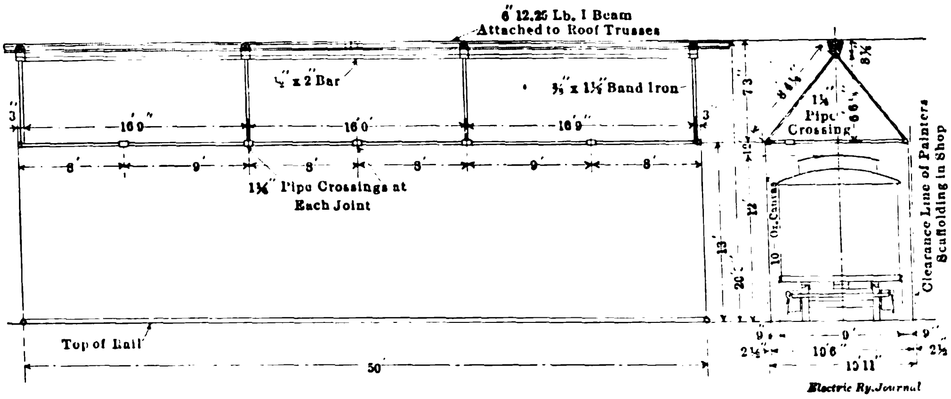
BY P. V. SEE, SUPERINTENDENT OF CAR EQUIPMENT HUDSON & MANHATTAN RAILROAD

MORE than two years ago experiments were begun by the Hudson & Manhattan Railroad with a view toward determining the value of baking enamel for painting cars. These experiments resulted in the development of a method for painting car interiors that was described in the ELECTRIC RAILWAY JOURNAL for Jan. 25, 1913, the scheme in use at that time being to close the car completely and to raise the interior temperature by means of three extra equipments of electric car heaters hung inside of the car. This plan was, of course, available only for interior painting, but sixty cars were finished in this manner in white and green enamel, and after service of more than one year it was found that the baked enamel had maintained their color and luster in spite of frequent cleaning, the appearance being considered to be much better than that which could have been obtained under the air-drying system of painting.

In view of these results, it was decided at the beginning of last summer's painting to extend the use of baking enamel to the exteriors of the cars as well as to the interiors, and several of the leading varnish manufacturers were called upon to furnish baking enamel for this service. All of the manufacturers, it may be said, approved of the decision to use baking enamel exclusively, claiming that enamel could be made freer-running than paint, and that, owing to the fact that the material could be applied in a more liquid state, it provided a much smoother and tougher surface, when hard, than did the ordinary air-drying paint which the railroad formerly used.

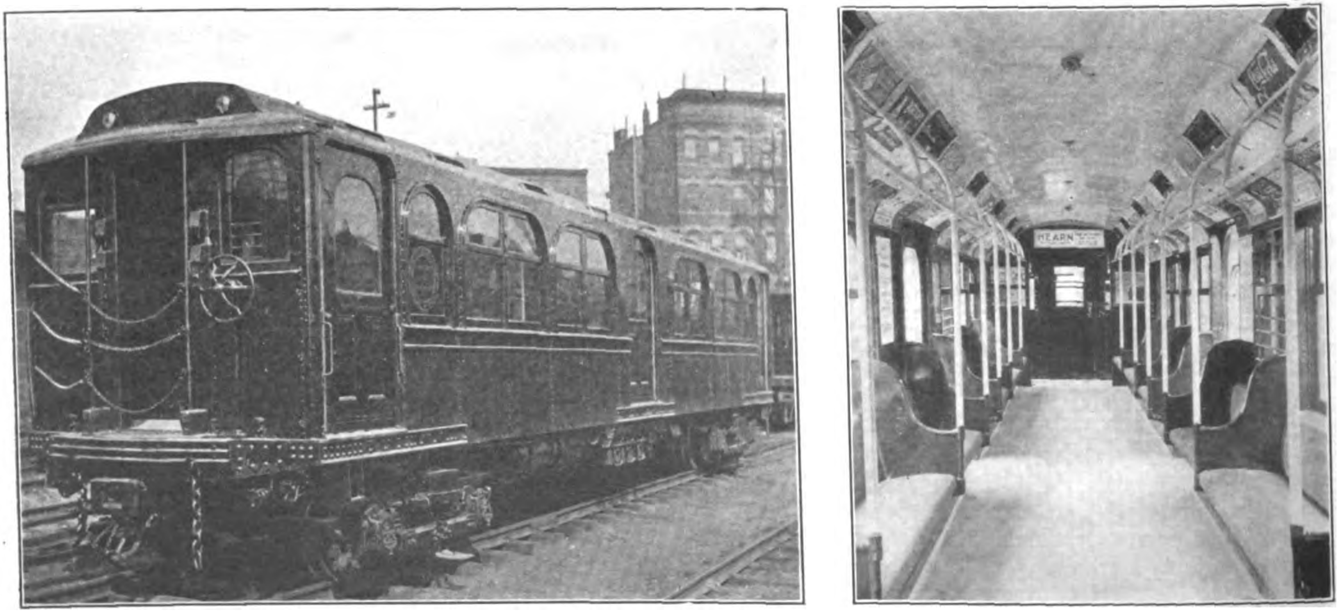
BAKED ENAMEL PAINTING

In order to apply the baking principle to the exteriors of the cars a 50-ft. portable canvas oven was designed to hang from an overhead framework, the latter being suspended on wheels from a 6-in. I-beam that was fastened to the roof girders. By the use of this canvas oven, which is heated by a battery of electric car heaters that are carried on low portable frames, a coat of enamel applied both to the interior and to the exterior of a car can be baked hard in about four hours. As the application of the coat requires about three hours, it is therefore possible for cars to be given two coats of enamel in one day, the nightwatchman at the shops having been trained to watch the temperature in the oven and to regulate the heat so that the oven can be operated after the painters leave. In consequence, it is possible for a car to be painted complete in two

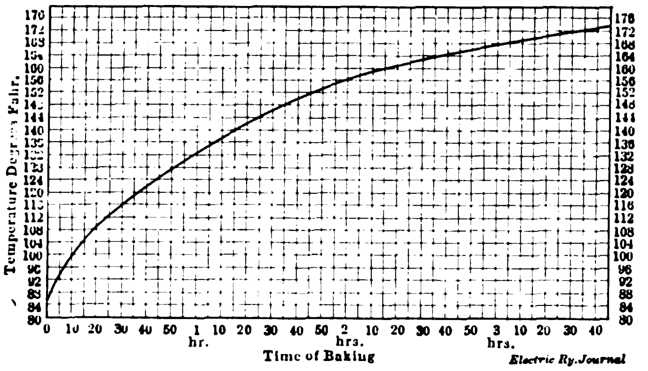


Electric Ry. Journal

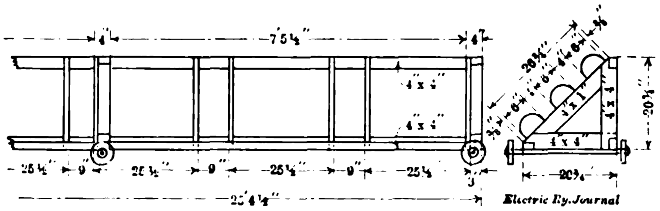
HUDSON & MANHATTAN PAINTING—DETAILS OF FRAME FOR CANVAS OVEN



HUDSON & MANHATTAN PAINTING—VIEWS OF EXTERIOR AND INTERIOR OF CAR AFTER PAINTING WITH BAKING ENAMEL



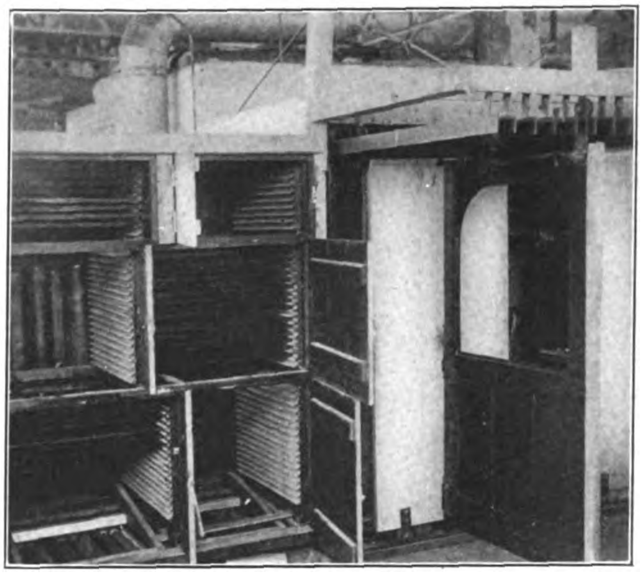
HUDSON & MANHATTAN PAINTING—CURVE SHOWING TEMPERATURE RISE IN OVEN



HUDSON & MANHATTAN PAINTING—HEATER FRAME FOR CAR OVEN

days, with the result that a large number of cars which would ordinarily be held for painting are made available for service. The cost of the oven and accessories was approximately $300.

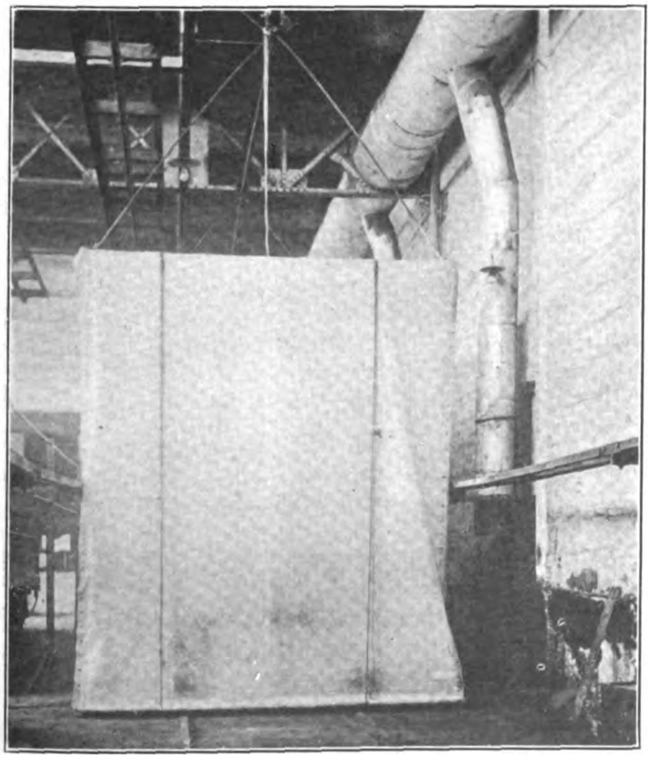
The use of baking enamel is limited to the car bodies and underframes, the trucks being painted only with such quality of paint as will serve to protect the metal against corrosion where it is not likely to be covered with oil or grease. To apply a coat of enamel over the inside and outside of a car takes approximately twenty-one man-hours. Four coats are given at each painting except for the roof, which has only three coats, and it has been found that about 1.2 gal. of enamel are required for each interior or exterior coat



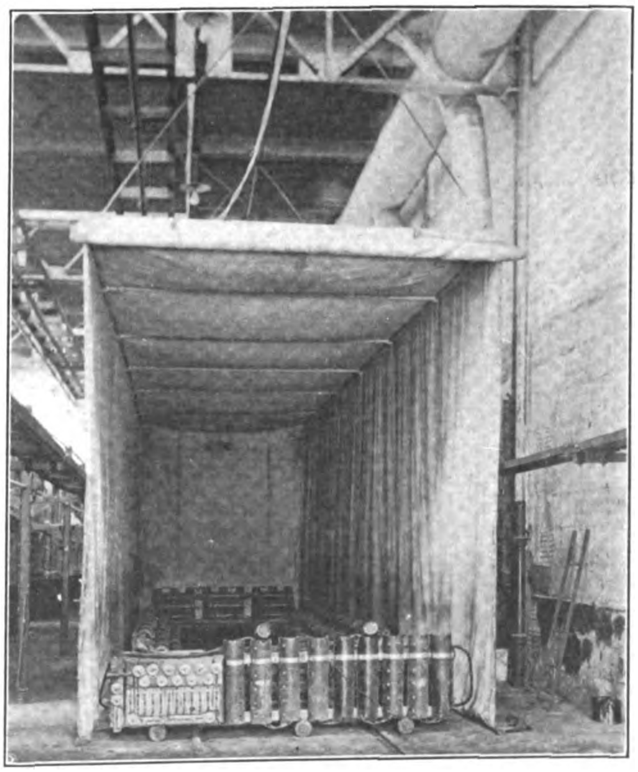
HUDSON & MANHATTAN PAINTING—SMALL BAKING OVENS FOR DOORS AND DASH

on the sides, 1 gal. covering the roof and ½ gal. covering the ceiling. The quantity of material that is used varies, of course, in accordance with the character of the enamel and its location on the car, the roofs of the Hudson & Manhattan cars, for instance, being made of a lead-covered steel, so that a special lead primer has to be applied. The exteriors of the cars are painted a solid Pullman green and the interiors are painted green with white trimmings, the ceilings being solid white. The cost of the various enamels used averages $3.50 per gallon, it being the belief of the management that high-priced paint is an economy in the end.

The temperature rise of the oven when it contains a car is shown in the accompanying curve. The readings for this were taken on a day when the tempera-



HUDSON & MANHATTAN PAINTING—VIEW OF BAKING OVEN WITH END-PIECE IN PLACE



HUDSON & MANHATTAN PAINTING—VIEW OF BAKING OVEN WITH END-PIECE ROLLED UP ture was approximately 85 deg., and the upper part of the curve shows the extent of radiation from the sides and roof of the oven. Prior to applying the enamel, the cars thus far have been sandblasted owing to the fact that the old exterior paint has been seriously affected in spots by the salt-water drip from the tunnel in which the Hudson & Manhattan Railroad operates. The present results, therefore, apply to cars which are stripped clean of all protective covering.

DETAILS OF PROCESS

The process has been followed of preheating the car before the enamel is applied so that positive assurance exists that the metal of the car body is hotter than the surrounding air and no chance exists that any moisture can collect to set up corrosion underneath the first coat of enamel. The pre-heating temperature has been set at approximately 175 deg. After this temperature is reached the oven is moved away from the car, and by the time the temperature of the metal surface has fallen to 110 deg. or 115 deg. the painting is commenced. By the time the coat has been applied the temperature has fallen 25 deg. or 30 deg, further, so that the car has again reached the approximate atmospheric temperature.

As soon as the first coat of enamel has been applied the oven is moved back over the car and the temperature is raised to 160 deg. This rise in temperature requires about two hours and after the baking temperature is reached the heat is maintained constant for three hours longer. These periods are based upon the requirements of a four-hour baking period, the two-hour rise in temperature being considered as the equivalent of one-hour run at the high temperature.

At the completion of the baking of the first coat of enamel, the oven is removed and the temperature is allowed to fall again to about 115 deg., when the application of the second coat is begun. After this is applied the temperature is raised to 140 deg. and maintained at that point for the equivalent of the four-hour baking period. The same process is followed for the two additional coats, making a total of four applications for each car. In future paintings, of course, it is obvious that four coats will not be required, as new priming coats will not be necessary.

During the time that one car is being painted the oven is kept in use by baking the enamel on another car, this being possible because the time required to apply a coat of enamel is roughly equal to that required to bake it. The movement of the oven is facilitated by the fact that it is hung on rollers and the heaters with which it is equipped are mounted on frames with wheels, so that they can be rolled with facility across the concrete floor of the paint shop.

BAKING OVEN AND EQUIPMENT

The framework on which the oven is carried is made of 1½-in. pipe and ¼-in. x 1-in. strap iron, as shown in the accompanying cut. Over this frame is hung a 10-oz. canvas curtain made in a single piece 50 ft. long and 26 ft. wide, so that it extends from one side of the frame to the other. The end pieces are 13 ft. high and 10 ft. 6 in. wide, and they are sewed to the top of the main canvas covering. The end pieces are fitted with eyelets at 6-in. intervals along the edges, and the edges of the main curtain have corresponding buttons, so that the end pieces can be fastened in place while the baking is going on.

Heat is provided by seven and one-half equipments of car heaters, each equipment consisting of eighteen Consolidated car heaters. The connections are made of No. 10 wire with car-jumper plugs and sockets, so that they can be made and broken very quickly. Each equipment is supplied through a snap switch so that the temperature may be readily adjusted by cutting out groups of heaters as required. The heaters are mounted in three horizontal rows on a long wooden framework that is supported on wheels. The frame is triangular in section, having three 4-in. x 4-in. stringers extending for the full length of 25 ft. and the heaters are attached to the diagonal pieces of 4-in. x 1-in. wood. An accompanying illustration shows the construction of the frames for the heaters at the sides of the car. The frames for the heaters at the ends are similar in construction but are, of course, only 10 ft. wide. In addition they carry heaters mounted vertically along the outside of the frame.

Before the car is painted the doors and sash are removed and cleaned, enamelled and then baked in small stationary ovens located in another part of the shop. These ovens have been made by inclosing the old sash and door racks originally used with the air-drying painting system and equipping them with electric heaters in sufficient number to raise the temperature to that required for baking. It will be seen from the accompanying illustration that the door rack is arranged with runways upon which the doors are hung, the doors being given a coat of enamel and then run into the oven without the loss of any appreciable amount of heat by leaving the doors open.

COMMUNICATION

The "Jitney" Bus and Syndicated News

GEORGIA RAILWAY & POWER COMPANY
ATLANTA, GA., March 15, 1915.

To the Editors:

I have read with much interest and appreciation the presentation in your issue of March 6 of the malicious activities of a newspaper syndicate bureau. Your positive treatment of this matter, both in the body of the paper and editorially, should be of benefit to the industry. I believe you have revealed much to street railway interests throughout the country.

The article on page 509 in your issue of March 13 shows that the syndicate's anti-railway campaign is still active and continuous.

There is no doubt that a great deal of good can be accomplished if railway men reply promptly and vigorously to erroneous and exaggerated statements which appear in the public press. You may be interested in an experience which I have had in so doing. A syndicated article on the "jitney" bus, written by Dr. Frank Crane, New York, recently was given wide publication. It included a quotation, made with seeming approval, of a newspaper editorial statement that "The 'jitneys' may even achieve the miracle of making traction magnates understand that there is a limit to the patience of the American people." It said also that the street railway and subway businesses have never been satisfactory; that the facilities for transportation supplied by them had always been inadequate and that people had submitted to being jammed and pushed in street cars and subways and elevated cars as if they were cattle.

I wrote to Dr. Crane, and in my letter to him I quoted these statements and then said:

> President Wilson spoke recently of "the rules of the game" that must be observed by every business, big or little, wherein moves the spirit of true sportsmanship. He was addressing the mid-year meeting in Washington of the Electric Railway Association.
>
> He spoke plain, common sense. There are rules; and if A is to observe them, B is playing an unfair game if for

his part he does not observe them. Either A's rules in the game must apply to B also, with suitable adaptation and handicap, or B's freedom from rules must be extended to A. Otherwise there can be no game, no fair play.

The game of city and suburban transportation is played by established business under the following rules:

1. The player shall take good with bad, skimmed milk with cream, misfortune with fortune. For the risk is his, as well as the reward.

2. Player shall move conveyances throughout the city. He cannot address his game to those sections where traffic is heavy and profitable without obligating himself to serve also those other sections where traffic is light and unprofitable.

3. Player shall move conveyances on fixed, regular and frequent schedules. These schedules must be followed all day and every day and most of every night, regardless of weather. This rule is inflexible, even when its observance means loss to the player.

4. Player shall furnish rides to all who apply, just when they apply. This rule shall be observed even when nobody applies.

5. Player shall exchange for one 5-cent piece a ride from any point to any other point in his field, either by direct route or by transfer.

6. Once a route is established, it shall remain thereafter forever a part of the game, and service upon it shall not be discontinued by any circumstance.

7. In exchange for the right to play the game on the city streets, player shall contribute a full proportion of the cost of public pavements in the streets, even though these streets are occupied by all others in common with him, and notwithstanding he imposes no wear upon said pavement.

8. Player shall pay to the public, the proprietor of the game, city and county and state taxes of generous figure, and also to the city a fixed portion of his gross earnings.

9. Player shall not be permitted to gain an unlimited profit. This limitation is impassable notwithstanding he is not guaranteed in any degree by anyone any profit at all.

10. Player shall furnish to his patrons at all seasons protection from the weather, in clean, sanitary, ventilated, comfortable cars.

11. Player shall qualify as financially responsible for any and all injuries or damages to person or property for which he may be adjudged legally responsible.

12. Player shall obey under penalty such regulations as are prescribed by the police. He shall stop but briefly his conveyances, and at certain points only, and never for the purpose of soliciting patrons. He shall keep his conveyances moving on schedules and routes predetermined.

In all matters not covered specifically by the foregoing rules, player shall be subject at all times to oversight and regulation by the referees, who are the authorities named by the people.

If "jitney" buses are to enter the city and suburban transportation game, should not their play be adapted to these rules?

Nobody maintains that the alternative of declaring all rules "off" should be accepted. That would bring chaos in reality. But if no fair basis of competition is established, and the public wants "jitney" buses sufficiently to make them profitable on a permanent basis, would it not be reasonable for the established street car companies, the transportation specialists, to play the game with the "jitney" buses on their own ground and under their own rules?

I have continued sending to Dr. Crane other matter presenting the company's viewpoint. You may be interested to learn that I have just received from him this letter:

> The article "Look, Then Leap," which you sent me, strikes me as good advertising. While I don't think the "jitney" bus movement can be stopped, it certainly should be regulated. I would be pleased to see what further action you are taking in this matter. Cordially, Frank Crane.

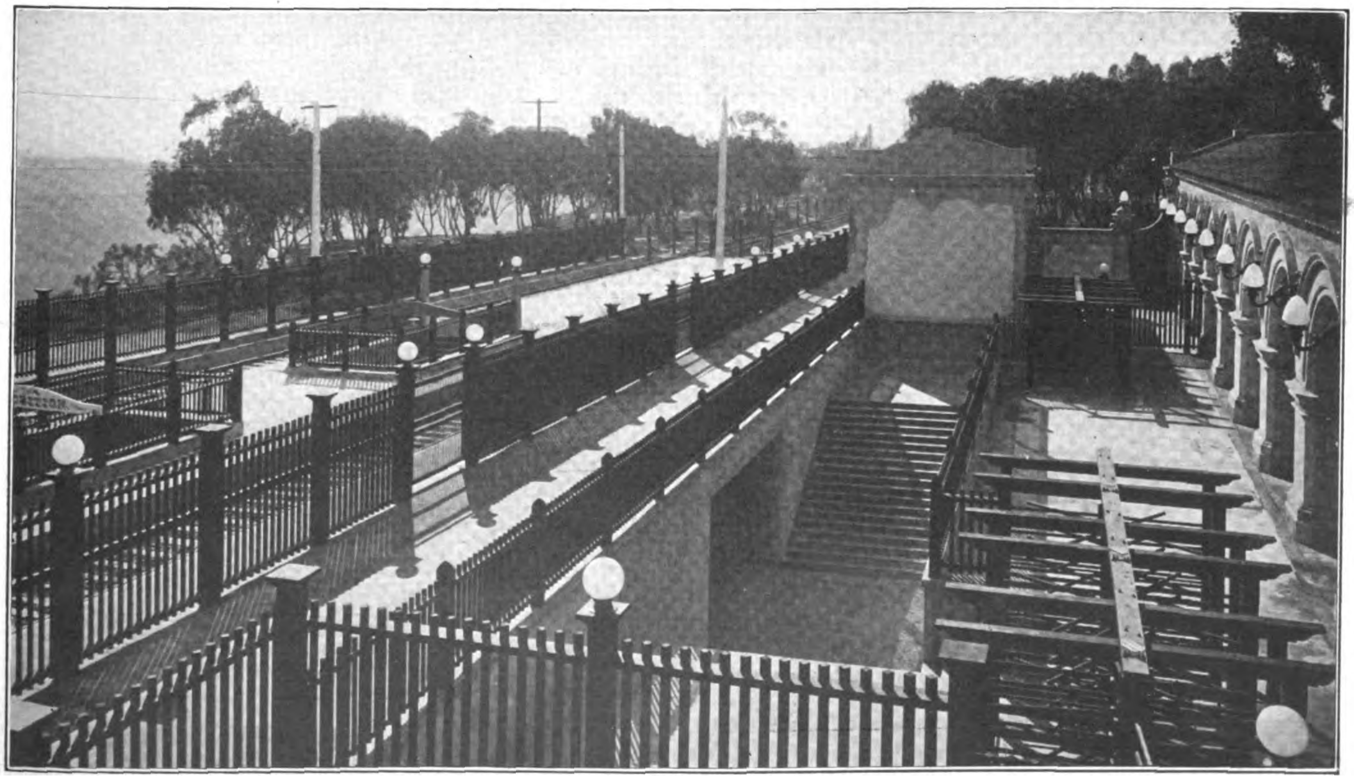
W. T. WATERS, Advertising Manager.

TERMINAL FACILITIES AT SAN DIEGO

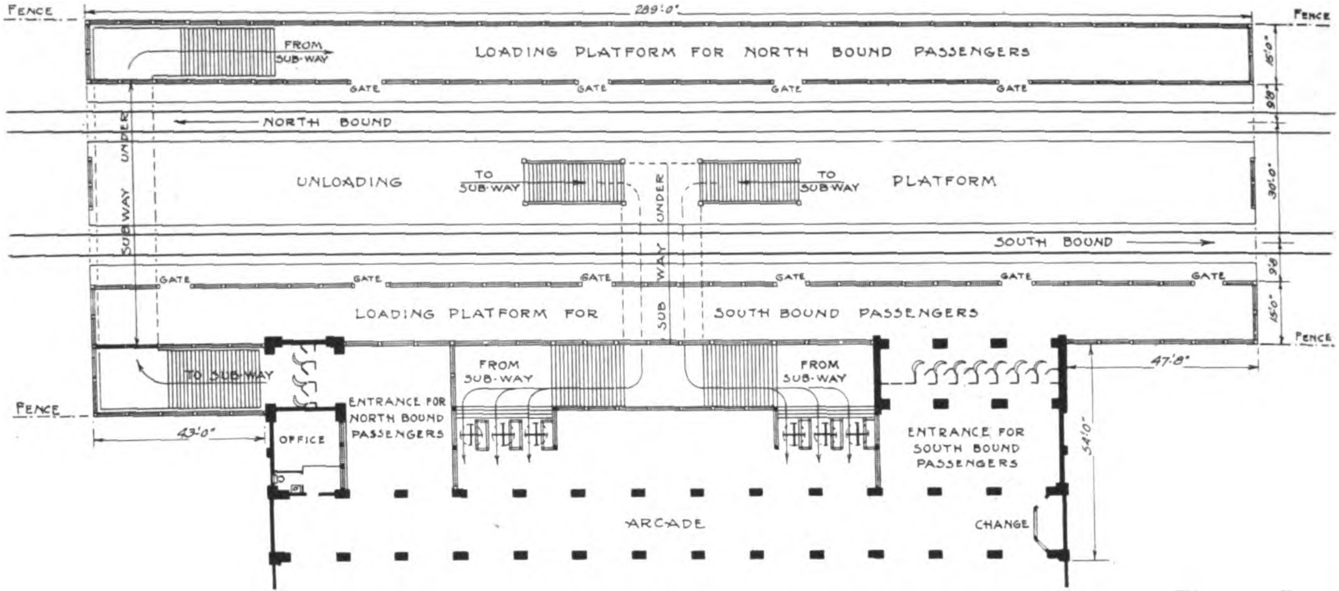
Provisions Made by San Diego Electric Railway for Handling Exposition Crowds

Many people probably do not realize that there are two large expositions in California this year, the Panama-Pacific Exposition at San Francisco and the Panama-California Exposition at San Diego. The former, being larger, is attracting more public attention than the exposition held at San Diego, but the promoters of the latter believe that there is opportunity for two large fairs of this kind in California this year. They think that few people will take the trip across the Continent to San Francisco without also visiting Southern California, and that the fair at San Diego will prove an added attraction for the trip.

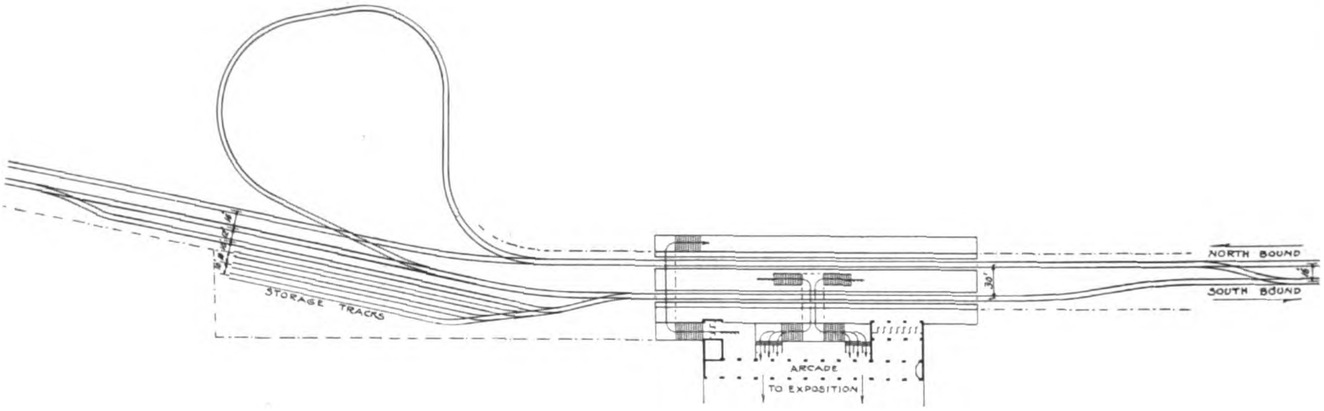
In location, the Exposition at San Diego is quite different from that at San Francisco. The latter is directly on the water. The San Diego Exposition is in Balboa Park—a large tract of land near the center of



SAN DIEGO TERMINAL—GENERAL VIEW OF PLATFORMS

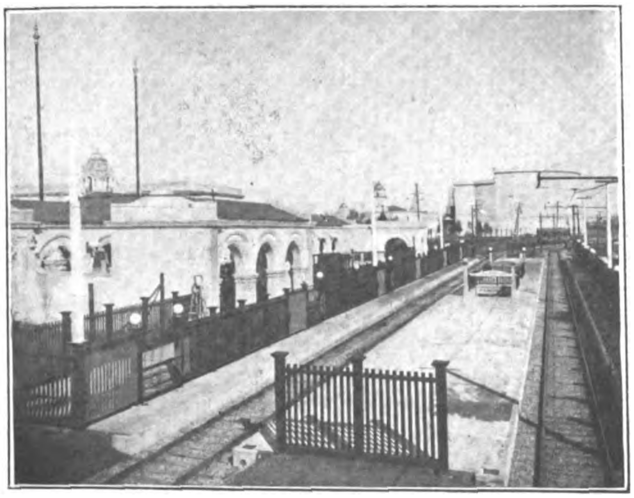

FENCE
289'0"
FENCE
FROM SUB-WAY
LOADING PLATFORM FOR NORTH BOUND PASSENGERS
15'0"
GATE
GATE
GATE
GATE
9'8"
NORTH BOUND
SUBWAY UNDER
UNLOADING
TO SUB-WAY
UNDER SUB WAY
TO SUB-WAY
PLATFORM
30'0"
SOUTH BOUND
GATE
GATE
GATE
GATE
GATE
GATE
9'8"
LOADING PLATFORM FOR
SOUTH BOUND PASSENGERS
15'0"
FENCE
TO SUB-WAY
FROM SUB-WAY
FROM SUB-WAY
47'8"
FENCE
ENTRANCE FOR NORTH BOUND PASSENGERS
43'0"
OFFICE
ENTRANCE FOR SOUTH BOUND PASSENGERS
54'0"
ARCADE
CHANGE

SAN DIEGO TERMINAL—PLAN SHOWING LOADING AND UNLOADING PLATFORMS


STORAGE TRACKS
NORTH BOUND
SOUTH BOUND
30'
ARCADE
TO EXPOSITION

SAN DIEGO TERMINAL—PLAN OF LOOP AND STORAGE TRACKS

the city and at a considerable height above it. From the buildings can be obtained a beautiful view of San Diego Bay. The area covered by the Exposition is 618 acres. The general exhibit and main buildings occupy 100 acres, the state and foreign sections 100 acres, and the amusement features 25 acres, while 250 acres are devoted to landscape gardens and park. The buildings are in the Spanish Colonial style. The Exposition was opened on Jan. 1, and will continue for the entire year of 1915.



SAN DIEGO TERMINAL—VIEW SHOWING ENTRANCE TO EXPOSITION

The electric railway system in San Diego is operated by the San Diego Electric Railway Company, which has recently completed at the main Exposition entrance an elaborate terminal with three platforms, two for loading and one for unloading. There are separate entrances or exits to each and subways so that passengers do not have to cross the tracks.

The track is constructed of 75-lb. T-rail. All of the platforms are of sufficient length to enable the company to discharge or load at least two-car trains at the same time. The company has 76 cars equipped with the General Electric system of control which enables the use of two or more cars per train. The train which has been found to be most convenient during the rush-hours is the two-car train, and this will probably be the standard unit for the exposition period at rush-hours. Passengers unloading from the cars pass down stairways to subways and then to the inside of the grounds, passing through turnstiles.

The inclosure on the loading platform has a capacity for 2000 people, so that in case of a blockade or any serious delay no difficulty will be experienced. Electric lights are installed to show intending passengers which way they are to go. These lights are under the control of the gateman. Ample storage capacity for cars is provided by the stub tracks and loop track. These enable the company to store a sufficiently large number of cars to enable it to take care of a crowd at closing time.

The cost of the construction of this terminal was nearly $20,000 exclusive of track.

AMERICAN ASSOCIATION NEWS

Important Meetings of Rules, Block Signals and Motor Vehicles Committees Were Held This Week—Complete Sets of Proceedings Were Issued

JOINT MEETING OF RULES AND BLOCK SIGNAL COMMITTEES

A joint meeting of the block signal committee and a sub-committee of the Transportation & Traffic Association rules committee was held at the Congress Hotel, Chicago, March 16 and 17, for the purpose of revising the rules pertaining to signals. This meeting was attended by L. H. Palmer, New York, N. Y.; C. E. Morgan, Jackson, Mich.; S. W. Greenland, Fort Wayne, Ind.; J. W. Brown, Newark, N. J.; John Leisenring, Peoria, Ill.; G. N. Brown, Syracuse, N. Y.; H. A. Nicholl, Anderson, Ind.; C. H. Morrison, New Haven, Conn.; G. N. Day, Syracuse, N. Y.; H. W. Griffin, New York, N. Y.; C. D. Emmons, South Bend, Ind.; W. J. Field, *Electric Traction*, and E. M. Haas, ELECTRIC RAILWAY JOURNAL. In the absence of J. M. Waldron, chairman of the joint committee on block signals, J. W. Brown, vice-chairman, presided.

The subject of the block signal rules was considered in detail, with a view to making such revisions of the definitions and rules as were deemed advisable. It was decided that Rule 10 relating to contactor signals should not be revised, but that an explanatory note should be added restricting its application to the non-registering type of signals. Since the registering type was believed to be special, no rule was recommended for it.

Rule 554, under automatic block signal rules for train and motor crews, which relates to the procedure at signals indicating "stop," a new rule, which was believed to cover the situation thoroughly, was discussed at length and approved. At the close of the discussion of block signal rules, Chairman J. W. Brown appointed C. D. Emmons and G. N. Brown as a sub-committee to work with the sub-committee of the Transportation & Traffic Association's committee on rules to complete the work of revision.

Immediately upon completion of the work of the joint committee on block signals and the sub-committee on rules of the Transportation & Traffic Association, the former committee went into session, taking up the subjects assigned directly to it. A tentative plan on clearance diagrams for semaphore signals was submitted, criticised and revised to meet the views of the committee as a whole, as well as those of the power distribution committee. On the subject of light signals for interurban railways it was decided that the recommendations made at the 1914 convention should remain unchanged, pending the adoption of definite standards.

On the subject of operating by signal indications only, the statement was made that data sheets had been sent out to a number of companies for information and their recommendations regarding this practice, and it was found that the concensus of opinion was against this method of operation, at least at this stage of the development of the art of block signaling. One of the points raised included the delay to superior trains by inferior trains and the possibility of a complete tie-up. A statement of the opinion of the committee regarding this method of operation is being preferred.

The committee accepted the A. I. E. E. standardization rules as far as they relate to signal work.

A complete report on the subject of highway crossings and protection was submitted and, after slight revisions, was approved for insertion in its final report.

MEETING OF COMMITTEE ON OPERATION OF MOTOR VEHICLES

A meeting of the committee of the American Electric Railway Association on the operation of motor vehicles was held in New York on March 16. It was attended by all of the four members of the committee, Britton I. Budd, Chicago; Henry G. Bradlee, Boston; William A. House, Baltimore, and C. L. S. Tingley, Philadelphia. This is the second meeting of the committee, the former having been held in New York last month. The conclusions of the committee were summarized in a report to President Allen, which will doubtless be issued in the immediate future.

ISSUE OF PROCEEDINGS

Bound volumes of the proceedings for the 1914 convention were distributed this week. As for last year, they consist of six volumes. Altogether there are 2130 pages, made up as follows: American Association, 314 pages; Engineering Association, 596 pages; Accountants Association, 200 pages; Traffic & Transportation Association, 464 pages; Claims Association, 216 pages; year book, 340 pages. Besides bringing the committees and other data in regard to the association up to date, the year book contains some twenty pages of tables compiled by the bureau of fare research, largely from the 1912 census report on electric railways.

PUBLIC SERVICE COMPANY SECTION

The regular meeting of the section was held in Newark on March 18. The speaker advertised for the evening was Oscar T. Crosby, but a letter received from Mr. Crosby on Wednesday stated that he had accepted the direction of the Belgian relief work, necessitating his sailing on Saturday. A new program was immediately devised, consisting of talks by R. E. Danforth, general manager, on experiences with early railway motors and results achieved in reducing motor maintenance costs; by Alfred Green, Galena Signal Oil Company, on experiences with several types of early motors in Rochester, and by H. H. Norris, ELECTRIC RAILWAY JOURNAL, on energy requirements in starting electric cars and keeping them at speed.

This program while extempore, fitted in with the course on "Public Service Economics," and Mr. Danforth stated that the discussion of equipment maintenance cost reduction would be continued at a later meeting.

ACCOUNTANTS' EDUCATIONAL COMMITTEE

A meeting of the committee on education of the American Electric Railway Accountants' Association is called for Monday, March 22, in New York. The members of this committee, whose names have not been previously announced in the ELECTRIC RAILWAY JOURNAL, are George C. Whitney, Washington Railway & Electric Company, Washington, D. C., chairman; F. J. Pryor, Jr., American Railways Company, Philadelphia, Pa.; F. D. Lasher, Republic Railway & Light Company, New York; N. E. Stubbs, United Railways & Electric Company, Baltimore, Md., and G. H. Caskey, Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Equipment and Its Maintenance

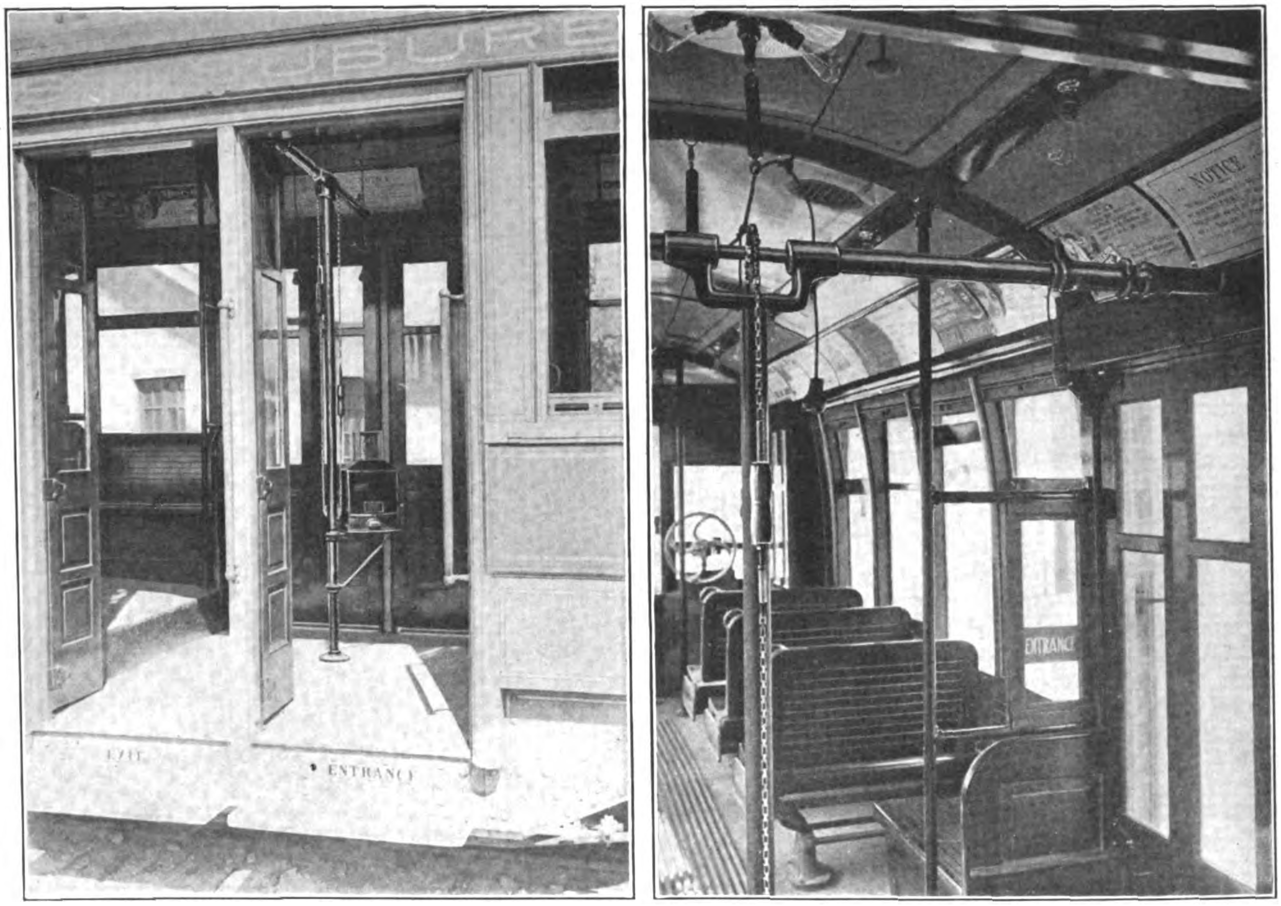
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Car-Door Operation with Sprocket Chain and Worm Shaft

BY J. N. LLOYD, MASTER MECHANIC SANTA BARBARA & SUBURBAN RAILWAY, SANTA BARBARA, CAL.

Our cars are of the center-entrance prepayment type. Originally they were equipped with wire doors but as these proved unsatisfactory the company decided to replace them with half-glazed wooden doors. For this change we designed and built in our own shops the door-operating mechanism hereinafter described. The first car, which was changed in July, 1914, gave such satisfaction that we have since converted the remaining cars in the same way.



VIEW OF SANTA BARBARA CAR AT CENTER-ENTRANCE, SHOWING THE DOOR-OPERATING CHAIN WITH HAND-HOLD FOR CONDUCTOR, SPROCKET WHEEL AND TUBING FOR CONTINUOUS SHAFT; SHORT LEVER OVER SLOT IN HORIZONTAL TUBE LOCKS ONE DOOR MECHANISM WITHOUT AFFECTING THE OTHER

There are four doors to each side of the car, two opening back to back at the center-entrance post and one at each side of the entrance bulkhead. The step works simultaneously with the doors. The doors are hinged on 1-in. door posts which have a bearing at the floor and just above the tops of the doors.

The two center-door posts extend through the floor and are equipped at the bottom with bevel gears which are in mesh with bevel gears on a jack shaft parallel with step shaft and operating step shaft by a lever.

In the center of the car is a 1½-in. pipe stanchion which has a cast fork at the top. A hollow tube runs from each side of the fork across the car to the post at the center of the entrance. Incased in these tubes is a continuous shaft which has bearings at each end of the tubes. The shaft has a right-hand worm screw on one end and a left-hand screw on the other. Each screw operates a wing nut which slides through two slots 8 in. long which are cut, one on each side of the tube, 14 in. from the door post.

Connected with each wing nut are two rods which in turn are connected to cranks, one on each center door post. From another crank on each center door post is a rod extending over and connecting with a crank on each side door post and causing them to operate simultaneously with the center doors.

The worm screw shaft extending across the car is fitted at the center with a sprocket which is caused to rotate by a continuous chain which runs over another sprocket fitted in the center stanchion 2 ft. from the floor.

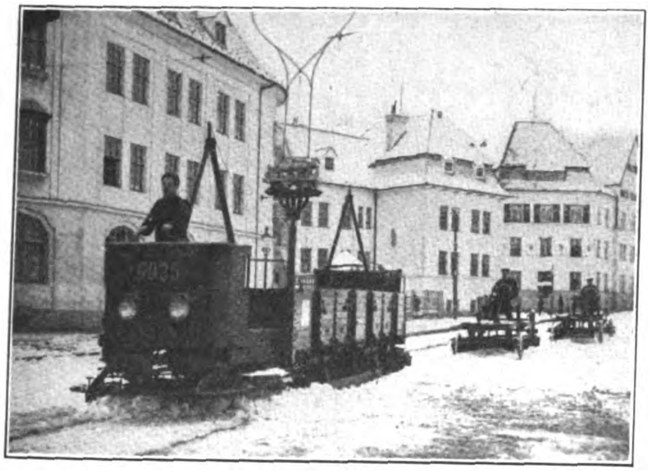
The chain is fitted on each side of the stanchion with a wooden grip to enable the conductor to operate the doors by a downward pull.

To prevent the doors on both sides of the car from operating at the same time, two collars are fitted on each tube at the ends of the slots through which the wing nuts slide. Between the collars is a slotted sleeve which is caused to rotate by means of a short lever over the slot in the tube. This arrangement causes the wing nut to be locked in place when the doors are closed. To operate the doors on either side of the car, the wing nut on the opposite side is locked, and the shaft is rotated by means of the chain and sprocket. The shaft rotates through both the locked and the unlocked nuts, drawing the latter back through its slot toward the center of the car for the 4-in. of distance required to open the doors.

Trailer Wagons with Automobile Steering Gear for Vienna Snow Cleaning—Car Scraper Practice

BY LUDWIG SPÄNGLER, DIRECTOR VIENNA MUNICIPAL TRAMWAYS

For many years the Vienna Municipal Tramways has been obliged to remove all snow not only from between its rails but also for certain distances on each side of the rails and even to the curbs. This makes it necessary to have equipment which will take care of the entire width of the street. To attain this end we use a train made up of a motor service car and two pole-coupled wagons, both classes of vehicles being fitted with snow plows, as illustrated. The space between the rails is cleared by the motor car while the rest is cleared by the wagons which can be steered from side to side and around obstructions. This steering gear is of automobile type, and is manipulated by seated operators. The wagons have iron-tired wheels and are hauled at an average rate of 7.4 m.p.h., at which speed they do not make excessive noise in paved streets. Consequently they may be run in between the regular passenger cars. The trains are placed in service as soon as a storm begins and if the storm is a heavy one remain at work during its continuance.


MOTOR CAR WITH PLOW FOR TRACK CLEANING AND WAGON TRAILERS FOR REMOVING SNOW BETWEEN RAILS AND CURB

For the more thorough removal of the snow at the rails patented Berbalk snow-scrapers for 200 to 300 motor cars are deposited at several points along the routes. As soon as snow begins to fall the cars stop at the supply depots where the scrapers are attached by their crews.

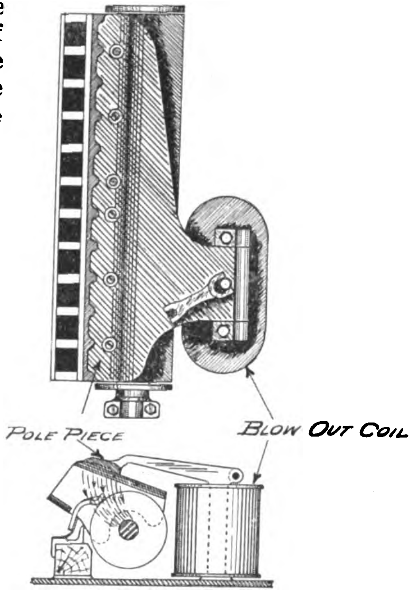
While the equipments described might prove insufficient for heavy snow conditions they are entirely satisfactory for the winters of Vienna.

Equipment Defects—Controller Blow-Out Coils—I

BY C. W. SQUIER, E. E.

It is necessary that all controllers handling large currents be provided with some means for successfully extinguishing the arc formed by the opening of the circuit at the contacts. At first mechanical devices were tried and the circuit was opened simultaneously at a number of points in series, but the great advance in extinguishing this arc came with the introduction of the magnetic blow-out. The principle of using a magnetic field to blow out an arc was first developed by Prof. Elihu Thomson. He found that an electric arc is urged out of a magnetic field and that when the circuit is broken in such a field the arc is blown out of line and is extinguished or cut in two.

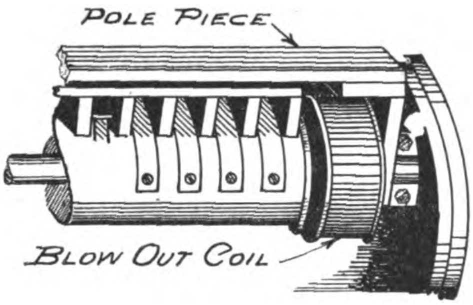
The General Electric Company was the first to apply this principle to extinguishing the arcing in controllers. Its first type of controller blow-out is shown in an accompanying illustration. This consists of a blow-out coil connected in series with the main contacts and fitted with a cast-iron pole piece which extends over the main fingers and contacts, hinged to one end of the core of the coil. The path of the magnetic circuit is from the coil through the pole piece and down through the fingers and contacts to the controller shaft and frame and so back to the core of the blow-out coil. Thus a magnetic field is provided at the point where the fingers bear on the contacts, by the passage of lines of force between the pole piece and the shaft. When the circuit is opened this magnetic field causes the arc to be blown sidewise and so aids in extinguishing it. To prevent this arc from short-circuiting to the adjacent fingers and contacts, molded insulating shields called arc deflectors are inserted between them. These are fastened to the pole pieces so that they can be easily swung out of the way to permit easy access and give an unimpeded view of the contacts for inspection.



FIRST CONTROLLER BLOW-OUT

This pioneer magnetic blow-out has proved very successful for handling currents up to 75 amp, and most of the hand controllers now in service have this type in some modified form. Many other types and arrangements of controller blow-outs have since been developed, however, in an effort to provide a more efficient blow-out and to overcome some of the principal objections to the pioneer type, namely: The coil occupies much space at a point that could be utilized to advantage for connections or contacts; the stray fields are very large, so that a big portion of the lines of force is not available for blow-out purposes; the contacts most distant from the coil have a smaller magnetic field and consequently a weaker magnetic blow-out than the contacts nearer this coil; as the arc is blown sidewise against the arc deflectors it does not have sufficient space to expand properly, causing excessive burning of the arc deflector plates. Troubles with the coils themselves have been very few and are confined chiefly to short-circuits which result from the burning of insulation, due to the floating back of the arc from the contacts or to the expansion of the coils when hot whereby the insulation is rubbed by the drum or some other moving part.

Troubles with the arc shield, which may be included as a part of the controller blow-out, are the following:



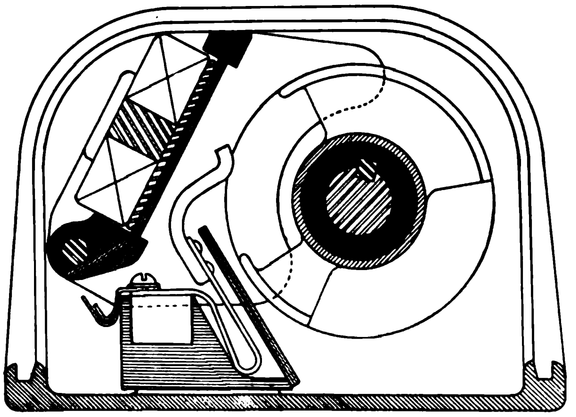
SHAFT TYPE OF CONTROLLER BLOW-OUT

Burned arc deflectors and broken or split deflectors. This splitting of the arc deflectors is due principally to the use of wood screws for fastening them together and to the pole piece.

Much attention has been given toward developing an insulating material which will withstand the severe arcing to which arc deflectors are subjected and also to permit fastening with wood screws to provide a solid support. So far, however, nothing entirely satisfactory has been produced.

Shaft Type Blow-Out

The type of blow-out next developed may be properly termed the shaft type of blow-out. It is shown in a second illustration. In this type the blow-out coil is placed directly around the controller shaft, and a wrought-iron pole piece extends over the coil and contacts. This location of the blow-out coil at the bottom of the controller makes a very neat design and utilizes the space to the best advantage. It is also remote from the arcing at the controller contacts so that trouble from burned insulation, due to this arcing, is overcome. This type, however, is still open to the criticism that the contacts at the top of the drum have less blow-out than those at the bottom and that the direction of the arc is still against the arc deflectors.



POLE-PIECE TYPE OF CONTROLLER BLOW-OUT

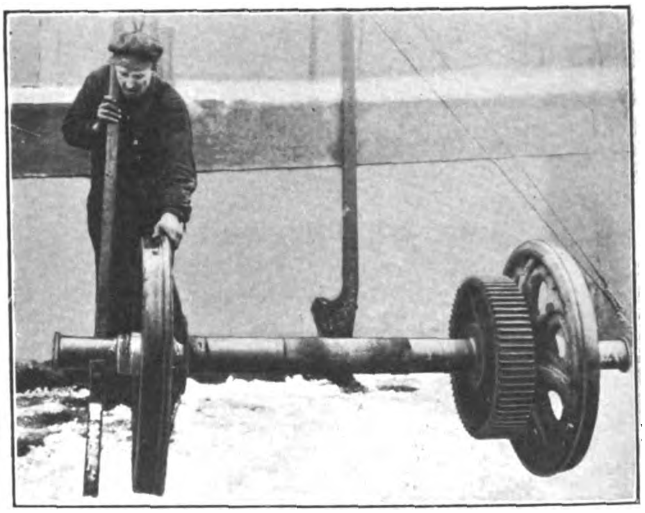
Pole-Piece Type of Blow-Out Coil

A third illustration shows the pole-piece type of blow-out coil which was the third design brought out. This consists of a long coil extending the entire length of the controller and mounted directly over the points where the fingers rest on their contacts. The magnetic circuit for this blow-out is from the inside of the core of the blow-out coil across the contacts to the controller shaft and then to the cover and frame and so back to the outside of the blow-out core. This blow-out is used quite extensively as it provides a uniform field for all contacts and so overcomes the objection of having some contacts with less blow-out effect than others.

All three of the blow-outs so far illustrated have the lines of force of the magnetic field passing in a direction perpendicular to the controller shaft and the arc is blown sidewise. To provide space for the expansion of this arc some controllers have been built with a space between adjacent contacts and with holes through the arc deflectors at the contact points through which the arc is blown. However, this adds to the height of the controller and so requires a disadvantageous amount of room.

Notched Stick to Steer Wheel Sets

The notched stick well known to steam railroad men for lifting wheel sets from the rails is used in the Wolf Street shops of the New York State Railways, Syracuse Lines, for moving a wheel set across the floor and steering it to the wheel lathe. The stick, which is shown in use, is made of wood except that a reinforcing strip of strap iron is added to prevent splitting. To steer the set the operator inserts the notched portion under the axle, lifting it, say, only 1/8 in., but this is enough to permit him to steer the set by pulling toward him the wheel on his left.



NOTCHED STICK FOR STEERING WHEEL SETS

Railless Traction in Shanghai, China

The railless street cars recently shipped from England for use in Shanghai have been temporarily abandoned because of the condition of the streets on which they were operated. It was found that the wheels of the new cars were pressing down the surface stones with which the roads are paved, and it seems that these roads will have to be gone over thoroughly before the operation of the railless cars can be undertaken successfully. Aside from the difficulty with the roadbeds, the cars are said to be eminently suited for use on the traffic-packed streets of Shanghai. In the period of thirteen days during which the cars were run 200,000 passengers were carried, the cars on the streets numbering about five each day.

Ampere-hour Meters on Battery Cars

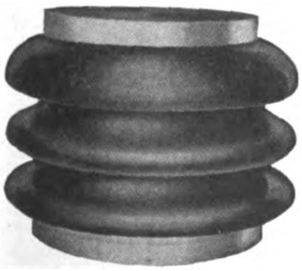
The Third Avenue Railway System, New York, now operates a total of 160 storage-battery cars, of which about 140 are in daily use. In order to show the motormen how much energy they have left in the batteries, and also as an incentive to economical operation, each car is equipped with a Sangamo integrating ampere-hour meter. On a storage-battery car, of course, the meter which records charge and discharge is a necessity since the car carries but a limited supply which, if used too lavishly, will cause the motorman to lose a portion of his day's work. Thus, a storage-battery motorman has a strong and immediate incentive to operate with economy. Should he run short of power when operating a car taken over from a morning platform man, the latter is likely to hear something to his disadvantage the next time he meets his relief.

The average weight, unloaded, of a storage-battery car is 8.25 tons. The car seating capacity averages twenty-four and the standing load may increase the total passenger load to fifty or sixty. The capacity of the battery is 420-amp-hr. With careful operation this is ample for the twelve to fourteen-hour schedule, which means a daily run ranging from 69 to 98 car-miles. The average schedule speed is 6.5 to 7 m.p.h. on Manhattan lines, but the City Island cars (four in winter and twelve in summer) make 9 m.p.h. on account of long free runs through park territory. The energy consumption varies, of course, according to traffic conditions as well as to the skill of the motormen. Thus, with a battery potential of 113 volts the average ampere-hours per car-mile of the five Manhattan divisions shape up as follows: 5.20 amp-hr. on the West Belt line, 5.22 amp-hr. on the 110th Street line, 5.72 amp-hr. on the Twenty-eighth-Twenty-ninth Street Crosstown line, 5.82 amp-hr. on the Avenue B line and 5.87 amp-hr. on the East Belt line.

A copy of the ampere-hour records of all motormen and the corresponding car numbers is sent by the transportation department to the storage-battery foreman. The former, therefore, has a check on the motormen while the mechanical department has one on the cars. The ampere-hour meters have given an excellent account of themselves. Outside of occasional careless handling, due in no way to the type of meter, they require no other maintenance than an occasional cleansing of the mercury. Such a cleansing may be needed at intervals of six months to two and one-half years.

Compact Wet Process Insulator

A demand for small compact wet process insulators for sustaining heavy loads has led the Pittsburgh High Voltage Insulator Company, Derry, Pa., to place on the market the type of insulator shown in the accompanying illustration. The bearing surface of the insulator is 9 in. in diameter, and it stands 10 in. high. It is provided with petticoats or corrugations to increase the creepage distance under rainy or stormy conditions.

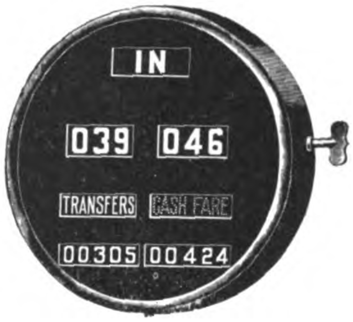


CORRUGATED WET PROCESS INSULATOR

It is supplied with a metal cap and base for attachment to the bottom of towers, the object being to provide an insulated base for support and insulation of heavy towers. The insulator shown in the illustration is designed to maintain a 500,000 lb. compression load, and to have an ultimate strength of 1,150,000 lbs.

Double Fare Register Adapted for City and Zone Operation

The New Haven Trolley Supply Company, New Haven, Conn., is just placing on the market a new Sterling double fare register which is particularly adapted for interurban service, where the zone system of fare collection is used, and also for city service. This machine obviates the need for two styles of register equipment where it is desirable to shift cars from city to interurban or from interurban to city service. In other words, this register gives one standard equipment for both interurban and city service. The machine visibly indicates the number of the zone, or trip, in which the fare is being collected. As the indicator is very prominent it greatly facilitates inspection, and serves as a reminder to the conductor not to "neglect" to reset his register at the end of each zone, or trip. The company has recently furnished a full equipment of these registers, and center-ringing device, to the Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.

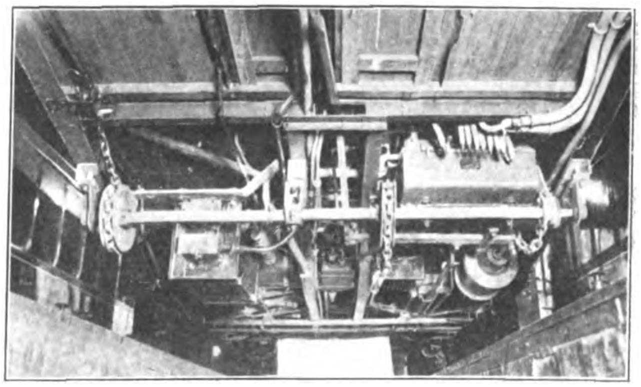


DOUBLE REGISTER ADAPTED FOR CITY AND ZONE OPERATION

Light-Weight Electrical Equipment of Wilkes-Barre Center-Entrance Cars

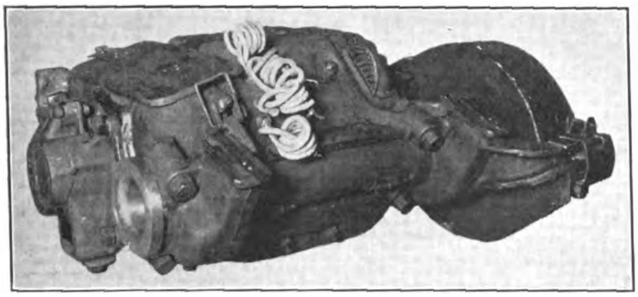
Supplementing the description of the Wilkes-Barre Railway's six center-entrance cars described in the ELECTRIC RAILWAY JOURNAL for March 13, the Westinghouse Electric & Manufacturing Company furnishes the following data on their light, compact electrical equipment.

Each truck carries two Westinghouse No. 532-B motors. The No. 532-B is a self-ventilated motor of the box-frame type, and has a rating of 36 kw (48 hp) at 600 volts. This motor equipment is the most powerful to which the light-weight HL equipment has ever been applied. The floor of the cars at the center entrance is approximately 13 in. above the ground, whereas at the trucks clearance must be provided for the 30-in. wheels. Consequently there is but little space for the control and brake equipment beneath the car.



UNDERFLOOR LAYOUT OF EQUIPMENT, WILKES-BARRE CENTER-ENTRANCE CAR

The switch group of this control weighs only 350 lb. Otherwise, a complete light-weight HL equipment is made up of the same number of parts as the regular



SELF-VENTILATED MOTOR OF 36 KW CAPACITY, INCLUDING GEAR CASE

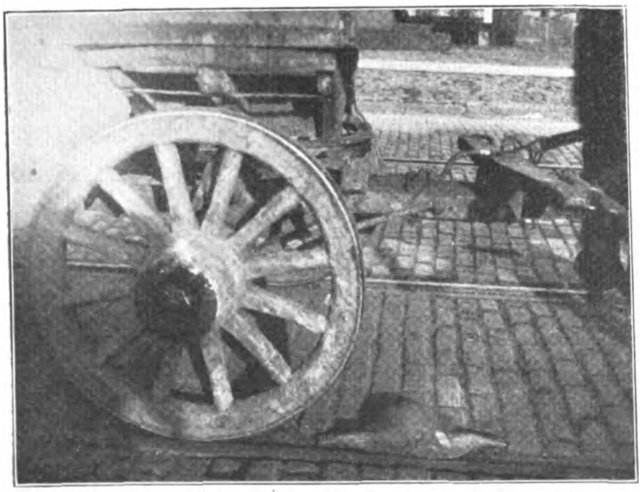
type HL. The switch group has an over-all height of only 17 in., thus being easily mounted under low-floor cars. The master controller used with the light-weight apparatus has an interesting feature in that it is provided with a slip ring which causes all the important circuit-breaking switches to open simultaneously whenever the master controller is "backed off" one notch from any position. This causes a division of the final break between several switches, eliminates all other current breaks when "backing off" and thereby greatly decreases the wear on switch contacts, arcing horns and arcing boxes.

The weight of the electrical equipment is 11,580 lb. Other weights are as follows: Car-body only, 22,000 lb.; each Brill 27 MCB-2X truck, 7200 lb.; Westinghouse semi-automatic air brakes and other equipment, 2000 lb.; total car complete, 49,980 lb.

Tread-Pickup Rerailer for Cars Which Serves Also as Derailer for Vehicles

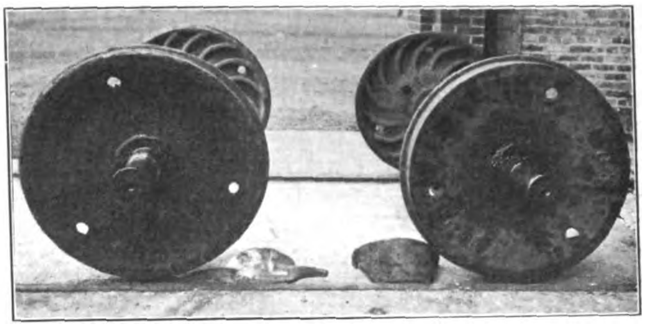
The accompanying illustrations show a radically new and improved rerailer made by the Sargent Company, Chicago, Ill. This rerailer is the result of several years of experimenting to obtain a final contour which will most readily serve to rerail wheels in track on paved streets. The principle used is asserted to be new in rerailing devices in that the wheel is picked up on its tread rather than on the flange. This method of rerailing requires much less elevation for the function of sliding the wheels to the rails. With other devices it is the practice to roll the wheels on their flanges over the rerailer and irrespective of the form of the flange. In such cases the car must be lifted from ⅝ in. to 1 in. higher before it is well mounted on the rerailing device.

With the Sargent rerailer, projections are provided as a part of the main casting. These projections serve to put the full weight directly onto the tread and thus give good traction before the flange climbs onto the body of the rerailer and reaches the point where it will automatically slide onto the rail.



RERAILER EMPLOYED AS A DERAILER TO GET A WEDGED WAGON WHEEL OFF THE RAILS

The accompanying halftones are from photographs made on the property of the Evanston (Ill.) Street Railway where these rerailers have been put to diversified use. They have been employed not only for rerailing cars, but also for derailing wagons and electric automobiles, which, under certain conditions of the pavement, get wedged between the gage lines of the running rails. One illustration shows the device in use for derailing a wagon. Another shows this device and the old style turtle-back rerailer. This view illustrates the difference in angle and vertical lift of the two devices and the consequent ease with which the new device operates.



NEW RERAILER AT LEFT AND OLD-STYLE RERAILER AT RIGHT

Motor Efficiency

R. E. Hellmund in the *Electric Journal* states that while a high efficiency in the railway motor is desirable, as in any motor, there are a number of reasons which make it inadvisable to give the question of efficiency too much weight. High efficiency means large and heavy motors and, in many cases, it might occur that the addition of a certain motor weight to make a small gain in efficiency would be bad engineering because the gain in motor efficiency might be more than outweighed by the power consumption necessary for hauling that a extra weight. It should further be considered that a reduction of efficiency caused by increased ohmic resistance in the motor does not mean very much, especially in city service, because there the motor is operated a large part of the time, and especially during the periods of large currents, with external resistance in circuit anyhow, and because the resistance losses in the motor itself are relatively small. It is somewhat different with the core losses of the motor which constitute a source of power consumption which can always be reduced by keeping the core losses of the motor low, as far as this can be done without materially increasing the weight and size of the motor.

The bureau of standards at Washington, D. C., is distributing upon request its publication entitled "The Testing of Materials." The publication is an eighty-nine-page pamphlet dealing with such subjects as metals and alloys, cements, clay products, lime, stone, paint materials, bituminous materials, inks, paper, textiles, rubber, leather, lubricating oils and greases, chemicals, and materials intended for technical use, such as electrical materials, optical materials, thermal materials, etc. The introduction gives briefly the theory upon which the testing of materials is based and outlines the purpose and ultimate aim of the bureau's work in this direction.

News of Electric Railways

CHARGES AGAINST COMMISSIONERS

Four Members of New York Commission, First District, Served with Charges—Reply Required by March 23

Four members of the Public Service Commission for the First District of New York—Edward E. McCall, chairman; J. Sergeant Cram, George V. S. Williams and Robert Colgate Wood—received on March 13 from Governor Whitman letters containing charges against them. The fifth commissioner, Milo R. Maltbie, whose term expired on Feb. 1, and who is holding over temporarily, got no communication from Albany. March 23 has been fixed as the date on or before which the commissioners may answer publicly in person or by counsel. The charges against Chairman McCall follow:

1.—He has been inefficient and neglectful of his duty in failing to supervise the handling by the subordinates of the commission of complaints of citizens regarding service on street railroads, and in failing to give support to the efforts of said subordinates necessary to enable them to accomplish satisfactory results.

2.—He has been inefficient and neglectful of his duty in failing to inform himself of the outstanding orders of the commission regarding service on street railroads.

3.—He has been inefficient and neglectful of his duty in permitting street railroad companies to violate the orders of the commission and in failing to resort to the remedies provided by law to compel compliance with said orders.

4.—He has been inefficient and neglectful of his duty in failing to compel street railroad companies to furnish such service to the public as could reasonably have been required under existing conditions.

5.—He was inefficient and neglectful of his duty in failing to require the Bradley Construction Company to cease work on the Lexington Avenue route of the subway, after having been advised by the chief engineer of the commission that this work would be useless in the event that the dual subway system was adopted.

6.—He has been inefficient and neglectful of his duty in permitting unreasonable and unnecessary delays in the final deterimnation of matters taken up by the commission in formal hearings.

7.—He was guilty of misconduct in office in devoting a considerable portion of his time to the private practice of law at a time when he should have been devoting all of his time to the business of the commission and acquainting himself with the duties of his office, the existing orders of the commission and the details of administration of the commission's affairs, and in absenting himself from the stated meetings of the commission, at which important business was transacted, in order to attend court on the same days in the interest of private clients.

8.—He was guilty of misconduct in office in using an automobile belonging to the commission for his own private purpose, and also in using the office of the chairman of the commission as a place for the taking of testimony in connection with his private practice.

The first five charges against Commissioner Cram were the same as the first, third, fourth, fifth, and sixth against Chairman McCall. Two others were individual to him. They were:

6—He was guilty of misconduct in office in using an automobile belonging to the commission for his own private purposes, as more fully specified on pages 16 and 17 of said report.

7.—He has been inefficient and neglectful of his duty in failing to devote the time and attention necessary to the faithful and efficient performance of the duties of his office, as is more fully specified on pages 15 and 18 of said report.

Only six charges were made against Commissioner Williams. Of these four were the same as the first, third, fifth and sixth counts against Chairman McCall, and he is also required to answer these special accusations:

3.—He has been inefficient and neglectful of his duty in failing to compel street railroad companies, and especially the street railroad companies in the Borough of Brooklyn, over which he had direct personal supervision, to furnish such service to the public as could reasonably have been required under existing conditions.

6.—He was guilty of misconduct in office, adjourning the hearing in Case No. 1436, involving the question of increasing the car equipment on the elevated lines in Brooklyn for a period of more than a year without disclosing to the public the fact that the commission had determined not to order additional elevated cars until final decision had been made as to the adoption of the dual subway contracts, and in neglecting to make an order in said proceedings requiring additional car equipment.

Against Commissioner Wood the same charges are brought as in the first, second, third, fourth and sixth specifications against Chairman McCall. The charges referring to him exclusively are:

6.—He has been inefficient and neglectful of his duty in failing to familiarize himself with the provisions of the Public Service Commission law.

7.—He was inefficient and neglectful of his duty and was guilty of misconduct in office in unnecessarily delaying the letting of a contract for the construction of a signal system in the Center Street loop.

DETROIT TRAFFIC SURVEY

Report by Barclay Parsons & Klapp Recommends Rerouting Loops and Two-Car Units—Cost of Downtown Subway $2,500,000

Barclay Parsons & Klapp, New York, have presented their report on their traffic survey of Detroit to the Municipal Street Railway Commission. The report covers 298 printed pages and includes twenty-one maps and plans. Provision is made in the recommendations for both temporary immediate relief and for permanent readjustment of the car lines and routes. Referring to the rush-hour problem the report says:

"The Detroit street railway rush-hour problem is essentially a case of unusual traffic concentration, due to a system of converging car lines loading and unloading the bulk of their passengers in a very limited central delivery district. The permanent nature of this district and the distribution of the new population during the recent rapid growth of Detroit clearly indicates that the convenience of the traveling public will best be served by continuation of their present main lines of travel."

Speaking of the density of traffic in Detroit, the report says:

"In the period from 1904 to 1914 the total revenue passengers grew from 78,349,220 to a total of 219,606,056, an increase of 180 per cent. This latter figure gives a density of traffic per mile of main single track of 1,062,000 revenue passengers, which is about 40 per cent heavier than in Cleveland in 1913, and 44 per cent heavier than the density on the surface and elevated lines in Chicago in 1914."

Briefly stated, the report recommends as follows:

Entire rerouting of various lines entering the heart of the city by a system of loops to eliminate, as far as possible, the present crossing interference. This rerouting provides for the looping back of cars not required for the carrying of legitimate through traffic across the center of the city. Two-car units are suggested on Woodward Avenue, with larger car units on some of the lines now using old type cars, the extension of crosstown lines, a system of "skip stops" on the heavy traffic lines, street collectors at the front doors in the downtown district in the rush hour, special non-stop cars through the crowds of factory workers on some of the main lines to take care of ordinary traffic, and suitable ordinances to encourage the use by automobiles of streets on which car lines do not operate.

The report sets forth that $400,000 spent for track changes, repaving, curbing and other items involved in a complete rerouting plan, in addition to the operation of two-car units and a system of "skip stops," will increase the carrying capacity of the lines from 30 per cent to 50 per cent.

The immediate construction of a long subway on Woodward Avenue, the heaviest traffic artery, is not recommended. The estimated cost of a long subway, 6 miles, is placed at $16,300,000, and even if a population of 1,000,000 is reached by 1920 the advisability of such a subway is questioned. The alternative of a short subway, that is, putting the street cars underground downtown, is discussed also. A tube of this kind, so built as to be available for a terminus of a complete subway system, would cost $2,500,000.

PHILADELPHIA ELECTRIFICATION TRIALS

It was announced that a few minutes after midnight on March 18 the Philadelphia Electric Company would cut over service to the cables of the Pennsylvania Railroad leading to the Bryn Mawr substation and that trial runs would follow on the electrified line of the Pennsylvania Railroad between Philadelphia and Bryn Mawr, connection with Paoli being made later. It is expected that regular service between Philadelphia and Paoli will begin on May 30. There are now forty-six trains from Philadelphia to Paoli, and forty-seven inbound trains, while under the tentative schedule there will be fifty-one eastbound and fifty-four westbound trains. All cars for the electric service are equipped and ready. There are ninety-three of them, all steel cars, each with a seating capacity of fifty-four passengers. Eight of these cars were in the West Philadelphia yard on March 15 and will be used in making trial runs.

CINCINNATI FRANCHISE DEFEATED

At the referendum election on March 9 the franchise granted the Cincinnati, Newport & Covington Street Railway for a terminal in Cincinnati, Ohio, was defeated by a vote of 32,494 to 23,591, or a majority of 8903. Secretary Polk Laffoon of the company declined to make a statement in regard to the results. Some of the conditions of the franchise and the agreements upon which it was based have been complied with by the company. It is likely that the portions of the ordinance known to be objectionable will be revised to meet the views of the opponents of the franchise.

Speaking of the defeat of the franchise, W. W. Freeman, president of the company, said that probably no definite plans will be considered for a few days. The company's franchise on the Covington line has expired and it has no franchise on the division that reaches Cincinnati. Mr. Freeman said, however, that the company would be glad to keep its cars in operation, and Mayor Speigel announced that an agreement has been reached with Director of Public Service Fosdick by which the city will receive the same franchise tax that was paid before the expiration of the old franchise.

The transportation committee of the Federated Improvement Association, which opposed the franchise of the Cincinnati, Newport & Covington Street Railway in the recent referendum election in Cincinnati, has suggested that a committee made up of three members each from the Power League, the Business Men's Club, the City Club, the Chamber of Commerce and the Federated Improvement Association, be appointed to meet the officials of the company and members of the City Council in an endeavor to arrive at an agreement on a form of franchise that will be mutually satisfactory.

A conference was held on March 11 by those interested in the proposed construction of the Bond Hill line by the Cincinnati Traction Company, at which a number of residents of that suburb, Service Director Fosdick, City Engineer Krug, City Solicitor Schoenle and Walter Draper, vice-president of the Cincinnati Traction Company, were present. Residents of Avondale were recently refused an injunction against the construction of the line on the ground that the street on which the tracks are to be laid had not yet been built. With the legal question settled an attempt will be made to reach an agreement in regard to the construction of the line.

LEGISLATION IN PENNSYLVANIA

The following bills affecting public utilities are pending in the Pennsylvania House: to repeal the Public Service Company law; to amend the Public Service law with municipal exemptions; to require lights on certain vehicles; to provide for the incorporation of omnibus lines; to provide a workmen's compensation act; to tax the real estate of public service companies; to require "all street cars to be equipped with air brake attachment and automatic air couplers"; to regulate the hours of employment of signal men, gatemen, etc., on any railroad by steam or electricity and provide compensation for extra labor; to require toilets on cars and terminal stations for street railways operating 15 miles; to empower cities of the second class to levy and collect taxes on railroad switches, turnouts, etc., on public streets; to empower cities of the second class to levy and collect taxes on poles, wires, cables, etc., on public streets; to regulate advertisements and solicitations for employees during strikes and other labor troubles; to revise, consolidate and amend the law relating to certain corporations; to establish a department of State police, etc., and providing for increases in pay; to permit members of the General Assembly and State officials the right of free transportation over carriers; to relieve from the payment of mercantile license tax corporations which pay a tax on capital stock; to regulate motor vehicles by changing the age condition so that no one under fifteen years shall be permitted to operate a car unless accompanied by a regularly licensed operator, no person between fifteen and eighteen to receive a license unless his competency has been attested by two licensed operators; to regulate the use of public highways by vehicles; to require suburban electric railways to provide waiting rooms; to take away from the Public Service Commission jurisdiction over counties, cities, etc., in certain matters and vesting the same in the court; amending the act to regulate the transaction of business by foreign corporations; to define public service companies and to establish a public service bureau in the Department of Internal Affairs, etc.; to provide for the equipment of all street cars with efficient air brakes, etc.; to limit the hours of labor of motormen, conductors and drivers employed by horse, cable and electric railways.

Among the bills introduced in the Senate are the following: to repeal the public service company law; to require the license and registration of private detective and detective agencies; to empower municipalities to construct and maintain street railway tracks and equipment for the operation of street cars and to lease said equipment, etc.; to authorize and empower municipalities to construct and give them the right of condemnation if necessary and to maintain and operate underground street railways and also street passenger or elevated railways connecting therewith or exchanging passengers with said underground street railways and to lease the underground street railway and any surface or elevated street railway connecting therewith to corporations, etc.; granting the right of eminent domain to boroughs and towns; directing the Public Service Commission to investigate the issuing of bonds of corporations, etc.; regulating the voting and meetings of stockholders of corporations; regulating and standardizing insurance policies.

Among the bills that have passed the Senate of interest to public utilities is one to empower municipalities to construct and operate overhead, surface or subway street railways.

Among the bills that have passed the House is the one to amend the act regulating auto vehicles, etc.

The bill in regard to the regulation of the "jitney" bus in Pennsylvania is referred to on page 603.

John R. Rose, Oklahoma City, Okla., and associates of Miami plan to build an interurban line to extend from Miami to Tulsa and north from Miami to connect with the interurban line in Missouri.

OHIO COMMISSION SUSTAINED

In a decision handed down on March 16 the Ohio Supreme Court sustained the Public Utilities Commission in an order issued to the Hocking Valley Railroad to resume electric service between Hamden and Jackson. It is probable that the case will be appealed to the United States Supreme Court. The most important point involved is whether a railroad can abandon an unprofitable portion of its line when the property as a whole has shown a profit.

Some time ago citizens filed a petition with the Public Utilities Commission, alleging that the Hocking Valley Railroad had operated an interurban service between Hamden and Jackson since 1896, and furnished current for lighting to towns along the route and to private consumers. A year ago the company proposed to discontinue this service and an order was asked to prevent abandonment of operation. The company contended that the service did not pay and offered to substitute steam trains. The commission ordered the company not to discontinue the interurban service, but made no ruling on the question of furnishing current.

MUNICIPAL OPERATION HAMPERED

Conflict between the requirements of federal and provincial statutes is responsible for a curious railway case in Brantford, Ont., dealt with in an order of the Railway Board on March 8. The city of Brantford owns a street railway acquired with municipal funds and under provincial authority; but it has no power to operate it because the original charter was a federal one. The City Council applied to the Railway Commission for relief, and Chairman Drayton, in his judgment, suggests that leave for operations be secured temporarily from the Minister of Railways until proper authority by parliamentary enactment is forthcoming. The Port Dover, Brantford, Berlin & Goderich Railway, a federally incorporated road, later changed its name to the Grand Valley Railway and acquired the Brantford Street Railway. Subsequently it became insolvent, and the city secured from the Legislature the right to purchase it. This was done, but the road is now on its hands without power of operation. Chairman Drayton says the Legislature has no more right to authorize operation of a federally incorporated road than it has to authorize its construction.

NEW YORK COMMISSION INQUIRY

The hearing on March 12 before the legislative committee at Albany into the work of the Public Service Commission of the Second District of New York was confined to the activities of Commissioner Irvine and Chairman Van Santvoord. Mr. Irvine said that there was no conflict between the two State commissions. He was opposed to any change in the territory allotted to the commissions. The expense accounts of Mr. Van Santvoord were inquired into. The commissioner had attached numerous memorandums to most of his items and the reading of them caused much laughter. He listed a trip from Albany to New York and return as "300 miles of danger at 2 cents a mile." He also listed $2 as the "amount paid to satisfy the modest but insistent demands of the intercostal subdiaphragmatic vacuities." On March 14 Col. William Hayward, counsel of the committee, injured his ankle severely in New York. This has delayed the progress of the inquiry, but it was expected that the sessions would be resumed late in the week.

MELBOURNE ELECTRIFICATION PROPOSAL

R. F. Millane, Collins House, Melbourne, Australia, has submitted an offer to the Melbourne Tramway Trust offering to carry out the conversion from cable to electricity of one of the main routes to and through the city, and a committee has been appointed to consider his offer and an early decision is expected. The trust may accept the offer of Mr. Millane or decide to carry out the work itself. The cable tramways in Melbourne were installed about twenty-five years ago and are similar to the lines which were installed in New York and in Washington. The plan is to equip each car with underground contact and trolley pole like those on the cars in Virginia and Maryland that run into Washington. Mr. Millane desires to hear from contractors for material and equipment such as were used in the conversion of the cable lines in this country to the underground system and to have such contractors quote prices for material and equipment. At a recent meeting of the Melbourne Tramway Trust it was agreed that the consideration of Mr. Millane's offer be postponed until the meeting of the board in February and in the meantime to obtain counsel's opinion as to the authority of the trust in connection with the proposal contained in the motion.

CLEVELAND PROPERTY LEASE

The Cleveland (Ohio) Railway has leased its property at St. Clair Avenue and East 103rd Street to Harry S. French for ninety-nine years, the rental being based on a valuation of $40,000. This property has been used for twenty years for a carhouse and repair shop, but a few months ago a new unit was completed near it and the company had no further use for the property. It will be improved with an apartment house and business buildings.

The company has asked Council for authority to purchase fifty new center-entrance cars at an aggregate price not exceeding $300,000. Councilman Stolte stated that he would insist that the company sell fifty of the old cars for use in other places before this authority was granted.

Agreement on the proposed new franchise in Lakewood has been delayed by a difference between the company and Peter Witt, street railway commissioner, as to its terms. It is probable that a general conference of those interested in the matter will be called soon.

CALGARY MUNICIPAL RAILWAY

In discussing the condition of the Calgary (Alta.) Municipal Railway Commissioner Greaves said that to operate the line as if it were owned by a private company would involve discontinuing service over some 10 or 20 miles of track. The citizens would not submit to this. P. S. Fitter, publicity commissioner, stated through a communication to the press on the finances of the line that although the loss on operation for the eleven months ended Nov. 30, 1914, was $44,284, during the four years' operation of the line a surplus of $300,000 had been built up over and above all fixed charges. The loss in operation was confined practically to the Bowness Park line and to the line to the Canadian Pacific Railway's Ogden shops. The present loss on this latter line is $50 a day.

The Street Railway Men's Association has accepted the new wage schedule, which provides for a reduced rate of pay consequent upon war conditions. The new schedule, effective at once, provides as follows: while operating on the spare list, first year, 28 cents an hour; second year, 30 cents; after two years, 32 cents. Regular runs, first six months, 32 cents; second six months, 33 cents; third six months, 34 cents; fourth six months and thereafter, 35 cents. It is estimated that this schedule will effect a saving of about $10,000 during the year.

LEGISLATION IN OHIO

Governor Frank B. Willis of Ohio has disappoved the Smith bill, which required inclosed vestibules on all cars for motormen. His reason was that the measure stated no time at which it was to go into effect. It is stated that a substitute bill will be introduced to become effective on Nov. 15, 1915.

The bill introduced in the Legislature by Senator L. E. Myers, providing for the construction and operation of union stations by steam and electric railways jointly will permit leasing of all grounds, tracks, etc. The present law provides only for the purchase of grounds for such structures. In addition, the bill would make it possible to construct, maintain and operate terminal railroads and connecting tracks, warehouses, office buildings, hotels and other buildings for the use of the public or to own and lease them. The requirement that the maximum charge per passenger handled within the city limits shall not exceed 1 cent is also suspended by the bill. The bill is before the judiciary committee of the Senate.

Senator Stone has introduced a bill in the Legislature which, if made a law, will authorize the Ohio Public Utilities Commission to regulate all municipally owned service plants, with the exception of the issue of bonds. This authority would extend to fixing rates and establishing a uniform system of accounting.

The Philadelphia Election.—The special election in Philadelphia at which the city will vote on making $6,000,000 available for transit improvements will be held on April 29.

Chicago Unification Upheld.—Quo warranto proceedings attacking the validity of the unification ordinances under which the Chicago (Ill.) Surface Lines have been operating for more than a year, were ordered vacated on March 17 by Judge Brentano in the Superior Court.

Valuation Conference Postponed.—The conference of railroad men and State utility commissioners with the Division of Valuation, Interstate Commerce Commission, scheduled for the week beginning March 22, has been postponed. At the present time it is the expectation that the conference will occur in the week beginning April 19.

Labor Rider Defeated.—The appropriations committee of the House refused to insert in the general deficiency bill the item of $200,000 for the relief of those against whom judgment was found in the Danbury hatters case. Ex-Judge Parker and Mr. Gompers contended that Congress did not intend to cover labor unions in the Sherman Act.

Extension of Powers of New Jersey Commission.—The Senate of New Jersey has passed Senator Read's bill placing municipally-owned utilities under control of the Board of Public Utility Commissioners. The bill in its original form did not affect Newark or Jersey City, but Mr. Read, in answer to opposition to the exceptions made, offered an amendment including first-class cities under the proposed law. The amendment was adopted.

Pan-American Financial Conference.—A cabled invitation from Secretary of State Bryan to all the countries of South and Central America to send three representatives to Washington as guests of the United States for the Pan-American Financial Conference on May 10 was transmitted to the foreign ambassadors and ministers on March 15. Mr. Bryan will send out later invitations to bankers and business men of this country to participate in the conference.

Basic Conditions Sound.—Theodore N. Vail, president of the American Telephone & Telegraph Company, on March 15 set forth in a letter to the security holders of that company, supplementing his annual report, his views respecting the general business situation and the course which should be pursued to restore prosperity. While admitting frankly that "there is a condition of disturbance, of economic unsettlement, it cannot continue indefinitely." He insists that the country was never in better shape basically.

Ohio Efficiency Report.—Kenneth McKinley, efficiency engineer of the Ohio State Civil Service Commission, has reported to the Howard committee in regard to the economies that can be worked with the Public Utilities Commission of Ohio. Mr. McKinley has recommended that nine positions be abolished and that the salaries of ten employees be reduced, for an annual saving of $25,000. On March 13 it was announced that the recommendations would be adopted.

Settlement of Claims at Toledo.—An agreement was reached on March 12 between the city of Toledo, Ohio, and the Toledo Railways & Light Company in the matter of the company's paying its share of the cost of pavement on Cherry Street. The amount due the city was $48,732, but for the first half of 1914 the city owed the company for street lighting $60,704. In paying this bill the paving charge was deducted and a warrant issued for the remainder, $11,971.

Abandoned Road a Testing Ground.—The City Council of Peterborough, Ont., has asked the Ontario Legislature to authorize the making of an arrangement with the Grand Trunk Railway for a lease to the Canadian General Electric Company of a portion of the right-of-way of the Peterborough & Chemong branch line as a testing track for electric locomotives. This branch line extends from Peterborough to Bridgenorth, and has not been operated for a number of years.

Engineer Appointed to Draw Toronto Plans.—E. L. Cousins has been chosen engineer to have charge of the work of drawing up the plans for Toronto's rapid transit system. Recently three engineers, R. C. Harris for the city, E. L. Cousins for the Harbor Board, and Mr. Gaby, of the Hydro-Electric Power Commission of Ontario, were appointed to submit a plan. At the request of Messrs. Harris and Gaby, Mr. Cousins has been asked to do the work. The Harbor Board has granted him leave of absence until the work is completed.

Ontario Hydro-Radials.—The Ontario Hydro-Radial Union deputation waited upon Premier Borden at Ottawa on March 10 and asked the granting of a subsidy for building hydro-electric radial railways through Ontario. The Premier replied that so far as any legislation at the present session was concerned conditions would not permit the government to bring it in. As far as a declaration of future policy was concerned, the Premier announced that he would submit to his colleagues what had been urged, but would not make any announcement as to policy.

Question of Authority.—In an argument which has just been concluded before Mr. McIntyre, chairman of the Ontario Railway & Municipal Board, the Hamilton, Grimsby & Beamsville Electric Railway contends that the board has no right to make orders concerning the road. The question was raised as the result of the board ordering the company to install certain sanitary appliances on the cars. The company says that in 1895 the Dominion Railway Board issued an order allowing it to cross a steam railway, and that this established the company under the jurisdiction of the Dominion Railway Board.

Ohio Commission Upheld.—The Ohio Supreme Court has approved the decision of the Public Utilities Commission in a case in which the city of Cincinnati appealed from a commission order. Some time ago the Council of Cincinnati unanimously passed an ordinance requiring the Cincinnati Traction Company and the Cincinati Street Railway to extend the Warsaw Avenue line along Glenway Avenue from Wilder Avenue to Seton Avenue. The companies appealed to the commission, which decided that the extension demanded was not practical because of the steepness of the grades and relieved the companies from complying with the terms of the ordinance.

Subway Cable Accident.—Fire supposed to have been caused by a workman drilling through the old subway wall at Seventh Avenue and Broadway, New York, into electric cables and wires at the north end of Times Square station of the present subway blazed fiercely between 3:15 and 5:10 a.m. on March 15, filling the tunnel with smoke. For two hours not a subway train stirred between Fourteenth and Ninety-sixth Streets. Shuttle trains were operated south of the downtown station and north of Ninety-sixth Street. The blaze spread to the heavy planking that has taken the place of pavement for Seventh Avenue at this point during the construction of the new subway. The telephone insulation was burned through and practically put the Murray Hill exchange out of operation.

Reimbursing the Seattle Municipal Railway Fund.—Mayor Gill, of Seattle, Wash., has signed the bill placing $10,000 in the street railway fund to meet the deficit incurred in the operation of the municipal railway lines in that city, but City Comptroller Carroll is reported to have announced that when the warrants come to him for his signature on March 25 he will refuse to sign them. The comptroller regards the "loan" as a deficit appropriation and says that as there is little likelihood of the railway paying back the loan it will be necessary eventually to raise the money by general taxation to reimburse the general fund. The communication from Mayor Gill dealing with the question of the deficit of the municipal railway was published in part in the ELECTRIC RAILWAY JOURNAL of Feb. 27, page 431.

The Cincinnati Inventory.—It was stated at the office of the Ohio Public Utilities Commission on March 16 that the inventory of the property of the Cincinnati (Ohio) Traction Company had been in its hands for two weeks, but that the figures are only tentative and are so regarded. Before any step can be taken toward a final valuation, the inventory must be checked by engineers of the department and then the appraisals must be made. The resolution introduced in the Council giving City Solicitor Schoenle authority to bring proceedings against the Cincinnati Traction Company to compel it to permit him to examine its books for the purpose of making a physical valuation has been referred to the committee on street railways, with instructions to Mr. Schoenle to ascertain from the Public Utilities Commission when it expects to complete its similar investigation.

Appeal to Supreme Court Against Competition.—The Ohio Public Utilities Commission recently authorized the Mahoning County Electric Company to purchase the plant of the Youngstown Heating Company through the issuance of $600,000 of twenty-year 6 per cent bonds and $400,000 of stock and to erect an electric generating plant which would come into direct competition with the lighting and power business of the Youngstown-Sharon Railway & Light Company, Youngstown, Ohio, in the business district. The commission held, however, that it was compelled to give consent to any reasonable issue of securities except in the case of telephone companies, and that the law did not provide for regulated monopoly in public utility service. The railway company has now appealed to the Ohio Supreme Court for relief from destructive competition.

Rapid Transit Construction Resumed.—With the Alien Labor law amended, the Public Service Commission of the First District of New York decided on March 16 that it could resume its program of construction, which had been held up for nearly three months. It ordered that bids be invited for the section of the Brooklyn Rapid Transit Company's subway in Seventh Avenue from Fifty-first to Fifty-ninth Street, and that they be opened on April 9. This contract has already been put up three times for bids, but had to be withdrawn on account of the alien law controversy. The change in the law requires that the existing construction contracts be modified so that the clause in them conforming with the old alien clause be made to fit the amendment to the law. Counsel of the commission has been instructed to prepare modifications so that the clause which required contractors to employ only citizens be made to demand merely preference to citizens.

New Franchise in Lakewood, Ohio.—On March 13 an agreement on a new franchise for Lakewood, a large western suburb of Cleveland, Ohio, was reached at a conference of the officials of that place, officers of the Cleveland Railway and Peter Witt, street railway commissioner. The proposed ordinance provides that the Madison Avenue line shall be extended from West 117th Street to Rocky River and that the new portion shall be in operation within six months. In return the company is to receive a franchise that will expire with the Tayler franchise in the city in 1934, which means an extension of eight years. The fare between the city and Lakewood is to be straight 5 cents, instead of eleven tickets for 50 cents, as at present, and the fare within the city of Lakewood is to be 3 cents. The ordinance was introduced in the Lakewood Council on March 15 and referred to the street railway committee. The franchise must also be approved by the City Council of Cleveland.

Suburban Rapid Transit Suggestion.—Ralph Peters, president of the Long Island Railroad, has notified the Public Service Commission for the First District that his company will consider a proposition from the city for the operation of the dual system rapid transit trains over the elevated railroad to Corona, the present terminus of the city-owned line, to and through Flushing to Whitestone and to the city limits at Little Neck over the tracks of the Long Island Railroad. The company is willing to make an arrangement for the use of such tracks for a reasonable rental, to be paid by the city, whereby rapid transit may be extended to Whitestone and Little Neck without the city going to the expense of constructing additional tracks beyond Corona. Mr. Peters estimates that it would cost the city about $6,800,000 to build extensions to Whitestone and Little Neck and that it would cost only $500,000 to build the connection between the city line at Corona and the Long Island tracks near Whitestone Junction. He suggests that a contract be made for ten years, with the privilege of renewal for the same period of time. The commission has referred the matter to counsel and chief engineer for opinion and report.

PROGRAM OF ASSOCIATION MEETING

Gas, Electric & Street Railway Association of Oklahoma.

The fourth annual convention of the Gas, Electric & Street Railway Association of Oklahoma will be held in Oklahoma City on May 12, 13 and 14, with headquarters at the Lee-Huckins Hotel.

Financial and Corporate

BANKERS CALL FOR SUIT

Dick Brothers & Company, New York, who own and control 11,000 shares of the Long Island Railroad, on March 18 served a notice on Ralph Peters, president, and the directors to bring suit against the Pennsylvania Railroad for the restitution of alleged misappropriated funds and for the cancellation of certain contracts. This notice states that unless suit is begun by the railroad officials within ten days the banking house will bring suit in its own name against the Pennsylvania Railroad and the directors of the Long Island Railroad. Prior reference to circulars issued by the bankers asking for proxies were made in the ELECTRIC RAILWAY JOURNAL of Feb. 6 and Feb. 20.

Among the requests cited in the notice served upon Mr. Peters there was one asking for an injunction to restrain the payment to the Pennsylvania Railroad of moneys on account of advances alleged to have been made in carrying out construction projects on Long Island initiated by the interlocking directorates of the two companies. It was further requested that the Long Island Railroad be returned to its status as an independent company, that an accounting be made of all expenses authorized by the board of directors and of the cost of electrifying tracks in the commuting zone, and that the contract covering the carriage of Long Island passengers into the Pennsylvania Terminal be cancelled.

An official of the Long Island Railroad said that everything which the company had done had been authorized by the Public Service Commission, and that the company welcomed an investigation. It is doing better every year, and, according to the last report, showed a deficit only half as large as the year before.

WAR REVENUES OF BERLIN TRAMWAYS

The Great Berlin Street Railway is operating all of Berlin's surface car lines, which are 240 single-track miles in length and have 2078 motor cars and 1334 trailers. The following table shows the comparative monthly revenues for 1913 and 1914 (also January, 1915, revenues 3,157,886 marks), indicating a decrease of 3,669,215 marks, or $891,619, for the last year mostly because of the war.

REVENUES PER YEAR IN MARKS (24.3 CENTS).

Month	1913	1914
January	3,579,735	3,399,936
February	3,394,265	3,295,781
March	3,880,679	3,707,039
April	3,769,961	3,715,807
May	3,829,493	3,695,319
June	3,748,779	3,567,340
July	3,553,513	3,518,415
August	3,647,969	3,272,977
September	3,708,611	3,054,923
October	3,859,086	3,264,484
November	3,695,974	3,109,364
December	3,848,969	3,327,713
Total	44,483,065	40,803,855

ALLEGED VIOLATION OF UTILITIES ACT

J. B. Hogarth, formerly general superintendent of the Chicago (Ill.) Railways, has filed a complaint with the Illinois Public Utilities Commission, alleging that the officers of the Commonwealth Edison Company, Chicago, by their purchase of $20,000,000 of the common capital stock of the Chicago Elevated Railways collateral trust, violated the commission law. Mr. Hogarth also filed a second petition questioning the method of financing the Chicago Elevated Railways collateral trust and charging that the officers of the trust did not obtain the consent or authority of the commission to issue approximately $23,000,000 of securities and that they failed to pay the State a fee of $23,000 required under the commission act. In an interview with a representative of the ELECTRIC RAILWAY JOURNAL, one of the attorneys for the Commonwealth Edison Company admitted that his client did hold $20,000,000 of capital stock of the collateral trust. It was asserted, however, that this purchase was made without violating the law, since the trust was made up of an association of individuals who had purchased a controlling interest in the four elevated railway companies. The trust was not a public utility and therefore was not under the jurisdiction of the commission.

ANNUAL REPORT

Public Service Corporation

The statement of income, profit and loss of the Public Service Corporation of New Jersey, Newark, N. J., for the twelve months ended Dec. 31, 1914, follows:

Operating revenue of subsidiary companies	$35,924,453
Operating expenses and taxes	$19,892,708
Amortization charges	1,303,609
Total	$21,196,317
Operating income	$14,728,136
Non-operating income	351,161
Public Service Corporation of New Jersey income from securities pledged and from miscellaneous sources	2,484,645
Total income	$17,563,942
Income deductions of subsidiary companies (bond interest, rentals and miscellaneous interest charges)	12,097,109
	$5,466,833
Public Service Corporation of New Jersey income deductions—	
Interest charges	$3,408,332
Amortization of debt discount and expense	223,664
Sinking fund for general mortgage 5 per cent bonds	209,500
Total	$3,841,496
Net income	$1,625,337
Appropriation accounts of subsidiary companies:	
Additional amortization of capital	$2,750
Amortization of new business expenditures prior to Jan. 1, 1911	40,330
Adjustment of surplus account (credit)	103
	$42,977
	$1,582,360
Appropriation accounts of Public Service Corporation of New Jersey—	
Adjustments of surplus account (credit)	728
Net increase in surplus	$1,583,088

The annual report states that the company under adverse conditions had a relatively successful year. The year's depression in business was felt by all the underlying companies. The normal annual gross increase in the railway company's business averages about 5 per cent, but during 1914 the operating revenue increased only 1.11 per cent. The normal annual gross increase in the electric company's receipts averages from 11 to 12 per cent, but last year the operating revenue increased 9.34 per cent. The normal annual gross increase in the gas company's business averages 7 per cent, but the operating revenue last year increased 3.61 per cent (partly owing to a difference in the rate for gas). The operating revenue of all the subsidiary companies increased $1,331,979, or 3.85 per cent, as compared to an average normal increase of about 7 per cent.

No comparative figures are presented for maintenance expenses during the year, but it is stated that the amount, exclusive of ordinary maintenance, set aside for amortization was $1,306,358. With the sinking fund charge added, the amount set aside during the year for amortization of properties and redemption of securities was $1,515,858. The taxes paid during the year amounted to $2,202,555, an increase over the previous year of $139,573. In five years the taxes paid by the corporation have increased approximately $1,000,000, but it is urged that the limit of the ability of corporations and individuals to meet these increases has about been reached, and that no further burdens of this character should be put upon property under present conditions.

The fire insurance carried as of Dec. 31, 1914, amounted to $29,009,824. This is an increase over the corresponding period of the previous year of $800,073. The premiums for 1914 amounted to $102,808, a decrease, as compared with the previous year, of $5,426, and a decrease in the rate per $100 of insurance from 44 cents for 1912 and 38.3 cents for 1913 to 35.4 cents for 1914. The total expenditures of the welfare department during 1914 were $79,794, an increase of $14,316. The cost of accidents under the workman's compensation act was $63,041, divided $44,200 for required payments, $9,101 for voluntary excess payments and $9,732 for expenses—a total increase of $6,622 for 1914.

The net expenditures charged to fixed capital accounts by subsidiary companies during 1914 were $2,644,099 for electric companies, $857,075 for gas companies and $1,389,961 for railway companies, a total of $4,891,136. Among specific improvements may be noted the building and opening of the Paterson & State Line Traction Company from the Paterson city line to Ridgewood, and the building and opening of the Sewaren Spur, extending from the Public Service Railroad tracks at Port Reading Junction to Sewaren, and making possible a new through line from Newark to Perth Amboy. Altogether, during the year, the railway company built 10.787 miles of track extensions. With land purchases in Camden and Paterson, it may be said that throughout the State the railway has acquired for carhouse, shop and terminal purposes practically all the real estate it needs.

The total passengers carried by the railway increased 0.71 of 1 per cent. The amount spent for accidents and the expenses in connection with the same was 4.27 per cent of the passenger receipts, as compared to 4.15 per cent for 1913. This company received honorable mention in the "safety first" contest for the Brady Medal. The following table shows the most important traffic statistics for 1913 and 1914:

	1914	1913
Revenue passengers	310,308,660	308,985,240
Transfers and passes	96,969,254	95,425,865
Total passengers	407,277,914	404,411,105
Percentage of passengers using transfers	21.2	21.1
Average fare per passenger, cents	3.83	3.82
Car mileage	50,792,889	49,853,408
Car hours	5,665,119	5,696,066
Passengers per day	1,115,830	1,107,976
Passenger receipts per car mile, cents	30.72	30.97
Passenger receipts per car hour, cents	2.75	2.71

Alabama Traction, Light & Power Company, Ltd., New York, N. Y.—It is reported that for the sake of more efficient and economical administration, several companies have been merged with the Alabama Power Company, Birmingham, Ala., the chief operating subsidiary of the Alabama Traction, Light & Power Company, Ltd. Besides the Decatur Light, Power & Fuel Company, the Leeds Light & Power Company and the Pell City Light & Power Company, the merged companies include two electric railways, the Anniston Electric & Gas Company, Anniston, Ala., and the Huntsville Railway, Light & Power Company, Huntsville, Ala. It is believed that this merger will enable the participating companies to obtain a larger amount of credit and make needed developments.

American Public Utilities Company, Grand Rapids, Mich.—Bioren & Company, Philadelphia, are offering at par and interest an issue of $1,500,000 of three-year 6 per cent secured gold notes of the American Public Utilities Company, dated March 1, 1915, and due on March 1, 1918. These notes are redeemable at any interest period for 101 and interest. They are secured by deposited collateral valued at more than $6,000,000.

Atlantic Gas & Electric Company, New York, N. Y.—Judge Hand, of the Federal District Court, has filed a decree ordering the foreclosure sale of the Atlantic Gas & Electric Company within ten days in the event of a final default on bond payments. Edward H. Childs has been appointed special master for the sale. The reorganization plan, under which the controlled properties of this company are to be taken over by the General Gas & Electric Company, was described in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

Central California Traction Company, San Francisco, Cal.—The California Railroad Commission recently held a hearing on an application to lease the Central California Traction Company to the Stockton Electric Railroad for a rental of $12,500 a year for the first three years and $15,000 a year for the following thirty-five years. H. Fleishhacker, vice-president of the former company, stated that the road was losing about $14,700 a year because it was not possible to keep it in the highest condition of efficiency and to make improvements.

Cleburne (Tex.) Street Railway.—By order of a higher court the receivership of the Cleburne Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23, has been vacated. John W. Floore, Sr., who holds the first mortgage of the company, states that the property will be sold immediately at public auction, and that if it is not purchased by others he will operate it. The line has not been in operation for several months.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Cleveland, Southwestern & Columbus Railway has applied to the Ohio Public Utilities Commission for authority to issue $319,875 of first consolidated 5 per cent bonds at 85, and, pending their sale, to hypothecate them at 65. The proceeds are to be used to reimburse the company for expenditures made in 1913 and 1914 and to retire $200,000 of underlying Cleveland & Elyria Railroad first mortgage 5 per cent bonds maturing on May 1.

Duluth-Superior Traction Company, Duluth, Minn.—The directors of the Duluth-Superior Traction Company have omitted the usual April 1 dividend of 1 per cent on the $3,500,000 of common stock of the company. This rate of dividend was paid quarterly from July, 1913, to January, 1915, inclusive. It has been decided, however, that a dividend of 1 per cent will be paid on July 1 to holders of record on June 15.

Electric Bond & Share Company, New York, N. Y.—The Electric Bond & Share Company is offering $1,000,000 of new preferred stock to its preferred stockholders at par in the ratio of one new share for each five shares of old stock owned. The common stockholders of the company are being offered $1,000,000 of new common stock at par in the same ratio. Stockholders of record of March 3 have a right to subscribe. The increase of the capital stock of this company by the addition of $3,000,000 of preferred stock and $3,000,000 of common stock was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20. According to a comparative income statement just issued by the company, the figures for the last two fiscal years ended Dec. 31 are as follows: gross income, 1914, $1,558,521; 1913, $1,554,404; net income, 1914, $1,137,042; 1913, $1,129,396; preferred dividends, 1914, $298,392; 1913, $277,900; common dividends, 1914, $400,000; 1913, $363,000 (additional special dividend, $1,500,000); surplus income, 1914, $438,650; 1913, $488,495. The total surplus and undivided profits of the company at the close of business on Dec. 31, 1914, amounted to $3,195,697.

Empire United Railways, Inc., Syracuse, N. Y.—It is reported that the $1,083,000 of Rochester, Syracuse & Eastern Railroad three-year notes due on Feb. 16 are being retired by an issue of $690,065 of Empire United Railways, Inc., guaranteed gold bonds and through the sale of the first mortgage 5 per cent bonds of the latter company.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—E. H. Rollins & Sons, Boston, are offering at 94 and interest, to yield about 5.75 per cent, $500,000 of first mortgage 5 per cent bonds of the Grand Rapids, Grand Haven & Muskegon Railway. These bonds are part of a closed first mortgage issue of $1,500,000, dated 1901 and due on July 1, 1926, and are an underlying divisional lien of the United Light & Railways Company. The subsidiary company owns and operates 47.26 miles of high-speed third-rail electric railway between Grand Rapids and Muskegon.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The California Railroad Company has authorized the Los Angeles & San Diego Beach Railway to issue a promissory note for $2,500 to refund a similar note held by the American National Bank, San Diego, and two promissory notes for $15,000 and $4,000 to refund a promissory note of $19,000 held by the Citizens' National Bank, Los Angeles.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—It is reported that the last assessment on the stock of the Oakland, Antioch & Eastern Railway has been postponed until March 29. A prior postponement was noted in the ELECTRIC RAILWAY JOURNAL on Feb. 6. The company has filed an application with the California Railroad Commission for authority to renew three promissory notes totaling $200,400 and to secure the renewals by the delivery of bonds on the basis of 60 per cent of the face value. The company also asks for authority to secure a note of $21,028 heretofore issued to the Union Switch & Signal Company by the delivery of bonds on the same basis.

Ogden, Logan & Idaho Railroad, Ogden, Utah.—As predicted in the ELECTRIC RAILWAY JOURNAL of Jan 16, the stockholders of the Ogden, Logan & Idaho Railroad have authorized a new mortgage to secure an issue of $10,000,000 of bonds. About $2,000,000 of this issue will be put out now to cover the present indebtedness of the company and the cost of the interurban extension to Preston, Idaho.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has called for redemption on March 25, at 100¼ and accrued interest, $1,000,000 of one-year 5 per cent collateral trust notes dated Dec. 15, 1914, of which $4,000,000 are outstanding. The notes will be paid either at the Bankers Trust Company, New York, or at the office of the company in San Francisco. The company has sold to N. W. Halsey & Company and Harris, Forbes & Company, New York, $2,000,000 of general and refunding 5 per cent bonds, $5,000,000 of which are at present deposited as part collateral for the above-mentioned notes issued Dec. 15, 1914. Part of the proceeds of this bond sale will be used to retire the $1,000,000 of notes on March 25, thus placing the finances of the company on a more permanent basis. On the same date, the $4,000,000 of notes then maturing, for the payment of which the $4,000,000 of notes of Dec. 15, 1914, were issued, will be paid. On March 8 the company filed an application with the California Railroad Commission requesting authority to issue and place in the sinking fund provided under its general and refunding mortgage, dated Dec. 1, 1911, $367,000 of its general and refunding mortgage gold bonds.

Pennsylvania Railroad, Philadelphia, Pa.—The annual report of the Pennsylvania Railroad for the calendar year 1914 states that business conditions on the lines of the company were unsatisfactory during the year. The operating revenues of the Long Island Railroad amounted to $13,220,334, and the operating income to $3,318,434. The net income of this company showed a deficit of $494,131. In connection with the report Samuel Rea, president, issued a warning to the country in regard to regulation, saying that a great deal of constructive work must be accomplished before governmental regulation is placed on a satisfactory basis.

Peoria (Ill.) Railway.—Merrill, Oldham & Company, Boston, are offering at 96 and interest, to yield about 5.5 per cent, a block of first and refunded mortgage 5 per cent gold bonds of the Peoria Railway, dated 1906. Of these bonds there are outstanding $2,819,000, an additional $435,000 having been retired.

Public Service Corporation, Newark, N. J.—Clark, Dodge & Company, New York, are offering for sale, to yield about 5.55 per cent, 6 per cent perpetual interest bearing certificates of the Public Service Corporation of New Jersey. These certificates are in form similar to certificates of stock, but are in effect perpetual collateral trust bonds, being secured by $58,334,700 of stock collateral, or nearly three times the par value of the certificates outstanding. On the securities so pledged, the certificates have a lien prior to that of $47,000,000 of general mortgage 5 per cent bonds.

Utah Securities Corporation, Salt Lake City, Utah.—The Guaranty Trust Company, New York, as trustee for the Utah Securities Corporation, has repurchased $599,500 of ten-year 6 per cent notes in accordance with its recent invitation for tenders, as noted in the ELECTRIC RAILWAY JOURNAL of March 6. The average price paid was 80.499. An amount of $25,369,500 of these notes has been issued, of which $8,766,000 has been retired.

United Railways & Electric Company, Baltimore, Md.—It is reported that J. E. Aldred, former president of the Consolidated Gas, Electric Light & Power Company and the Pennsylvania Water & Power Company, will be elected a director of the United Railways & Electric Company. A substantial interest in the stock of the latter company was recently acquired by Aldred & Company, which firm is the fiscal agent for the first-named companies.

Western Railways & Light Company, Peoria, Ill.—Plans have been consummated for the merging of the Western Railways & Light Company with the Illinois Traction System. A total of 22.543 shares of common stock of the Illinois Traction System has been exchanged for 45,086 shares of common stock of the Western Railways & Light Company. The total amount of the Western Railways & Light Company issue outstanding was 45,218 shares.

Wheeling & Elm Grove Railroad, Wheeling, W. Va.—An amount of $17,000 of 5 per cent first mortgage thirty-year bonds of the Wheeling & Elm Grove Railroad, dated March 1, 1898, has been called for payment.

DIVIDENDS DECLARED

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¾ per cent, first preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia (Pa.) Traction Company, $2.

Public Service Corporation, Newark, N. J., quarterly, 1½ per cent.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE					
1m., Jan., '15	$65,330	*$30,842	$34,488	$17,515	$16,973
1 " " '14	63,687	*31,333	32,354	17,358	14,996
12 " " '15	779,395	*374,728	404,667	209,275	195,392
12 " " '14	768,979	*348,911	420,068	207,603	212,465
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Jan., '15	$70,363	*$68,158	$2,205	$17,340	†‡$14,995
1 " " '14	75,568	*83,790	8,059	15,473	†‡23,532
7 " " '15	594,388	*535,095	59,293	120,646	†‡60,297
7 " " '14	616,906	*534,744	82,162	106,354	†‡23,164
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Jan., '15	$81,330	*$60,208	$21,122	$29,349	$8,227
1 " " '14	99,233	*58,352	40,881	27,653	13,228
12 " " '15	1,067,193	*701,579	365,614	341,105	24,509
12 " " '14	1,208,529	*716,738	491,791	301,335	190,456
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO					
1m., Jan., '15	$274,752	*$164,178	$110,574	$38,719	$71,855
1 " " '14	272,026	*171,949	100,077	40,356	59,721
12 " " '15	3,069,024	*1,878,975	1,190,049	477,823	712,226
12 " " '14	2,995,411	*1,939,873	1,055,538	491,241	564,297
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.					
1m., Jan., '15	$1,241,903	*$650,972	$590,931	$360,376	$230,555
1 " " '14	1,228,577	*666,548	562,029	344,108	217,921
12 " " '15	14,019,809	*7,534,320	6,485,489	4,229,121	2,256,368
12 " " '14	13,733,037	*7,695,878	6,037,159	3,896,143	2,141,016
CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., Jan., '15	$604,464	*$450,321	$154,143	$98,270	‡$77,503
1 " " '14	591,824	*460,336	131,488	88,374	‡64,488
7 " " '15	4,796,849	*3,547,521	1,249,329	687,977	‡713,141
7 " " '14	4,874,158	*3,573,768	1,300,390	625,527	‡828,217
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.					
1m., Jan., '15	$184,546	*$106,976	$77,570	$42,018	$35,552
1 " " '14	187,831	*125,854	61,977	44,144	17,833
12 " " '15	2,237,022	*1,334,853	902,169	497,545	404,624
12 " " '14	2,209,078	*1,353,997	855,081	471,385	383,696
NEW YORK & STAMFORD RAILWAY, PORTCHESTER, N. Y.					
1m., Jan., '15	$23,072	*$24,635	$1,564	$7,876	†‡$9,417
1 " " '14	22,588	*24,129	1,541	7,800	†‡9,317
7 " " '15	237,880	*186,560	51,320	55,130	†‡3,515
7 " " '14	232,720	*179,723	52,998	53,893	†‡585
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Jan., '15	$35,495	*$44,233	$8,737	$8,236	†‡$16,348
1 " " '14	29,306	*49,868	20,562	5,226	†‡24,827
7 " " '15	260,611	*305,585	44,974	45,122	†‡88,734
7 " " '14	234,191	*345,873	111,382	36,777	†‡144,590
NORTHERN OHIO TRACTION & LIGHT, AKRON, OHIO					
1m., Jan., '15	$280,839	*$181,979	$98,860	$50,251	$48,509
1 " " '14	270,961	*171,291	99,669	49,462	50,207
PORTLAND RAILROAD COMPANY, PORTLAND, MAINE					
1m., Jan., '15	$73,370	*$51,895	$21,475	$22,549	†$1,074
1 " " '14	72,159	*52,505	19,654	23,242	†3,588
12 " " '15	1,046,053	*646,631	399,422	249,911	149,511
12 " " '14	1,036,975	*681,950	355,025	193,869	161,156
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.					
1m., Jan., '15	$489,713	*$261,404	$228,309	$182,361	$45,948
1 " " '14	582,610	*277,286	305,324	173,282	132,042
12 " " '15	6,180,274	*3,248,001	2,932,273	2,181,758	750,515
12 " " '14	6,752,754	*3,305,387	3,447,367	2,028,862	1,418,505

*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE "JITNEY" BUS

Further Efforts Toward Regulatory Legislation—Labor's Attitude in Rock Island and Providence

The closing hours of the session of the Legislature of the State of Washington were enlivened by the controversy over the "jitney." The proponents of the bill to regulate the bus called the attention of both Houses to the numerous accidents to "jitney" bus patrons and to the financial irresponsibility of the drivers of these buses. It was contended that the patrons of the buses were entitled to the same protection as was afforded to the users of street cars. The proposal was to require the drivers of "jitney" buses to give a surety bond in the sum of $2,500. Those who favored the bill contended that a "jitney" driver who could not give a $2,500 bond was not sufficiently responsible to be permitted to engaged in hauling people. The bill passed both Houses, but was promptly vetoed by Governor Lister. On March 11 the measure was repassed over his veto by a vote of sixty-three to thirteen in the House and of twenty-eight to twelve in the Senate. The Governor contended that the regulation and control of the buses should be undertaken by the cities and towns, and stood out for the doctrine of home rule. He said that if the bill should be placed on the statute books it would be impossible to change or amend it in any way until a meeting of the Legislature in 1917. He said he appreciated the necessity for proper regulation and expressed the hope that the members of the Legislature from the cities of the first class would return to their respective cities and endeavor to have the city authorities pass such ordinances as would give to the public the protection to which it was entitled.

The Public Service Commission of the State of Washington, in a communication to the City Council of Seattle, states:

"We communicated some weeks ago with your honorable body with reference to the competition of the "jitney" bus, over which the commission has no jurisdiction. We called your attention to the fact that the operation of the "jitney" bus decreased the revenues of the company more than $2,000 a month. Just prior to the advent of the "jitney" we arranged with the company for improved service in Seattle, including service to the outlying districts. With the advent of the "jitney" we felt that the company should be permitted to adjust its business so as to be able to compete with the bus. Whether the company can render the service required and obtain a reasonable return upon its investment is a question that can be determined only by a valuation of the property of the company."

In this connection it is of interest to note that the Puget Sound Traction, Light & Power Company notified the Port Commission of the city of Seattle that the present agreement of the company with that body whereby the patrons of the Port Ferry are granted a single 5-cent fare over the Port Ferry and the Ferry Hill line in West Seattle would be discontinued by the company on the expiration of the present joint traffic arrangement on March 16. A. L. Kempster, manager of the company, in returning the unsigned agreement, wrote the commission as follows:

"After carefully considering this matter, we feel obliged to inform you that on the expiration of the present agreement we must discontinue the joint fare arrangement heretofore existing. We are forced to this conclusion owing to the very serious loss of revenue suffered by this company by reason of unregulated competition of the "jitney" buses, particularly within short-haul territory. The authorities have permitted this ruinous competition to continue in face of the fact that by so doing one of the heaviest tax-paying institutions and most potent factor in the up-building of the community is being crippled. With these facts before us, it becomes our duty to conserve our revenue in every reasonable manner. It is not our desire to work unnecessary hardship upon any section of the community. On the other hand, the curtailment of service in unprofitable territory and the withdrawal of privileges heretofore extended to different sections of the city must of necessity prove burdensome to some. This is a condition which we regret but cannot escape."

Regulations for the operation of motor vehicles for public transportation, including provision for payment of 10 per cent of gross receipts to the municipality in which the line is operated, are laid down in a bill introduced in the Pennsylvania Legislature by Mr. Jones of Susquehanna, chairman of the public roads committee. By the terms of the bill all cars must take out regular State licenses and file with the commonwealth a list of all routes by streets or roads, a $10,000 bond for each machine operated for recovery of damages for death or injury and a statement of capacity of all vehicles operated. All operators must be of age. Before operating in any municipality the lines must arrange to pay 50 cents a month per car, to the treasurer of the municipality as a license fee. Cars operating on State highways are not required to have this extra license. Thirty days after Jan. 1 each line must file with the municipality granting licenses a statements of gross receipts, and pay 10 per cent for street maintenance. The Public Service Commission is given authority to regulate the lines. Fines are provided for violations.

Charles M. Talbert, director of streets and sewers of St. Louis, Mo., is preparing a "jitney" regulatory ordinance. Realizing the need, however, of the immediate regulatory measures on account of the promiscuous manner in which the "jitneys" are running, he, together with President McPheeters of the Police Board, conferred on March 8 and drew up a set of tentative rules which will be enforced till a permanent ordinance is adopted. No "jitney" will be permitted to operate without its owner first having secured a permit from the city and subscribed to the regulations. Five principal features are covered. All chauffeurs must be examined as to their competency to handle a car. All cars will be examined to see that they are in proper condition. No speeding to obtain passengers will be allowed. There must be no overloading of cars, and passengers must be taken on and deposited at the curb, instead of the middle of the street, as many now are. In addition, all chauffeurs must obey the usual traffic laws applicable to other vehicles.

A temporary or emergency ordinance for the regulation of "jitneys" and other vehicles engaged in public transportation has been introduced in both Houses of the Council of Kansas City. The ordinance contains twenty-five sections. The more important sections relate to the character and qualifications of the operators of this class of public transportation service and clearly set forth their responsibility and liability in regard to protecting the lives of the people. They are required to secure from the city franchises to operate their vehicles and to indemnify the city in bonds to cover personal injury. The city reserves the right to designate the routes to be traversed by the cars, the operating hours and schedules, to determine the qualifications of operators and to regulate the rates of fare.

In Atlanta regulatory legislation in the form of an ordinance prepared by P. S. Arkwright, president of the Georgia Railway & Power Company, and introduced by Councilman Lee is pending before a committee of the City Council. None of the terms of the ordinance is severe. It would require a bond to the city in the sum of $10,000 for two cars or less under the control of one operator and $20,000 for more than two cars. It contains no provision against overcrowding. In the course of an interview published in the automobile section of the Atlanta *Constitution* of March 14 the following was quoted as coming from E. W. VanDuzen, sales manager of the Mitchell Motor Sales Company:

"The assertion that "jitneys" are not lighted at night is a small detail that can easily be remedied by the expedient of lighting them. I believe they ought to be lighted. As for undesirables riding in them, as has been suggested might happen, the "jitney" is only a common carrier similar to any other common carrier in the character of the passengers it carries, and I see no reason for suspecting that the "jitneys" would carry a larger percentage of undesirables than any other common carrier."

Under the terms of an ordinance introduced in the City Council of Savannah, Ga., "jitney" buses are required to run on established routes, maintain regular schedules, pay a license to the city and furnish indemity bonds to guarantee responsibility for accidents.

An ordinance regulating the operation of the "jitney" has been prepared for submission to the City Council of Houston, Tex. The measure provides, among other things, for a $10,000 accident insurance or personal bond, license according to capacity of car for carrying passengers, regulation requiring cars to run on one line only and on a schedule, prohibition of passengers being carried on running boards, fender or on car doors, a fare of not more than 5 cents and a requirement that cars must not stop more than 2 ft. from the curb.

No "jitney" licenses will be issued by the city of Nashville, Tenn., until the City Commission has disposed of the ordinance which it has under consideration. This has been amended to provide that the applicants for such licenses shall first deposit with the city a $5,000 bond.

The Pacific Electric Railway, Los Angeles, Cal., has announced increases in service on a number of its lines, and General Manager McMillan is quoted as stating that "we are prepared to give the 'jitney' bus a run for its money." In this connection the Los Angeles *Times* said recently:

"Following a month of rather strenuous retrenchment the Pacific Electric Railway announcement of improved service is interpreted by many as evidence that the 'jitney' bus, like the seven-year locust, has about run its cycle here. As proof of this it is alleged that the number of light cars that are going back to the dealers under the mortgage clause after brief but hectic careers on our streets, is in excess of the purchases. But if the 'jitney' had seen its best days in the Southwest, in spite of Councilman Coddling, it is becoming an increasingly live issue in the East."

Interesting instances of labor's attitude toward the "jitney" bus are furnished at Rock Island, Ill., and Providence, R. I. At a recent meeting in Rock Island of the Tri-City Federation of Labor, it was voted to put the "jitney" on the unfair list. The Davenport and Rock Island locals of the street railway men's unions entered a joint resolution asking that the federation go on record against the use of the buses by union men. The men fear that the intrusion of the "jitney" may lead to union men being forced out of employment by the curtailment of the electric railway service. On March 6 there were fourteen automobiles in competition with the Tri-City Railway.

In Providence a committee of labor men has been appointed to investigate the "jitneys" and to report to the Central Trades & Labor Union. Pending the outcome of the investigation it was voted to "ask members to refrain from using the 'jitney' service and to discourage as far as possible the use of the service by others." Members of Local Division No. 618 of the Amalgamated Association of Street & Electric Railway Employees defended the Rhode Island Company and said that consideration should be shown it until the affairs of the company could be readjusted under the federal decree for the segregation of the properties of the New Haven Railroad. "Jitney" service was referred to as "unregulated and unrestricted competition" and it was also stated that the operators are unorganized and that no responsibility attaches to them or the owners of the cars.

The idea of profit-sharing has been extended to the "jitney." In Houston, Tex., coupons are being given to patrons by one operator. On the Montgomery line in that city ten cars called "coupon" cars are being operated. A sign on the windshield of each of these cars announces that the passenger will receive a coupon with every fare paid and that five coupons will be exchanged for one ride.

The menace of the bus to pedestrians has been strikingly stated by Paul Beemer, city passenger and ticket agent of the Union Pacific System at Ogden, Utah, who recently returned to Ogden from a trip to the Pacific Coast. He said of the "jitney": "It sure stimulates the mind to active thinking, trains the eye for spectacles of peculiar character and inspires the belief that to be knocked off your footing means resignation to the inevitable. Owners anxious to clean up as much coin as possible while the fire of the fad is burning hottest take any chances to get the money, allowing the cars to become packed with human beings whom the driver distributes along the route of travel without even bringing the car to a stop."

Reference has been made previously in the ELECTRIC RAILWAY JOURNAL to the local associations of "jitney" bus owners and to the strength and influence that they have exerted in their own behalf in a political way. According to William A. Sears, manager of the Motors Service Company, St. Louis, Mo., with twenty-two cars in service in that city, plans are under way for the organization of a national "jitney" bus association to be designed as a clearing house of information for the owners and operators of "jitneys."

Other automobile men than John N. Willys, of the Willys-Overland Company, have gone on record recently in regard to the "jitney." Among them is H. H. Franklin, president of the Franklin Automobile Company, Syracuse, N. Y. Mr. Franklin is quoted in part as follows:

"As crude as the 'jitney' may be, it is the beginning of a radical change in transportation. Fight it as they may, the street railways cannot stop the growth of the service. The rapid development of public automobile transportation during the next five years will be another wonder in the marvelous progress of the automobile. While at the present time the 'jitney' is any old automobile, it will not be long before cars well adapted to the service will appear. Moreover, the service will not be confined to cities. It will eventually cover the country from city to village and village to city, as do the interurban railways."

The letter addressed by W. Clayton, vice-president and managing director of the San Diego (Cal.) Electric Railway, to Stephen P. Kieffer, chairman of the Oakland Chamber of Commerce & Commercial Club Consolidated, in reply to his request for facts and opinions on the "jitney" bus situation, has been reprinted in pamphlet form. This letter is a review of the cause and effect of the "jitney" and the necessity for its regulation. Mr. Clayton concluded his letter as follows:

"If the 'jitney' bus is all they claim it to be, it will put the street car out of business by legitimate competition, but the competition street cars are suffering from to-day is not only not legitimate, but it is neither fair nor honest on the part of the people, the cities or the State. Street cars are willing to meet any legitimate competition if the people will give them a square deal, and I believe it is to the interest of the people, the municipalities and the State itself to see that the street railway systems of California are treated with the same measure of honesty and protection that the people themselves have demanded should be extended to them through the State and the State Railroad Commission."

LIMITING CAR CAPACITY

A meeting of the Board of Health of New York was held on March 15 to receive the protest of the New York Railways and the Brooklyn Rapid Transit Company against the orders of the board concerning the Eighty-sixth Street cars of the former company and the Graham Avenue cars of the latter. The Third Avenue Railway had agreed previous to the hearing to obey the order of the health commissioner with regard to Fifty-ninth Street by running three extra cars during the rush hours. Commissioner Goldwater stated that when the board issued an order it was presumed to be reasonable until it was proved otherwise, and that the burden of proof rested with the company protesting. He said the board was prepared to prove its case and is necessary would go to court about it. Dr. Goldwater would not admit that Mr. Peacock, counsel for the New York Railways, had any right to inspect the samples of germs, but said that he might do so. On March 16 the New York Railways notified the doctor that it would accept his order concerning the running of more cars on the Eighty-sixth street crosstown line. Dr. Goldwater wrote to Frank Hedley, vice-president and general manager of the company, that for the first few days, until passengers grew accustomed to the new regulations, policemen would assist the company's employees in observing the rules.

The Health Board had issued an order against the carriage of more than half as many standees as seated passengers by the Staten Island Midland Railway on some of its cars. Placards bearing an appeal from Dr. Goldwater to the citizens of Brooklyn, asking for their assistance and co-operation in his campaign had been posted at various points along the route of the Graham Avenue line and at the bridge terminals.

DETROIT CAPACITY ORDINANCE

The Common Council of Detroit, has passed an ordinance requiring 30 cu. ft. of air space for each passenger on the cars of the Detroit United Railway. Exception is made where cars are operating over the same tracks half a minute or less apart. The Council passed the ordinance without any hearing before any committee, and neither the street railway nor any other interested party was permitted to make known its objections. The same ordinance was defeated in committee when it was proposed several months ago, largely because the city police commissioner informed the Aldermen that he did not have sufficient men to enforce the ordinance.

The ordinance requires the board of health to measure each car and placard it with the number of passengers which may be admitted. It is estimated that the result of the ordinance will be to prohibit a standing load in excess of 40 per cent of the seated load. The new regulation becomes effective after the measure has been signed by the Mayor and then properly published.

The company in a statement to the public through its official publication, calls attention to the condition on its interurban lines and makes it plain that the surplus riders under the ordinance who board the cars beyond the city limits will be required to leave at the city limits and wait for other cars, and it suggests that a sufficient number of police be stationed at the city limits to make sure that these riders leave the cars. The employees of the two largest manufacturing concerns in the city will be affected, as both plants lie beyond the corporate limits of the city.

INCREASE IN FARES

Rate of 8 Cents, with Seven Tickets for 50 Cents, Announced by Blue Hills Street Railway, Effective April 15

The Blue Hills Street Railway, Canton, Mass., has issued the following announcement regarding changes in fares on its line effective on April 15:

"It appears to us that the only way to continue to serve the public with safety and to their reasonable satisfaction is to endeavor to increase the company's earnings. We believe that the least burdensome way to do this is to increase the unit of fare rather than to attempt to shorten the fare limit or introduce additional fare limits. We have therefore decided to increase the unit of fare to 8 cents per passenger, but to sell tickets at the rate of seven for 50 cents, which is practically a 7-cent fare.

"The new rate will go into effect on April 15 unless some order is issued by the Public Service Commission, whose decision in such matters is final.

"We hope that the change will bring in $8,000 or $10,000 in additional revenue. The increase from a 5-cent fare to a 6-cent fare resulted in about an 8 per cent increase in earnings, and, based on this figure, with the other information which we have on the general situation, we are led to believe that the above estimate is probably not far from what will prove to be the fact.

"The need of additional earnings is imperative. While the road in many respects is better off than it was at the time of the previous change in fare, and while it has reduced its deficit somewhat during that period, the cost of operation and the necessary increase in maintenance are so high that not enough is left after paying interest charges to take care of betterments, which we know must be done in the next few years in order to serve the public properly.

"We should be glad if we could hold out a hope that the increased earnings would result in dividends to the stockholders. They invested $300,000 in cash some sixteen years ago. If they had placed the money in a savings bank at that time they could now draw out $540,000. Instead they have a practically worthless security on their hands.

"The property has always been operated with the utmost economy consistent with safety and reasonable service, so that no saving can be hoped for in that direction. The tendency is rather upward in such expenditures, as is well known to every one.

"To increase fares is not a pleasant task, as it is extremely difficult to convince people of the necessity of such a move. We do hope, however, that the people of Canton and Stoughton who have had the service rendered by the Blue Hill Street Railway so many years below cost, will believe that we are acting for their ultimate best interests in seeking additional revenue.

"The investment, the earnings and the expenses are all matters of public record and the details are in our office, open to the inspection of any patron who desires to convince himself of the reasonableness of our position."

Fare Reduction Denied.—The Public Utilities Commission of Maine, has dismissed the petition of William H. Peaseless and others asking for a reduction in fares from 10 cents to 5 cents between Dunstan and Saco. The petition, in formal language charged that the Cumberland County Light & Power Company maintained discriminatory rates over the part of the line where the reduction was desired.

Accidents in Ohio.—The report of the Public Utilities Commission of Ohio for February shows that four persons were killed on interurban electric railways. Two were employees on duty and two were passengers. In all fifty-five persons were killed on steam lines, of which thirty-three were trespassers, twelve were employees on duty, two were employees off duty, one was a passenger, three were employees on the right-of-way and four were killed in highway-crossing accidents.

Washington Trail-Car Order.—The Public Utilities Commission of the District of Columbia has suspended, until July 1, 1915, Section 13 of Order No. 21 requiring separate conductors for trail cars in order to permit observations to be made with a view to determining whether the order should be amended by striking out Section 13. The Washington Railway & Electric Company and the Capitol Traction Company contended at the recent hearing before the commission that a single conductor made for safety.

Free Ride Order Amended.—The Public Utilities Commission of the District of Columbia has decided that Order No. 19 in regard to free transportation on street railways and other carriers in the District shall be amended to read as follows: "That hereafter no street railway or similar common carrier shall furnish free intra-District transportation other than to its own employees and to members of the metropolitan police, crossing police, park police, and fire department of the District of Columbia when in uniform and in the performance of their duties."

New Transfer Privilege.—An agreement has been reached between officials of the United Railroads, San Francisco, Cal., and of the Municipal Railways of that city permitting the exchange of transfers between the Stockton Street line of the Municipal Railway and the Fourth Street line of the United Railroads, on the basis of 50 per cent to each line. This gives the city lines immediate connection with the Southern Pacific Depot at Third and Townsend Streets and obviates the necessity for extension of the municipal system to this point, which would include an undesirable crossing of Market Street at a point already congested. It is probable that this new arrangement will also mean the discontinuance of the transfer agreement between the two systems at Geary and Kearny Streets as well as at the Geary and Larkin Street junction. Transfers have heretofore been exchanged at these two points on a 3-cent and 2-cent basis, in favor of the private company, and the exchange has cost the city something more than $1,000 a month.

New Wage Scale in Des Moines.—On Feb. 23 the employees of the Des Moines (Ia.) City Railway approved a new agreement with the company which went into effect on March 1. Under it the wage scale of the motormen and conductors is increased 1 cent an hour. The men will receive 25 cents an hour the first year, 26 cents an hour the second year and 30 cents an hour after the third year. The wages of the carhouse, shop and power house employees are increased 1 cent an hour and in some cases the increase amounts to several cents. Some of the men, particularly oilers and wipers, have been receiving from $2.10 to $2.30 for a ten-hour day. These hours have been reduced to eight hours and a uniform wage of $2.40 has been agreed upon. The increase for the men will average for from 7 to 9 cents. Women car cleaners have had their pay increased from $1.58 to $2 for an eight-hour day. Seniority rights are also to be applied to carhouse and shop employees.

Mr. Arnold on Service Standards.—Bion J. Arnold, chairman of the Board of Supervising Engineers, Chicago Traction, testifying before the Public Utilities Commission of Illinois on March 10, outlined his personal views of rush-hour standard of service in Chicago. He divided the so-called "rush hour" into five parts as follows: For the first and last parts, consisting of twenty-five minutes each, fifty-three passengers per car, allowing 11 sq. ft. to each standing passenger. For the second and fourth parts, consisting of twenty-five minutes each, seventy-three passengers, allowing 4¼ sq. ft. to each standing passenger. For the third or middle part, this being the crest of the rush period, an average load not to exceed the number of seats and one standing passenger to each 3½ sq. ft. Mr. Arnold said that during the crest of the rush-hour period, the 600 largest cars would have a capacity of eighty passengers each, according to this idea of a service standard. He believed the present terminal facilities of the surface lines in Chicago to be such as to allow reasonable and adequate service.

Safety on Public Service Railway.—The Public Service Railway, Newark, N. J., is carrying an advertisement in the daily newspapers calling attention to its record for safety. The advertisement is 15 in. wide by 10 in. deep, and deals particularly with the commendation received from the judges in the contest for the Anthony N. Brady medal. The company says that during three years 1,194,793,266 passengers were carried without a single fatality due to collisions between cars or derailments. After reciting the object, the offer and the conditions of the Brady award the company said in part: "The Public Service Railway began its efforts to promote and safeguard the lives of its patrons and employees years before any contest was thought of. Its entry for the Brady medal was an incident. Its main purpose was, is and will continue to be to transport the public safely. The company management and the company employees will pursue the policy of doing everything possible to eliminate accidents and conserve life and health. It asks for the co-operation of the public so that the good work may be maintained for the benefit of all."

Accidents in New York and New Jersey in February.—According to the report of the National Highway Protective Society eighteen persons were killed during February by automobiles on the streets in New York City, nine of these being children under seventeen years of age. Electric railways caused the death of five and wagons four, as compared with ten by electric railways and two by wagons in February a year ago. Edward S. Cornell, secretary of the Highways Society, states that on account of the great increase in the number of automobiles it is necessary that all operators of automobiles should be licensed. The society will have a bill introduced along those lines in Albany. During February six persons met their death by automobiles, three by electric railways and one by wagon on the streets and highways of New York State outside of Greater New York, as compared with three by automobiles and four by electric railways last year. In New Jersey six persons were killed by automobiles and one by electric railway.

Survey of Transit Conditions in Brooklyn.—The Public Service Commission for the First District of New York has published in pamphlet form the survey of transit conditions on the Brooklyn Rapid Transit System submitted to the commission by Joseph Johnson, chief of its transit bureau. The survey is dated Dec. 31, 1914, and is addressed to Edward E. McCall, chairman of the commission. It contains 126 pages and cover. The report was rendered in connection with the inquiry before the commission regarding the service on the surface lines of the Brooklyn Rapid Transit Company, and its contents and recommendations have been referred to previously in the ELECTRIC RAILWAY JOURNAL. The final argument of the company before the commission in connection with this inquiry was made before the commission on March 8, on which date D. A. Marsh, counsel for the Brooklyn Heights Railroad and other surface companies, summed up the case of the company. Mr. Marsh's brief in this connection was referred to in the ELECTRIC RAILWAY JOURNAL of March 13, 1915, page 532.

Personal Mention

Mr. E. Blaine Moore, formerly chief engineer of the Consolidation Coal Company, has been appointed assistant general manager of the Monongahela Valley Traction Company, Fairmont, W. Va.

Mr. W. L. Martin, who has been in charge of the legal department of the Alabama Traction, Light & Power Company, New York, N. Y., has been appointed vice-president and chief counsel of the company.

Mr. James O. Watson, formerly general manager of the Monongahela Valley Traction Company, Fairmont, W. Va., has been made vice-president. Mr. Watson will continue in active management of the railway.

Mr. Smith Hood, formerly general superintendent of the Monongahela Valley Traction Company, Fairmont, W. Va., has been made general manager to succeed Mr. James O. Watson, who becomes vice-president, as noted elsewhere.

Mr. C. K. Morrell, has resigned as superintendent of lighting with the Kentucky Traction & Terminal Company, Lexington, Ky., and has been succeeded by Mr. Washington Reed, lately of Smithfield, Va. Mr. Morrell, it is said, will enter business in Lexington.

Mr. James Mitchell, president of Alabama Traction, Light & Power Company, New York, N. Y., has been elected president of Alabama Power Company, the principal operating subsidiary, to succeed Mr. Frank S. Washburn, who became chairman of the board.

Mr. C. C. Cole, who has been day dispatcher of the Lewiston, Augusta & Waterville Street Railway, at Augusta, Me., has been appointed division superintendent of transportation of the company, succeeding Mr. Sherman W. Dunn. Mr. Cole was with the company for seven years.

Mr. L. M. Levinson, formerly manager of the Mineral Wells Traction & Light Company, Mineral Wells, Tex., and manager of the Shreveport (La.) Traction Company, has been engaged by the Bryan-College Interurban Railway, Bryan, Tex., to supervise the electrification and start operations under the new plan of the company.

Mr. Sherman W. Dunn, who has been connected with the Lewiston, Augusta & Waterville Street Railway as division superintendent of transportation, has resigned that office but will continue with the company at Augusta, Maine. Mr. Dunn has been connected with the company for twenty-three years. He entered its employ in the carhouse of the Augusta, Hallowell & Gardiner Railroad two years after that company commenced operating.

Mr. H. S. Newton, until recently general manager of the Mesaba Railway, Virginia, Minn., has been appointed general manager of the Ohio Valley Electric Railway, Huntington, W. Va., to succeed Mr. W. W. Magoon, resigned. Before becoming connected with the Mesaba Railway, Mr. Newton was general manager of the Hartford & Springfield Street Railway, Warehouse Point, Conn., for nine years. He was graduated from Ohio State University as an electrical engineer and has served with the General Electric Company, the Wheeling (W. Va.) Railway, the Syracuse (N. Y.) Railway, the Syracuse Consolidated Street Railway, the Syracuse Rapid Transit Company, the Syracuse, Lakeside & Baldwinsville Railroad and the Beaver Valley Traction Company, Pittsburgh, Pa.

Mr. Robert Trimble, first vice-president of the American Railway Engineering Association, was elected president at the annual convention in Chicago on March 16, 17 and 18. Mr. Trimble was born at Butler, Pa. After completing a public school course he entered the Western University of Pennsylvania (now the University of Pittsburgh), where he remained for three years. In July, 1875, he entered the service of the Pennsylvania Railroad as a messenger in the office of the chief engineer at Pittsburgh. He was then successively chainman, rodman, levelman, transitman, draftsman, assistant engineer and principal assistant engineer. He was made chief engineer of maintenance of way of the Pennsylvania lines in 1903. His jurisdiction is over the Northwest system of the lines west of Pittsburgh.

Mr. William D. Ray has resigned as vice-president and manager of the Northern Indiana Gas & Electric Company's properties at Hammond, East Chicago, and Whiting, Ind., to become general manager of the newly organized Pennsylvania Utilities Company, with headquarters at Easton, Pa. The latter company operates in nearly fifteen communities contiguous to Easton, containing many quarries and large manufacturing plants. Mr. Ray entered the electrical field as electrical engineer for the Chicago & Northwestern and Northern Pacific railroads, and later was connected with the World's Columbian Exposition, Chicago, as assistant superintendent of electrical operation. In 1894 he was general superintendent of the Everett (Wash.) Street Railway, and later he became sales engineer for the Loraine Steel Company. Subsequently he was electrical engineer for two traction lines operated by the Detroit Construction Company, following which he superintended the construction of the Grand Rapids, Grand Haven & Muskegon Railway. In 1908 he was appointed contract agent of the Sanitary District, Chicago, and in 1910 went to Hammond for the Northern Indiana Gas & Electric Company.

Mr. Oscar T. Crosby has been appointed to take general charge of the distribution of supplies for the Commission for Relief in Belgium, and also a member of the executive committee. Mr. Crosby's headquarters will be in Brussels, and, as general director of distribution, he will succeed Mr. A. N. Connett, chief engineer and joint-director of J. G. White & Company, Ltd., whose appointment was mentioned in the ELECTRIC RAILWAY JOURNAL for Dec. 26, and whose business affairs permitted him to take the appointment only temporarily. The Commission for Relief in Belgium, whose work in that country Mr. Crosby will direct, is an American organization exclusively, with headquarters at 71 Broadway, New York. It is supported by voluntary contributions and has a fleet of forty-three vessels constantly carrying food and other supplies from America to the destitute in Belgium, estimated at present to be about 1,500,000 persons. The commission has been officially recognized by both the Allies and Germany. Mr. Crosby resigned from active electric railway management some few years ago, so that he has the time to devote to this work, and for it his extensive experience in administrative affairs and his knowledge of the French and German languages eminently fit him. Since his return from an exploring trip in Borneo last year Mr. Crosby has been very much interested in the proposed International Court of Decree and Enforcement, under which it is proposed to establish an international court at the Hague or some other suitable place, with sufficient international military and naval force to carry out its decrees. He has written a pamphlet advocating this plan which has been widely circulated and has been translated into a number of languages, including Japanese and Chinese. A joint resolution committing the United States to the acceptance of this plan was introduced in the Senate last month by Senator Shafroth, and a similar resolution was introduced in the House. These resolutions did not succeed in passing at the recent session of Congress, but Mr. Crosby hopes that they will be introduced at the next session. Among others who have actively been engaged with Mr. Crosby in support of this plan has been Mr. Elihu Root.

OBITUARY

J. C. Rothery, of the Canadian Northern Railway, was found dead on March 10 near the Grand Trunk Railway tracks at Weston, Ont., having apparently fallen from a train. Mr. Rothery was born in Glasgow sixty-seven years ago. His first practical experience in railway building was gained during the construction of the Niagara Gorge Railway between Niagara Falls and Lewiston. He was afterward appointed manager of the line, and when the Niagara Falls, Park & River Railway was merged with the International Railway, Buffalo, he was made general manager of the system at the Falls. He next superintended the construction of the International Bridge across Niagara River at Lewiston. Upon the completion of the bridge he was appointed general manager of the East Liverpool Railway & Light Company, East Liverpool, Ohio, where he remained until 1910. He then entered the service of the Mackenzie and Mann interests as general manager of the Monterey Railway, Light & Power Company, Monterey, Mexico, and later supervised the building of the electrical line of the Toronto & Eastern Railway on the north shore of Lake Ontario. Since that time he has been superintending general construction work for the company, which is a Mackenzie and Mann interest.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Panama (Pa.) Traction Company.**—Application for a charter has been made in Pennsylvania by this company to take over the property of the defunct Sugar Grove Electric Railway and extend the line through Youngsville, Sugar Grove, Jamestown, Lakewood, Panama, Sherman and probably Findlay Lake and North East.

***Petersburg & Appomattox Railway, Petersburg, Va.**—Chartered in Virginia to build an electric railway from Petersburg to City Point, 5 miles. Capital stock, $100,000. Officers: T. M. Wortham, president; B. W. LaPrade, vice-president, and W. W. Alexander, secretary and treasurer.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council for an extension on Central Avenue in Los Angeles.

Louisville, Ky.—The Board of Public Works of Louisville has begun advertisement of the franchise for electric railway rights and privileges represented by the extension of the Chestnut Street line of the Louisville Railway. The franchise is to run for twenty years and an upset bid of $500 is provided for.

Geneva, N. Y.—The Geneva, Seneca Falls & Auburn Railroad has asked the Council for a franchise to double-track Exchange Street from Seneca to the New York Central tracks in Geneva.

Lancaster, N. Y.—The Buffalo & Depew Railway has asked the Council for a franchise to extend its lines from its present terminus, through Ellicott Road and Central Avenue to the New York Central Railroad tracks in Lancaster.

Cincinnati, Ohio.—The City Council has adopted an ordinance requiring the Cincinnati Street Railway and the Cincinnati Traction Company to extend the Warsaw Avenue route along Glenway Avenue from Wilder Avenue to Seton Avenue in Cincinnati. Council's action was on the request of the Citizens' Club, of Price Hill, and the West Hills Allied Improvement Association.

Linden, Ohio.—Council committee on railroads has approved the ordinance creating the electric railway route from the Leonard Avenue viaduct to Linden and also to Shepard. The term of the franchise is to be twenty-five years and if the terms offered by the East Linden Electric Railway Company, which has applied for the franchise, are satisfactory, the franchise will be granted the company. The Shepard line will compete with the Columbus, New Albany & Johnstown Traction Company.

Three Rivers, Que.—The Three Rivers Traction Company has received a twenty-year franchise from the Council in Three Rivers. This is part of a plan to build a 30-mile railway in Three Rivers. The present intention of the company is to build 5½ miles of track within the city limits. [Aug. 1, '14.]

Toronto, Ont.—The Forest Hill Electric Railway has asked the Ontario Legislature for an extension of time on its franchise in which to build its projected railway on Forest Hill Road, Toronto, northerly, and northwesterly to 2½ miles north of Eglinton Avenue, also on Eglinton Avenue to 1 mile west of Dufferin Street and northerly on Dufferin Street 2½ miles. W. E. Grierson, Toronto, is interested. [Feb. 27, '15.]

Montreal, Que.—The Montreal & Southwestern Railway & Power Company has applied to the Quebec Legislature for an extension of time for the building of this projected line from Adirondack Junction, on the Canadian Pacific Railway, along the St. Lawrence River to the International boundary, and another line from Adirondack Junction, on the New York Central Railroad, to Sunder, Quebec. The provisional directors are: V. Casson, L. Dansereau, A. Geoffrion, G. N. Cusson, R. Gange, Montreal, Quebec. The company has power to operate by steam or electricity.

TRACK AND ROADWAY

Florence & Huntsville Interurban Railway, Florence, Ala.—Surveys have been begun and preliminary arrangements are being made by this company on its 75-mile line to connect Florence, Rogersville, Athens and Huntsville. There will be three power stations and the repair shops will be located at Florence. Capital stock, authorized, $100,000. Officers: S. Jacobs, Birmingham, president; Alan Jemison, vice-president; Thurston H. Allen, Florence, secretary and general manager, and T. W. Pratt, Huntsville, treasurer. Headquarters: Florence. [Dec. 19, '14.]

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made to begin work soon laying new tracks on North Fair Oaks Avenue in Pasadena. The company has placed in operation its extension to connect Riverside, Arlington and Conora. [Nov. 14, '14.]

Capital Traction Company, Washington, D. C.—Plans are being made by this company to build a line on Seventeenth Street in Washington.

Washington & Maryland Railway, Washington, D. C.—This company has filed with the Public Utilities Commission a request for permission to extend its lines from Third Street and Kennedy Street to Thirteenth Street and Ohio Avenue northwest in Washington.

Atlanta & Carolina Railroad, Atlanta, Ga.—Arrangements are being made by this company to complete this electric line in the near future. The right-of-way has been purchased and the roadbed has been completed for a part of the way.

Lula-Homer Railroad, Lula, Ga.—Bids are being received until March 30 by this company to build its 14-mile proposed line from Lula to Homer. The track is to have 3000 ties per mile and 60-lb. relaying rails. D. G. Zeigler, engineer. [Nov. 7, '14.]

Chicago & Northern Interurban Railroad, Chicago, Ill.—No definite plans have yet been decided upon by this company when work will be begun on its line to connect Fox Lake, Lake Geneva, Barrington, Des Plaines, Park Ridge, Niles Center, Chicago and smaller towns between these cities. Headquarters: 127 North Dearborn Street, Chicago, Ill. [Feb. 27, '15.]

Illinois Traction System, Peoria, Ill.—A branch line to extend from near the Martin stop, 1½ miles north of Lincoln, and eastward to Wapella, 4 miles north of Clinton, is being planned by this company.

***Elkhart, Ind.**—It is reported that H. E. Bucklen, Elkhart, Ind., will shortly apply for a supplementary charter for an electric railway line between the Indiana-Ohio state line and Toledo. Should this line be built it will form a through route between Toledo and Chicago in connection with the Bucklen roads and others already in operation.

Charles City Western Railway, Charles City, Ia.—Electrifying 18.5 miles and building 7½ miles of extensions will be completed by this company by Nov. 1.

Tri-City Railway, Davenport, Ia.—Rails have been ordered for the Fourth Street line which this company will build in Moline.

Caney Light & Railway Company, Caney, Kan.—Within the next thirty days this company expects to purchase one carload of poles, 25 ft., 30 ft. and 35 ft. in length. J. C. Miller, manager.

Louisville & Interurban Railway, Louisville, Ky.—An extension of the Orell line into West Point is being planned by this company.

Southwestern Traction & Power Company, New Iberia, La.—Plans are being made by this company to build soon a line from Jeanerette to St. Martinville.

St. Tammany & New Orleans Railway & Ferry Company, New Orleans, La.—This company, which has been operating a motor-car railway between Mandeville, Abita Springs and Covington, La., 13½ miles, will, it is stated, convert its railway to electric operation. Reconstruction of the track has been begun, and the erection of an electric power plant will be begun at once.

Winnipeg (Man.) Electric Railway.—The Manitoba Legislature is being asked to amend the company's charter by adding to its powers.

Union Street Railway, New Bedford, Mass.—Work has been begun by this company laying new rails on Kempton Street in New Bedford.

International Railway, Buffalo, N. Y.—Plans are being made by this company to double-track its line on Virgil Avenue as far as Kenmore Avenue in Buffalo.

Ithaca (N. Y.) Traction Corporation.—This company is making surveys of the Mitchell Street and Stewart Avenue lines in Ithaca.

Wallkill Transit Company, Middletown, N. Y.—Plans are being considered by this company for an extension from Midway Park to connect with the extension of the Newburgh line from its Walden terminal, and taking in the towns in the adjacent territory, including Maybrook, Montgomery and Campbell Hall.

Long Island Railroad, New York, N. Y.—President Ralph Peters, of this company, has replied favorably to an inquiry made by the Public Service Commission as to whether his company would entertain a proposition on behalf of the City of New York for the extension of the City Rapid Transit Railroad from Corona to and through Flushing, by making a connection with its tracks at a point in Flushing Meadows, near the interlocking tower, at Flushing Junction; thence over its tracks on the Whitestone Branch, by way of Flushing (Bridge Street), to Whitestone, and by way of Flushing (Main Street) to the city limits, at Little Neck. Mr. Peters in his reply says he is willing to co-operate with the city in providing such service by permitting the use of his company's tracks through the territory described.

New York, N. Y.—New bids are desired April 9 by the Public Service Commission, First District, 154 Nassau Street, for the construction of Section 4 of the routes 4 and 36, a part of the Broadway, Fourth Avenue Rapid Transit Railroad in Manhattan. The work consists of a two, four and six track underground railroad northerly under Seventh Avenue, from Fifty-first Street to Fifty-ninth Street, and easterly under Fifty-ninth Street to a point 22 ft. west of westerly building line of the Seventh Avenue extended.

Geneva, Auburn & Seneca Falls Railroad, Seneca Falls, N. Y.—Plans are being made by this company to double-track its line from the Seneca Street switch to the New York Central crossing in Geneva.

Asheville Power & Light Company, Asheville, N. C.—An extension of its railway lines in Kenilworth Park in Asheville is being planned by this company.

***Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.**—This company, the incorporation of which is announced elsewhere in this issue, is making plans to begin work soon on the proposed 49-mile electric line from Ossipee to Durham. The route includes 58 villages. It is stated that interests connected with the Piedmont Trust Company and the North State Realty Company, both with headquarters at Burlington, and their interests are back of the railway plan, also that after the charter is obtained the several counties to be traversed will be asked to call elections on proposed bond issues to make subscriptions to the stock of the railway company. Junius Harden, Burlington, is among those interested.

Consolidated Railways, Light & Power Company, Wilmington, N. C.—First rails have been laid by this company from its loop at the entrance to the Navy Yard toward North Charleston, a distance of 2 miles.

Pictou County Electric Company, Ltd., Stellarton, N. S.—Work will be begun about April 1 on the extension to Parkdale.

Northern Ohio Traction Company, Akron, Ohio. — New track will soon be laid by this company on West Tuscarawas Street in Canton. A 90-lb. T-rail on steel ties and concrete foundation will be used for the new track. Plans are going forward whereby work will soon be begun on both the Arlington Street line from Spicer Street to Market Street and the extension of the East Exchange Street line in Akron.

Cleveland, Ohio.—Residents of the eastern section of Cleveland, Ohio, are urging the extension of the Payne Avenue line to connect with the 105th Street line. Street Railway Commissioner Peter Witt is opposing this on the ground that the cost will be $25,000. He informed a meeting of the citizens that he would under no condition approve of the extension. Conferences relating to the proposed new East Cleveland franchise have been postponed until arrangements are complete for improvements on Euclid Avenue.

Dayton, Ohio.—It is reported that the electric railway companies of Dayton, Ohio, will spend $100,000 this season in the construction of tracks and plans for rerouting cars. At a conference of the presidents of the companies on March 10 plans were tentatively arranged for rerouting in order to allow the changes that have been planned on Main Street, between Monument and Fifth Streets in Dayton.

Ohio Valley Traction Company, Portsmouth, Ohio.—Contracts are being awarded by this company to build the extension from Sciotoville to Ironton.

New Castle Traction Company, Youngstown, Ohio.—Plans are being considered by this company to build a line on Atlantic Avenue and also to construct a terminal loop on the public square in New Castle.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—Plans are being made by this company to award contracts and to begin work within the next sixty days on the 130-mile line to connect Columbus, Galena, Baxter Springs, Miami, Centralia, Collinsville and Tulsa. Surveys have been completed between Columbus and Baxter Springs and are now under way between Columbus and Tulsa. John R. Rose, Oklahoma City, president. W. K. Palmer, Kansas City, chief engineer. [Feb. 13, '15.]

Aylmer, Ont.—A by-law will be submitted to the ratepayers in the near future, authorizing the guarantee of their share of the bonds of the proposed hydro radial from Tillsonburg to London.

Hamilton, Ont.—The Board of Control has decided to ask the Provincial Hydro-Electric Railway to survey route for radial line from Hamilton to Fort Erie.

Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.—It is reported that work will soon be begun by this company on the Perth and Smith Falls section of this projected railway. The line will extend through Rideau Ferry, and not as originally planned. [Feb. 20, '15.]

Toronto, Barrie & Orillia Railway, Toronto, Ont.—This company has applied to the Ontario Legislature to authorize the reduction of their capital stock and for an extension of time for the building of the projected line in Barrie, Ont., northerly to Orillia and southerly to Toronto.

***Toronto, Ont.**—Plans are being considered by citizens in and around Baysville, Ont., for the construction of a Hydro-Electric Radial Railway from Bracebridge through to the Wa Wa Hotel and ultimately extending to the Algonquin Park headquarters in the Muskoka district. The project has been endorsed by the Council and Board of Trade of Bracebridge and by the Councils of Baysville, Sherbourne, Nightingale and Clintock Townships. The projected line from Bracebridge to the Wa Wa will be about 24 miles, and power can be easily secured from any one of the numerous falls along the river. There are no engineering difficulties in the way. Sir Adam Beck has promised to give the matter every consideration.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—Plans are being made by this company to build an extension on Bridge Street of the Falls division from Erie to Victoria Avenue, in Niagara Falls.

Willamette Valley Southern Electric Railway, Portland, Ore.—This company has placed in operation its line between Oregon City, Beaver Creek, Mulino, Molalla and Mount Angel. G. B. Dimmick, president. [Jan. 2, '15.]

Easton (Pa.) Transit Company.—During the next few weeks this company plans to rebuild its track on its South Side line, a distance of about 3 miles, using creosoted ties and 110-lb. Dudley section T-rail. These rails are manufactured by the Bethlehem Steel Company.

Conestoga Traction Company, Lancaster, Pa.—Surveys have been completed by this company for a new line 13 miles in length to be a branch of the Lancaster and Coatesville division. The new line will begin about 1 mile east of Conestoga Park, near Millinger's Church, follow along the old turnpike to the Horse Shoe Road, and along it to Witmer, whence it will cross the country to Bird-in-Hand, and thence along the old Philadelphia turnpike to Intercourse.

***New Castle, Pa.**—James L. Freeble, Pittsburgh, and associates are considering plans to build an electric railway from the corner of Haywood Street in Farrell to Mercer and New Castle.

Monongahela (Pa.) Railways.—Hereafter the company operating the railroad between Brownsville and Fairmont, W. Va., will be known as the Monongahela Railways Company, the name having been officially changed from the Monongahela Railroad Company the first of this month. The work of completing the line near Fairmont is now in progress and it is expected that service will be established in the near future.

Eastern Pennsylvania Railways, Pottsville, Pa. — Announcement has been made by this company of the abandonment of plans by the company to build an electric railway over Broad Mountain to connect Pottsville with Shenandoah. This line will now be constructed by the Schuylkill Electric Railway.

Reading Transit & Light Company, Reading, Pa.—Improvements to its lines in and about Reading, which are expected to cost about $200,000, will be begun by this company as soon as the weather permits.

Montreal & Southern Counties Railway, Montreal, Que.—Work will be begun soon on the extension to Youville Square in Montreal.

Ogden, Logan & Idaho Railway, Ogden, Utah.—The stockholders of this company have authorized the issue of bonds for extension and other improvements on the company's lines in the sum of $10,000,000. It is said that the company will use $2,000,000 to pay off present obligations and to make immediate extensions, the remainder being reserved for future corporate purposes. Included in the work which is contemplated for the future is the construction of an interurban extension to Preston, Idaho.

Clarkston, Wash.—A. G. Nortz, promoter of the proposed electric railway through the Lewiston-Clarkston Valley, has announced that construction on the line will be begun at once. The contract has been awarded to Edward McGarry, Lewiston, to build the section of the line across the Snake River. [Jan. 19, '15.]

SHOPS AND BUILDINGS

Brantford (Ont.) Municipal Railway.—The commissioners have approved of this company's plans for a new passenger station to be built on the site of the old powerhouse on Colborne Street in Brantford. Work on the station will probably be started at once.

Hershey (Pa.) Transit Company.—This company's new carhouse in Hershey is nearing completion.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—This company has awarded a contract to the Shand Engineering Company to build a new carhouse at Main Street and Rice Street in Columbia.

POWER HOUSES AND SUBSTATIONS

Ohio Light & Power Company, Shawnee, Ohio.—Within the next two months this company expects to erect new substations in Shawnee and Straitsville for the purpose of distributing electricity received from the Newark plant. When completed the local plant will be closed down.

Oil Belt Terminal Railroad, Oklahoma City, Okla.—Plans are being made by this company to build a new power plant on Lagoon Creek, between Oilton and Jennings, Okla. Frank Brown, president. [Oct. 17, '14.]

Reading (Pa.) Transit Company.—An order has been placed by this company with the Westinghouse Electric & Manufacturing Company for three 185-kva., single-phase, sixty-cycle, 2300-volt high tension, rotary low tension, outdoor type O. I. S. C. transformers.

Southwestern Traction Company, Temple, Tex.—A new substation is being built by this company in the western section of Temple.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Work will be begun in the spring by this company on a new generating station to take the place of the present power house in Parkersburg. Sanderson & Porter, New York City, engineers, are expected to have preliminary details ready within sixty days.

Manufactures and Supplies

ROLLING STOCK

Toronto (Ont.) Civic Railway is considering the purchase of ten more cars at a cost of $100,000.

Illinois Traction System, Peoria, Ill., has ordered from the Haskell & Barker Car Company fifty hopper bottom gondola cars, fifty-ton capacity.

Brantford (Ont.) Municipal Railway has ordered three single-truck pay-as-you-enter city cars from the Preston Car & Coach Company, Ltd., Preston, Ont.

Toronto (Ont.) Railway on March 8 placed in operation seven cars fitted with cross seats. Only one of the cars is new, the others being old cars remodeled and reconstructed.

Alberta & Great Waterways Railways, Winnipeg, Man., Can., has purchased two McKeen 55-ft. steel combined passenger-baggage 200-hp gasoline motor cars for service in northwestern Alberta.

New York State Railways, Rochester, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of March 13, 1915, as asking for bids on one sample car, has ordered this equipment from the G. C. Kuhlman Car Company.

Ogdensburg (N. Y.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1915, as expecting to purchase four one-man cars, has ordered this equipment from the Wason Manufacturing Company.

Carolina & Yadkin River Railway, High Point, N. C., has ordered from the Southern Car Company one electric locomotive for the purpose of moving cars over the tracks of the North Carolina Public Service Company in the city of High Point.

Boston & Worcester Street Railway, Boston, Mass., noted in the ELECTRIC RAILWAY JOURNAL of March 6, 1915, as expecting to purchase new cars, has ordered five interurban closed cars from the Osgood-Bradley Car Company, and five open cars from the Wason Manufacturing Company. The open cars will be equipped with rattan seats.

Ogden, Logan & Idaho Railway, Ogden, Utah, has ordered a 50-ton Baldwin-Westinghouse electric locomotive. This locomotive will be quipped with Westinghouse field control No. 562-A-5 motors and type HLF control, arranged for full speed operation on 750 or 1500 volts. The locomotive will be used for freight service and with 25 per cent adhesion will exert a maximum tractive effort of 25,000 lb.

TRADE NOTES

Fairmont Machine Company, Fairmont, Minn., has changed its name to the Fairmont Gas Engine & Railway Motor Car Company.

Carlton R. Mabley, for the past five years general manager of the R. I. V. Ball Bearing Company, has joined the selling organization of the S.K.F. Ball Bearing Company.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has received an order for gears and pinions for the four new cars which have recently been ordered by the Kansas City, Clay County & St. Joseph Railway.

American General Engineering Company, New York, N. Y., has secured a renewal contract on its A. G. E. reinforced trolley wheels for the 1915 requirements of the Brooklyn (N. Y.) Rapid Transit Company.

G. Drouve Company, Bridgeport, Conn., has received an order for "anti-pluvius" puttyless skylights and "straight-push" sash operators for the new group of buildings which the Stone & Webster Engineering Corporation is constructing for the Massachusetts Institute of Technology, Boston, Mass.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., advises that the United Railways of St. Louis has placed contracts for the following open hearth titanium treated rails to be rolled during the second quarter of this year: with the Lorain Steel Company, 1400 tons; with the Illinois Steel Company, 1350 tons; with the Pennsylvania Steel Company, 800 tons. The Los Angeles (Cal.) Railway has also ordered from the Lorain Steel Company 500 tons and from the Pennsylvania Steel Company 1000 tons. All of these rails are to be treated with 0.1 per cent titanium, added in the form of ferro carbon-titanium.

Prepayment Car Sales Company, New York, N. Y., held its annual meeting on March 16, and the president's report showed that a very satisfactory business had been done during the past year. Reference was made to the development of safety devices in connection with car door and step operating mechanism and the further development of pneumatic devices for electric railway and interurban cars. The report further states that owing to the increase in business during the past year the company had taken over full control of its sales, with its own special representatives, and had cancelled the sales agency of the Electric Service Supplies Company, which theretofore was general sales agent for the company.

Thomas R. Woulfe has resigned as manager of the light and power department of the Cleveland, Southwestern & Columbus Railway, effective April 1, 1915. He will enter into partnership with Frank B. Rae, at present consulting engineer, 315 Engineers' Building, Cleveland, under the name of the Rae-Woulfe Company, consulting, electrical and mechanical engineers. Mr. Woulfe has held his present position for three years. He was formerly superintendent of the gas and electric property of the Illinois Northern Utility Company at Sterling, Ill.

Westinghouse Electric & Manufacturing Company has received the following orders for electrical equipment: Corpus Christi Street & Interurban Railway, No. 323 motors and K control; Burlington (Vt.) Traction Company, No. 101-B-2 motors and K-28-B control; Tidewater Power Company, Wilmington, N. C., No. 323-A motors and K-10-J control. The Shore Line Electric Company has ordered ten double truck cars from the Wason Manufacturing Company, to be equipped with Westinghouse No. 632-B M ventilated motors and type HL control. The Charleston & Interurban Traction Company will soon place in service six new passenger cars equipped with Westinghouse No. 306 motors and K-36-J control.

Union Switch & Signal Company, Swissvale, Pa., at the annual meeting of its stockholders on March 9 in the Westinghouse Building, Pittsburgh, Pa., elected the following directors: J. D. Callery, J. J. Donnell, William McConway, J. R. McCune, J. R. McGinley, M. S. Rosenwald, T. W. Siemon, W. D. Uptegraff and H. H. Westinghouse. The newly elected directors later went into executive session and chose the following officers for the ensuing year: President, Mr. Uptegraff; vice-president and treasurer, Mr. Siemon; secretary and assistant treasurer, Thomas S. Grubbs; assistant secretary, G. F. White. The new executive committee that was appointed is composed of Messrs. Callery, Donnell, McCune, Siemon and Uptegraff.

McIntosh & Seymour Corporation, Auburn, N. Y., has two of its new Diesel type oil engines on exhibition at the Palace of Machinery at the Panama-Pacific Exposition. The larger of these oil engines is of 525 brake-hp and is the largest and most powerful of its class in the exposition. It is using fuel oil supplied at the header of Machinery Palace. At the price of 92 cents per barrel of 42 gal. this fuel will give about 850 brake-hp hr., or say 525 kw-hr., at a cost of $1. The machine is of the four-cylinder type, and, operating on the four-stroke cycle, develops this power at 165 r.p.m. The smaller Diesel engine shown by the McIntosh & Seymour Corporation is a four-cylinder set of 280-brake-hp capacity designed to turn at 200 r.p.m. In character it is distinguished from the larger set chiefly by its greater compactness due to the higher running speed.

Royal Manufacturing Company, Rahway, N. J., announces that hereafter it will sell its cotton and wool waste under guarantees that are asserted to be new in this field. One guarantee is that the purchaser will always get exactly what he orders. This will be accomplished by providing the customer with a sampling folder which contains six white and six colored grades of cotton waste. A second guarantee is that the tare of "Royal" waste will be limited to 6 per cent, the company refunding the difference on all bales upon which the tare is overweight. A third guarantee is that of furnishing bales to exact weight. The determination of the company to conduct its business on a high plane is shown also in the adoption of a trade-mark, "Our Waste Is Your Gain," in the stamping of the word "Royal" on each steel band and the adoption of the phrase "Look for the Brand on Each Steel Band." The packing of the bales has been standardized, clean, light burlap and new steel bands being used instead of rope or shabby burlap.

James Walker and George H. Cressler have announced their association under the firm name of Walker & Cressler, consulting engineers, with offices at 742 First National Bank Building, Chicago. Mr. Walker has been engaged in consulting practice in Chicago for ten years, being identified during that period with work in connection with the Chicago Elevated Railways, the Chicago Surface Lines, the Chicago Association of Commerce Committee of Investigation on Smoke Abatement and Electrification of Railway Terminals, various electric railroad, lighting and power companies, and financial institutions interested in public utility properties. Mr. Cressler has been the past ten years vice-president and chief engineer of the Kerr Murray Manufacturing Company, Fort Wayne, Ind.

Southwark Foundry & Machine Company, Philadelphia, Pa., announces that it has secured the exclusive United States license to manufacture the Harris valveless engine, Diesel principle, which will hereafter be known as the Southwark-Harris valveless engine. The engine will be built in sizes from 75 brake-hp to 1000 brake-hp for both marine and stationary service. The recent extensive improvements which the company has made to its plant and equipment insure the proper facilities for the manufacture of this engine. The company has added to its engineering staff Leonard B. Harris, the inventor of the Harris valveless engine, as consulting engineer and naval architect, and his extensive experience in power engineering, especially in the marine field, will be available for all prospective customers. J. P. Johnston, who has been interested in and connected with the development of the Harris valveless engine, will also be associated with the company in charge of its oil engine sales. The Southwark Foundry & Machine Company will also continue to manufacture a full line of steam turbines, d.c. and a.c. generators, centrifugal air compressors, centrifugal blowers, turbine pumps, hydraulic pumps, hydraulic presses, steam hydraulic presses, surface, jet and barometric condensers and air pumps.

ADVERTISING LITERATURE

Economy Welding Machine Company, Kansas City, Mo., has issued a catalog which describes and illustrates its portable welding outfits which are equipped with welding and carbon remover torches.

Whiting Foundry Equipment Company, Harvey, Ill., has issued a large sheet which contains a reprint of the rules for safely operating cranes as issued by the National Founders' Association.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-35, which supersedes Bulletin D-30, and which describes and illustrates its Universal electric drill for operating on direct or alternating current.

Ohio Brass Company, Mansfield, Ohio, in its January-February, 1915, *O-B bulletin* illustrated several of the difficult features of overhead work constructed by the Memphis (Tenn.) Street Railway, in which O. B. overhead materials are used.

Atlas Preservative Company of America, New York, N. Y., has issued a catalog describing its methods for using "Atlas A" weed killer and track preservative. Through the elimination of track vegetation the performance of section gangs is confined by the aid of this method to the essential upkeep of track structure without the usual interruptions that result from the necessity of removing vegetation. The equipment for sprinkling the weed-killer, photographs of which are shown in the catalog, consists of one or more tank cars fitted with spraying apparatus and all necessary accessories for handling the chemical. The catalog contains a number of pairs of illustrations taken on several railroads showing their weed-infested condition, before applying the preservative, and their total absence from vegetation several months after application, which are self-explanatory in demonstrating the effectiveness of the weed killer. A repellent compound, designed to prevent cattle from grazing on the treated area, is used wherever advisable and is included in the service given.

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THE MEANING OF LOW REPAIR COSTS

Although we have come to regard locomotive maintenance costs only as incidental to electrification problems, the record of the New York Central's equipment, published in last week's issue, possesses from one angle a very considerable degree of importance to those interested in the electrification of steam railroads. The units in question have been kept in repair during the past eight years at a figure that has remained consistently close to 3½ cents per locomotive-mile, and although this fact does not prove that all electric locomotives in the country will be maintained at the same rate of expense, it does show what can be done. The low cost is, obviously, the result of skilful management on the part of the New York Central's equipment-maintenance department, this being shown in the road's maintenance cost of some 1.9 cents per car-mile for its multiple-unit cars, but since good management certainly ought to be available on any line similar results can hardly be considered impossible of duplication elsewhere. Upon the assumption that this is the case, a somewhat surprising conclusion develops. An electric locomotive that costs 3½ cents for repairs saves just about 10 cents per mile over the repair cost of the steam locomotive that it displaces. This saving alone, even when based upon a low annual mileage of 36,000, will pay 8 per cent interest on the cost of the electric unit, and inasmuch as twice this mileage is possible, the high first cost of the electric locomotive ceases to be of import under high-grade supervision.

THE AUTO-BUS EIGHTY YEARS AGO

The present "jitney" bus agitation has undoubtedly brought to the minds of students of transportation history the fact that the automobile is about a century old and that more than eighty years ago it was, in England, a potentially formidable rival of the then well-established and profitable stage-coach lines. The condition of the roads in this country was not favorable to either mode of transportation at that time. The steam carriage was brought to a remarkable state of perfection for the time, and its operation was satisfactory to the passengers, as indicated by liberal patronage. London was the center of the new industry, and the London & Greenwich Steam Carriage Company had good equipment and an opportunity to build up an interurban, and possibly an urban, business. The only difficulty was to make any profits, the same difficulty which is confronting the "jitney" to-day, although the promoters are blinding themselves to the facts. If the rapid development of the steam railroad had not modified the situation, the steam road carriage might have become a real competitor of the stage coach. As a matter of fact, however, even the stage coach had to take to rails eventually and was restricted to the urban field by economic considerations. Transportation history has proved that the economical and safe wholesale movement of passengers and freight requires the use of rails, large vehicles and operators who are skilled in all the various branches of railroading, and history has a habit of repeating itself.

EXAMPLE OF ASSOCIATION ACTIVITY

The report of the committee on the operation of motor vehicles, published elsewhere in this issue, is a good example of the interim work which an association is capable of doing. Many people not familiar with the work done at the New York office of the association imagine that it is confined mostly to compiling the reports of the previous convention and preparing for the next; in other words, that to hold a convention is the chief purpose of the association. Actually, it is the expression only of the work, and in some respects of only a part of the work, done during the year. In this connection it is illuminating to compare the activities of the association now and ten years ago, when it was reorganized. At that time the convention was practically the only association event of the year, and in 1905 two volumes only were required to report the meeting of the association. Now there are six volumes, an engineering manual, a monthly magazine, bureaus of information, fare research and identification of claimants, and many other activities. Yet up to last October, when a slight increase was made, there had been no change in the dues since 1905. It is idle to say that the needs of the industry have not grown enormously during this period and now require a larger general staff to direct the united work which must be undertaken. Much of the work of an association cannot be planned a year in advance. Who could have foretold, for instance, last October, of the development of the "jitney" bus situation? Without a permanent organization little could have been done until next October, but with the present organization a group of prominent operating men have been brought together to study the situation and have been able to issue their conclusions with a statistical report on the subject prepared by the bureau of fare research. We believe that this work will be appreciated by the membership at large. It is also evidence to companies which are not now affiliated with the association of the value of membership.

LIGHT ON THE BUS SITUATION

In brief, the conclusion reached by the committee on motor vehicles in its report on the "jitney" bus is that a thorough illumination of the whole subject is the one vital necessity. No other solution of the problem is emphasized in the report, which is published elsewhere in this issue, and in view of the committee's strongly-expressed belief in the temporary character of most of the "jitney" bus competition, no more immediately satisfactory plan is apparent. By this time, of course, it is well established in the minds of electric railway operators that the motor-driven vehicle cannot handle traffic as cheaply as the surface car. And it is also well established that, notwithstanding the futility of regulated "jitney" operation, the unregulated "jitney" continues to operate and even can make money over sufficiently short, heavily-traveled routes, so that if it is encouraged by a community through neglect of legal restrictions the inevitable result will be the economic waste incident to the artificial maintenance of inefficiency.

Unfortunately, the public at large has not yet grasped this fact. The "jitney" bus offers high speed, and in some cases it offers, as well, the convenience of stopping at the doors of its patrons' homes. From the viewpoint of the individual, there are opposed to these definite advantages only the minor visible objections of discomfort and risk of accident, together with the nebulous assertion that the effect on the railway company of the continuance of the "jitney" will eventually be to drive the fare up or the service down throughout the outlying sections of the city. As the "jitney" patrons are, in general, limited to the residents of, say, a 2-mile zone about the business district, they are naturally inclined to let the other fellow do the worrying about what is going to happen in the suburbs.

Obviously, this does not alter the fact that the public at large has an immediate and very direct concern in the matter. The public at large will pay the bills in the end, and it is entitled to an unobscured view of the goal toward which the bus fallacy may lead it. There is certainly wide opportunity for the dissemination of information on the subject. This is exemplified by the situation in Chicago, where the suggestion in the City Council to use the city's 55 per cent share in the net receipts of the surface traction lines for establishing competitive buses has resulted in an investigation of the profits accruing from the proposed enterprise. The inquiry was conducted by the Commissioner of Public Service, and he has prepared a glowing report in favor of the project which will, no doubt, influence the minds of many of Chicago's citizens regardless of the fact that it is fairly reeking with errors.

To be specific: In the report a suggested route to Hegewisch, the suburb made famous by the real-estate ventures of one Battling Nelson, is among those selected for analysis. This calls for a 7-mile run for a thirty-passenger bus with an assumed load factor of 70. As the report does not contemplate that the buses will do a pickup business these premises correspond to an average of twenty-one passengers per trip or three passengers per bus-mile, producing gross receipts of 15 cents per mile, while the report admits the bus would cost 26 cents per mile to operate. The figure of three passengers per bus-mile is certainly a liberal allowance in view of the fact that the Fifth Avenue buses in New York, with their high average seating capacity of thirty-eight and with undoubtedly more short-haul traffic than on the line proposed in Chicago, carry only 3.86 passengers per bus-mile. Nevertheless, the Commissioner of Public Service, by a peculiar process of reasoning and seeming confusion of "seats per single trip" and "seats per round trip," finally reaches the conclusion that the twelve buses on the route in question would earn annual profits of more than $17,000. On another page he states that a 14-mile north and south route across the city of Chicago is good for receipts that are equivalent to 6.2 passengers per bus-mile, although twenty-six-passenger buses are to be used.

Again, in the same report there is published a table of data on the 3-cent, crosstown bus line in the city of Detroit. In this the number of passengers per bus-mile is actually stated to be five, allowing 35 per cent of standees, while immediately following this is an item showing the direct cost of operation alone to be 27 cents per bus-mile. According to our method of calculation, five passengers at 5 cents each would bring in only 25 cents per bus-mile and would net nothing but a deficit. Yet the Detroit authorities are quoted as stating in all seriousness: "Were we to charge a 5-cent fare we would readily lay aside a nice sum annually!" If this is the material with which the citizens of Chicago and Detroit are fed by their local officials can they be blamed for believing that the "jitney" is a gold mine?

Would it not be well to begin by supplying city engineers, who may be in position to influence public opinion, with some of the elementary data and methods used in transportation problems? At the present time, a perfect flood of glaringly inaccurate reports on bus operation is submerging the fact, and electric railway men alone are equipped with the experience necessary to dam it.

As we have explained before, the only conditions under which automobile service for a 5-cent fare can be made economically successful are on very short runs with large traffic, but even here electric cars can carry passengers much more cheaply than the bus. If the latter is to be permitted, the only recourse for the railway companies, as pointed out in the report of the bureau of fare research, is to go to a zone system and beat the "jitney" out in its own field. However, a campaign of publicity which can be based upon such definite facts as exist in the case of the "jitney" can hardly fail to result in the application of restrictive measures so that such a drastic remedy may not be needed. Most of the "jitney's" freedom at present seems to be due to a belief that it is a highly valuable infant industry and needs pampering. If this belief is dissipated regulation should follow at once as a matter of course, and, in general, the "jitney" is not able to survive regulation.

BUSINESS CONDITIONS AND REGULATION

The annual report of the American Telephone & Telegraph Company is usually a most interesting corporation document. This year, however, it surpasses all previous records by virtue of its being an index of general business conditions in the United States and an authoritative commentary upon the success and needs of public utility regulation.

Theodore N. Vail, president of the company, believes that the basic conditions of this country never were better for the restoration and continuance of normal conditions, and to his mind the correction is simple. Of the three principal creative divisions of industrial enterprises—producers from the earth, manufacturers, and transportation and intercommunicating companies —Mr. Vail looks upon the last as the most important in their creative effect. Upon these industries depend all interchange and movement; their relative economic importance is many times their relative capital, and any cause that disturbs them disturbs the two other classes as well, both industrially and financially. As a corrective measure, therefore, it is necessary to make the securities of such companies, particularly the transportation lines, so attractive that they can secure from investors the $1,000,000,000 a year needed by the country as a "going" and a "growing" concern. If this were done, the normal conditions of employment, ability to purchase, production and prosperity would soon be restored.

Mr. Vail is a keen and experienced observer of American conditions, and his recognition of the importance of transportation prosperity is forceful. This point comes out, too, in connection with his remarks on regulation. To his mind, regulation and control by commissions and business courts have become a permanent feature of our economic life. Regulation must not be too drastic, however, or interfere too much with operation. During the last few years the disturbance, uncertainty and timidity about transportation caused by legislative requirements and increased wages without corresponding revenue increases have caused a jump in operating expenses which can no longer be met by a reduction in such expenses or by scientific methods. The fact is that the same ratio of progress that was brought about by the introduction and application of the principles of scientific management cannot be permanently maintained, and when this fact is coupled with increasingly onerous legislative and regulatory burdens, it is easy to see, as Mr. Vail says, that an irreducible minimum in unit expenses has just about been reached.

As we have before stated in these columns, there have been a few evidences in the last few months that some commissions are beginning to realize that bankrupt public service companies mean stunted communities and that utilities cannot expand and develop without additional capital. Funds for further investment, however, will not be proffered in the desired abundance until better returns are in sight than at present. Investors must be reassured against commission severity, and the best way to accomplish this is to bring the general public to a fuller realization that the problems which are before public service commissions are far more vital to our national prosperity than questions before even the highest courts.

MAILING COMMUNICATIONS WITH DIVIDENDS

With the quarterly or semi-annual distribution of dividends an electric railway company has an opportunity often overlooked to communicate to its stockholders information, advice or suggestions bearing upon the welfare of the property. There is no reason why such communications should so generally be confined to annual reports, and as the importance of taking an interest in the public relations of a utility becomes more generally realized by security holders, an increase may be expected in the practice of addressing stockholders and bondholders several times a year if need be, in connection with matters where public sentiment has much influence.

Thus the latest dividend checks of the Pennsylvania Railroad Company, mailed a few days ago, were accompanied by printed slips calling the attention of stockholders to the efforts the management is making to obtain the repeal of the so-called full crew laws of the states of Pennsylvania and New Jersey. The statements point out that the campaign is being made to uphold the interests of the stockholders, of railroad workers as a body and of the public, all of which are unfairly attacked by the full crew laws. The stockholder, it is urged, has a vital interest in the repeal of these laws, and the slips conclude with the request that each stockholder do all that he or she can to interest friends, community and state in securing the removal of this legislation from the statute books.

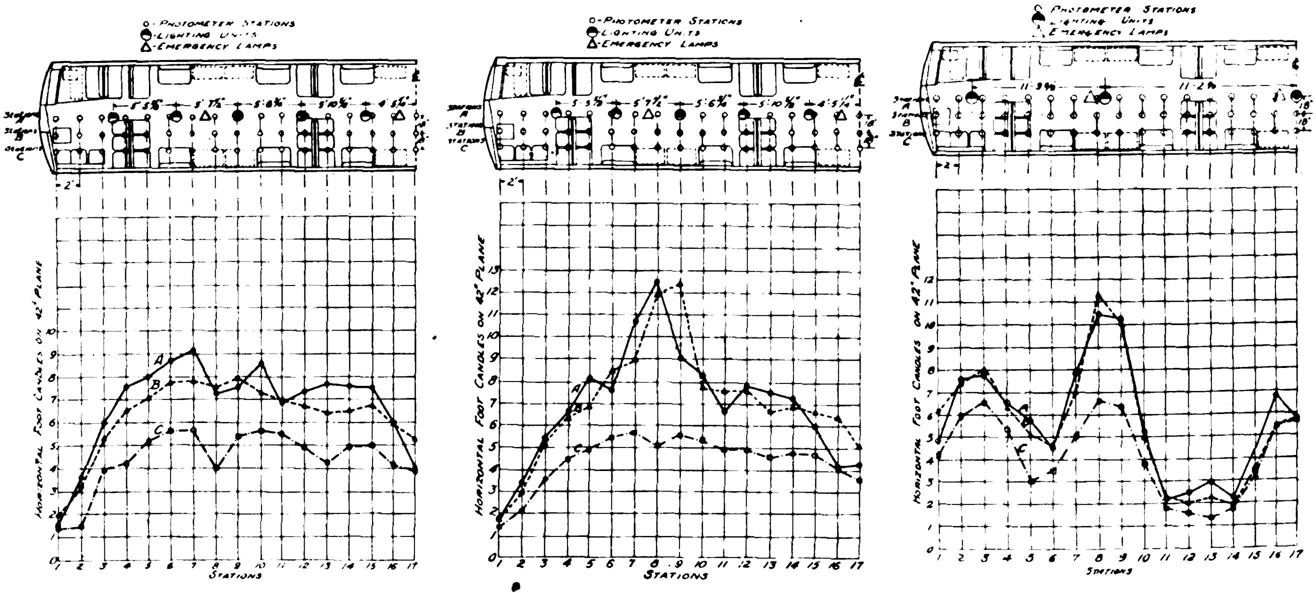
This practice can be applied in the electric railway field on occasions which will readily occur to executive officers. Among them might be cited forthcoming or pending rate proceedings before state commissions, applications for legislation freeing companies from various burdens of excessive taxation, such as severe requirements in connection with the replacement of highway structures after track construction is carried through, or the repeal of ordinances relating to paving, drainage and other matters of like import, so far as they affect local stockholders. In many of these cases a partial mailing list will be sufficient. Such procedure does not mean that the directors and executive officers of a company are not doing their full share of company management, but it may on occasion afford a useful means of stimulating public opinion along proper lines of action, and at much smaller cost than where circularization has to be independently conducted through the mails. Even the postage on a message to several thousand stockholders is worth saving, if it can be effected by a little foresight along the lines above indicated.

The New York Municipal Car—The Lighting[*]

Many Lighting Combinations Were Tried in a Full-Size Template Car, Resulting in the Choice of Fifteen 56-Watt Bowl Frosted Tungsten Lamps along the Car Center Line, Besides Emergency Lamps

BY W. G. GOVE, ENGINEER OF CAR EQUIPMENT NEW YORK MUNICIPAL RAILWAY CORPORATION, AND L. C. PORTER, EDISON LAMP WORKS, GENERAL ELECTRIC COMPANY, HARRISON, N. J.

Not the least of the advanced equipment of the New York Municipal car is its lighting. Many new problems had to be solved to meet satisfactorily the following desiderata: (1) Quantity of light; it is desirable to have an average intensity of not less than 3 foot-candles on a horizontal plane 42 in. above the floor, at 85 per cent normal voltage. (2) General effect and appearance of lighting system with lamps lighted or extinguished. (3) Lack of eyestrain for both seated and standing passengers, involving not only intensity and direction of light, but also glare and possible shadows thrown by standing passengers on the reading matter of seated passengers. (4) Efficiency. (5) Installation and maintenance expense. (6) Depreciation of equipment in service.



NEW YORK MUNICIPAL CAR—FIGS. 1, 2, AND 3—CHARTS SHOWING DISTRIBUTION OF LIGHT AND EFFECTIVE ILLUMINATION

Fig. 1 shows ten 56-watt, 120-volt tungsten filament lamps in glass reflectors, and four 10-watt, 115-volt tungsten emergency lamps with same reflector. Fig. 2 shows ten 56-watt, 120-volt tungsten lamps in prismatic reflectors and four 10-watt, 115-volt tungsten emergency lamps in prismatic reflectors. Fig. 3 shows five 94-watt, 120-volt tungsten lamps in prismatic reflectors and four 10-watt, 120-volt emergency lamps in prismatic reflectors.

To study these problems tests were conducted in a full-sized model car. This car was 67 ft. 3 in. over all, 9 ft. 10 in. wide and 12 ft. 3 in. high. The interior dimensions were 65 ft. long and 9 ft. wide. The interior finish was white enameled headlining and walls down to the window sills. Below the sills the walls were painted gray. The floor was concrete and the seats were upholstered in yellow rattan.

Photometer tests were taken to supplement such data as observation of the general appearance, installation and maintenance cost figures, etc. The photometric measurements were not made to compare the efficiency of any particular types of illuminating devices or accessories thereto, though the average intensities obtained were used in securing the relative utilization efficiencies.

In making the photometer tests stations were chosen 2 ft. apart in a horizontal plane 42 in. above the car floor, over one-fourth of the floor area. The entire car, however, was equipped with lighting units. Five readings were taken at each station, on a portable photometer, recalibrated before each test. To make one reading comparable with any other, simultaneous voltage readings were taken, as constant voltage was found to be impracticable. Each photometer reading was corrected to normal voltage from the characteristic curves of the lamp and the five corrected readings averaged to obtain the station value. In obtaining the average intensity for the entire car, weight was given the stations in proportion to the area covered. The illumination values were also calculated for 85 per cent normal voltage. The same lamps, as far as practicable, were used in the various reflector equipments.

It was decided before the tests started that tungsten filament lamps would be used for illuminants, the question being what was the best method of applying the lamps. Three systems of illumination were tried out, namely, direct lighting, semi-indirect lighting and totally indirect lighting. To carry on the tests the interior construction of the car was altered when this was necessary.

Photographs of the interior of the car were taken with the lamps burning. The exposures were timed to exactly two minutes. These photographs have no bearing on the photometric readings, except to indicate in a comparative way the high and low lighting throughout the car.

Direct Lighting Tests

The direct lighting tests made were as follows:

No. 1.—The lighting units consisted of a single row of fourteen 6-in. opal glass reflectors (Fig. 9) mounted along the center line of the ceiling and spaced as shown

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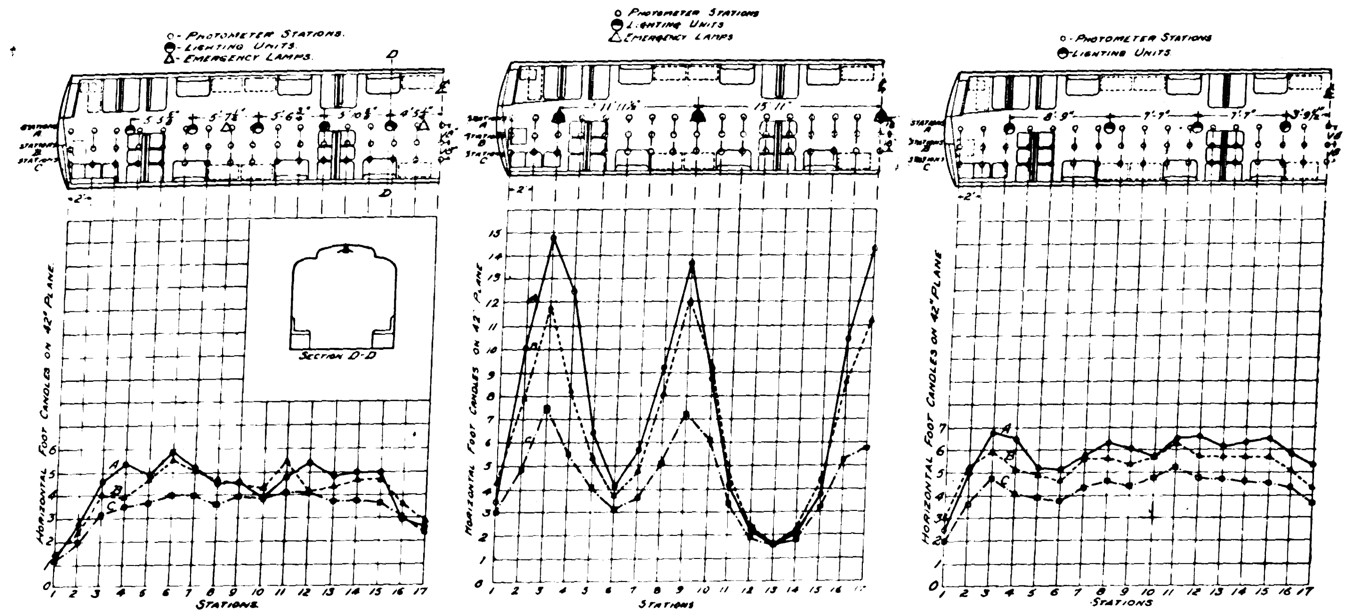
[*] Abstract of a paper entitled "A Practical Study of Car Lighting Problems," read at a meeting of the New York Section of the Illuminating Engineering Society, March 11, 1915.

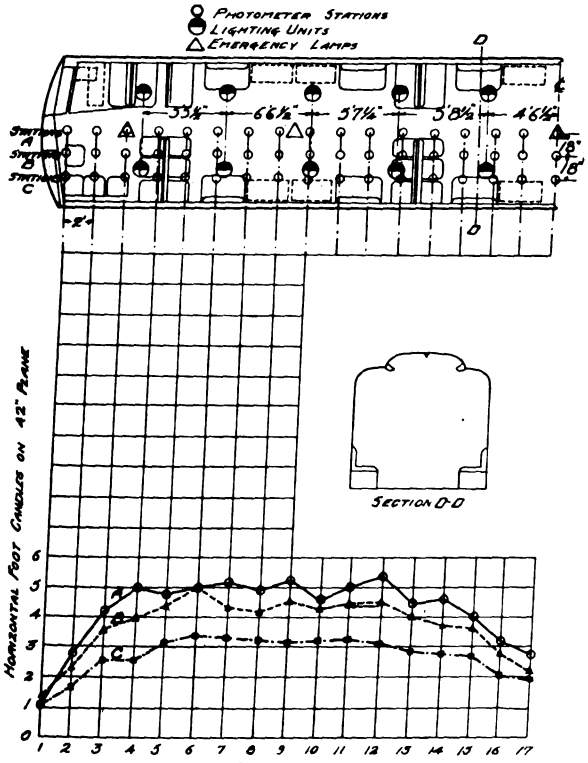


NEW YORK MUNICIPAL CAR—FIGS. 4, 5 AND 6—DISTRIBUTION OF LIGHT AND EFFECTIVE ILLUMINATION

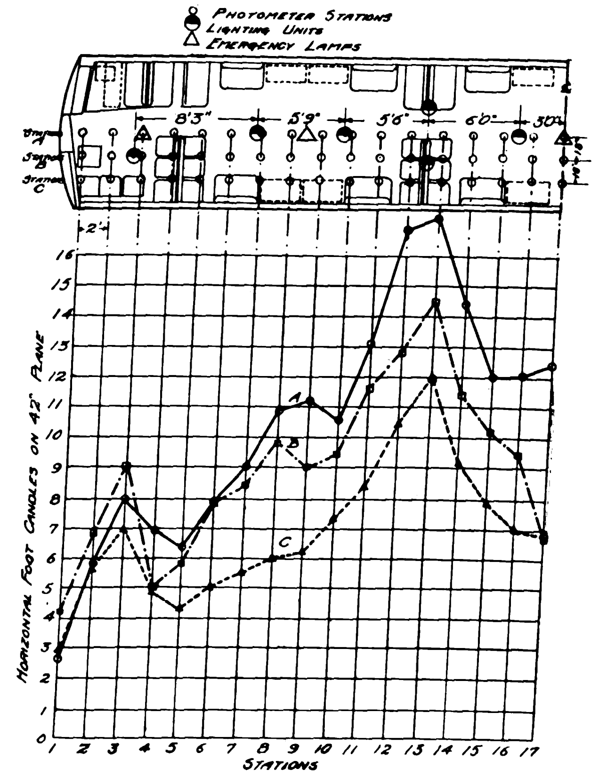
Fig. 4 shows an installation of indirect reflectors set in coves, ten on each side of car, and five 10-watt frosted emergency lamps along center line of car, set in ceiling rosettes. Fig. 5 shows a semi-indirect installation of two 94-watt (horizontal) lamps and one 10-watt (vertical) lamp for each of five units. Fig. 6 shows an indirect installation comprising eight white enameled steel indirect reflectors with three 36-watt, 115-volt lamps per unit.

in Fig. 1. Ten reflectors were equipped with 56-watt clear bulb tungsten lamps and four with 10-watt clear bulb tungsten emergency lamps. The light distribution, Fig. 1, was good, though it had points of high intensity under the emergency lamps, due to the small lamp in the large reflector. No bare lamp filaments were visible along the normal line of vision. The efficiency of the system was high, installation costs—on account of the single row of large units—were low, and maintenance was good, the smooth surface of the reflectors facilitating rapid cleaning. The general appearance in the car was pleasing (Fig. 15) and the illumination good, averaging 5.7 foot-candles at normal and 3.2 at 85 per cent voltage, with an energy consumption of 1.03 watts per square foot. There were 5.54 effective lumens per watt and the effective utilization efficiency was 68.7 per cent. The utilization efficiency in an ordinary dark yellow car with similar equipment is about 30 per cent, showing the great advantage of the white enamel interior finish.

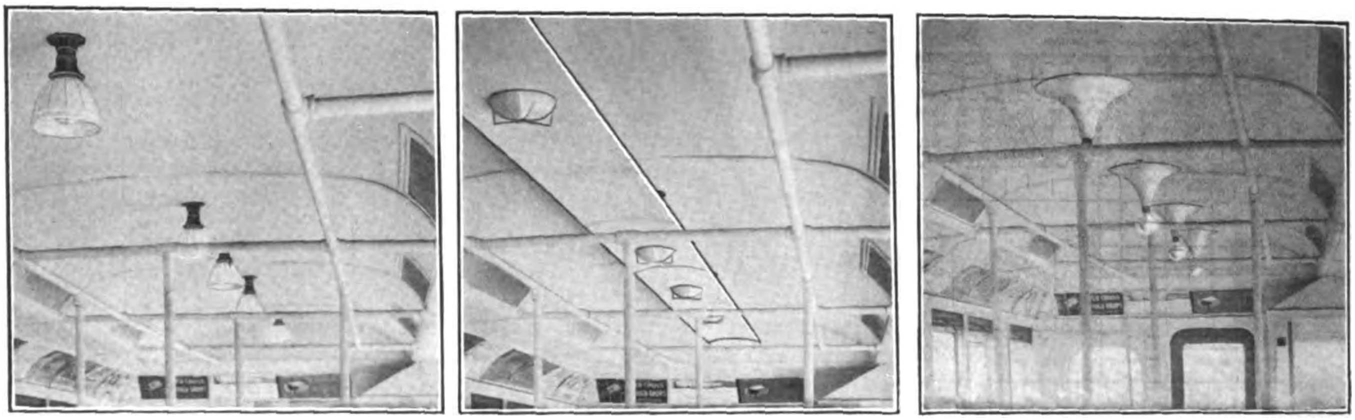
No. 2.—The second test, Fig. 2, was similar to the first, except that clear prismatic reflectors were used. The change of reflectors raised the average foot-candle intensity to 6.1 at normal and 3.4 at 85 per cent voltage. The effective lumens per watt were increased to 5.90 and the utilization efficiency to 73.2 per cent. Maintenance would be slightly higher, due to cleaning the prismatic glass. There was also a little more glare, though not an objectionable amount.



NEW YORK MUNICIPAL CAR—FIG. 7—CHART SHOWING DISTRIBUTION WITH COVE LIGHTING (SEE FIG. 17)



NEW YORK MUNICIPAL CAR—FIG. 8—CHART SHOWING DISTRIBUTION WITH LIGHTS ON GRAB RAILS (SEE FIG. 18)



NEW YORK MUNICIPAL CAR—FIGS. 9, 10 AND 11—ARRANGEMENTS AND TYPE OF LIGHTS

Fig. 9 shows 56-watt tungsten lamps in white glass reflectors. Fig. 10 shows 56-watt lamps with reflector board below ceiling. Fig. 11 shows 80-watt turnip-shaped lamps.

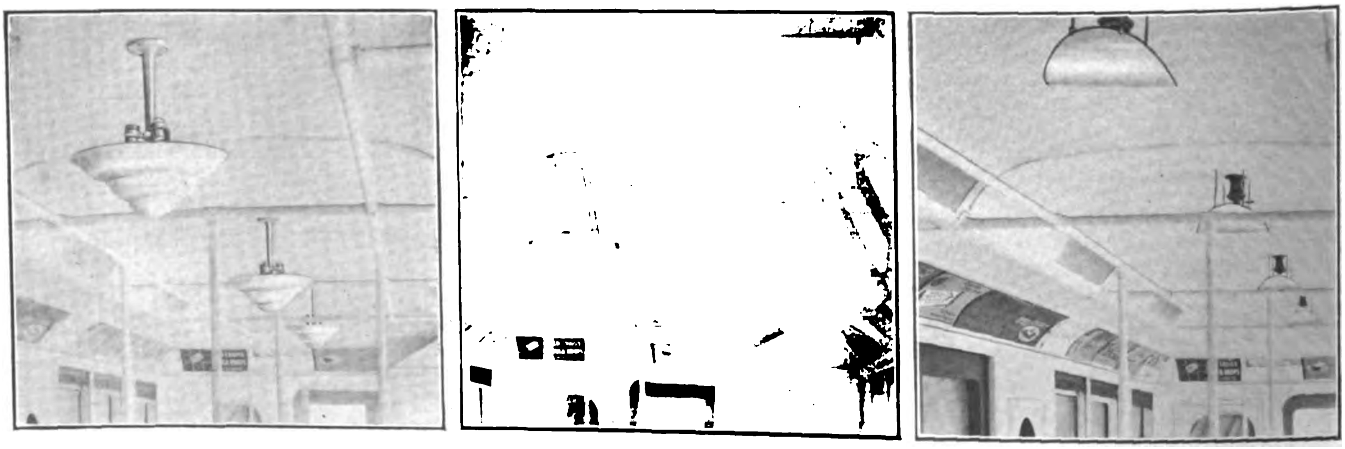
No. 3.—In the third test five 94-watt clear tungsten filament lamps, equipped with clear prismatic reflectors, were located in a single row down the center line of the ceiling. Four 10-watt tungsten emergency lamps in clear prismatic reflectors were located between these. The resultant average intensity in the car body was good, but due to the relatively low hanging height and wide spacing of the units the distribution was very uneven (Fig. 3). The installation and maintenance of the system would be low, on account of the small number of large units to install and clean. The average foot-candles obtained were 5.0 at normal and 2.8 at 85 per cent voltage. The energy consumption was 0.87 watt per square foot; the effective lumens per watt were 5.75; and the effective utilization efficiency was 71.5 per cent.

SEMI-INDIRECT LIGHTING TESTS

No. 1.—A very interesting method of lighting was used in the first semi-indirect lighting test. Twelve special 80-watt 95-volt turnip-shaped tungsten lamps, opal-dipped over the tip half, were installed down the center line of the ceiling. Each lamp was suspended by an inverted white enameled cone, shown in Fig. 11. Three 10-watt tungsten emergency lamps were also used in small rosettes. The 80-watt lamps were connected six in series. All of the filament of the 80-watt lamps was located below the center of the bulb; hence, none of it was in the line of vision. The opal on the lower half of the bulb served to protect the passengers' eyes from the glare of the bare filament and to reflect the light up to the ceiling. This system eliminated reflectors, special holders and other accessory equipment, thus lowering both installation and maintenance costs. The average intensity was 7.7 foot-candles at normal and 5.1 at 85 per cent voltage. The energy consumption was 1.69 watts per square foot, the effective lumens per watt 4.65 and the utilization efficiency 58.4 per cent.

No. 2.—In the second semi-indirect lighting test a novel equipment was used (Fig. 10). Ten 56-watt clear tungsten lamps were located on the center line of the ceiling, supplemented by four 10-watt tungsten emergency lamps. At 6 in. below the ceiling, and extending the entire length of the car, was suspended a reflector consisting of a white enameled board 11 in. wide, convex on a 16-in. radius. The bowls of the 56-watt lamps extended through holes cut in this reflector. Under each hole was fastened a white glass dish to diffuse the glare of the bare filament. The plan was to utilize as much as possible of the direct light from the lamp, to illuminate the advertising signs; the indirect light to give even distribution and the direct light to brighten up the under side of the reflectors. The light distribution was good, but the intensity low, averaging 3.9 foot-candles at normal and 2.2 at 85 per cent voltage. The watts per square foot were 1.03, effective lumens per watt 3.81, and the effective utilization efficiency was 47.2 per cent. The illumination was pleasant, but the appearance of the lighting equipment was rather crude, suggesting a watering trough down the center of the car. While both sides of the reflector and the ceiling were painted alike, the under side of the reflector appeared gray, due to the lower intensity of light on it. Another test with the interior finish silver gray instead of white lowered the efficiency about 10 per cent.

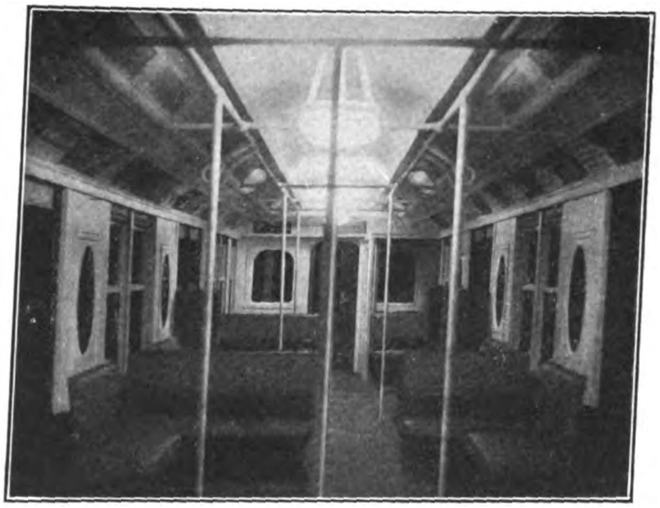
The next semi-indirect equipment tested consisted of ten 94-watt tungsten lamps equipped with five 13-in. glass bowls, mounted down the center line of the ceiling.



NEW YORK MUNICIPAL CAR—FIGS. 12, 13 AND 14—ARRANGEMENTS AND TYPE OF LIGHTS

Fig. 12 shows an indirect fixture with three 36-watt tungsten lamps (see Fig. 6). Fig. 13 shows semi-indirect lighting with two 94-watt and one 10-watt lamp per bowl. Fig. 14 shows tungsten lamps and special curved white glass screens.

NEW YORK MUNICIPAL CAR—FIG. 15—LIGHTING EFFECT OF INSTALLATION SHOWN IN FIGS. 1 AND 9



NEW YORK MUNICIPAL CAR—FIG. 16—SEMI-INDIRECT LIGHTING WITH SPECIAL CEILING INSERTS

There were two 94-watt lamps and one 10-watt emergency lamp in each bowl. The bowls were hinged to allow lowering for cleaning and lamp replacement. The bowls were suspended with their tops located 12 in. below the center of the ceiling. The illumination from this system was very uneven, being high directly under the units and low between them (Fig. 5). The average intensity was 5.7 and 3.2 foot-candles at normal and 85 per cent voltage respectively; watts per square foot 1.69, effective lumens per watt 3.36, and effective utilization efficiency 41.5 per cent.

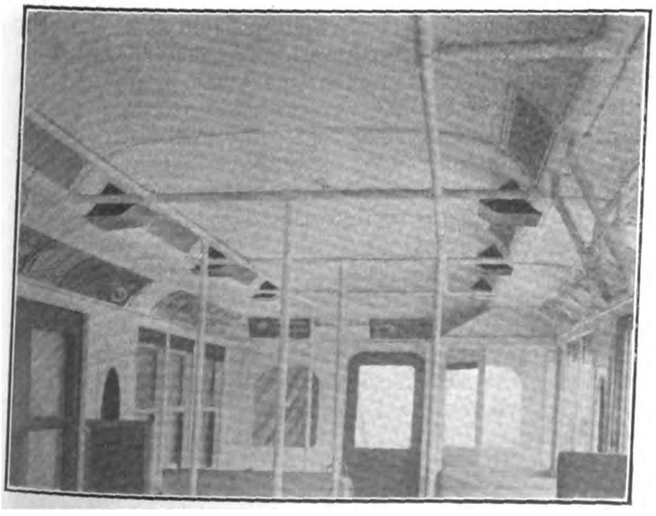
To determine the effect of the shape of the ceiling on the light distribution, a special headlining consisting of a white enameled insert, having a 3-ft. span on an 18-in. radius, was inserted and the test repeated (Fig. 16). This raised the average foot-candles to 6.1 and 3.4 at normal and 85 per cent voltage respectively, effective lumens per watt to 3.62, and the utilization efficiency to 44.7 per cent.

The insert was then removed and the test repeated with a different spacing of the units. This resulted in a little improvement in distribution. The principal trouble was that the car headroom was not sufficient to allow the lighting units to be hung the proper distance below the ceiling.

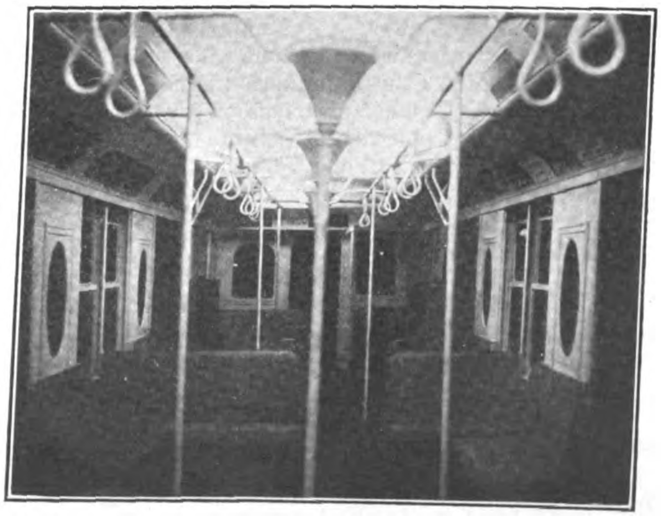
The next equipment tested required special reflecting devices. Ten 56-watt clear tungsten lamps were located in a single line down the center of the ceiling, with five 10-watt all-frosted emergency lamps in rosettes between them. Each 56-watt lamp was equipped with a screen made from a circular piece of glass bent over a cylinder (Fig. 14). This gave a screen 11 in. long x 8 in. wide x 3 in. deep. When these screens were hung beneath the lamps with their open ends toward the side of the car, it was possible to see the lamp filaments from any part of the passenger car body; at the same time the direct light from a considerable portion of the lamp fell on the ceiling and reached the reading plane with but one reflection, making the system fairly efficient. The distribution lengthwise of the car was even, though the outboard seats received considerably less light than the center aisle of the car. The average intensity was 4.8 and 2.7 foot-candles at normal and 85 per cent voltage, the energy consumption 1.04 watts per square foot, effective lumens per watt 4.63, and effective utilization 57.6 per cent. The chief advantage of this equipment was the ease with which the reflectors could be cleaned.

TOTALLY INDIRECT TESTS

No. 1.—The first totally indirect equipment tried consisted of eight special indirect fixtures, these being white porcelain enameled on steel, 15½ in. in diameter and 5½ in. deep. Each fixture contained three 36-watt tungsten lamps mounted vertically. The fixtures were hung in a single row down the center line of the ceiling, the tops of the reflectors being 13 in. below the ceiling. The spacing of the units is shown on Fig. 6. The resultant illumination was uniform and of fairly good intensity, averaging 5.1 and 3.2 foot-candles at normal and 85 per cent voltage, for an energy consumption of



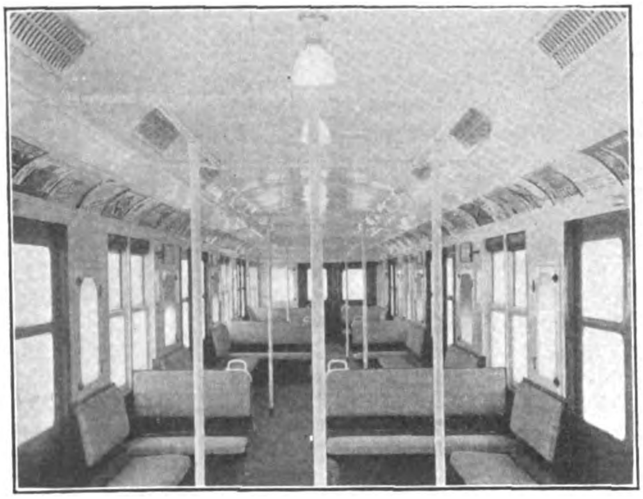
NEW YORK MUNICIPAL CAR—FIG. 17—INDIRECT LIGHTING WITH REFLECTORS SET IN COVES, TEN ON EACH SIDE.



NEW YORK MUNICIPAL CAR—FIG. 18—INDIRECT LIGHTING FROM UNITS ON GRAB RAILS

1.47 watts per square foot. The effective lumens per watt were 3.43 and the effective utilization efficiency was 46.3 per cent. The chief drawback of these fixtures was their liability to catch and collect much dirt, thus materially reducing their efficiency; also to obtain good distribution it was necessary to hang them so low that they might be in the way of tall passengers.

No. 2.—To get away from a low fixture in the center line of the car, the next equipment tested consisted of twenty 36-watt tungsten lamps in indirect reflectors. These were mounted in two rows of ten each on the sides of the car, just above the deck sill between the ventilators, as shown in Fig. 17. Five 10-watt frosted lamps in rosettes were mounted on the ceiling for emergency lights. The 36-watt lamps were mounted horizontally with their centers 7 ft. 4 in. above the floor. The spacing of the lighting units and the distribution therefrom is shown in Fig. 7. The resultant illumination was of low intensity, averaging 3.5 and 2.2 foot-candles at normal and 85 per cent voltage. The wattage consumption was 1.32 per square foot, effective lumens per watt were 2.67, and effective utilization efficiency 36.3 per cent. The main objection was keeping the reflectors clean.



NEW YORK MUNICIPAL CAR—FIG. 19—LIGHTING ADOPTED

56-watt bowl-frosted lamps in white glass reflectors, and 10-watt all-frosted emergency lamps.

No. 3.—The last test was made on twelve 94-watt tungsten lamps in indirect reflectors and five 10-watt emergency lamps in rosettes, located down the center line of the ceiling. To get maximum headroom for these reflectors and still have them out of the way of passengers, special inverted cone-shaped containers for the reflectors were built into the stanchions along the center line of the car (Fig. 18). Unfortunately the construction of the car necessitated spacing the units rather far apart, so that uneven illumination resulted. In addition to the bowls, smaller inverted bowls were mounted on the horizontal grab rails, at points shown in Fig. 8. Each of these contained one 94-watt tungsten lamp, making a total of twelve 94-watt and five 10-watt lamps in the car. The average foot-candles were 8.5 and 4.7 at normal and 85 per cent voltage, watts per square foot 2.01, effective lumens per watt 4.21, and the utilization efficiency was 53.4 per cent. Much difficulty would be experienced in keeping this equipment clean.

CONSIDERATIONS WHICH FIXED THE CHOICE

General Effect and Appearance.—The general effect and appearance of each system under test were judged by comparison with present methods of car lighting for similar service, namely, with the use of tungsten lamps but without reflectors. Under this item was also considered the effect of the distribution of light on the various parts of the car.

Lack of Eyestrain.—The effect of the light on the eyes was particularly noted by a large number of observers.

Ease in Reading for Seated and Standing Passengers.—Particular attention was given to the possible shadows thrown on reading matter of seated passengers by passengers standing in a crowded car. In some cases it was found that passengers could obtain proper light in any position; in others it was necessary for them to move in their seats, often to uncomfortable positions, to obtain proper light.

Efficiency of System.—The efficiencies of the systems tested differed widely. In some cases this was largely due to the type of reflector used; in others to the position of the reflector, shape of the ceiling, etc. In several tests it was evident that improvement could be made by changes.

Maintenance.—The question of maintenance was serious. Some of the most desirable arrangements of reflectors and lights were handicapped by the dust problem. With a large number of small units this difficulty increases.

Energy Consumption.—To secure a reasonable operating cost, low energy consumption was one of the important factors. The indirect system of lighting required considerably more power than the direct, while the semi-indirect came between these two.

Depreciation.—The relative loss of reflecting power, due to accumulation of dust on the various types of reflectors, also received consideration.

Emergency Lighting.—It was decided that sufficient light would be obtained from the emergency lamps to permit clearly distinguishing people and various objects in the car with the main lamps extinguished.

A thorough study finally led to the adoption of a single line of fifteen 56-watt bowl-frosted tungsten lamps placed symmetrically down the center line of the ceiling, equipped with reflectors, as shown in Fig. 19, supplemented by six 10-watt all-frosted round-bulb tungsten emergency lamps. One big unit was placed on each end bulkhead of the car to bring up the illumination at these points. This system was chosen as the one containing the highest percentage of satisfactory illumination, low energy consumption, low maintenance and upkeep and pleasing appearance.

The emergency lamps were placed in rosettes, one being located on the side wall over each pair of doors. These lamps do not burn while there is power on the line, but the instant that fails they are automatically thrown onto a storage battery.

In the car as finally equipped the illumination averaged 5.94 foot-candles at normal and 3.85 at 85 per cent voltage, the energy consumption was 1.44 watts per square foot, effective lumens per watt 4.14, and the utilization efficiency 50.6 per cent. These data are not comparable with the other tests, due to the use of bowl frosted lamps (instead of clear), also a larger number and different arrangement of lighting units.

It was interesting to note that the low intensities of illumination, at stations 7 and 17, were opposite the entrance doors, which are dark green, in comparison to the white finish between doors. The curves were slightly high at stations 2, 3 and 4, due to the fact that the end lamps are located on the bulkheads considerably lower than the rest of the lamps in the car.

On the whole, the illumination is remarkably soft, even and pleasing. It is not possible to note any unevenness with the naked eye. The use of bowl-frosted lamps lowers the efficiency a little, but also eliminates glare, even when one looks directly at the lamp.

Report On Motor Vehicles

Committee on Operation of Motor Vehicles Presents Report on "Jitney" Bus Situation—Statement for the Press —Cost Analysis by Bureau of Fare Research

A meeting of the committee on operation of motor vehicles of the American Electric Railway Association, held in New York on March 16, was mentioned briefly last week. The conclusions of the committee are summarized in a report printed below, submitted to President Allen of the association. The report is signed by the four members of the committee: Britton I. Budd, Chicago; Henry G. Bradlee, Boston; William A. House, Baltimore, and C. L. S. Tingley, Philadelphia.

REPORT TO PRESIDENT ALLEN

The special committee on the operation of motor vehicles, appointed by you to consider the "jitney" bus and its effect upon electric railway operation, begs leave to submit its report as follows:

Your committee has held two meetings, at which the information compiled by the secretary was carefully reviewed.

Consideration of the information in the hands of the committee has convinced it that the "jitney" bus, while at the present time a seeming menace to the interests of the railways, is in general the product of present business conditions and the present state of unemployment, is economically unsound and cannot for long continue to exist. It is, however, at present causing, and for some time to come may cause, a diminution in the revenues of those properties located in cities in which the "jitney" operates. A report prepared by the bureau of fare research bearing on the cost of service of the "jitney" bus is transmitted herewith.

Your committee desires to emphasize the distinction between regular motor bus service and the "jitney." The latter may in general be said to possess these characteristics:

It is the operation of the ordinary four to seven-passenger cars, usually second-hand and of the cheaper makes, by the owner or lessee, for the carriage of passengers for short distances. The service is without fixed schedule or route, and is operated only in such sections as afford a profitable haul.

Your committee is convinced that the evil effects of "jitney" bus operation may only be corrected by the public and not by the companies, and that the companies' part in the elimination of these evils must be confined to the fair and square presentation of the facts in connection with the case, as they affect the public.

In this connection, two elements of the situation stand out above all others:

First, that the ability of railway companies to furnish adequate and reliable service depends upon the patronage of the public, and that the curtailing of this patronage through the operation of the "jitney" must necessarily reduce the ability of the companies to give such service.

Second, that the loss to the community through diminution in taxes and other public charges paid by the railway companies, wear and tear on streets and highways, increased accidents, and ultimate deterioration in electric railway service will more than offset any gains to the community which may arise out of "jitney" operation.

With the idea in mind of affording assistance to the member companies of this association in their task of awakening their communities to the true situation, your committee appends to its report:

First, a statement designed for use in the press, in which has been assembled what the committee believes to be the salient points in the argument against the unrestricted operation of the "jitney." This statement the committee proposes to supplement from time to time, with such other publicity matter as it believes will be of service to member companies.

Second, a statement intended for general circulation, and for such use as the member companies may desire to make of it, which elaborates and puts in terms easily understood by the ordinary citizen, the reasons why this "jitney" competition is not to the best interests of the community.

Your committee has examined many regulatory measures which are in effect or under consideration, and for, your information two typical forms are appended hereto. Copies of additional measures are on file in the office of the association and will be furnished to member companies or to public officials interested, upon request to the secretary.

On the matter of regulation, your committee believes it important that this fundamental idea be kept in mind: If the "jitney" is to enter the business of the common carrier, which is in fact what it is doing, then it should by the proper authorities be declared a common carrier and subject to all the duties and obligations placed upon common carriers.

Electric railways are operated under strict laws, ordinances and commission requirements, which have been instituted by the representatives of the people, in the interests of the public and for its protection. If equal protection to the public interest is to continue, it is obvious and equitable that the same requirements and obligations, or other requirements and obligations meeting the special conditions which have arisen, should be placed upon any form of local transportation which seeks to acquire the same rights and privileges upon the public highway.

FOR THE PRESS

The special committee of the American Electric Railway Association, consisting of Britton I. Budd, president Metropolitan West Side Elevated Railways Company of Chicago; H. G. Bradlee, president of the Stone & Webster Management Association of Boston; William A. House, president United Railways & Electric Company of Baltimore, and C. L. S. Tingley, vice-president the American Railways Company of Philadelphia, which has been investigating the subject of "jitney" buses, has submitted its report to the association.

The committee says:

"The 'jitney' is a product of unemployment and has sprung into existence primarily because the owner or lessee, being out of work, is for the time being content with such income as arises from the small difference between the fares collected and the cost of gasoline, tires and minor repairs.

"The committee's investigations have been such as to convince it that the operation of the 'jitney' is not profitable to its operators. This is shown conclusively by the constant change in the personnel of the operators of these machines in the cities where the 'jitney' has been established. The experience in all of these places is that few men stay in the business longer than a month or two, and the conclusion is inevitable that such owners find the business unprofitable but that their places are supplied by others, who are led to take up the work because of the advertising that has been given to the 'jitney' proposition and to a certain extent because of the representations of automobile dealers, anxious to secure a market for their second-hand cars.

"In the meantime, however, it must be borne in mind by those communities which are encouraging 'jitney' operation that the revenue received by their proprietors is taken from the revenue of the electric railways, and that, because the ability of these railways to furnish adequate service depends entirely upon the moneys received in fares, such diminution in income lessens the ability of the companies to furnish the service demanded. Communities are apt to forget the benefits which are received from electric railway operation and which are not received from 'jitney' bus operation. Included in these are the payment of a very large amount in taxes and in other public charges, extensive contributions toward the cost of paving, the maintenance of unprofitable lines necessary to civic development, the maintenance of fixed routes and fixed schedules and service uninterrupted so far as possible by weather conditions, the investment of a large sum of money in the equipment necessary to take care of the demands during the time of extraordinary travel, the provision of comfortable and safe cars, properly lighted and suited to the varying conditions of the seasons, the system of transfers, whereby the revenues of the company are largely reduced, in order that transportation may be furnished to all parts of the city, its financial responsibility for the damages resulting from the accidents, its submission to the control of the regulatory bodies as to capitalization, rates and service, and, above all, the fact that a very heavy percentage of its income is returned to the community, in the shape of taxes, public charges, wages, payment for supplies and other items.

"Contrasted with the benefits to be derived from the operation of 'jitneys,' your committee believes that the advantage to the community is all with the electric railways, and that it is, therefore, for the communities to decide whether, in their own interest, the 'jitney,' being a common carrier and seeking the privileges granted to common carriers, should not be obliged to assume the obligations of a common carrier.

"In other words, it is for these communities to say whether, as a matter of protection to the public, the 'jitney' should be compelled to operate over fixed routes and upon fixed schedules, whether it should be placed under the jurisdiction of such regulatory bodies as exercise jurisdiction over railways, should contribute in taxes for general city purposes and for paving purposes a sum proportionate to that contributed by the railways, should be held to strict accountability for accidents, should be required to establish its responsibility for damages arising from such accidents, should be compelled to provide for the safety of its passengers, and should maintain the same standard of service required of electric railways.

"Every obligation placed upon the electric railway has been so placed by the representatives of the people in the interest of the people.

"It is now for the people, for whom this elaborate system of safeguards has been put into effect, to say whether an untried and evidently inefficient experiment in local transportation should, without restrictions, without the exaction of a return, with no responsibility and with no obligations, be given the use of the streets and highways, for which use the electric railways pay so high a price.

"This, the committee feels, is the question that squarely confronts every community which has permitted the unrestricted operation of the 'jitney.' It is, moreover, a question which must be decided by the community and in the solution of which the part of the companies is simply to point out the undoubted facts."

REPORT OF BUREAU OF FARE RESEARCH

The report of the bureau of fare research will be published in pamphlet form by the association for distribution among the members. An abstract follows:

Such regulation as has been undertaken through city ordinances may be classified as to the intent of its provisions as follows:

(1) Requiring "jitney" operators to carry liability insurance or to execute a bond for $10,000 or other substantial sum, for each car operated in order that the public may be assured of their financial reliability in the event of accident.

(2) Requiring and charging a fee for a license in order that (a) the "jitney" shall contribute to the common funds of the community, and (b) the casual and irresponsible operator may be eliminated.

(3) Providing for the regulation and licensing of drivers in the interests of safety.

(4) Providing for definite routes and schedules as affecting reliability of service.

(5) Providing standards (loading, lighting and heating) to promote the comfort and convenience of passengers.

(6) Providing definite rates of fare.

(7) Providing penalties for failure to comply with regulations (fines and revocation of license).

The following tabular representation of ordinance requirements is drawn from copies of ordinances either proposed or adopted. The table is incomplete and some of the requirements may be or may have been altered before adoption. Numbers correspond to numbered paragraphs above:

TABLE I, SHOWING REQUIREMENTS IN "JITNEY" ORDINANCES

City	Requirements in Ordinance
Birmingham, Ala.	1
Fresno, Cal.	1 to 4, 6, 7
Long Beach, Cal	1 to 4, 7
Los Angeles, Cal.	1 to 5, 7
Oakland, Cal.	1 to 4, 6, 7
Pasadena, Cal.	1, 2, 4, 7
San Francisco, Cal	1 to 4
Boise, Idaho	1 to 3, 7
Oklahoma City, Okla	1, 2, 4, 7
Fort Worth, Tex	1 to 4, 7
Port Arthur, Tex	1 to 4, 7
Seattle, Wash.	2 to 5
Spokane, Wash.	1, 2, 4

The city of Denver has passed an ordinance requiring each individual contemplating engaging in the passenger transportation business to obtain a franchise.

COST OF OPERATION

An examination of the various elements of the cost of operation of "jitney" buses may be conveniently made under the general groups of accounts in use by electric railways. Under the head of way and structures there will be normally little expense for the man who operates his own car. Companies, however, which maintain their own garages or own and maintain general office buildings will incur expenses properly listed as maintenance of buildings, fixtures and grounds, and as depreciation of structures. Inasmuch as the greater part of the operators of "jitneys" own their cars and keep them in sheds and stables not otherwise in use, no cost has been considered under this head. Individual "jitney" owners are under no necessity of counting as part of the cost of operation, taxes and interest on the investment in and the cost of maintenance of property otherwise idle. There have, however, been considered a part of such items under the caption of garage costs.

Under the heading of equipment some rather extensive cost figures have been kept during the past year by a company which is a member of the American Electric Railway Association. This company operates several types of cars in different cities, and its records based on twenty Ford cars in service for eight months disclose an expense of 1.3 cents per mile for maintenance of chassis and body. Tires cost 1.2 cents per car-mile, and miscellaneous expenses for maintenance and replacement of parts amount to 0.3 cent per car-mile, or a total for the three items of 3.3 cents. These costs do not allow for depreciation and replacement of the car. Corresponding figures from two other reliable sources and covering other types of cars are respectively 7.71 cents per car-mile and 4.56 cents per car-mile.

Under the heading of power there must be included the cost of gasoline and oil, and engine maintenance. For the Ford cars above referred to, the cost for these items was slightly more than 2.5 cents per car-mile, while the amounts for the other two types of car were 4.43 cents per car-mile and 2.39 cents per car-mile respectively.

Under the heading of conducting transportation the major item is the wage of the driver. The figures which the bureau has been able to obtain for this show a wide variation. One "jitney" company pays 2 cents per mile; one 30 cents per hour; another pays $8 per week to foreigners for this type of work. Still another company is reported as paying $15 per week and one pays the driver 35 per cent of the gross receipts. Inasmuch as the possession of a license is necessary in many cities if one wishes to operate a car, it seems that the minimum wage which can be paid will not be greatly below $2 per day and the man who drives his own car will probably consider his time worth at least $2 per day. Less may be paid, however, in the case of men and boys who operate cars for three or four hours per day in addition to some other occupation.

There will usually be little to be considered under the heading of traffic. An occasional payment for advertising and solicitation may occur, but this in general may be neglected and may to a certain extent be offset by revenue from advertising.

Injuries and damages and insurance will be the most important items in the general charges, and in many instances these will be by far the largest expenses to be met by the owner-operator. In one of the Pacific Coast cities, each of the three local bonding companies has, since the advent of the "jitney" bus, refused to issue indemnity insurance for such vehicles, and in a somewhat smaller city the rates for such policies have been increased from an annual fee of $50 to one of $250.

However, the rates for insurance indemnifying automobile operators against loss through injury and damage suits are not as yet based upon sufficient experience to render them stable, and as "jitney" buses become numerous, they are being increased. At present the rate for a Ford car operated for hire in New York City is $150 per year. To this sum should be added insurance against damage from fire, against damage from collision, against loss by theft, and against judgments obtained by employees. Probably these risks can be pooled through insurance for a sum ranging from $200 to $300 per year.

Garage expense, cleaning and inspection may be figured between $12 and $20 per week. This expense will be avoided by owner-operators of single cars, but is nevertheless a real outlay which must be taken into account where several "jitneys" are operated by employees.

TAXICAB OPERATING COSTS

The experience of taxicab companies is also of interest. The estimated figures shown in Table II were prepared some months ago by Benedict Holden, former counsel of the Mason-Seamon Taxicab Company operating in New York City. They are presented without extended discussion as a contribution to the subject from one closely associated with the operation of automobiles for hire and in possession of pertinent information. The Ford town car is the one assumed in the following table, in which the figures are given in cents per mile:

TABLE II.—EXPENSES PER MILE FOR TAXICABS

1. Drivers' wages, clothing and gasoline	4.07
2. Lubricants	0.05
3. Tires	2.00
4. Washing, polishing and garage attendance	0.70
5. Repairs, labor	0.85
6. Repairs, material	0.33
7. Painting, upholstering, etc.	0.17
8. Rent	0.56
9. Light, heat, power	0.14
10. Taximeters	0.20
11. Licenses	0.07
12. Injuries and damages	0.50
13. Office and supervising salaries	0.76
14. Advertising	1.11
Total	11.51

These figures were based on the assumption that 15,000 miles would be run annually per car. Items 4, 8, 9, 10, 11, 13 and 14 are nearly independent of the miles run, and if a car made 25,000 miles instead of 15,000 miles in a year, the cost per car-mile would become 10.1 cents instead of 11.5 cents. Eliminating advertising and rent of taximeters, expenses which the "jitney" operator will reduce to a minimum or avoid entirely, the total becomes 9.3 cents per car-mile. To this figure, however, there should be added at least 0.8 cent per car-mile for depreciation of the car, so that on the basis of these figures a car should earn at least 10 cents per mile to pay expenses. In Table III the above figures as well as the foregoing ones are summarized in classified form.

FIXED CHARGES

In addition to ordinary operating expenses, the items of depreciation and interest are essential parts of the cost of service. By far the largest number of "jitney" buses in service are Ford five-passenger touring cars, costing about $500. The private user receives an allowance of $200 on an old car turned in on the purchase of a new one, this being based on an estimated normal use of 5000 miles for one year. For two years' operation, or 10,000 miles, the minimum depreciation is about $275.

TABLE III.—OPERATING EXPENSES OF SMALL AUTOMOBILES

	Company-Owned Automobiles		Estimate for Taxicabs	
	Cents per Car-Mile	Dollars per Year	Cents per Car-Mile	Dollars per Year
Way and structures equipment:				
Car body and chassis	2.1 } 7.71, 4.56	....	1.35	...
Tires	1.2	....	2.0	...
Power:				
Engine maintenance	2.5, 4.43, 2.39	....	1.5	...
Gasoline		....	0.95	...
Conducting transportation:				
Drivers	2.0	416—532	2.5	...
Garage expense	....	....	...	105
Traffic	....	....	...	166
Advertising	....	....	...	...
General and miscellaneous:				
Supervision and office expenses	....	....	...	219
Injuries and damages	....	75—130	...	75
Insurance	....	50—130	...	...

However, there seems little reason to doubt that, considering the excess of mileage over 5000 made yearly by the "jitney," the minimum depreciation will be $200 whether new cars are secured each year or on alternate years. Similar figures furnished by individual owners of private cars range from $160 to $225.

Of course, the cheapness of second-hand cars may influence individual owner-operators to enter the "jitney" business, but it appears unlikely that such competition will be of as long duration or as serious as that of the owners of new cars of recent design. Consequently, the annual cost of maintaining the investment in a Ford car may be taken as $240.

The items of taxes and license fees may be considered together at a minimum of $5. There is no uniformity of license fees and no estimate can be made as to the amount of the average fee.

Collecting the figures and putting most reliance on those coming from companies which keep cost data a tentative summary can be made. Looking at the matter from the point of view of those who drive their own "jitney" buses and who will be persistent but not serious competitors, the cost of operation is simply the expenditure for gasoline, oil, repairs and tires, and the difference between this amount and the fares collected represents profits. The lowest reliable figure for these items, reported in Table III, is 5.8 cents per mile. Assuming a 2.5-mile route (round trip 5 miles) and 75 miles as a day's run, $4.35 represents the "out of pocket" cost. If four passengers are hauled on each trip the fares will amount to 40 cents per round trip, or $6 per day, leaving a wage for the operator of $1.65. A shorter haul or a higher number of passengers will increase the operator's wage but it is not likely that much more profitable conditions than those assumed can be found regularly.

In the case of the company which purchases machines for the service and treats the whole matter as a business proposition the costs varying with the mileage made may be placed at 5.8 cents per mile. Other operating expenses to be considered are insurance, amounting to $200 per year; cleaning, inspection and housing, $100 per year; wages of driver, $700 per year; superintendence and management, $195 per car per year, the latter figure being based on the expenses of supervision of a large taxicab company.

The above operating expenses may be summarized as 5.8 cents per car-mile plus $1195 per year. To these must be added $240 interest and depreciation, and for want of better information $5 each for state registration, personal property tax and public vehicle license. The total then is $1450 per year plus 5.8 cents per car-mile, including an 8 per cent return on investment. In other words, the expense is $4.05 per day plus 5.8 cents per mile.

MAXIMUM PROFITABLE HAUL FOR "JITNEYS"

If we assume that 75 miles are run per day and that four passengers are handled on each half round trip and letting S represent the length of the route or one-half round trip, the number of passengers handled per day will be $75 \times 4 \div S$. At 5 cents per passenger the revenue in dollars will be $15 \div S$. This must equal the cost, which is $75 \times 0.058 + 4.05$, and if any interest on investment is earned the revenue must exceed the cost by the amount of the interest. The effect of interest, however, is negligible, because of the small investment.

On the basis of no return on investment, the relation between the number of passengers per half round trip and the maximum length of half round trip for various daily mileages is shown in Table IV.

Although the above figures will vary from place to place and from time to time, it is believed that they are substantially correct as representing average conditions, and it is to be concluded that competition from the "jitney" bus will be confined to the short-haul business. If the "jitney" service survives the experimental stage and finds, as it may, that after being put by laws and ordinances into its proper relation to the community, passengers can be carried from 1 mile to 2 miles for 5 cents, this short haul competition will constitute the necessity for, and furnish a valid argument for, a much more serious consideration of the zone system of fares on the part of the electric railways and regulatory bodies than it has received in the past. It is obvious that, to the extent that the street railways are deprived of the traffic that costs less than 5 cents per passenger to handle, they cannot continue to carry passengers for 5 cents where the cost is more than 5 cents.

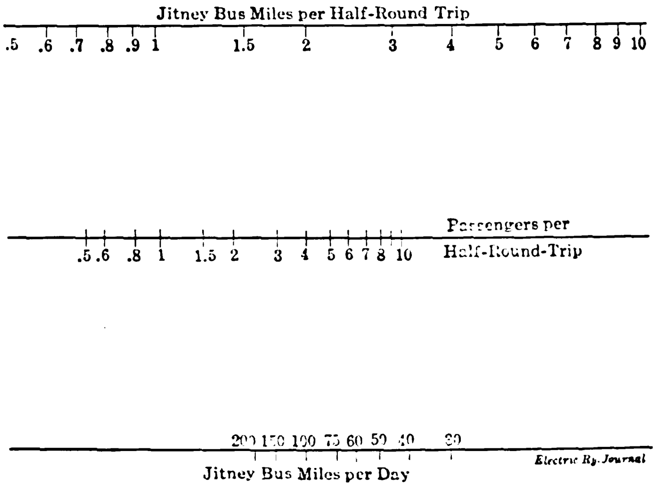
TABLE IV.—MAXIMUM LENGTH OF HALF ROUND TRIP FOR "JITNEY" SERVICE

Number of Passengers per Half Round Trip	Length of Half Round Trip in Miles			
	75 Miles per Day	100 Miles per Day	150 Miles per Day	200 Miles per Day
1	0.45	0.51	0.58	0.63
2	0.89	1.02	1.17	1.27
3	1.34	1.52	1.76	1.91
4	1.79	2.04	2.34	2.55
5	2.24	2.54	2.93	3.18
6	2.68	3.05	3.52	3.82

Fig. 1 is a graphical representation of the relations expressed in the equation:

$$\frac{M}{S} \times N \times 5 = M \times 5.8 + 405$$

where M represents the daily mileage, S the length of a half round trip, N the number of passengers per trip, and 5 the fare in cents. The diagram is used by laying a straight edge across the points corresponding to the assumed figures for the bus-miles per day and for passengers per half round trip, the answer in maximum trip mileage being read on the upper scale. For example, a total daily mileage of 100 with three passengers per half round trip will permit a maximum haul of 1.5 miles.



"JITNEY" BUS—FIG. 1—DIAGRAM FOR DETERMINING MAXIMUM PROFITABLE HAUL

RAILWAY AND "JITNEY" COMPARED

It is of considerable interest also to compare the costs of transportation by the small automobile with the costs on a typical electric street railway, and the following analysis, while admittedly not complete, is nevertheless, it is believed, detailed enough to indicate rather closely the relations between the factors which control the profitable length of haul on street railways. The operating expenses, depreciation, taxes and return on investment of a $20,000,000 street railway plant, classifying the expenses according to the factor which presumably influences its variations, amount to $0.106 per car-mile, plus $0.985 per car-hour, plus $14 per mile of track per day, plus $0.0025 per passenger, plus $980 per day or, since the assumed plant is operating 200 miles of track, $4.90 per mile of track per day.

Assuming a speed of 8½ m.p.h. and that the number of cars in service will be varied to correspond with the variations in traffic so that there is a fixed number of passengers carried on each half round trip, and that a degree of concentration of traffic exists such that if the number of car-miles run during the busiest hour is multiplied by $10\frac{1}{2}$, the result will be the total number of car-miles of all cars per day, the following equation obtains:

$$P(R-.25)=L(3T+22.2)$$

where P represents passengers per half round trip, R the fare in cents, L the length of half round trip, and T the minimum headway in minutes.*

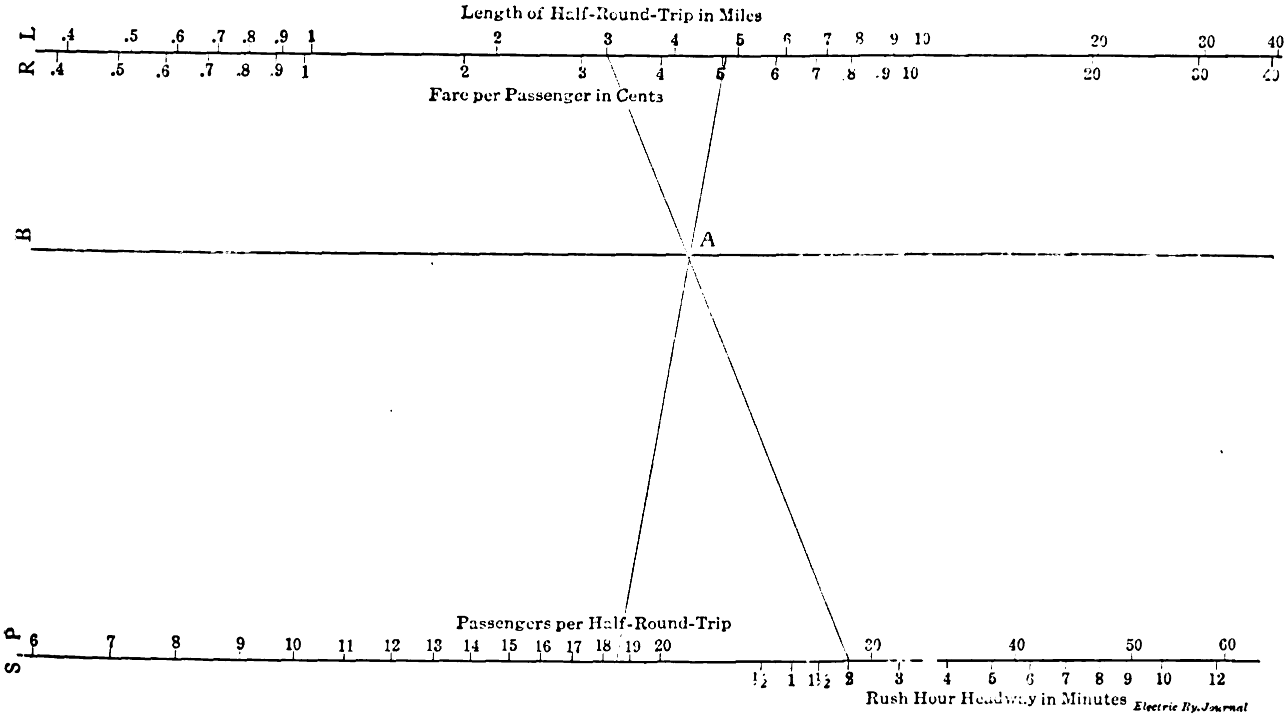
Fig. 2 shows the relation between the four quantities which appear in the equation. In this diagram, the figures outside of the two lines should be considered together and the figures inside of these lines should be considered together. For example, assume that it is desired to find out how many passengers per half round trip must be carried to make profitable the operation of a line 3 miles long on which the fare is 5 cents, when the minimum headway during the rush hour is two minutes. Placing a straight edge on the figure connecting 3 miles in Column L and two minutes in column S, the point A on line B is determined. Connecting A and 5 cents in column R, the number 18 is read in column P as the number of passengers per half round trip. If it is desired to determine the number of passengers per day under these circumstances, it may be done by multiplying the number of trips during the rush hour, 30, by 2, to determine the number of half round trips, multiplying this product by $10\frac{1}{2}$ to determine the number of half round trips per day, and multiplying this again by 18 to determine the total number of passengers handled, or more briefly, divide the number of passengers per car by the headway in minutes and multiply by 630.

TABLE V.—SHOWING RECEIPTS ON COST BASIS AND FLAT-RATE BASIS

Length of Half Round Trip Miles	Number of Passengers: Half Round Trip	Number of Passengers: Total	Receipts on Cost Basis: Per Passenger in Cents	Receipts on Cost Basis: Total in Dollars	Receipts on Flat-Rate Basis: Per Passenger in Cents	Receipts on Flat-Rate Basis: Total in Dollars
2	30	3,000	2.25	67.50	5	150
3	30	3,000	3.10	93.00	5	150
5	30	3,000	5.00	150.00	5	150
10	30	3,000	10.00	300.00	5	150
Total		12,000	5.09	610.50	5	600
Total excluding 2-mile line		9,000	6.03	543.00	5	450
Total excluding 2- and 3-mile lines		6,000	7.50	450.00	5	300
Total excluding 2-, 3- and 5-mile lines		3,000	10.00	300.00	5	150

It is of interest to note in comparison with costs of "jitney" bus operation that with the length of haul of 2 miles, which is about all the "jitney" bus can do for a nickel (with an average of four passengers per half round trip), and with a rush-hour headway of one minute the electric railway would require about eleven passengers per half round trip to make operation profitable at 5 cents per passenger. A car, however, seating twenty people can be run on such a route and schedule as this for a 3-cent fare. A passenger riding 10 miles, however, in a car which is carrying on the average of twenty people per half round trip would have to pay something over 12 cents per ride.

To show the effect of the "jitney" in taking away this short-haul traffic, assume, for example, four lines, 2 miles, 3 miles, 5 miles and 10 miles in length respectively, and assume that the fare on each one is 5 cents. Assume 3000 people ride on each line in 100 half round trips. A



"JITNEY" BUS—FIG. 2—DIAGRAM FOR DETERMINING VARICUS FACTORS INVOLVED IN BUS OPERATION BASED ON ARBITRARY COST PER MILE

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* This equation is derived as follows:

As L equals length of line, $2L$ will equal length of track and also the mileage per round trip of each car. Then

$$\frac{2L}{8.5} = \text{hours per round trip.}$$

If I equals minimum headway in minutes, then

$$\frac{2L}{8.5} \times \frac{60}{T} = \text{maximum number of cars in service (rush hour)}$$

$$\frac{14.1L}{T} \times 10.5 = \text{car-hours per day.}$$

$$\frac{14.1L}{T} \times 89.25 = \frac{1260L}{T} = \text{car-miles per day.}$$

$$\frac{1260L}{2TL} = \frac{630}{T} = \text{round trips per day.}$$

$$\frac{1260}{T} = \text{half round trips per day.}$$

If P equals passengers per half round trip, then

$$\frac{1260}{T} \times P = \text{passengers per day.}$$

And if R equals fare in cents, then

$$\frac{1260PR}{T} = \text{revenue per day in cents.}$$

Now if the costs of operation equal the revenues per day

$$2L\ (1400+490)+\frac{1260}{T}\times 10.6+\frac{148L}{T}\times 98.5+\frac{1260P}{T}\times 0.25=\frac{1260PR}{T}$$

Or $P\ (R-0.25) = L\ (3T+22.2)$.

fare at cost on the previously-outlined basis would yield the railway $610.50, while the flat-rate, 5-cent fare yields $600, as indicated in Table V on page 623, the two figures in this case being in substantial agreement.

The elimination of the 2-mile trip would clearly require that 6 cents be made the flat rate for the remaining lines, and the elimination of the 3-mile and 5-mile lines would raise this flat rate first to 7.5 cents and then to 10 cents.

It must be evident then that the "jitney" bus can compete in the matter of the cost of operation only under very special conditions with the electric railway, and it should be borne in mind that each passenger now riding 2 miles on an electric car contributes something toward the cost of carrying the passenger who rides 10 miles. If the "jitney" bus, then, is permitted to compete with electric lines for this short-haul business, it is obviously but a step toward the zone system of fares.

Electrical Night at N. Y. R. R. Club

Recent Progress in Steam Road Electrifications Described before the New York Railroad Club

The eleventh annual electrical night of the New York Railroad Club was held Friday, March 19, with some 500 members present.

Following the opening remarks by William McClellan, chairman of the committee on electrical subjects, George Gibbs of Gibbs & Hill, consulting engineers, New York, was introduced.

Mr. Gibbs' Remarks

Mr. Gibbs first discussed, with the aid of slides, the electrification of the Norfolk & Western Railway. The superiority of electrification in this case, he said, was due largely to the presence of a long, continuous grade and the opportunity it afforded for the maximum utilization of equipment. If electrification should be extended, say for the entire division of 120 miles, the economies would be less because grades occurred in the middle of the adjoining sections.

Speaking about the equipment in hand, Mr. Gibbs said that twelve electric locomotives were replacing thirty-two steam locomotives. This was due in part to the fact that an electric train would have but two electric locomotives, header and pusher, as against three steam locomotives; and in part to the elimination of engine watering and coaling.

One characteristic of the new locomotives was their ability to exert full tractive effort for a considerable time, say five minutes, while standing. In starting trains it was difficult always to get synchronous action of the header and pusher. With regenerative control it had been found feasible to go down grade at 15 m.p.h. without the use of brakeshoes. As much as 8000 hp had been put into a train, an amount, he believed, never before reached in either steam or electric operation.

Mr. Gibbs then discussed the Paoli electrification of the Pennsylvania Railroad, also with the use of slides. In this case the reason for electrification was that it would reduce existing track congestion at less expense than would the acquirement of land for more track and terminal facilities. It was not, then, a question of securing a direct return on the investment. Among Mr. Gibbs' views were some of the newly-installed light signals which show rows of white lights in any one of three positions—horizontal, 45-deg. and vertical—to take the place of the usual movable semaphore arms.

Mr. Eaton's Remarks

The next speaker, G. M. Eaton, Westinghouse Electric & Manufacturing Company, presented a series of slides which showed the progress of the Norfolk & Western locomotives from the receipt of the Baldwin chassis to their completion at the Westinghouse works. In discussing various details of the locomotives Mr. Eaton mentioned the liquid rheostat. This device has no moving plates. Instead of moving the plates to vary the resistance, a valve and pneumatic cylinder are provided for the converse act of raising the water.

Professor Pender's Remarks

Harold Pender, professor of electrical engineering University of Pennsylvania, then discussed the use of electric motor trucks in large freight houses and stations. As in other kinds of electrification, density of traffic determined the question of economy. In one instance of freight moving with two-wheel hand trucks the cost was $5.33 per ton-mile whereas electric trucks in one Chicago freight house had lowered the cost to 39 cents per ton-mile and in another Chicago house to 48 cents per ton-mile. These costs included labor, interest, depreciation, cost of energy, etc.

W. S. Murray's Remarks

W. S. Murray, of McHenry & Murray, consulting engineers, New Haven, in taking the floor first referred to his earlier New Haven progress reports before the American Institute of Electrical Engineers and to his more recent paper before the Franklin Institute (see Electric Railway Journal for Jan. 30). He referred to the maintenance costs of locomotives there given and said that these costs, within a few months, would be brought to 6 cents per locomotive-mile and possibly to less.

Operation of single-phase locomotives showed that even without regeneration a most remarkable absorption of starting peaks took place, although the New Haven electric zone is on practically level track. It was found that when 3000-ton electric trains were placed in operation, instead of the expected peaks in the power station load line during the period of acceleration, the load line was actually improved. The explanation of this phenomenon was that when a number of heavy trains are in translation on level track a train that is starting draws down the voltage of the line slightly, not enough to interfere with the schedules but yet far enough to leave the trains in translation at speeds which exceed those corresponding to the lower voltage.

Mr. Murray then discussed what he termed "the visualization of the kilowatt-hour." He said that the capacity of the Cos Cob station had been slightly taxed, but an opportunity had been offered to buy a 4500-kw supply at the eastern end of the line. The question was, what would this comparatively small addition mean? The power records of the New Haven Company had been kept and analyzed so carefully that it was known in advance that the additional 4500-kw could be applied to handle twelve 3000-ton freight trains. On the basis that 1 lb. of coal in the power house delivers as much energy as 2 lb. of coal in the locomotive, it was calculated that the substitution of electric for steam operation of twelve trains would save $70,000. The reduction in engine repair costs with consequent increase in mileage and the saving in line losses, due to using the available energy nearer the points of supply, meant further economies. In fact, the total saving was about $150,000.

He believed that electrical engineers had the tendency to drive trains too rapidly. The New Haven trains were geared for about 35 m.p.h. While that speed was justifiable on the New Haven, because of its heavy traffic, yet if the speed was 35 per cent less the increased tractive effort obtained therefor would permit the operation of 4000-ton instead of 3000-ton trains. Therefore, in considering engines in the future it would be of great advantage to look to tractive effort as well as speed.

In conclusion, Mr. Murray spoke enthusiastically about the tests on the New Canaan branch with the mercury arc rectifier. It offered the best means to join the advantages of a.c. transmission and distribution to the advantages of d.c. propulsion. One practical result on the New Haven would be the possibility of increasing the tractive effort of the a.c.-d.c. locomotives by 50 per cent with all speed characteristics maintained.

MR. ARMSTRONG'S REMARKS

A. H. Armstrong, railway department, General Electric Company, was the next speaker. Referring to the economies of electrification, he said that the first cost of the Butte, Anaconda & Pacific Railway, including interest during construction, was $1,200,000. For handling practically the same tonnage, the railway had saved $240,000 in operating expenses compared with the last year of steam operation. The success of this electrification had led the Chicago, Milwaukee & St. Paul Railway to adopt 3000-volt d.c. electrification. The 113-mile section between Deer Lodge and Harlowton was well under way. In the entire 440 miles only fourteen substations were required, whereas the Norfolk & Western Railway had four substations in an 11,000-volt a.c. 30-mile electrification. The 3000-volt line was reinforced with but 500,000 circ. mils of feeder copper.

MR. TURNER'S REMARKS

W. B. Turner, Westinghouse Traction Brake Company, then described the advantages of actuating air brakes electrically to obtain simultaneous operation of the brakes throughout the train. As an example, a stop made in 580 ft. with the ordinary brake has been made in 330 ft. with electrically-operated brakes, from a running speed of 40 m.p.h. Not only could emergency stops be made in half the time but all other stops were made in less time, more agreeably and with less strain on the equipment.

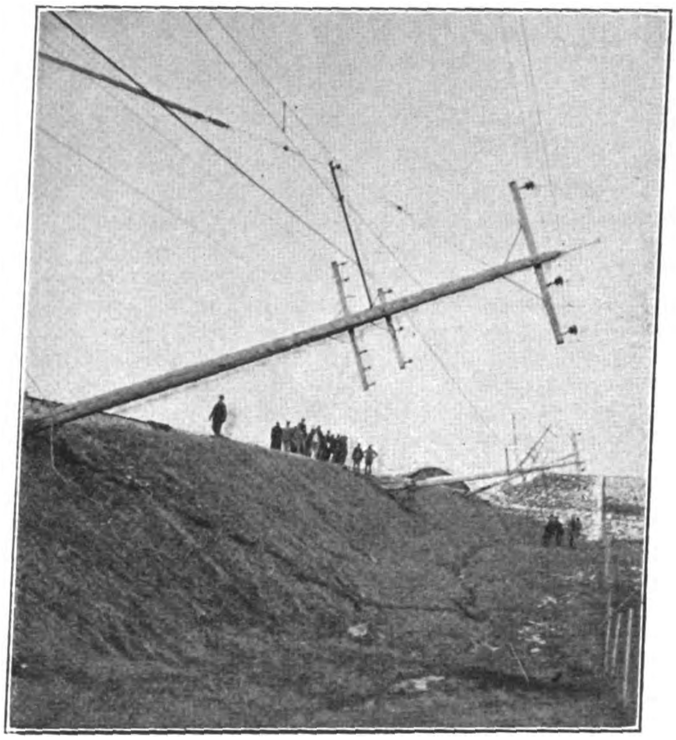
CHAIRMAN MCCLELLAN'S REMARKS

Mr. McClellan in concluding the meeting, said that it marked his resignation as chairman after many years of service. He was pleased to see that even in hard times money was being spent on electrification. He ventured to prophesy that electricity if used to its fullest extent would abolish all physical limitations of railroads. Rivers and mountains would no longer be an obstacle. The possibilities of multiple-unit operation were as yet hardly realized. The day would come when single cars would be operated much more freely in trunk line service than to-day. The most startling possibility was in operation through distant control. He thought that the day might come when trains would be operated on automatic stops and signals only, and there would be no employee on the train except someone to look after the comfort of the passengers and telephone in case of emergencies. A still greater improvement that lay in the future was a wide-gage railroad from the Atlantic to the Pacific Ocean for freight only. He was willing to predict the possibility of universal electrification, but the only thing he was not willing to predict was what system would be used.

On the conclusion of the speaker's farewell remarks President Syze thanked Mr. McClellan in the name of the Railroad Club for the excellent work that he had performed as chairman of the committee on electrical subjects.

Storm Plays Havoc on Kansas Pole Lines

The accompanying halftone shows how many of the fifty-three poles between Liberty and Excelsior Springs on the Kansas City, Clay County & St. Joseph Railway were blown down by a storm on Feb. 22. In some instances the poles were on embankments higher than the track, while in others they were on a fill. Both the high-tension and low-tension lines were down at many places.



HIGH-TENSION POLES BLOWN DOWN ON THE KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY

The section mentioned was out of service for four days. The only previous interruption on this railway was Feb. 22, 1914, when a section of the St. Joseph division was out two hours because of poles blown down in a similar storm. The telephone and telegraph companies lost many poles in eastern Kansas and western Missouri, but no serious damage was reported by interurban railroads other than that shown.

Brooms and Street Cars

A recent discussion of brooms appears in the current issue of *Trolley Topics*, the official organ of the Louisville (Ky.) Railway. It is written by G. B. Powell, superintendent of employment of the Louisville Railway. Mr. Powell says:

"Our present type of broom was invented more than a century ago and is quite an improvement over the 'turkey wing' which was in use at that time. There are many kinds of brooms and their uses are varied, and you will find them in all parts of the civilized world, including the rear platform of street cars. The street car broom has developed a one-sidedness from lack of exercise and from standing, straw-end down, in the same position for days at a time, which gives them the appearance of a run-over shoe. Now if you will give them vigorous exercise about once a trip by sweeping out your car, it will benefit the broom by improving its appearance, improve the looks of your car, cause favorable comment from passengers and prevent the inspector from reporting you to the office for allowing your cars to be dirty."

Meeting of Illinois Electric Railways Association

Economies in Power Consumption, Feeder-Tap Protection and Care of Commutators, and One-Man Cars Were the Topics of Discussion at This Meeting, Which Was Held at the New Morrison Hotel in Chicago on March 19

At the meeting of the Illinois Electric Railways Association, held on March 19 at the New Morrison Hotel, Chicago, sixty members were in attendance, President F. E. Fisher presiding. In the business session which preceded the regular program, it was decided to change the name of the association's signal committee to engineering committee, in order to broaden the scope of its future work. The subject assigned to this committee was economy in power consumption, subdivided under three headings, namely: distribution, handling cars, and return circuits.

G. T. Seely, assistant general manager Elevated Railroads of Chicago, in commenting on the importance of making a thorough study of the subject of economies in power consumption, stated that his company had a man who devoted his entire time to this work. Although this man had been thus employed only a short time, excellent results had already been obtained through close attention to the use of heaters, lamps and controllers. This inspector had found that the heaters and lamps, both in cars and buildings, were left in service when they were not required. Although the large demand for power during the winter months made it practically impossible to accomplish much by instructing motormen in the methods of coasting, the rise in temperature during the early spring permitted much to be done by instructing the men along this line.

Continuing Mr. Seely stated that during the remaining portion of the spring, the summer and the fall months, this schooling should result in a considerable saving. Coasting boards have been installed, and by temporarily placing coasting clocks and meters on cars the motormen were shown the effect of the improper use of controllers. Mr. Seely estimated that his company's power bill was approximately $1,250,000 a year, so that a small per cent saved in energy consumption represented quite an item. Marshall E. Sampsell, president Central Illinois Public Service Company, in emphasizing Mr. Seely's remarks stated that, even though power was being sold, it was good policy to instruct the power purchaser how to reduce his energy consumption in addition to effecting economies within his organization.

President Fisher stated that the association had decided to inaugurate a question box, and in pursuance of that idea, he had sent out to the member companies the first list of questions. These, however, had been put in the mail too late to permit a full discussion at this meeting and were referred to the different committees. The president requested all companies to reply to such questions as they desired, mailing the answers to Secretary W. B. Griffin, secretary and treasurer of the Elevated Railroads of Chicago, who in turn would distribute the replies to the committees interested, for final disposition.

Chairman E. E. Soules, manager of the publicity department Illinois Traction System, reported for the publicity committee regarding progress in the preparation of the Illinois Electric Railways Association map. He stated that the area to be included in the map had been slightly enlarged in order to show the lines of all member companies. A preliminary draft of the map had been sent to all the member companies and corrections had been received. The map was in the hands of an artist in the process of a final sketch, and as soon as it was completed it would again be sent to member companies for final check and approval.

Charles H. Smith, engineer executive department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., was then called upon to deliver his paper, "Feeder-Tap Protection in D. C. Apparatus," following which J. M. Bosenbury, superintendent of motive power and equipment Illinois Traction System, Peoria, Ill., read a paper on "The One-Man Car." These papers are abstracted on the next page. The discussion which followed centered around the economies to be obtained by the adoption of the one-man car and details regarding its operation. It was brought out that after the motorman had become familiar with the operation of the one-man car, lengthening of the schedules was unnecessary, even though the single man was required to issue transfers and sell tickets. It was deemed advisable, however, to station flagmen at extremely busy steam-railroad crossings, the operation of the one-man cars making possible a saving which was much in excess of that necessary to pay for this extra crossing protection.

J. M. Strasser, vice-president Illinois Light & Traction Company, Streator, Ill., stated that at one point where one-man cars had been placed in service much opposition on the part of the employees had been experienced. This had been overcome, however, by obtaining other positions for the deposed conductors in addition to convincing the city that it would be possible to give better and safer service than could be afforded under the existing method of operation. Increased safety in operation was believed to be the best argument for the introduction of one-man cars in the smaller cities and towns. It was also considered good policy, should the resultant savings permit, to purchase new cars or at least thoroughly to overhaul the old ones.

At this point J. R. Blackhall, general manager Chicago & Joliet Electric Railway, Joliet, Ill., called attention to the present tendency to seek ways and means of reducing expenses rather than to consider seriously the possibility of obtaining an increased fare. While the one-man car offered a logical and satisfactory means of reducing expenses in the smaller cities and towns, Mr. Blackhall did not believe it a practical proposition for the larger cities. A campaign for increased fares appeared to be the most plausible and practical way to obtain relief. The weight of the argument for higher fares was on the side of street railway companies, because they could show that since their inception the crude horse car had been replaced by the modern electric street car, provided with comfortable seats, heating and lighting systems, while the rate of fare had remained the same. Superimposed upon this argument was the marked increase in the cost of materials, many of which cost 100 per cent more than they did ten or fifteen years ago.

At the close of this discussion the meeting adjourned to the regular association luncheon, during which the members and guests were entertained by songs and music furnished by a chorus and orchestra of employees of the Elevated Railroads of Chicago.

THE ONE-MAN CAR

BY J. M. BOSENBURY, SUPERINTENDENT OF MOTIVE POWER AND EQUIPMENT ILLINOIS TRACTION SYSTEM

If, through the use of the one-man car, it is proposed to place upon the motorman the responsibility for collecting fares and issuing transfers in addition to his other duties, it is manifest that some arrangement should be afforded to simplify and to make safe the method of operating the car. Concentration of the operating devices to which the motorman must give attention is an important requirement, and this may be effected by combining the air-brake valve with the door-operating and step-operating mechanism. Such a combination should provide for stopping the car in the ordinary way and at the same time should open the doors and lower the steps without requiring the motorman to remove his hand from the brake-valve handle. Furthermore, the operation of the air brakes or the operation of the doors and steps should be so controlled that either could be accomplished independently. It is also desirable to include with these functions the application of sand to the rails by means of the brake-valve handle during the progress of a stop and without interfering with any of the other operations.

All of the foregoing requisites have been observed in the one-man cars that are now used on several of the properties of the Illinois Traction System, and, in addition, as the air-brake equipment on these cars is provided with the emergency feature, automatic operation of the emergency valve is provided if the motorman's hand is removed from the controller handle when it is in running position. A rear or emergency door has been provided also, and this is so arranged that if an emergency application of the air brake is made both front and rear doors and steps are automatically thrown open, the release of the air brakes closing them. This is the only circumstance under which the rear door and steps are operated. When the brake valve handle is moved to emergency position by the motorman, sand is automatically applied to the rail.

The principal objections which have been advanced against one-man car operation are that it might retard the schedule by lengthening the time of stops, or by flagging at railroad crossings. The difficulty of attending to the trolley and (in some sections of the country) the race problem are also put forward from time to time as undesirable features. With regard to the effect on the schedule, it may be said that the handling of passengers is largely a question of car design and arrangement. Under the present system of two-men operation the number of unpaid fares on the platform when the car starts is primarily a question of the location of the conductor. But in any case it is highly desirable to have as many passengers seated as possible, or at least past the platform, when the signal to proceed is given, and herein the one-man car does not suffer by comparison.

With regard to the flagging of railroad crossings it is necessary, of course, for the motorman to leave the car and to investigate the safety of the crossing before he returns to his car to move it across. This applies only to crossings where traffic is infrequent, because wherever considerable traffic obtains a watchman is generally stationed at the intersection.

Attention to the trolley or other parts of the car under one-man operation is under about the same handicaps as it is with the fully-inclosed cars of two-man type. Furthermore, the question of the trolley coming off the wire is largely one of maintenance, and it has been found that this criticism has not been borne out in the case of cars with two men when both of them are stationed on the front platform.

In the sections of the country where the distinction in race is made some objection may be advanced against the entrance of negroes by the front door of the car, but this situation does not differ greatly from that which prevails under conditions where the whites enter at the rear, and are obliged to pass through a section reserved for negroes.

In general it has been observed where one-man car operation is practiced that the undivided responsibility has produced a degree of efficiency in operation not normally reached with two-men operation. Step accidents are unknown. Where a comparison has been made between the two methods of operation the results so favor the one-man car that in one instance a claim department has actually requested the use of more cars of this type. The net savings in operation has been variously estimated to be from 8 per cent to 14 per cent of the gross earnings and the cost of arranging a car for one-man operation is almost negligible in comparison.

The attitude of labor toward the introduction of the one-man car will probably be antagonistic, but if any considerable saving can be effected, it follows that the railway company will be in a position to provide better service for its patrons, and to reach this desirable condition the transportation companies must be met halfway by the public. With the possibility of more frequent service, combined with adequacy and at least an equal degree of comfort, it is fair to assume that once the proposition is thoroughly understood co-operation from the public will follow.

FEEDER-TAP PROTECTION AND CARE OF COMMUTATORS

BY CHARLES H. SMITH, ENGINEER EXECUTIVE DEPARTMENT WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Under the title "Feeder-Tap Protection for D. C. Apparatus and a Few Suggestions Regarding the Care of Commutators" Mr. Smith explained how and why feeder-tap protection should be furnished, and stated the precautions necessary to secure good commutator operation. His paper was an extension of one published in the *Electric Journal* of January, 1915.

LOCATION OF FEEDER TAPS

By the location of feeder taps at proper distances from the power station or substation, the resistance or reactance of the feeders suffices to limit short-circuit currents to values which will not cause "bucking" or "flash-over." Mr. Smith quoted an official of a large system to the effect that his practice is to allow no taps to be made within 2000 ft. of stations. Recently, a tap located 1000 ft. from a station caused flash-overs and temporary shut-down. Removal of this tap to a distance of 2000 ft. stopped the trouble. In another case taps were found in front of substations in which flash-overs were serious. The cutting of these taps produced improvement, and the removal of the nearest taps to a distance of 4000 ft. entirely overcame flashing. Other illustrations cited by the speaker demonstrated the importance of furnishing proper feeder-tap protection, from 75 per cent to 90 per cent of the trouble from flashing being due to lack of such protection.

No general rule can be laid down for determining the proper tap distances. So many variables enter that the problem in each case can best be solved by moving the "close-in" taps until the resistance of the circuit becomes great enough to cushion and protect the machines. The variables which enter in determining tap distances are as follows:

(1) Capacity behind the generating unit. With a rotary converter the greater the capacity at the source of generation the greater will be the damage in case of trouble, and the more nearly equal the capacities of rotary and a.c. generator the less serious will be the damage. Motor-generator sets are better protected through the cushioning effect of the windings, including the transformer windings, as are also engine-driven d.c. generators. In the latter, there is the cushioning effect of the engines in addition to that of the windings.

(2) Capacity of the rotary or generator. The larger the unit the less subject is it to flash-overs.

(3) System voltage. The lower the voltage the nearer to the machines may the taps be placed.

(4) Sizes of feeders and rails. The larger the feeders and rails the greater must be the tap distances from the machines.

(5) Disposition of feeders. The distribution of feeders should be such that each will carry a reasonable proportion of the station output. Trouble on a feeder carrying more than its share is frequently responsible for flash-overs.

(6) Bonding. Broken bonds and poor ground connections have occasionally been known to produce flash-overs.

(7) Sizes of cars. With a given size of substation unit the heavier the car equipment and the higher the motor rating the greater will be the "drag" upon the substation equipment.

In general, experience has shown that on a 600-volt system the first tap should not be less than 2500 ft. from the machines, and on a 1200-volt system, 5000 ft. The line losses due to these distances are of no consequence compared with the energy lost through flash-overs and the expense involved in repairing damaged apparatus. Furthermore, with long feeders the car equipment is benefited by being worked at a more uniform voltage.

KINDS OF FLASHING

Mr. Smith analyzed the different varieties of flashing under these heads: Quick "squealing" or "kicking" flash; flash-over or buck-over; pedestal flash, and flash to the V-rings. The first shoots from under the brushes but does not carry across. It rarely results in much damage. Flash-overs are those which reach from positive to negative brush-holders. They may or may not prove destructive, but after one occurs the machine should be shut down and the commutator and brush-holders cleaned. Flashes to the bearing pedestal are invariably destructive and, in addition to blistering and burning the commutator and the brush rigging, burn the pedestals. They are largely traceable to the practice of grounding the frames of machines of which the negatives are grounded. Flashes to V-rings are not as common as formerly, as the rings are now insulated.

With rare exceptions, flashing is due to troubles originating outside the station, that is, line and car troubles in combination with "close-in" taps. The general impression that motor-driven d.c. generators, engine-driven d.c. generators, twenty-five-cycle rotaries and sixty-cycle rotaries, are equally suitable for all d.c. service, regardless of conditions, is not correct. These machines are temperamentally different, although there is no d.c. service to which they are not equally applicable provided they are properly installed and protected.

COMMUTATOR TROUBLES

The ideal commutator is a smooth one, and if it were possible to find brushes which would carry current at the high density now required and at the same time be sufficiently abrasive to keep the mica down, the practice of slotting would soon lose favor. Undercutting is objectionable because the slots must be cleaned, the bars must be bevelled, and the copper must be removed from the slots after turning. A revolving stone gives satisfactory results in the surfacing of commutators.

The rate at which slots are bridged over is governed by the hardness of the bar copper, the width of the bars, the speed, the angle at which the brushes are set, the direction of rotation and the brush characteristics. In addition, lubricants have to be more intelligently applied with undercutting than without.

The "seasoning" of the commutators at the manufacturer's shops to render them permanently tight in service is difficult. Bars loosen due to the expansion and contraction of the copper and the V-rings, and to the results of the heating of the mica. Tightening of the V-rings while the commutators are hot usually cures the trouble, especially if bolts are tightened at opposite ends of diameters. Loose commutators are likely to cause flashing on slight provocation. Proper care of brushes is also an element in satisfactory operation.

In conclusion Mr. Smith makes the inquiry, "Is it not worth while to protect service, apparatus and men against the damaging effects of flashing and 'buck-overs' when the method is so fundamentally simple and the cost so small?"

Gear and Pinion Operation

In the current issue of the *General Electric Review*, A. A. Ross contends that operating conditions have much to do with gear life. He states that the involute tooth is best suited for railway motor work on account of the greater thickness at the root, and because the distance between pinion and gear centers can be slightly increased without seriously affecting the mesh. He recommends the "standard" rather than the "stub" tooth wherever it can be used, for "railway motor gearing is bad enough at the best."

Under operating conditions affecting wear Mr. Ross emphasizes four, as follows: (1) Grit, which accumulates in the gear pan. While practically every master mechanic will disclaim its presence it is there and has been found in quantity up to 24 per cent. It usually enters between gear hub and gear pan in the form of street dust, brakeshoe dust and wheel wash. Carelessness during inspection is also a cause of gritty grease. (2) Excessive lining wear, which produces improper mesh. This also produces noisy chattering affecting commutation. (3) Consistency of lubricant. This should be of such consistency and used in such quantity as to permit the teeth to dip frequently. (4) Number of stops in schedule, motormen's methods of accelerating and braking, etc.

The practice of driving pinions home with the sledge is bad. After fitting, the pinion should be heated throughout in boiling water and lightly tapped into place. In dismounting a puller which grips all of the teeth is safest. On account of "fatigue" of the metal pinions should be scrapped on a safe mileage basis, regardless of wear. Gears and pinions should be of the same hardness. In mounting solid gears without keys a pressure of 20 to 30 tons is sufficient for city cars and 50 tons for interurbans, as it takes a higher torsional pressure to twist a gear than to mount it.

March 11 was known as safety day among the employees of the Brooklyn (N. Y.) Rapid Transit Company. It was celebrated in the evening at the main clubhouse of the company at Jamaica and Alabama Avenues, with an entertainment under the auspices of the Brooklyn Rapid Transit Employees Benefit Association.

A. R. E. A. Convention Proceedings

An Account of the Action Taken by This Association on the Various Committee Reports

The discussion of the committee reports at the annual convention of the American Railway Engineering Association, held in Chicago, March 16-18, 1915, abstracts of which were contained in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, brought out additional facts of interest to electric railways. President W. B. Storey, Jr., vice-president Atchison, Topeka & Santa Fé Railway, reviewed briefly the year's events of interest to railroad engineers, discussing topics relating particularly to the association's work.

ACTION ON COMMITTEE REPORTS

The report of the committee on signs, fences and crossings was presented by W. F. Strouse, chairman, and after some discussion the specifications for galvanized wire fencing, gates for right-of-way fences and concrete fence posts were adopted by the association. This committee's recommendation for track construction and flangeways in paved street crossings and in paved streets was revised so that the 141-lb. 9-in. girder rail was not recommended unless conditions required. For street crossings it was revised and provides for standard track construction with such modification as may be required to suit the situation. Upon motion it was finally decided to refer the question of track construction back to the committee for further consideration.

That part of the roadway committee's report setting forth a classification of soils was referred back for further consideration, while the specifications for sodding were adopted for inclusion in the manual. The formula recommended by the committee on ties to provide an economic comparison of railroad ties with different materials, was also approved and adopted for the same purpose. The information on metal, composite and concrete ties was received as such.

The recommendations of the committee on rail, i.e., that the sections weighing 100 lb., 110 lb. and 120 lb. per yard be approved as standard, that the A. R. A. section *A* also be adopted as standard for 90-lb. rail, that for sections below 90 lb. it was inadvisable to recommend any changes and that these conclusions be presented to the A. R. A. for its adoption, were approved. The specifications for high carbon steel joint bars and for heat-treated, oil-quenched steel joint bars were adopted for publication in the manual. In the discussion of the rail committee's investigation of transverse fissures, Dr. P. H. Dudley, New York Central Railroad, stated that one phase of this investigation had led him to believe that the shape of wheel treads was not as it should be. He found that the coning of the tread materially reduced the tread bearing. He believed that the uniform bearing over the entire head of the rail would produce much better results both as regards rail and wheel wear.

That part of the track committee's report containing tentative plans and specifications for manganese frogs and crossings was received as information. In a similar manner the report of the committee on buildings, portions of which were submitted as information and the other parts containing recommendations for changes in the manual, were approved.

The report of the committee on electricity was largely one of progress, but contained two recommendations, namely, a clearance diagram for equipment and permanent way structures adjacent to third-rail, which was approved by the association for publication in the manual. The second recommendation relating to specifications for crossings of wires and cables over steam railroad rights-of-way was also approved. A recommendation containing certain revisions and modifications in the existing specifications for overhead crossings of electric light and power lines was approved, but on the suggestion of the committee was not recommended for publication in the manual.

The recommendation of the wood preservation committee, namely, that the use of coal tar in creosote be permitted, was approved. In addition to this a specification for creosote-coal tar solution was adopted for insertion in the manual, as well as four rules relating to the water allowance in creosote. In support of the recommendation of the committee on the grading of lumber, the present rules for white and Norway pine and hemlock were rescinded and the suggested rules for grading Southern pine lumber were received as tentative rules.

The report of the committee on ballast brought out more lively discussion than any other submitted at this convention, particularly that part of the report containing a proposed ballast section for single track on tangents. It developed that there was no necessity for banking ballast against the ends of the ties as proposed in the recommended section, since this was believed to be detrimental to the track. In substantiating this the opinion was advanced that the ballast at the ends of the tie becomes clogged, both by powdered ballast and dust, and thereby prevents good drainage. An actual test also had demonstrated that excessive tamping aided in clogging ballast. Banking of gravel at the ends of the ties also made more difficult the maintenance of track circuits when block signals were used, while a change to the drainage section, namely, by exposing the ends of the ties, eliminated this difficulty. Furthermore, it was found that the usual objection to the drainage ballast section did not obtain in practice, namely, that it was difficult to keep the track in line.

Regarding the kind of tile to be used for track drainage purposes, one member stated that in the past too high a value had been placed upon the qualities of ordinary farm tile. Experience had shown that it crushed out of line and filled with silt after a time, becoming valueless for drainage purposes. Vitrified bell and spigot tile was recommended, since it has a higher compressive strength and the bell tends to reduce the amount of silt carried into the tile by water. Following this discussion the track section was referred back to the committee for further consideration, awaiting such time as the report of the other committees investigating questions closely related to this one had made a report.

ANNUAL DINNER

The annual dinner was held in the Gold Room of the Congress Hotel on the evening of March 18, with President W. B. Storey acting as toastmaster. The list of speakers included Charles S. Gleed, president Missouri & Kansas Telephone Company; Sir George Foster, minister of foreign trade and commerce, Dominion of Canada; Frank L. Mulholland, president International Association of Rotary Clubs, and Benjamin Baum, chief engineer maintenance of way Maumee Valley Railroad.

The following officers were elected for the ensuing year: President, Robert Trimble, chief engineer maintenance of way Northwest System Pennsylvania Lines, West Pittsburgh, Pa.; first vice-president, A. S. Baldwin, chief engineer Illinois Central Railroad, Chicago; second vice-president, John G. Sullivan, chief engineer Western Lines Canadian Pacific Railroad, Winnipeg; treasurer, George H. Bremner, assistant district engineer division of valuation Interstate Commerce Commission, Chicago, and secretary, E. H. Fritch, Chicago.

American Association News

Committee Meetings Held This Week Included Accountants' Educational, Engineering Lightning Protection, and T. & T. Training of Transportation Employees—Transportation Committees Active Also

CONVENTION TRANSPORTATION MATTERS

Secretary Burritt's office is sending advance information to local transportation committee chairmen regarding the trains to and from the convention. A train will go over the N. Y. Central, northern route, and another over the Pennsylvania via Denver and Salt Lake City. Leaving San Francisco these trains will stop at Yosemite National Park, the San Diego Exposition and other Southern California points, as well as the Grand Canyon of Arizona. The details of these trips have not yet been definitely settled, but they will be round trips of the all-expenses-paid variety. A "special" will also be made up in Chicago and another one-way New York train is contemplated, leaving as late as Oct. 1, arriving in San Francisco on Oct. 4.

ACCOUNTANTS' EDUCATIONAL COMMITTEE

A meeting of the committee on education of the A. E. R. A. A. was held in New York on March 22. The committee members present were George G. Whitney, Washington, D. C., chairman, and F. L. Pryor, Philadelphia, Pa.; E. B. Burritt and H. C. Clark, of the American Association; J. L. Conover, Jr., Newark, N. J., and H. H. Norris, ELECTRIC RAILWAY JOURNAL, were present by invitation. The status of the correspondence course was discussed and a number of suggestions for improvement in details were referred to the chairman for conference with the instructor, Professor John R. Wildman of New York University. The desirability of adding an introductory course for accounting and other clerks and for individuals not familiar with accounting practice was considered.

PROGRESS ON THE ACCOUNTANTS' CORRESPONDENCE COURSE

Reports which have been received by the chairman of the educational committee of the Accountants' Association show that about one-half of the individuals enrolled in the correspondence course are now submitting papers for examination by the instructor. This is a very gratifying proportion and shows that an intelligent interest is being taken in the topics covered by the instruction papers. Many of those enrolled subscribed for the course to secure the information for reference purposes, and these also are being benefited although they do not file reports.

As was clearly explained in the prospectus of the present course, it was designed to give a scientific foundation for accounting work to those familiar with the practical details. Classification of accounts is not being considered because there is not yet sufficient unanimity regarding classification to warrant its incorporation in a regular course. Those in charge felt that there are certain fundamental principles of accountancy which permeate all lines of work so that the experience gained in other fields is available in electric railway accounting. The illustrations have, therefore, been drawn from different lines and the students have been left to apply the principles to their own work. As the course proceeds the illustrations will be drawn more and more from electric railway practice.

In view of the somewhat restricted field, the enrollment of a class of more than 300 was an excellent indication of the desire of young electric railway accountants to prepare themselves for doing their work better and thus for promotion. If the result of the year's work is the establishment of a course or set of courses which will be permanent except for their adaptation to changing conditions in the industry, the achievement will redound to the credit of the association and to those who have fostered the movement. It devolves largely upon those who are now following the course to get the most possible out of it, realizing that they are thus assisting in laying the foundation for the future of the course as well as for their own progress.

COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES

A two-day session of this committee was held in Boston on March 25 and 26, Chairman C. S. Ching, Boston Elevated Railway, presiding. The members present were E. E. Strong, Rochester, N. Y.; F. I. Hardy, South Bend, Ind.; W. J. Harvie, Syracuse, N. Y.; H. H. Hanson, R. B. Currie, and Edward Dana, Boston. The committee is making a study of the laws relating to employment and is planning a systematic program for the improvement of courtesy. These will be covered at length in the report to be presented at the 1915 convention.

NEW ENGLAND TRANSPORTATION COMMITTEE

This committee held its first meeting on March 16, those present being H. E. Reynolds, Boston, chairman; C. C. Wood, Springfield, Mass.; A. A. Hale, Boston; J. E. Johnson, Boston, and R. M. Sparks, Boston, secretary. It was decided that the plans as outlined by the director of transportation will be followed by the New England section and it is expected that a large number of local members will make the trip. A notice for presentation at the annual banquet of the New England Street Railway Club on March 25 was prepared. This called attention to the inducements and conveniences which will characterize the trip and gave the names of the New England committee members so that inquiries can be made of those conveniently located.

COMMITTEE ON LIGHTNING PROTECTION

A meeting of the Engineering Association committee on lightning protection was held in Pittsburgh on March 24 with all of the members present, as follows: D. E. Crouse, Annapolis, Md., chairman; F. R. Phillips, Pittsburgh, Pa.; E. J. Blair, Chicago, Ill., and J. Leisenring, Springfield, Ohio. C. G. Hecker, Pittsburgh, also attended part of the meeting. The following assignments were made, the individuals named to prepare sections of the report after correspondence with other members of the committee: Mr. Phillips, material of cores, location and size of car lightning arrester choke coils, also location, available types, and suitable methods of inspection of car lightning arresters; Mr. Crouse, car wiring with reference to the prevention of electrostatic and electromagnetic induction, and lightning arrester grounding, including size of ground wire, proximity of other wires, and effect of steel cars on methods of grounding; Mr. Leisenring, available types of line lightning arresters and recommendations as to the desirable number per mile; and Mr. Blair, line lightning arrester ground connections, with regard to earth or rail connection or both. These topics were thoroughly discussed by the committee with a view to a logical development of the subject in preparation for the convention report.

DENVER TRAMWAY SECTION

The regular monthly meeting of Company Section No. 3 was held on March 18, with an attendance of 125. H. P. Fligg, chief of the coasting department, read the principal paper on the subject of "Coasting." This provoked a lively discussion.

PUBLIC SERVICE RAILWAY SECTION

On account of lack of space last week the March meeting of Company Section No. 2 was merely mentioned. The meeting was attended by more than 300 men, and talks were given by R. E. Danforth, general manager; Alfred Green, Galena Signal Oil Company, and H. H. Norris, ELECTRIC RAILWAY JOURNAL.

Mr. Danforth reviewed his own experiences in Buffalo and Rochester, calling attention to the fact that in the latter city seven new sets of motor equipment were required in ten years, owing to the rapid development of the railway motor between 1890 and 1900. He showed how this development work imposed heavy financial burdens on the electric railways of the country and intimated that the cost of this development is a proper capital charge. From the experience of the Public Service Railway he showed how, during seven years past, maintenance costs, even of old motors, had been reduced by such devices as impregnating windings with insulating varnish, slotting commutators, etc. He also gave figures comparing maintenance costs of different types of motors used in Rochester some years ago, indicating how rapid was the progress in perfecting mechanical details in motor construction. Mr. Danforth quoted a number of prices paid for repair parts of early motors and for complete motors, showing that not only were motors expensive, but the cost of the repair parts was excessive, due to the inexperience of the manufacturers.

Mr. Green's talk was an intimate personal account of troubles with early motors with particular reference to gears and controllers. He gave amusing details of the construction of gears with wooden centers and cast-iron rims, the wooden centers being necessary for insulating purposes. Steel rims were later shrunk on the wooden centers with great reduction in cost. His talk gave a vivid impression of the difficulties of keeping cars in motion in the early days, which difficulties are apt not to be appreciated by the rising generation. He closed by emphasizing the fact that troubles with equipment were farreaching in preventing regular operation and dissatisfaction to patrons.

Mr. Norris confined his attention to calculations of the energy required to bring cars to speed from rest on level track, grades and curves and to maintain speed, for the purpose of showing the relation of accelerating power to the necessary size of motors. The speaker and the audience worked the problems out together, using motor curves which were printed on the regular Public Service data-book leaves. The calculations were based on equipment used in Newark, so as to permit the results to be checked from the experience of the men present. The A. I. E. E. motor rating was explained and the relation of this rating to the all-day load of the motor was illustrated from the calculations.

New England Street Railway Banquet

Large Attendance at the Annual Meeting in Boston on Thursday—New Officers Elected

Between 600 and 700 members and guests of the New England Street Railway Club gathered at the Copley-Plaza Hotel, Boston, Mass., on the evening of March 25 for the fifteenth annual banquet of the organization.

As usual, the banquet was preceded by the annual meeting in the afternoon, at which Clarence E. Learned, of Boston, was elected president, succeeding John T. Conway, of Brockton, Mass. Other officers elected were: vice-presidents: Massachusetts, C. V. Wood, Springfield; Maine, A. H. Ford, Portland; New Hampshire, J. Brodie Smith, Manchester; Vermont, Frank C. Wilkinson, St. Albans; Rhode Island, A. E. Potter, Providence; Connecticut, R. W. Perkins, Norwich. H. A. Faulkner, of Boston, and E. P. Shaw, Jr., of Framingham, Mass., were re-elected secretary and treasurer, respectively. The executive committee consists of J. T. Conway, Brockton, Mass.; Harry B. Ivers, Boston; E. F. Flynn, Boston; C. S. Ching, Boston; J. E. Dozier, Lynn, Mass.; J. W. Belling, Boston, and A. A. Hale, Boston, the finance committee consisting of C. E. Learned, H. B. Potter and A. P. Emmons, all of Boston. A biographical sketch of the new president is printed on another page of this issue. At the close of the business meeting an informal reception was enjoyed in the corridors and lobby of the hotel.

At the banquet in the evening "safety first" was featured in the menu, which abounded in clever cartoons and quips sponsored by Secretary Faulkner. The outside cover bore a red, white and green shield—the original "safety first" appliance of primitive man, handsomely decorated with trolley cars rampant and other appropriate emblems. Inside the folder were a set of "safety first" banquet rules wittily paraphrased. Among these were the following:

"Avoid hasty movements. Watch out. Be sure of your seat before sitting."

"Be careful. When in doubt pick the fork on the outside and work toward the plate. Watch the man on the other track."

"Don't leave the hall while the speakers are in motion. Face the front."

"Safety first pays. Remember the names of the men you are introducing—or cough at the meeting points."

An attractive musical program was provided during the evening. A decided hit was made by the appearance of an East Indian crystal gazer whose "revelations" of the future contained many appropriate references to prominent members and their activities.

ADDRESSES OF THE EVENING

Mayor James M. Curley of Boston paid a high tribute to the safety work of the Boston Elevated Railway and to the personnel of the club. He emphasized the present serious situation in the transportation field with respect to the need of increased revenue and pointed out that the public fails to realize the rising cost of living to the railroads. The speaker recognized the need of higher fares, contrasting the difficulties of securing adequate income with the facility with which municipal and state taxes can be increased. " 'Safety first'," said the Mayor, "should be extended to the stockholder's interests as well as to the life and pocket of the public." Closing, he said that he believed the railroad men of New England were competent to work out a solution of the present difficulties, including the invasion of the "jitney" bus, and voiced his purpose to see that so far as lies within his power, justice shall be accorded the railways.

The next address was delivered by Judge Thomas Duncan, chairman of the Indiana Public Service Commission. The speaker traced the legal development of the power of states to regulate common carriers from the early regulations of ferrymen, wagoners and common carriers by parliament to the present mode of regulation by states through their public service commissions. "The exercise of the right to regulate rates, and to require adequate service through the instrumentality of state control, is but a change of the form, and not a change in the character of regulation," he said, and "the order of a commission in fixing rates has the same force as a legislative act. Continuing, he said:

"The courts go very far to sustain an order of the commission. It has frequently been determined by the highest courts of the land, that the orders of the commission are final unless, (1) beyond the power which it could constitutionally exercise; or (2) beyond its statutory power; or (3) based upon a mistake of law. But questions of fact may be involved in the determination of questions of law, so that an order regular on its face may be set aside if it appears that (4) the rate is so low as to be confiscatory and in violation of the constitutional prohibition against taking property without due process of law; or (5) if the commission acted so arbitrarily and unjustly as to fix rates contrary to evidence or without evidence to support it; or (6) if the authority therein involved has been exercised in such an unreasonable manner as to cause it to be within the elementary rule that the substance, and not the shadow, determines the validity of the exercise of the power."

The speaker then quoted figures from the reports of the Interstate Commerce Commission showing the growth of the railroad business and investments therein, and then said:

"The present depression in the transportation business is not permanent, nor in my judgment is it due to governmental regulation. It is not confined to business regulated by the state. It prevails generally with varying degrees of violence. The people and the public service corporations are not enemies but friends. Our citizens know these splendid properties cannot be permitted to die of starvation without injury to all. It is the mighty task of the leaders of thought of this age to show the people a more excellent way. When the broadest publicity discloses a reasonable necessity for increased revenues the people will respond with a just—nay, even with a generous hand. But deception is dangerous.

"It is the duty of public service corporations to assist in restoring harmonious relations between the carriers and those they serve. He who engenders strife is an enemy to the prosperity of his business. With the coming of peace in the world prosperity may confidently be expected and the development of the country will have the opportunity to proceed along efficient lines."

The next address was by Chairman Fred J. McLeod of the Massachusetts Public Service Commission who referred to the Middlesex & Boston case as a declaration of policy on the part of the board. He predicted that within the next two years many more applications for increased rates will be presented to the commission and said that, generally speaking, these are likely to be granted. Mr. McLeod said in part:

"The troubles of the railways are not due to state or federal regulation. This has in the main been constructive. The commission is not responsible for the adequacy of rates. That rests with the companies. In general, my conclusion is that the rates now charged by Massachusetts street railways are insufficient to enable the companies to give the kind of service the public has the right to demand, to adequately conserve the property and to provide for depreciation. The commission is not in an enviable position, but the differences between the interests of the railways and of the public are largely superficial. The companies are run honestly and it would be to the highest degree imprudent to let the street railways of Massachusetts get into the unfortunate position of the Boston & Maine (steam) Railroad."

General William A. Bancroft, the next speaker, contrasted the difference between private income opportunities and the restrictions placed on public service corporation revenue and declared that unless responsibility for income is recognized as a necessary function of governmental regulation, then the latter becomes a failure. Capital furnishes equipment; labor operates it, and income should support both, as well as provide for maintenance, depreciation, obsolescence, attracting and supporting new capital. The requirements of good service and adequate wages are generally conceded, but the element of income needs more consideration. Government now determines the income and, with it, should assume the same responsibility formerly borne by those who fixed the revenue. The investor is entitled to as much consideration as are labor and the public. Said the speaker: "Government, to use the language of the President of the United States, must play the whole game and play it according to the rules. It cannot leave out any part. It must provide for capital, both for new and for old, as well as for service and for labor. It must raise rates if necessary, just as managers did before their power to do so was taken away."

General Bancroft emphasized the Middlesex & Boston decision as one which completely recognized the principle that income must be adequate to meet the conditions which it is its function to support. In conclusion he said: "In the expressive phrase of the day, it is 'up to' the governments of our respective states and to the government of the United States to provide for income. If government control fails to provide for income, then government control is a failure."

President C. Loomis Allen of the American Electric Railway Association, the next speaker, said that the survival of the industry, extensions into new territory, and increased facilities require a change in the public's attitude. A greater confidence must be inspired in the purchase of electric railway securities to enable the necessary expansion to be made. Self-education as to the problems of the industry and the education of employees are essential. "Tell your employees in language that will be understood how much money you take in and how these revenues are disposed of," said the speaker. He advocated giving employees a correct understanding of the profits that are earned on each nickel received. Many employees beside the public at large believe that these profits are very great. Financial facts should be set forth in plain and terse language, avoiding technicalities and accounting terms. The public wants to know about the expenditures from revenue. It wants to know the amounts paid in salaries, labor, and for the purchase of material and supplies; the amounts paid out in the settlement of injuries and damage claims, and the expenses connected therewith; the amounts of legal fees, of various forms of taxation, and to what extent the municipalities are benefited by these sums. The companies are interested in letting the public know the outlays in interest on funded and unfunded loans, the payments in dividends, who the stockholders are and the amount of stock each holds. A great service can be done the industry by furnishing employees with the details of operation, requesting them to tell the story to their neighbors, fellow-workers and friends. No expenditure and but little time is required to give such information in simple form. Misunderstanding has arisen in the past on the part of the public through failure to make proper use of employees as avenues of truth distribution.

Frank J. Hedley, vice-president and general manager of the Interborough Rapid Transit Company of New York, was the last speaker. He touched upon the magnitude of the electric passenger transportation problem in New York City. About $300,000,000 is now being expended in the construction of new rapid transit lines. When these improvements are completed, the maximum ride on a 5-cent fare will go up from 17 to over 26 miles. Mr. Hedley referred to the great benefits of the open shop method of operation and emphasized the efforts of the company to insure the satisfaction of employees and equal opportunities of advancement to all men of ability. Closing, he deprecated misuse of opportunities of the press and advocated a square deal in newspaper columns for railways.

C. S. Clark, Boston, and Harry B. Ivers, Boston, were, respectively, chairmen of the reception and general banquet committees.

COMMUNICATION

Meters and Men

SANGAMO ELECTRIC COMPANY
CHICAGO, ILL., March 18, 1915.

To the Editors:

In the editorial "Meters and Men," in the Feb. 27 issue of the ELECTRIC RAILWAY JOURNAL, the editor, after cautioning against the use of average consumption per car-mile records for determining motormen's relative performance in car operation without first carefully analyzing and subdividing the different service conditions, suggests the development of some sort of stop-recording device for simplifying the work.

It is the writer's opinion that the adoption of a device of this nature on any system would tend to defeat the real purpose of the car meters, the attainment of economy of operation, by putting a premium on the number of stops made by the motormen. Where the number of stops are considered in the motorman's average consumption rate, there would be an incentive for all the men, no matter whether they had a low or high consumption, to make the maximum number of stops, or even more if possible, thus reconciling their consumption to an unnecessarily extra number of stops.

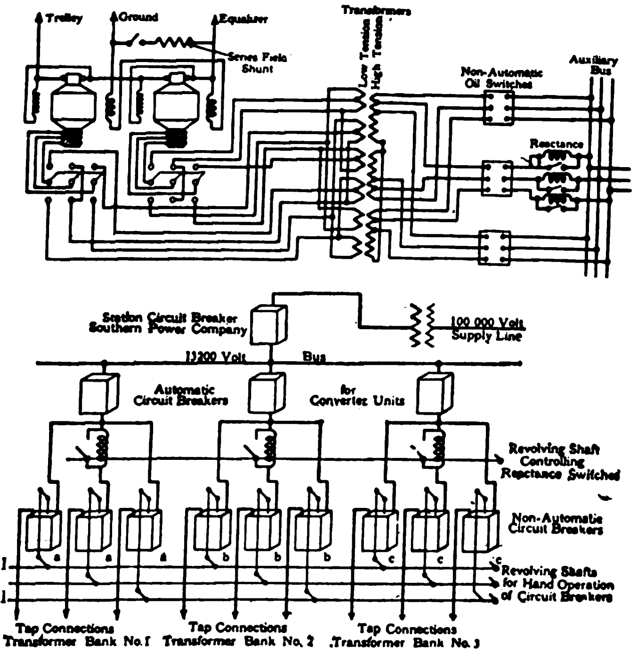
The argument in favor of a stop-recording device must support the contention that the average car-energy consumption per mile is proportional to the number of stops per mile. This means that there must be a fair uniformity of energy consumption per stop, or rather between stops, over the test period. Yet, on a city system it is evident that the average consumption per stop per mile for a car crawling along behind wagons and slowly moving traffic will be far less than the average for a heavily-loaded car that makes from ten to twelve stops per mile at evenly divided intervals. Therefore, for fairness, it is either necessary to know the exact kind of stops, namely, to classify the stops according to the amount of energy used in accelerating and running between stops, or to take the test over a comprehensive period, to eliminate such variables, and to enable all men to make nearly an equal number of similar stops. To eliminate the variable representing the number of stops would be in fact eliminating the necessity of a stop-recording device.

There will be a difference in average consumption per stop per mile on different lines with the same type of car over a reliable test period, depending on conditions of local traffic, schedule, etc., just as there will be a difference in average consumption per mile for the same reasons, thus necessitating the separate classification of the results of the different service conditions, with either system. So that while the stop-recording device might apparently be of advantage in showing the total number of stops that any motorman has made with a given consumption, still the far more important variable representing energy used between stops has to be eliminated by the law of averages and the separate classification of service conditions.

It is true that a word of caution is due with regard to the use of meter records for comparisons of motormen. The different types of cars must be divided into car classes and the different service conditions divided into service classes, and the results in each car-service class should be figured separately in average consumption terms. Then each man's results in the different classes can be combined by percentage figures. It is not difficult properly to classify the different service conditions, and in this regard it is advisable to over-subdivide rather than otherwise, as later on similar averages of service classes can be combined and the total number of car-service classes reduced appreciably. Above all, no figures should be accepted until it is certain that they are reliable and have all variables but the ones of relative performance of motormen eliminated by having been taken over a sufficiently long period. Because a ball player has a batting average of 1.000 for two games is no sign that he is a great batsman, and similarly the record of an extra man on a tripper or special, over the rush hours of the day, is no criterion of his ability. C. H. KOEHLER.

Sixty-Cycle Rotary Converters in Series in 1500-Volt Service

In the April issue of the *Electric Journal* Nicholas Stahl gives operating details of the rotary converter equipment of the Piedmont & Northern Railway, installed last year. Both motor-generator sets and rotary converters are used in the substations, but in the Spartanburg substation each unit consists of two sixty-cycle rotary converters connected in series on the d.c. side and mounted on a single bedplate. As the voltage on the substation was liable to considerable variation due to


Trolley
Ground
Equalizer
Series Field Shunt
Transformers
Low Tension
High Tension
Non-Automatic Oil Switches
Auxiliary Bus
Reactance
Station Circuit Breaker Southern Power Company
100 000 Volt Supply Line
13200 Volt Bus
Automatic Circuit Breakers for Converter Units
Revolving Shaft Controlling Reactance Switches
Non-Automatic Circuit Breakers
a
b
c
I
II
III
Revolving Shafts for Hand Operation of Circuit Breakers
Tap Connections Transformer Bank No. 1
Tap Connections Transformer Bank No. 2
Tap Connections Transformer Bank No. 3

SPARTANSBURG SUBSTATION—A.C. AND D.C. CIRCUIT DIAGRAMS SHOWING TRANSFORMER SECONDARY MULTI-TAP CONNECTIONS

(The lower is a straight-line diagram)

the length of the transmission system and the varying load demand upon it, special provision was made for adjusting the secondary voltage of the transformers. The arrangements for connecting different taps in the 13,200-volt transformer primaries to the auxiliary busbars are shown in the diagrams which appear on page 633.

The transmission voltage to the substation is 100,000 and it is reduced to 13,200 in outdoor transformers. Inside the substation are nine transformers, each of 167-kva capacity, arranged in three banks, with star-connected primaries and delta-connected secondaries. These reduce the voltage to about 460 for the rotaries. There are three primary taps on each transformer, each made through an oil switch, the center or normal tap being provided with a preventive coil and a disconnecting switch. This arrangement provides for shifting the taps in service, the "disconnect" being open while two of the switches are closed in the process of transferring taps. The taps provide for voltage 90, 100 and 110 per cent of normal. The secondaries of these transformers are double, the two windings supplying respectively one phase of each of the two rotaries forming a pair.

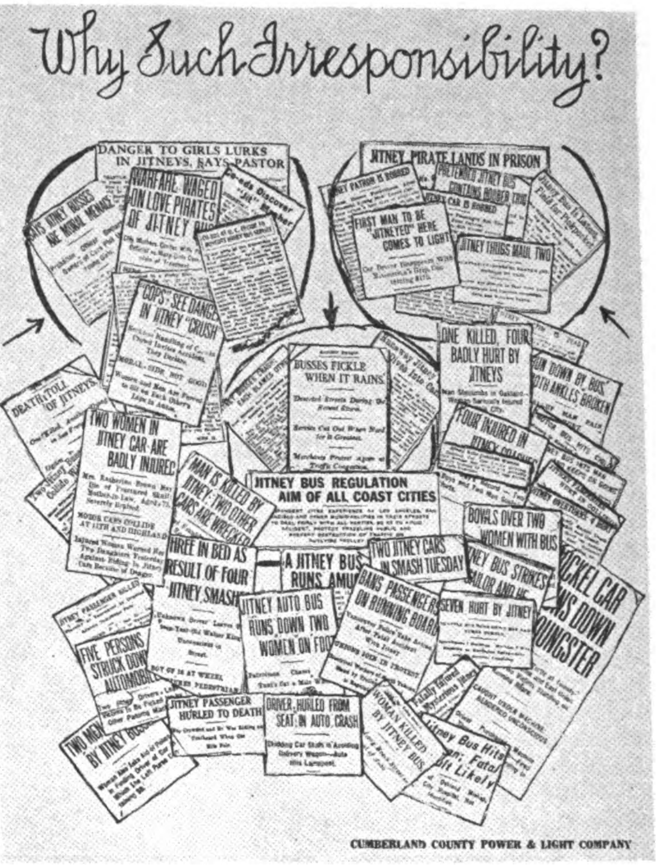
The a.c. circuit breaker for controlling a transformer bank is provided with a low-voltage release and pallet switch. On failure of the alternating voltage the circuit breaker will trip out and the pallet switch, being connected to a non-voltage or shunt trip coil on the d.c. circuit breaker, will trip out the d.c. end of the rotary, completely isolating it. This prevents damage due to a.c. power coming back when the machine is out of phase and nearly at rest. As the substation is also liable to receive power over the d.c. trolley, d.c. reverse-current relays are installed on the machine panels to operate when the rotaries tend to reverse themselves. These short-circuit low-voltage coils on the a.c. circuit breakers and cut out the sets. Additional circuit breakers are placed on the negative side of the d.c. circuit to protect the "low side" machine in case of a short-circuit around the "high" machine. These circuit breakers, with the equalizer switches, are mounted on inclosed panels placed between the machine and feeder panels.

To protect the substation the feeders are not tied directly to the trolleys at the substation but are carried about a mile down the line. Flash-overs have been extremely rare and then of no serious consequence, and no trouble has been experienced through reversal of polarity of d.c. generators elsewhere on the system, which might have been caused by rise of voltage on the d.c. side of the rotary converters when a rise occurred on the a.c. side.

Ammunition in the "Jitney" War

The accompanying illustration shows an advertisement entitled "Why Such Irresponsibility?" originally inserted in the daily papers of Portland, Ore., by the Portland Railway, Light & Power Company and later, through the courtesy of that company, published in some of the daily papers of Portland, Maine, by the Cumberland County Light & Power Company.

As the other side of any question is interesting, however, an advertisement of a Chicago dealer in automobile supplies is reproduced also. The advertiser in this case is obviously a frank soul, for his plea to the casual reader to spend a few hundred dollars and earn $100 per week sounds enticing. The statement of profit would, of course, be more convincing if the dealer had taken advantage of the opportunity himself, but as a possible insight into one of the causes of the remarkable growth of the "jitney" craze the advertisement is enlightening. Incidentally, it might be added that in the many statements which have been received at the office of the ELECTRIC RAILWAY JOURNAL in regard to the profits of "jitney" bus drivers, none has ever claimed the gross profits of $100 per week. The most extravagant claim of net receipts among them up to this time has been limited to about $30 per week in cases where the driver neglected all expenses except those for gasoline and tires.


Why Such Irresponsibility?
DANGER TO GIRLS LURKS IN JITNEYS, SAYS PASTOR
WARFARE WAGED ON LOVE PIRATES OF JITNEY
JITNEY PIRATE LANDS IN PRISON
FIRST MAN TO BE "JITNEYED" HERE COMES TO LIGHT
JITNEY THUGS MAUL TWO
COPS SEE DANGER IN JITNEY "CRUSH"
ONE KILLED, FOUR BADLY HURT BY JITNEYS
BUSSES FICKLE WHEN IT RAINS
TWO WOMEN IN JITNEY CAR ARE BADLY INJURED
JITNEY BUS REGULATION AIM OF ALL COAST CITIES
FOUR INJURED IN
BOWLS OVER TWO WOMEN WITH BUS
THREE IN BED AS RESULT OF FOUR JITNEY SMASH
A JITNEY BUS RUNS AMUCK
TWO JITNEY CARS IN SMASH TUESDAY
BANS PASSENGERS ON RUNNING BOARD
SEVEN HURT BY JITNEY
JITNEY AUTO BUS RUNS DOWN TWO WOMEN ON FOOT
FIVE PERSONS STRUCK DOWN AUTOMOBILE
JITNEY PASSENGER HURLED TO DEATH
DRIVER, HURLED FROM SEAT IN AUTO. CRASH
WOMAN KILLED BY JITNEY BUS
CUMBERLAND COUNTY POWER & LIGHT COMPANY

"JITNEY" WAR AMMUNITION—NEWSPAPER HEADINGS ON "JITNEY" MENACE

Be the First to Operate a
"JITNEY"
BUS LINE

Why work for $25 a week when on an investment of a FEW HUNDRED DOLLARS you can start in business and make $100 a week?

New and used autos at prices never before offered. You can convert any of our cars we sell into a "Jitney" bus. Consult us—we will show you how to do it.

Limousine, coupe and up-to-date fore-door touring bodies at your own price.

AUTO SUPPLIES—TIRES

Accessories and radiators for all cars at 50 cents on the dollar.

Our No. 7 Price Wrecker covers every automobile want. Send or call for it. Save money.

WORLD'S LARGEST DEALERS
TIMES SQUARE AUTO COMPANY
1210 MICHIGAN AVENUE
Also Fifty-sixth Street and Broadway, New York.

"JITNEY" WAR AMMUNITION—ADVERTISEMENT IN CHICAGO PAPERS

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

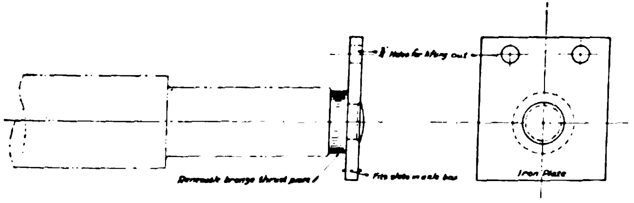
Thrust Plate for Worn Car Axles

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

A. R. Johnson's article on "Case-Hardened Collar and Welding Reclaim Worn Button-End Axles," on page 294 in the issue of Feb. 6, raises a subject of considerable interest, inasmuch as all who have had charge of the maintenance of rolling stock have at some time or another encountered the trouble referred to.

Mr. Johnson refers to the excessive wear as having taken place after his company had commenced to use check (or keep) plates made of hard bronze, but I should imagine that even when the plates were made of a softer metal the axle wear in the check grooves was more than that which occurred at other parts of the axles. In England I have come across scores of cases where an otherwise sound axle has been cast aside as useless, simply because the sides of the check grooves have worn to a bad shape; the plates are generally of fairly hard bronze, but soft metal is still quite common.

Considering the great pressures which are impressed on the sides of the axle grooves when a car takes a curve, at the high speeds so common nowadays, and remembering at the same time that the whole load is spread over only about one-half of the full circle, it is not reasonable to expect such thrust faces to keep their normal shape for very long. Although there are two check plates per axle it can practically be assumed that the total side pressure is at any instant carried on one plate only per axle.



RENEWABLE BRONZE THRUST PIECE FOR AXLE

Take a common English case, namely, a double-deck car weighing 13 tons, on a four-wheel truck, traveling round a curve of 50-ft. radius at say 10 m.p.h. (14.6 ft. per second). Since the street track, as a rule, has no super-elevation, the centrifugal force causing pressure against the check plates will be:

$$F = \frac{W \times V^2}{g \times R} = \frac{13 \times 2240 \times 14.6 \times 14.6}{32.2 \times 50} = 3860 \text{ lb.}$$

where F = centrifugal force in pounds.
W = weight of car in pounds.
V = velocity of car in feet per second.
g = gravity acceleration = 32.2 ft.p.s.p.s.
R = radius of curve in feet.

This force is imposed on two check plates, one on each axle, and as the side-bearing area per plate is usually about 1.95 sq. in. the pressure intensity is

$$\frac{3860}{2 \times 1.95} = 990 \text{ lb. per square inch.}$$

This figure is, of course, very high indeed for the class of bearing under notice, but even this amount will be considerably exceeded when the car takes a sudden change of direction, as when taking switches and crossings and when nosing occurs at high speeds.

The case-hardened collar described by Mr. Johnson will undoubtedly effect a very considerable improvement. However, I think that the arrangement which I devised and used on two large systems having between them more than 600 cars, goes one better still.

The arrangement eliminated altogether the horseshoe type of check plate. In place of this we adopted a thrust plate which rubs against the end of the axle. To allow existing axle boxes to be used, the old axles with worn grooves were cut off in the lathe, level with the inside groove face, so that when in position there was just the necessary space available to allow the insertion of a plain solid bronze plate abutting on the axle end.

The check plates are reversible. For a 3-in. axle end they have a thrust-bearing area of nearly 7 sq. in. as compared with less than 2 sq. in. for the old arrangement. As can be expected, the wear on both axle and plate is very small indeed. They have been used on both single and bogie trucks (in the latter case for both driving and trailer axles), and in every case they have proved their superiority over the old pattern.

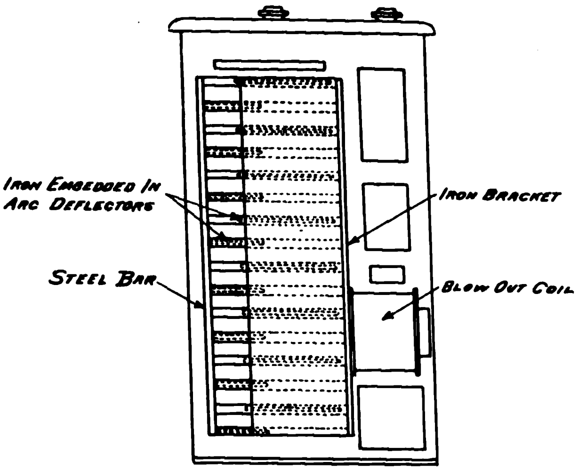
A later improvement greatly reduces the amount of bronze, which metal somehow or other seems to disappear very quickly when not in actual use on the cars. The accompanying sketch fully illustrates the revised check plate, and since all particulars are given thereon no further description is necessary.

Equipment Defects—Controller Blow-Out Coils—II

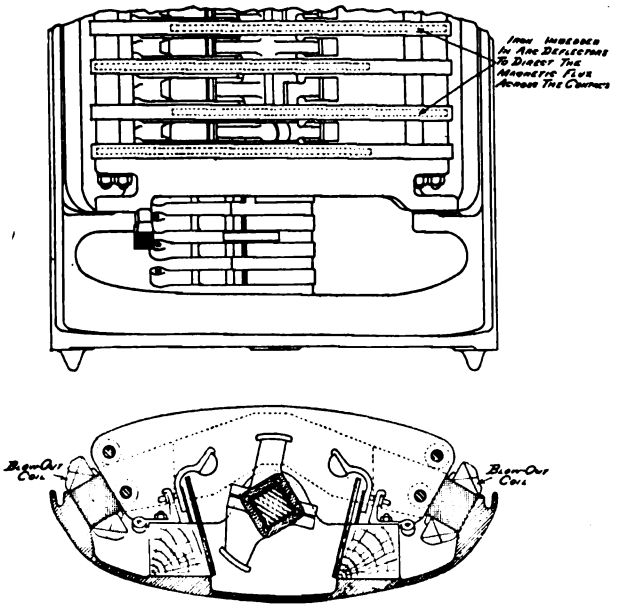
BY C. W. SQUIER, E. E.

Directed Flux Blow-Out.—In order to direct the magnetic field so that the lines of force would pass across the contacts in a direction parallel to the shaft and so blow the arc away from the drum instead of against the arc deflectors, the Westinghouse Electric & Manufacturing Company developed what may be called the "directed flux blow-out." An accompanying illustration shows this arrangement as applied to the No. 210 controller. A cast-iron bracket runs down the blow-out coil side of the arc shield, and a facing is provided for this bracket to make contact with the core of the blow-out coil. The arc shield is fastened to this bracket and swings with it. The individual arc deflectors are made of pressed asbestos or Ambroin, and pieces of sheet iron are imbedded in them. These deflectors and iron plates are so arranged that every alternate one has the iron projecting backward to the bracket on the blow-out coil side, while the iron in the remaining arc deflectors consists of short pieces projecting down to a steel bar which runs down the front and on the lower edge of the arc shield. The magnetic circuit is then as follows: From the core of the blow-out coil lines of force enter the bracket at the back and pass to the iron plates in the arc deflectors and to one side of the contact fingers. Then the lines cross over the intervening space across the contacts to the short pieces of iron in the adjacent arc deflectors and from these short plates down to the steel bar running in front of the arc shield and to the controller frame, and so back to the blow-out coil core. In passing from one arc deflector to the adjacent ones the lines of force cross the fingers and contacts in a direction parallel to the controller shaft, so that any arc formed by the opening of the controller circuit is lifted away from the drum. This type of blow-out overcame the disadvantage of having the arc blow against the arc deflectors, but as some contacts were a greater distance from the blow-out coil than others these had a less efficient blow-out.

Field Type of Blow-Out.—A further development of the directed flux blow-out overcame the disadvantage of a less effective blow-out for the contacts most distant from the blow-out coil. This was brought about by using two blow-out coils, one on either side of the controller, running the entire length of the contacts. It is known as the "field type blow-out" on account of its resemblance to the field of a two-pole motor. An accompanying illustration shows the arrangement of the coils, which are so wound that the faces of the pole pieces are of opposite polarity. In the arc deflectors are imbedded iron plates which extend about three-quarters of the distance from one pole piece to the other. Each succeeding arc deflector is reversed so that the iron plates in adjacent arc deflectors overlap through the center of the controller, and the contact fingers are placed in this space. The path of the magnetic flux is from one blow-out coil core through the iron plates which rest against this face to one side of the contact fingers, then across to the plates in the adjacent arc deflectors and through these to the blow-out coil core on the opposite side of the controller. By using coils which extend the entire length of the contact portion of the drum an absolutely uniform field is produced at the various contacts to produce a correspondingly uniform blow-out. The location of the coils at the side of the controller at a distance from the points at which arcing occurs leaves them safe from injury and gives an uninterrupted view of the contacts, which is desirable for inspection purposes.



WESTINGHOUSE NO. 210 CONTROLLER WITH DIRECTED FLUX BLOW-OUT

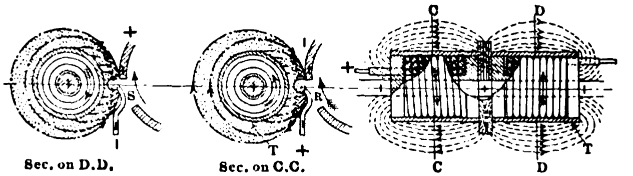

Iron Imbedded In Arc Deflectors To Direct The Magnetic Flux Across The Contacts
Blow-Out Coil
Blow-Out Coil

WESTINGHOUSE T-1 CONTROLLER WITH FIELD-TYPE BLOW-OUT

Another desirable feature of this type of arc shield is that it permits the elimination of all screws in the deflector plates. Such screws promoted splitting of the plates and proved a constant source of trouble in all the previous types of blow-outs discussed. The deflector plates of this type are bolted together with iron rods and separated by fiber spacing blocks so that they are held firmly together with no tendency to split, the whole forming a very substantial construction. In a later design the holes for the rods are slotted so that any single arc deflector can be removed and replaced without disturbing the remaining ones.

THE METALLIC SHIELD TYPE OF BLOW-OUT

A somewhat unique but efficient type of blow-out is used in the controllers manufactured by Dick, Kerr & Company, Ltd., England. This is shown in an accompanying illustration and is called the "metallic shield" blow-out. It consists of an iron core running the entire length of the controller drum on the side where the contact fingers are located. Several different coils of wire are wound about this core and arranged so that there are in alternation a series of positive and negative poles along the length of the iron core. These poles are at such locations that the direction of the magnetic flux across the contacts will draw the arc toward the coil. A copper metallic shield surrounds the blow-out coils so that, when the arc is broken, it is drawn around the circumference of this shield until a point is reached where it is broken without damaging results.



Electric Ry. Journal

DICK-KERR METALLIC SHIELD BLOW-OUT

This feature of blowing the arc against copper shields or tips which the arc can follow along until it is spread out and then disrupted without damaging the contacts has been used very extensively in multiple-unit controllers by applying arcing horns to the unit switch contacts.

An important safety feature of the metallic shield blow-out is that the circuit to the blow-out coil and controller fingers is broken whenever the arc shield is swung back for inspection purposes. The danger of an accident due to a repairman leaving the circuit breaker in while inspecting the controllers on a car is thus reduced.

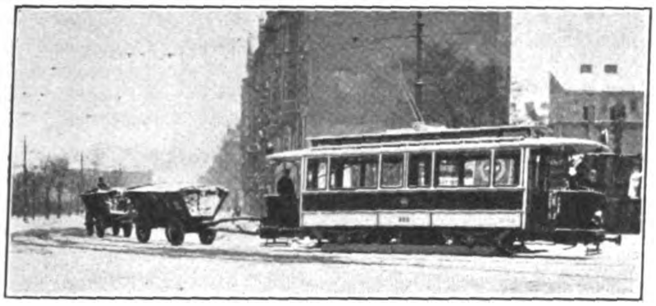
INDIVIDUAL BLOW-OUT COILS

The latest General Electric controllers have individual blow-out coils and arc chutes for each finger or group of fingers instead of a single blow-out coil for the entire controller, as was formerly used. These coils have steel cores, and the steel flanges which are riveted to these cores are in turn fastened to the finger bases. Steel plates are also imbedded in the arc deflectors so that they direct the lines of force through the arc chutes in a direction parallel to the shaft. This insures a very efficient blow-out and minimizes burning and the consequent repairs to contacts and fingers.

Motor Cars Supplant Horses in Vienna for Drayage

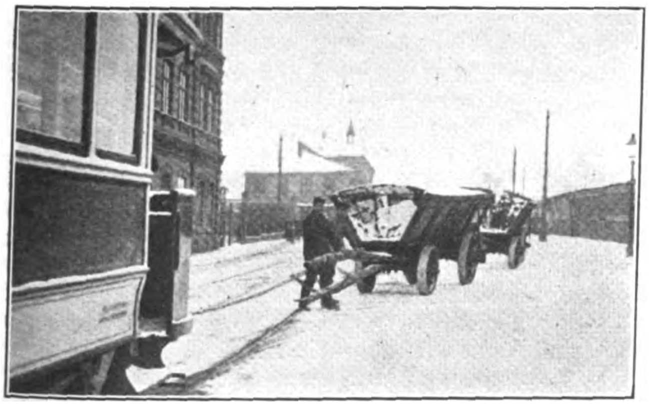
BY LUDWIG SPÄNGLER, DIRECTOR VIENNA MUNICIPAL TRAMWAYS

Owing to the war most of Vienna's heavy automobile trucks, horses and vehicle operators have been drawn upon for military duty, thereby making difficult the cheap and skilful transportation of freight throughout the city. We are therefore adapting our electric railways for that purpose so far as possible. The same condition holds true also throughout Austria-Hungary.



WAR-TIME TRANSPORT IN VIENNA—PULLING COAL WAGONS ON A CURVE

A most important new field for the electric railway is the hauling of coal and coke from the steam railroad warehouses and gas plants to large city depots and retail dealers. In Vienna the direct use of the electric railway for this purpose is often impracticable because the coal is delivered to several widely-scattered terminals and the coke also must be taken from two different gas plants. Most of these sources of fuel supply are not accessible directly to the electric railway tracks. To build sidings and special fuel cars, including weighing facilities, would have called for a prohibitive expense, aside from which the retail fuel supplies in Vienna would have been exhausted long before new equipment could be furnished and installed.



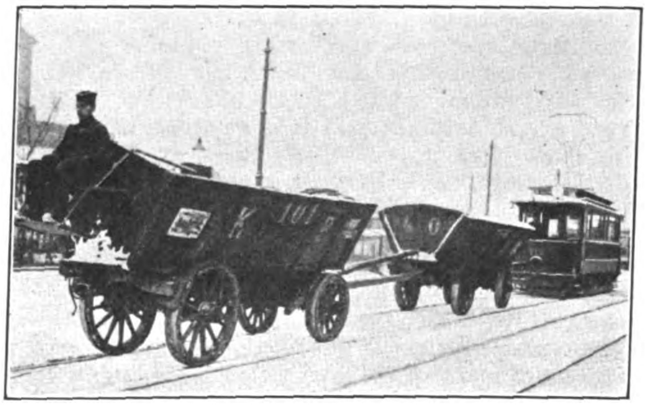
WAR-TIME TRANSPORT IN VIENNA—ATTACHING AN EMPTY COAL WAGON

To meet the emergency created by the war the writer suggested that the coal and coke be carried in the same wagons as before, but that motor-car haulage be substituted for horses on reaching the car tracks. The great reduction in horse mileage thus obtained would make it possible, of course, to get along with very few animals.

Following the writer's suggestion, the wagons are loaded and weighed at the supply points, whereupon they are drawn by horses to the nearest street railway. There the horses are unhitched and reharnessed to take back the empties. In the meantime the motor cars draw the loaded wagons to the desired distributing centers. In some localities the horses draw the wagons to the coupling place in the daytime, where they are left for the night drayage by the cars.

The short wagon hauls to the tracks are usually in level territory, whereas in an extended trip through Vienna it would be impossible to avoid quite a number of grades.

The coal wagons are attached to the standard draft rigging of the motor car by means of a coupling rod extended from the underside of the wagon axle. A second coal wagon may be attached to the first. Vienna coal wagons are usually of a slightly narrower gage than our tracks. On tangents, therefore, only the wheels of one side run on a rail, while the other two wheels run on the paving, but this causes no harm. If the service was to be continued for any length of time it would, of course, be natural to use wagons with the same gage as our tracks. However, we find that a motor car and wagon will run very well even on our shortest curves. The only precaution necessary is so to regulate the coupling rod that the wagon does not swing too far to one side.



WAR-TIME TRANSPORT IN VIENNA—PULLING COAL WAGONS ON A TANGENT

The permissible speed of a train is about 3.7 m.p.h., which is about twice that of a horse-driven wagon. The wagons make the extra speed without damage or excessive noise. Of course, even this rate of speed is far below that of our passenger cars, which average about 8 m.p.h. Consequently, they cannot be interpolated with the short headway service of the day, so that all of this work has to be done at night.

The motor cars are furnished with extra heavy resistors to permit slow-speed operation. They make several trips a night, hauling an average load of 9 tons of coal per trip. In view of the short period for which this kind of transportation was devised, the cost of operation is very reasonable indeed and with no addition at all for new equipment. Our experience in this connection, and in the handling of freight generally during war times, proves the adaptability of the electric railway for new and important duties.

Points on the Installation and Removal of Pinions—I

BY R. H. PARSONS, ELECTRICAL FOREMAN

The correct installation and removal of pinions is a part of maintenance work which does not always receive the attention that it deserves. The old-time combination of a heavy sledge and a husky man is still in force in too many shops. In such places the pinion is usually placed on the shaft and then driven home by one man, who hammers against an iron block (or another pinion) held against the pinion by a second man. If the men fail to start the pinion straight they force it along anyhow, often dragging the surface of the shaft and destroying all possibility of a tight pinion.

After the pinion is driven as far as it will go the nuts are placed on the shaft and tightened again, with brute force acting on the end of a long wrench. The wonder is that more pinions are not broken and more threads stripped, especially if the workman stands upon the wrench and jumps on it until the nut will move no more. That ten minutes of such strenuous effort will not prevent the pinion from working loose seems incredible to the sledge wielder. Neither is it the least bit probable that he will detect cracks in the metal caused by his strength and ignorance. He would be astonished to learn that the pinion may drag enough of the metal of the shaft to shim itself tight temporarily but that it will loosen quickly in operation.

Conditions are even worse when a pinion is to be removed. Granting that the pinion has been in service for a year and that it was properly installed at the time, it need not be assumed that it is on tight and will require some force to remove it. Removal often causes serious damage, not only to the pinion itself but to the other parts of the motor, bringing such results as bent or broken armature shafts, broken frame heads and broken bearings. Sometimes, even, it is necessary to cut the pinion before it can be removed.

One of the difficulties encountered in devising an efficient pinion puller is due to the condition that the designers of many of the later type motors intentionally or otherwise did not pay particular attention to the fact that pinions do have to be removed. This is indicated by the fact that they did not leave space enough between the pinion and bearing or housing to apply the jaws of a pinion puller of sufficient strength.

Pinion pullers have been adapted for such motors by making them with jaws which have teeth to grip the side of the pinion. These jaws would do the work if the pinion is of soft material and not too tight on the shaft, but the newer pinions of high-grade surface-hardened steel do not allow the teeth to make an impression. As there is not room behind the pinion for a substantial jaw, the question arises: How are we to pull this pinion without damage to the motor and save the pinion if it is not worn beyond the limit? Furthermore, even if the pinion could be pulled with this outfit it might be cut so badly by the teeth that its further use would be out of the question.

Again, where the design of the motor does permit the use of a pinion puller which will clutch behind the pinion, the next points to be determined are: How much force must be exerted on the puller; how is this force conveyed to the pinion, and will the puller or the pinion give way first? Did you ever see four or five men tugging at the bar and turning the screw of a pinion puller, with one man using gentle persuasion on the pinion in the form of a heavy sledge?

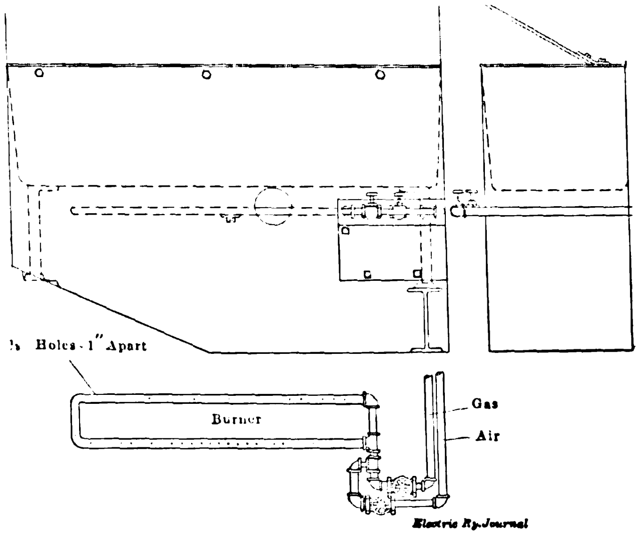
Some pullers are constructed with a screw placed against the end of the armature shaft and operated with a long lever. Others have a screw and eccentric so arranged that the screw will take up the slack. The movement of the eccentric is intended to remove the pinion. Still others use the same principle but are operated as hydraulic jacks. In most instances 40-tons or 50-tons steady pressure would be required to remove a pinion. Yet I have seen a hydraulic pinion puller rated to exert a force of 100 tons give out trying to pull a pinion.

Lightness and portability are other problems that the designer of a good pinion puller must face because pinion work should be the duty of one man, not of half the force. The pinion puller should be brought to the motor, instead of transporting the armature or motor to the pinion puller.

Some day may see a pinion puller which will fill all requirements—one that will pull the pinions without damage to shaft, bearings or pinion. In the meantime, however, we must remove and replace our pinions when necessary. The following paragraphs may be found to embody a few helpful hints taken from every-day practice.

HEAT FOR MUSCLE IN PINION INSTALLATION

As a modern pinion properly installed will give long service and as the modern motor itself will give a very high mileage before overhauling, every endeavor should be made to get from the pinion a mileage between overhauls equal to that of the motor. We cannot afford to bring a car into the shop just to replace a pinion. Therefore the installation of pinions by brute strength should be abandoned in favor of more scientific methods.



WATER TANK FOR HEATING PINIONS WITH GAS AND AIR MIXTURE

The heating of the pinion to a moderate degree before placing it on the shaft is approved by the best authorities because the contraction of the metal when it cools is sufficient to make the pinion tighter on the shaft than is possible by driving.

The recommended practice is to place the pinion for one hour in water kept at its boiling point, 212 deg. Fahr. In this bath the metal will expand uniformly to a size which will allow the pinion to be placed on the shaft as far as the design requires. The increase in the inside diameter of a pinion for a 65-hp motor when placed in boiling water for one hour is approximately 0.0045 in.

Immediately after removal from the water the pinion is placed on the cold armature shaft, pushed as far as it will go by hand and then driven home by striking its wooden block facing with a light hammer. Next, the nuts are screwed to the shaft and tightened. The pinion guard is then struck a few more easy blows with a light hammer before the nut is tightened again. A short wrench with a handle 3 ft. or 4 ft. long is the only tool that is necessary, and this can be handled by one man. Neither the pinion nor the motor has been subjected to heavy blows or damage of any kind. The pinion shrinks back to its normal size, and when cool it is tight.

The cut on page 637 represents a tank heated by a combination of gas and air. This tank is very convenient for heating pinions. The one shown was an old cast-iron watering trough for horses. It was part of the equipment used in the maintenance of horse cars, but was readily adapted for electric car maintenance. It is about 3 ft. long, 2 ft. wide, and 1.5 ft. deep. It is mounted on an iron frame and fitted with an air and gas burner, as shown on the same sketch. Covering is provided in front and on the sides to protect the workman's clothing from the flame, and an iron top is used to confine the heat. Of course, pinions may also be heated by steam or electric ovens, but the water bath has been found to answer the purpose best. In the second article the removal of pinions will be discussed.

Headlight Test at St. Louis

An instructive comparison between arc headlights and incandescent headlights was recently made by the United Railways of St. Louis. The constantly increasing installations of high-efficiency incandescent headlights to replace arc lights suggested a competitive test between the railway's present equipment and the "Golden Glow" incandescent headlights. Some months earlier the latter lamps had been installed before the advent of concentrated filament tungsten bulbs. With the perfection of tungsten bulbs it was decided to try both the interurban and city type "Golden Glow" headlights on a car also equipped with the regular semaphore lens incandescent headlight and the 4½-amp arc. The test was conducted by M. O'Brien, master mechanic, the electrical engineer and the district superintendents of the railway, and Frank O. Grayson of the Esterline Company.

As reported by the company, the first run was made on the Hodiamont line. This is the old "Suburban Line" which runs about 8 miles from one end of the city to the other. The greater part is on poorly-lighted right-of-way. In fact, there are no lights except at street crossings. On this line the 4½-amp arc headlight has been used regularly.

The test was made on a rainy, misty night. The first headlight tried was the T-128 interurban lamp with 94-watt bulb. This lamp gave far greater illumination than was desired. Hence the No. 95 headlight with 46-watt bulb was put in place. This lamp gave a better penetration than the 4½-amp arc, and yet reduced the power consumption from 2.7 kw to 46 watts.

Then followed this interesting experiment: The arc lamp was lighted and when the "Golden Glow" headlight rays were thrown on top of the arc lamp rays the illumination of the latter lamp was lost almost entirely.

After a general conference it was decided to recommend the SM-95 headlight with 46-watt bulb for the Hodiamont line, burning in series with two circuits of 23-watt bulbs within the car, and the same style, but with a 23-watt bulb, on the purely city lines. As a result of this test the railway placed an order for 100 headlights for immediate delivery.

New safety-first signs to be placed in the yards, offices, carhouses and shops are being considered by the safety-first committee of the United Railways.

Tests of a 500-Hp Diesel Engine at Auburn, N. Y.

The McIntosh & Seymour Corporation, Auburn, N. Y., announces that on Jan. 11 it made five tests upon one of its 500-hp Diesel type engines. According to these tests the fuel oil consumption of the engine per brake-hp-hr. was 0.407 lb. at full load, and this was very little exceeded at four-fifths load. The consumption at one-half load was equal to that generally reckoned by the average engineer when estimating for full load conditions. These results naturally are considered to be exceptionally fine. Abstracts of the engine test and fuel analysis follow:

REPORT OF TEST MADE JAN. 11, 1915

Type of Engine, 4-A-38; Number, 1542; B.HP 500; R.P.M., 165; Cyl. Diam., 18⅞ in.; Stroke, 28.347 in.; Kind of Fuel, Fuel oil.

Test number	1	2	3	4	5
Load per cent of rating	113.4	100.4	79.4	52.4	25.2
Number of r.p.m.	171	165	172	174	170
Brake-hp = $\frac{W \times N}{K}$	567	502	397	262	126
Test began	8:15 a.m.	1:20 p.m.	3 p.m.	4:30 p.m.	5:24 p.m.
Test ended	8:45 a.m.	2:20 p.m.	4 p.m.	5 p.m.	5:54 p.m.
Fuel consumption during test, lb.	115.0	204.7	163.8	68.9	41.1
Fuel consumption per b.hp hour, lb.	0.405	0.407	0.412	0.449	0.652
Injection pressure, lb.	925	925	815	785	775
Exhaust gas appearance	Clear	Clear	Clear	Clear	Clear
Inlet temperature of cooling water, deg. Fahr.	56	56	56	56	56
Outlet temperature of cooling water, deg. Fahr.	145	147	145	147	150
Temperature in testing room, deg. Fahr.	62	62	62	62	62

ANALYSIS OF FUEL OIL FROM INDIAN REFINING COMPANY

Gravity	60 deg. Fahr., 0.8550 per cent
Flashing point	190 deg. Fahr.
Burning point	246 deg. Fahr.
Tar test	Negative
Water	0.051 per cent
Sulphur	0.187 per cent
Carbonization	6.4 per cent
Acidity	Trace
Heat value	19,266 B.t.u. per pound 137,463 B.t.u. per gallon

Transformer Blower of 40,000 Cu. Ft. Capacity per Minute

The Buffalo Forge Company, New York, has recently installed an unusually large fan for cooling air-blast transformers at the Blue Island power station of the Public Service Company of Northern Illinois. The installation was made under the direction of Sargent & Lundy, engineers. It consists of a direct-connected blower handling continuously 40,000 cu. ft. of air per minute at 70 deg. Fahr. and 29.92-in. barometer, with a static increase in pressure of 2.6 in. water gage. The blower is direct connected to a 30-hp, twenty-five-cycle, three-phase, 470 r.p.m. GE motor. Aside from the size of the unit, the interesting feature is the operating speed. Most transformer cooling units are 20,000 cu. ft. per minute capacity or below, and although direct connection is desirable, it has heretofore involved prohibitive expense for the slow-speed motors necessary on larger units. The blower in this case is a turbo Conoidal high-speed type, such as the Buffalo company has been using in connection with motor and steam turbine-driven forced-draft units for underfeed stoker work. Although the air pressures required for cooling air-blast transformers are much less than for stoker work, the speed of this fan is high enough to permit the use of a motor at a price which is not excessive. The fan is of the multiblade type with compact housing. It has a static efficiency of 60 per cent, and requires 27 brake-hp.

Impregnation Saves Copper and Repairs

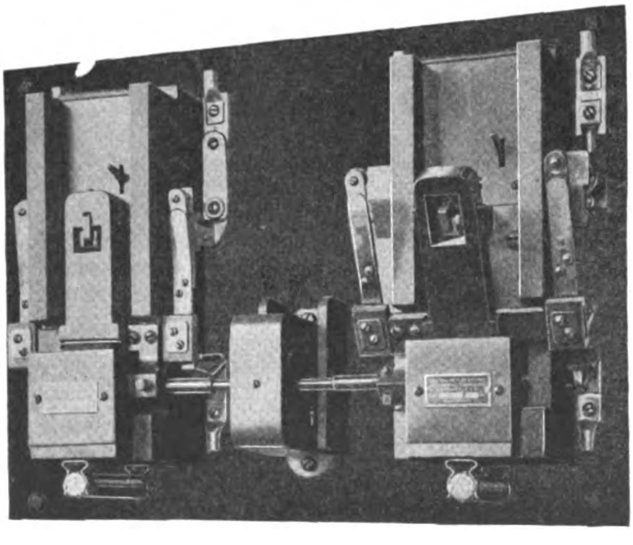
The Metropolitan West Side Elevated Railroad several years ago used approximately 3000 lb. of copper wire a year in rewinding the field coils of air compressors. Shortly after the vacuum impregnating process was introduced, this company tested several impregnated field coils to determine the relative merits of the impregnated and the ordinary untreated coils. The impregnated coils were placed in the same service as the untreated ones. Within a year the compressors containing these test coils came in for repairs, and examination showed that the coils which were in perfect condition were the impregnated ones, and they were adopted as standard.

Since the company began to use the impregnated coils, approximately five years ago, no copper has been required for repair work on compressor field coils. In the case of large motor field coils, where high temperatures would shrink the insulation on the field, resulting in a loose field coil which required rewinding, the conditions are similar. The average cost of rewinding and replacing large field coils was approximately $50 per motor. With impregnated coils the field winding is tightened without rewinding, effecting a saving of approximately two-thirds of the former cost, to say nothing of the elimination of many "shorted" field coils.

Emergency Lighting Magnet Switches

A recent development in automatic switches for use when two sources of current potential are available in subways and other places, where the exigencies of the service are such that an interruption of lighting service might produce serious results, is shown herewith.

This device consists of two magnet-operated switches with a mechanical interlock that prevents the closing of both switches at the same time, and the magnetic feature includes an automatic device that causes the opening of one switch and the closing of the other on a potential drop of predetermined value. The switch is normally closed to a preferred source of energy; the auxiliary system is thrown in upon the failure of the preferred source and the normal connection re-established upon the return of full potential to the line. If both circuits are dead, the switch automatically closes to the one first available.

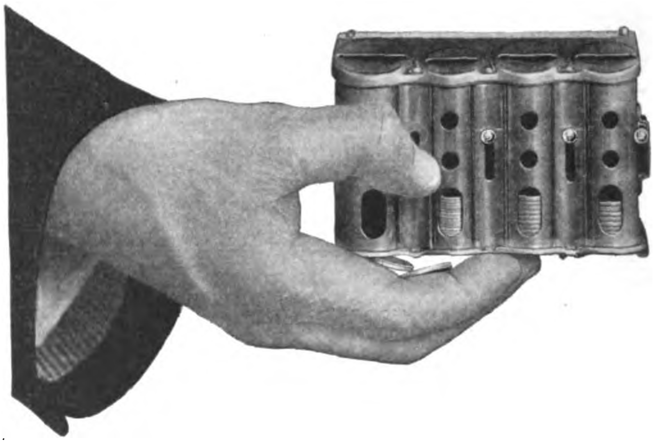


DOUBLE-THROW MAGNET SWITCHES

This switch will handle 600-volt railway circuits successfully, and transfers the lighting load from the regular to the auxiliary source of potential so rapidly that the momentary outage in the lighting system is not noticeable. The switch is made by the Palmer Electric & Manufacturing Company, Boston, Mass.

Improved Change Carrier

A conductor's change carrier improved by the addition of thumb levers which eject coins from each of the four compartments, has just been put on the market by the McGill Ticket Punch Company, Chicago. This device is made of brass throughout, the standard outfit containing four compartments, two for nickels and one each for dimes and quarters. It will also be made with compartments for pennies or for Canadian coins. One of these improved change carriers is shown in the accompanying illustration. Its advantage lies in the fact that simply by pressing down one of the thumb levers with which each compartment is fitted, coins are ejected one at a time and as rapidly as desired. The ejectors have been so placed that the hand naturally assumes the proper position for receiving the ejected coins. Also the rapid, easy ejection of coins, one at a time, permits the operation of this change carrier with gloved fingers and the receipt of a coin with each operation.



ONE FORM OF IMPROVED CHANGE CARRIER

Auto-Bus for Houston

The J. G. Brill Company has lately built for the White Company the auto-bus shown in the accompanying illustration. The bus body was built at Philadelphia but was mounted on a White T. A. D. 3-ton chassis of 16-ft. 2-in. wheelbase in the Kuhlman works.

The body is 18 ft. 2 in. long and 22 ft. 2 in. over the rear platform. The rear wheels are of 40-in. diameter, making the successive risers 15½ in., 13½ in. and 11 9/16 in. from pavement to platform to bus floor. The front exit is by way of a glass-paneled folding door and folding step. The width over the posts is 7 ft. 6 in. and the height from the floor to the center of the headlining 6 ft. 6 in. The cane seats are of cross-seat type, one two-passenger seat on each side of a 17½-in. aisle. The seating capacity is twenty-six.

MAIN STREET BUS LINE
HOUSTON
GRAND CENTRAL DEPOT

SINGLE-DECK AUTO-BUS FOR HOUSTON, TEX.

News of Electric Railways

COMMISSIONERS REPLY TO CHARGES

Governor Whitman of New York Hears Commissioners for the First District on Charges Against Them

The dénouement that attended the hearing on March 23 before Governor Whitman of New York, at which Chairman McCall, and Commissioners Cram, Wood and Williams of the Public Service Commission of the First District answered the charges against them resulted in the Governor adjourning the hearing for two weeks. All the commissioners save Mr. Williams had been heard. As he concluded his prepared brief, Mr. Williams turned to memoranda and began urging on the Governor the meaning of removal from office and apparently bracketed the Governor with the "cruel piratical politicians." The Governor promptly ordered him to withdraw the insinuations under pain of immediate removal. Mr. Williams apologized, saying that he had been laboring recently under mental and physical strain.

Chairman McCall was the first to face the Governor as the hearing opened at noon. He had prepared a pamphlet answering in full the eight charges preferred against him. He called attention to his own unwillingness to leave the bench for the commission and to the sacrifice which he made to do so. Having shown that he was not with the commission at the time mentioned in the charge with reference to the Lexington Avenue subway, the chairman recited the difficulty of deciding the course of the subway. As for the charges based on the method of the commission in dealing with informal complaints Mr. McCall pointed out that the allegation that he neglected them rested solely on the evidence of the chief clerk, who could not possibly know what the chairman did concerning them in consultation with the secretary and the other commissioners. The chairman then explained how the committee had been misled concerning the way these complaints which were styled "informal" were handled. One trouble had been that the legislative investigating committee never had any conception of the real work of the commission or how difficult it was to attend to all its details. The chairman then called attention to the fact that the committee in raising this point about informal complaints had never mentioned the work of the commission in increasing transfer privileges in Brooklyn and thereby removing perhaps the greatest source of complaints. A commissioner could not attend to petty details and do the more important constructive work necessitated by his office.

Taking up the charge that he had permitted the railroad companies to violate the orders of the commission Mr. McCall first pointed out that since he had been chairman the subway had carried 720,000,000 passengers with less than forty complaints. As he passed on to consider the charge founded on the delay in ordering more cars by the Brooklyn Rapid Transit Company, the chairman said that the committee when it made its charge must have known that cars would be in use on the Fourth Avenue Subway in May. The fourth charge dealt with delay in insisting on the improvement of the Brooklyn service. Mr. McCall said in this connection that the commission was bound by law to grant a hearing.

The chairman next turned to the two charges against him of malfeasance in office. The first was founded on the fact that he had practiced law while he was in the commission. He owned frankly that he had gone into the commission with the belief that he could do so. The entire time that he gave to private practice since he went to the commission has been thirteen days. On not one of these days had he failed to be at his desk. Not a meeting had been held when he had been in town, that he had not first gone over the calendar carefully, and more often he had been kept away by the business of the commission than by his private practice. During his two years in office he had never taken a vacation. As for the use of the commission's automobile the chairman explained that it was necessary for him to go on business of the commission to all parts of the city at all hours of the day. His own car had been used more frequently in the public service than the commission's automobile.

In the course of his general plea the chairman said:

"Governor, I have been a Democrat and I shall be a Democrat as long as my principles will permit me. I found in the commission an organization left by my Republican predecessor and it is there to-day. No one under me has dared to ask a man what his politics are. I would rather cut off my arm than remove a man for his political beliefs. Millions of dollars have been spent by the commission but not a single charge of favoritism has ever been brought against it. Our engineering expenses have been cut down to less than 6 per cent of the capital expended and I defy you to make it less. I care no more for place than a child for a broken toy. I hold office at financial loss. But there is something dearer to me than money. Here I stand before you in this town where I was born and where everybody knows me. Here I say to you, I am tenacious of my honor, and for that I protest against these scandalous charges."

Commissioner Wood confined himself to reading his printed brief. He pointed out particularly that he had been in office only eight months, and in going over the specific charges covered much the same ground as the chairman. He pointed out how much he had done for the Bronx and stated that he had made particular inquiries as to the informal complaints that came to the commission from that borough.

Commissioner Cram asserted that the method of handling informal complaints adopted by the commission was in his judgment one of the best things ever done, while the charge that there had been neglect in keeping the subway up to the proper service was absurd, considering it was the most remarkable service in the world. Then he spoke of his achievements in connection with the rehabilitation of the public utilities in Richmond, in moving for the aboliton of the wooden cars in the subway and in promoting the abolition of grade crossings on Long Island.

CLEVELAND CONSTRUCTION MATTERS

Twenty-five owners of property on Euclid Avenue, between East Twenty-second and East Fortieth Streets, Cleveland, Ohio, filed a petition in common pleas court on March 22, asking for an injunction to prevent the Cleveland Railway from constructing a double track over that section of street, commonly known as "Millionaires' Row." Judge A. J. Pearson denied the order, when Attorney Harry J. Crawford, representing the company, gave his personal pledge that work would not be started on the tracks until a similar suit involving another section of street, pending in Judge Vickery's court, has been decided.

The charter adopted by the city of Cleveland some time ago provides that consents of owners of abutting property are not necessary to construct a line on the street. The plaintiffs in this suit insist that consents are necessary in spite of the charter provisions and also that legal permission from the City Council had not been obtained for the construction of the line. Director of Law Stockwell asserted that a temporary injunction was not necessary, as the Council resolution permitting the construction of tracks will not become effective until April 10.

Recently the Brookside Sausage Company brought suit to prevent the company from laying tracks for a loop on Archwood Avenue, S. W., near the entrance of Brookside Park. The allegations are similar to those made in the Euclid Avenue petition. The case will be heard soon and on the decision in this action will depend the result of the later attempt to keep street cars from operating over the heretofore prohibited section of Euclid Avenue.

At a public meeting on March 22 the proposed new franchise for Lakewood was discussed by citizens. Objections were made to the provision for a straight 5-cent fare between Cleveland and Lakewood and several leading men argued that the old rate of eleven tickets for 50 cents between the city and Lakewood and within Lakewood would be better than the proposal made, by which the fare within Lakewood will be 3 cents. Mayor Tyler threatened to veto any grant made by Council along the lines suggested. Another meeting will be held and in the meantime the Council committee will confer with the company officials and Peter Witt, street railway commissioner.

The subject of a new franchise was discussed in the East Cleveland Council on the same evening. The East Cleveland Chamber of Commerce insists that the length of the franchise be submitted to a vote, while Council stands for a twenty-five-year grant. It is contended by some that the proposed grant will bind the city to a 5-cent fare in case it is annexed to Cleveland and many object to an increase over the city rate.

Councilman Woods submitted a resolution to the City Council on March 22, directing an expenditure of $15,000 for the extension of the Payne Avenue line to an intersection with the East 105th Street line. Mr. Witt opposed the measure on the ground that the extension does not justify the expenditure. At present passengers must walk up or down a hill to make transfers from one line to the other, and people in that vicinity are insisting on the extension.

TRAFFIC IN SAN FRANCISCO

How the Exposition Crowds Are Being Handled at San Francisco

In referring to the successful manner in which the crowds were handled on the opening day of the Panama-Pacific International Exposition an official of the Oakland, Antioch & Eastern Railway said that "the transportation world ought to feel pretty good over what has been accomplished." Since the attendance at the grounds on that day was 246,738, the opinion prevails that with the improvements in the service which both the Municipal Railways and the United Railroads have under way, there will be no delays or inconvenience in handling the traffic even on the busiest days during the exposition. The total number of admissions to the grounds in the first fourteen days was 1,036,349, or an average of 74,025 per day.

The Board of Supervisors of San Francisco, recognizing the able manner in which the railways were operated, adopted the following resolution:

"Whereas, On Feb. 20, the opening day of the Panama-Pacific International Exposition, the Municipal Railways of San Francisco transported 265,000 persons without accident or discomfort, and conveyed them to their destinations without delay; therefore, be it

"Resolved, That the Mayor and the Board of Supervisors hereby extend congratulations and commendation to the superintendent and employees of the Municipal Railways for the splendid service given the public on the said opening day of the exposition, and that there is hereby expressed public appreciation of the courteous and expeditious transportation of the people of this city and visitors who had occasion to use the Municipal Railway service."

A. M. Mortensen, traffic manager for the exposition, expressed the opinion that the facilities for bringing visitors to the exposition grounds were already equal to any requirements likely to be imposed, and recalled that at the Chicago exposition the opening day crowd, though much smaller than at San Francisco, caused great congestion and delay. He pointed out that the location of the exposition grounds at San Francisco was so convenient to the residential portion of the city that many of the opening day visitors would have walked if any inconvenience had attended their using the cars. Although many thousands joined in the parade on Feb. 20, it is estimated that a total of 220,000 people rode directly to the exposition gates. This traffic, it is estimated, was divided as follows:

Municipal Street Railways	80,000
United Railroads (Polk and Fillmore)	50,000
Key Route Ferry (direct)	35,000
California cable road	25,000
"Jitneys" and buses	25,000
Sausalito Ferry (direct)	5,000
Total	220,000

The United Railroads has at present capacity for transporting 28,000 passengers an hour to the exposition gates. Three lines from different parts of the city whose capacity totals 20,000 an hour when operating on forty-five-second headway terminate in a loop at the Van Ness entrance. The Fillmore Street lines can bring 12,000 an hour to the terminus at the top of the hill, whence the seven blocks to the Fillmore entrance are covered by an extension operated as a funicular line for two blocks. This extension has a capacity of 6000 an hour at the present time, but will shortly be improved by putting on closed pay-as-you-enter cars so as to be operated in two-car trains over the funicular part of the line, and the capacity will then become 8000 an hour. These trains are to be operated on less than a two-minute headway over a maximum grade of 25.5 per cent.

The "jitney" buses on the opening day inaugurated a 10-cent fare from the ferries to the exposition grounds, and about 1000 automobiles, including the larger buses, were in operation. The Key Route Ferry maintained a twenty-minute service from its Oakland pier direct to the exposition ferry slip and, in addition to much local traffic from Oakland, carried all the passengers brought in on the excursion trains of the Oakland, Antioch & Eastern Railway, which terminate on the Key Route mole. Altogether about 172,000 passengers were brought over from transbay points, and this number was handled so easily that J. D. Brennan, superintendent at the Oakland pier, where the heaviest traffic centered, said that he knew from this experience that the companies could carry 500,000 people or more into San Francisco in the course of a day.

The total receipts of the Municipal Railways on Feb. 20 were $13,421.20, which represented the cash taken in on 150 of the large new cars and twenty-seven of the small open cars used on the Union Street line. Besides these, eighteen of the large cars were held in reserve. Only one minor accident was reported on the Municipal Railway system, although ninety new crews of platform men had to be broken in during the twenty days preceding the opening date. The receipts on this system on the three days following Feb. 20 were $6,825.75, $8,046.40 and $5,707.70 respectively, and it is now estimated that the probable gross receipts on the system during the exposition will be $3,000,000.

Branches of the Municipal Railways reach all five of the main exposition entrances, and cars are looped on double tracks past three of these. That is, cars arrive at an entrance from opposite directions on each track of the double loop, and by serving one entrance with both pairs of looped tracks the maximum number of cars direct to or from the city pass each main entrance. With this arrangement the minimum effective headway is so satisfactory that it has not been thought necessary to install turnstiles except at the Laguna Street entrance. At this point the only access to the cars is through the exposition exits, so that turnstile collection involved no special inclosure.

WORKMEN'S COMPENSATION AMENDMENT

The Senate of the State of New York on March 19 passed the amendment to the workmen's compensation bill providing for permissive direct settlement between employee and employer. The Senate also passed unanimously the bill appropriating $445,000 for current expenses of the commission. Both bills are now before Governor Whitman for his signature. The amended bill provides that the employer and the employee may enter into a tentative agreement on settlement. Where they do not choose to enter into such a direct settlement, the matter devolves upon the commission. The bill also does away with the actual payment of awards by the commission and provides that payments may be made direct by the employer to the employee. Just before adjournment on March 19 a resolution was passed by the Senate calling for an investigation of the charges that corrupt and sinister influences forced the passage of the amendment providing for direct settlement.

The ways and means committee of the Assembly, which has in its custody the concurrent resolution calling for an investigation which was passed in the Senate, met on March 24, but took no action on that measure, and it is presumed that the resolution will be permitted to die in committee.

THE CINCINNATI INVENTORY

On March 17 the city solicitor of Cincinnati sent a communication to the Cincinnati Traction Company in which he insisted on the right to an immediate examination of the company's books. The company had informed Mr. Schoenle that its books were constantly in use and suggested that the report of the Public Service Commission would contain all the information that he would need. The street railway committee of the City Council now has under consideration the request of Mr. Schoenle for authority to bring proceedings against the company to compel it to allow him to make an examination of its books at once.

On March 22 W. Kesley Schoepf, president of the Cincinnati Traction Company, wrote to City Solicitor Schoenle about the company's policy with regard to his inspection of its books. Mr. Schoepf said in short that the company had nothing to conceal. Its books were frequently examined by city, state and federal authorities. The annual audit was being made when Mr. Schoenle's request was made and at the same time the Public Utilities Commission was engaged at the request of Council on an inventory of the property. He understood that Mr. Schoenle was willing to join with the company in requesting the early completion of the work of the commission. In view of this and the fact that the books were no longer in demand for the audit and by the commission the books were now at Mr. Schoenle's disposal. On the same day Walter M. Draper, vice-president of the company, denied before the street railway committee of the City Council that he had refused Mr. Schoenle permission to examine the books. Mr. Schoenle said that since Mr. Schoepf had consented to allow him access to the books there would be no need of further proceedings. Council had already denied him permission to bring proceedings of any kind to secure the books at this time.

LEGISLATION IN PENNSYLVANIA

The House has passed the bill empowering cities of the second class to tax railroad switches, etc., and has also passed the bill authorizing the merger of street railways in Pennsylvania with street railways outside of the State. Since March 11 bills have been introduced in the Senate to authorize cities to regulate and license certain motor vehicles, etc., and seven measures have been introduced affecting workmen's compensation. Among the bills introduced in the House since March 11 are the following: authorizing cities of the second class to locate, construct, etc., subways or galleries and to require public service companies to use the same under certain conditions; giving certain jurisdiction to the Public Service Commission in the matter of furnishing quotations of stock exchange; making it compulsory on the part of street railways to do an express and freight business; authorizing street railways to lease or operate motor omnibuses, etc.

HYDRO-RADIAL RAILWAYS

At a meeting of representatives of Windsor, Walkerville and Sandwich, held on March 19 in Windsor, Ont., it was decided to memorialize the provincial government in favor of a system of hydro-radial railways. A deputation will be sent from the City Council of Windsor to Toronto on March 26 to meet representatives of the government, when an effort will be made to have engineers from the Hydro-Electric Power Commission detailed to report upon the proposed plan for municipal railway lines to connect the three municipalities.

The second annual meeting of the Niagara District Hydro-Radial Union, comprising the Counties of Welland, Lincoln and Haldimand, was held at Welland on March 19. T. J. Hannigan, Guelph, Ont., secretary of the Provincial Hydro-Radial Association, announced that arrangements had been made with Premier Hearst to receive a deputation from the municipalities of Ontario on March 26, when the government will be asked to adopt the policy of subsidies to hydro-radial railways at the rate of $3,200 a mile. The annual report of the Niagara District Association showed that of the forty-five municipalities in the three counties thirty-five had asked for surveys and that a number of these had been completed by the engineers.

ELECTRIFICATION IN IOWA

The Charles City (Ia.) Western Railway, which operates between Charles City and Marble Rock, Ia., a distance of 18½ miles, announces that it has contracted for the electrification of its line now operated by steam locomotives and gasoline motor cars. In addition to the electrification of the existing line, a 7½-mile extension will be constructed. The overhead construction will be of the mast-arm direct-suspension type and energy will be supplied at 1200 volts d.c. from a central station in Charles City.

Rolling stock for this electrification has been purchased from the McGuire-Cummings Manufacturing Company, Chicago, Ill., and includes two single-truck, all-steel city cars, one all-steel interurban car and one 35-ton electric locomotive. The three cars are to be equipped with General Electric apparatus, the single-truck cars with two GE 270, 50-hp motors each, and the interurban car with four motors of the same type. The electric locomotive, which will be used largely for handling freight between Charles City and Marble Rock, where the line connects with the Rock Island Railroad, will be equipped with four GE 205, 80-hp motors and type M control. According to the present plan of E. R. Ernsberger, general manager, the existing line, which includes 18½ miles of track along with a 2½-mile extension, will be completed and in service by July 1, 1915.

TOLEDO FRANCHISE PROSPECTS

Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, was in Toledo on March 18. Mr. Doherty said he had nothing new or different in the way of a franchise to offer or suggest and that he was not ready to renew negotiations just at this time. He expects to return to Toledo soon for a conference with the city officials.

The Thurstin ordinance, providing for an issue of $4,000,000 of bonds, the proceeds to be used for the purchase of the tracks and cars of the local company, was considered by the railway and telegraph committee of the City Council on March 17 and was referred back to the city solicitor for additional details as to how it is to be put into operation. Councilman Dotson said that no bids could be secured on bonds until a valuation had been completed of the property upon which the bonds will be a lien.

Municipal Ownership Inquiry Bill.—Assemblyman A. F. Shartel has introduced into the Legislature of California a concurrent resolution directing the State Highway Commission to investigate all interurban electric railways with a view to their ultimate purchase by the State. Mr. Shartel's resolution provides that the commission shall report back to the Governor the result of the proposed inquiry by Jan. 1, 1916.

New Haven Indictment Pleas.—Judge Hunt has postponed in the Federal District Court until March 29 the entering of pleas to the second or superseding indictment returned against twenty-one of the directors of the New York, New Haven & Hartford Railroad. This was done because the government had interposed demurrers to the special pleas made by two of the indicted directors. By March 29 it is expected that argument on these demurrers will have been heard.

Federal Trade Committee.—The board of directors of the Chamber of Commerce of the United States in Washington, an organization representing the federated chambers of commerce of the different cities in this country, has appointed a committee on federal trade to co-operate with the new Federal Trade Commission. It is composed of nine members, one of whom is Guy E. Tripp, chairman of the board, Westinghouse Electric & Manufacturing Company.

Municipal Ownership Bill Defeated.—The Massachusetts House has rejected a bill to provide that the people may vote in any year on the question of public ownership of the electric railways in that State. Mr. Robinson, Boston, characterized the bill as a half-baked proposition. He pointed out that it would absolutely commit the State to the policy of public ownership with a single affirmative vote at a single election, and that this might happen without any public discussion.

Des Moines Franchise Negotiations.—Negotiations between the Des Moines (Ia.) City Railway and the City Council for a new franchise for the company are being continued through the medium of a committee representing the commercial organizations of the city and a new franchise is being drawn up for approval by the city and company. The grant then will be submitted to a vote of the people, probably early in June. Members of the mediation committee included newspaper editors and others of prominence. Emil G. Schmidt, president of the company, is present at the meetings of the committee.

Subway Car Order Accepted.—The Interborough Rapid Transit Company has notified the Public Service Commission for the First District of New York that it will accept the order of the commission, adopted on Jan. 12, 1915, requiring the removal of the 478 composite cars from operation in the subway and the substitution of all-steel cars therefor. The work of removal is to begin May 1 and to be completed by Dec. 1, 1915. These composite cars are a part of the original equipment of the subway. They have steel underframes and wooden sides, sheathed with copper. With the removal of the composite cars, all cars in the subway will be of all-steel construction.

Toronto Report Suit.—John Mackay & Company, Toronto, Ont., have entered action at Osgoode Hall against the city of Toronto, Ont., to recover $42,546.50, alleged to be due for services rendered and for disbursement made in connection therewith. It is alleged that Mr. Mackay was retained by Mayor Hocken to make a report. When his retainer was questioned Mr. Hocken is said to have announced that he would pay the bill himself. This he failed to do. The report for which payment is sought was rendered in connection with the negotiations of the city for the purchase of the property of the Toronto Railway, Toronto Electric Light Company and Toronto & York Radial Railway.

Pittsburgh Subway Bill Objections.—The committee on subway legislation of the Chamber of Commerce of Pittsburgh, Pa., has made a report disapproving the Senate subway bill, already passed by the Pennsylvania Legislature. The chief objections found in the Senate bill by the Chamber committee were that it does not specifically permit the building of a subway confined wholly to the congested area of the city; that it puts no limit on the lease the city may grant to the subway corporation and under its terms a lease might be perpetual and exclusive, and that it gives to the city the right of charging a sum not in excess of 2 cents per passenger for the use of the proposed subway in addition to the charge made by the operating or leasing company.

Subway Construction Contracts in New York.—March 19 was the second anniversary of the signing of the dual system rapid transit contracts. In the two years which have elapsed the Public Service Commission for the First District of New York has awarded thirty-eight construction contracts, which, with those previously awarded, make sixty-four of the eighty-four sections of the city-owned lines already under contract. The commission hopes to let contracts for the remaining twenty sections within the next six months. The total of all city contracts now outstanding is about $142,000,000. The greater part of the work to be done and paid for by the Interborough Rapid Transit Company and the New York Municipal Railway Corporation in the third-tracking and extension of existing elevated lines is also under way.

Separate Chicago Commission.—The Illinois Legislature through its public utilities committee, has undertaken to learn through public hearings the demand for a separate public utilities commission for Chicago. Mayor Harrison, William Hale Thompson, Republican nominee for Mayor, and Robert M. Sweitzer, Democratic nominee, along with aldermen and members of Chicago commercial organizations interested in what is termed "the home rule of public utilities," have appeared before this committee. Two bills are pending before the public utilities committee of the Legislature, one amending the present utilities law by providing for the establishment of a separate commission to be appointed by the Mayor of Chicago, and the other authorizing the City Council of Chicago to appoint a commission to regulate its public utilities.

Financial and Corporate

PASSENGER CAR ORDERS

Electric Railways Surpass Steam Carriers in Large Orders and in Total Cars Ordered

A comparison of the purchasing activity of steam and electric roads, a subject of timely interest in view of the large order this week by the Interborough Rapid Transit Company for 478 car bodies, shows the number of large passenger car orders and of total passenger cars ordered from year to year to be decidedly greater on electric than on steam railways.

In regard to the number of "star orders," electric railways easily surpass steam railroads. Since 1908, inclusive, the largest electric passenger car orders, graded according to size, have been as follows: (1) The Philadelphia Rapid Transit Company, with 1000 cars ordered in 1912; (2) the Chicago Railways, with 700 cars ordered in 1908; and (3) the Philadelphia Rapid Transit Company again with 500 cars ordered in 1913. The Interborough Rapid Transit Company's recent order ranks next, according to the number of car bodies ordered, although owing to the omission of truck equipment in the order, it might rank somewhat lower in amount of expenditure. The greatest number of passenger cars ordered per year by any steam railroad in the last two years, before which time individual figures are not readily available, was only 342 in 1913 for the Pennsylvania Railroad, including the Pennsylvania Lines West. In general, during 1913 and 1914, there were thirteen electric as compared to eleven steam orders for more than 100 passenger cars.

Electric railways also rank first as regards consistent ordering of passenger cars. During the last eight years orders of electric railways for this type of equipment exceeded those of steam railroads for every separate year except 1909, making a total of 31,811 for electric as compared to only 22,951 for steam lines. In view of the great difference between these two figures, which would be much greater if the large number of mail, baggage and milk cars, classed as passenger cars under the latter figure, were omitted, it seems safe to infer that the electric car industry, despite the shorter average length and the less costly character of car body, offers to the manufacturer a field whose relative importance has not always been fully appreciated.

REPORTS ON BUSINESS OPTIMISM

Composite Opinion of Representative Business Men Is Inclined Toward Optimism

A digest recently compiled by Harris, Winthrop & Company, New York, contains the opinions of many representative business men on the commercial and financial outlook of this country. This digest is worthy of note, for it indicates that the scattered advices as to the rising tide of business confidence and activity are in accordance with the conclusions drawn by many business men from the present trend.

According to the composite opinion of more than 700 representative business men, as shown by letters answering specific questions, the stock of goods on hand is low and will need replenishing, thereby increasing future demand. The accumulation of savings is interpreted to be a reassurance as to the future of the investment market and business credit. The unemployment reported is large, but of late is decreasing. It is generally believed that no appreciable burden will be placed on domestic commerce by the higher freight rates. Economy is general, but is in many cases a matter of choice.

When asked for an expression of opinion on these points, 60 per cent of the respondents stated that present conditions made the outlook encouraging. Moreover, 17 per cent stated that there was no abnormal business depression in sight. Confidence and hope are only mental attitudes, but it is interesting to note this expression of optimism on the part of business men themselves.

ANNUAL REPORTS

Milwaukee Electric Railway & Light Company

The comparative statement of income, profit and loss of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for the fiscal years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Operating revenues	$6,005,495	$6,016,916
Operating expenses:		
Current ordinary operating expenses	$3,095,606	$3,167,365
Depreciation (reserve credit)	698,516	633,359
Contingencies (reserve credit)	1,601	15,042
Taxes (reserve credit)	436,701	390,669
Total	$4,232,424	$4,206,435
Net operating revenues	$1,773,071	$1,810,481
Non-operating revenues	65,807	45,178
Gross income	$1,838,878	$1,855,659
Interest charges	823,375	733,322
Net income	$1,015,503	$1,122,337
Dividends on preferred stock	270,000	270,000
Dividends on common stock	763,375	788,000
Surplus	*$17,872	$64,337

*Deficit.

The comparative statement of income, profit and loss of the railway department for these two fiscal years is as follows:

	1914	1913
Operating revenues:		
Passenger revenues	$4,075,213	$4,184,135
Other revenues	35,505	37,175
Total	$4,110,718	$4,221,310
Operating expenses:		
Way and structures	$135,697	$156,162
Equipment	232,647	295,717
Traffic-power-transportation	1,514,176	1,472,919
General	153,849	111,764
Undistributed	328,427	385,718
Depreciation (reserve credit)	514,488	457,532
Contingencies (reserve credit)	1,097	10,553
Taxes (reserve credit)	299,342	273,935
Total	$3,179,723	$3,164,299
Net operating revenues	$930,995	$1,057,011
Non-operating revenues	14,633	11,926
Gross income	$945,628	$1,068,937
Interest charges	559,895	498,659
Net income	$385,733	$570,278

The total operating revenues of the company for 1914 showed a decrease of $11,421 as compared with the figures for the previous year. This decrease was caused by a reduction in the operating revenues of the railway department of $110,593, in large part offset by an increase of $99,172 in the light and power department. It is stated that the street railway in Milwaukee, in common with those in other cities, is suffering from an absence of growth of revenues and an increase of expenses over which the owners have no control, and the continuation of present conditions in respect to railway net earnings will necessarily affect the ability to expand. During the first seven months of the year the revenues of the railway department decreased 0.7 per cent on account of the then prevailing business depression. The decrease since that time was exaggerated by the disturbances resulting from the European war, making the decrease for the year 2.6 per cent.

The total net income of the company decreased 9.5 per cent, resulting from a decrease in gross income of $16,782 and an increase in interest charges of $90,052. While the gross income of the light and power department increased $106,527, the gross income of the railway department decreased $123,310. This decrease was caused in part by the smaller revenues before referred to and in part by the higher operating expenses brought about by increased car service to comply with prescribed commission standards.

Before arriving at net operating revenues, there were deducted for maintenance and depreciation of physical property amounts equivalent to the following percentages of the operating revenues: railway department, 22.25 per cent; light and power department, 16.25 per cent, and steam heating department, 6.63 per cent. The balances remaining after providing for maintenance in ordinary operating expenses were carried to the credit of the depreciation reserves. The property accounts increased $391,309 during the year, the largest items covering extensions to the overhead and underground electric distribution systems. The amount of construction work was kept at a minimum during the year, the capital expenditures being smaller than those for any year since 1898. A total of 9.4473 miles of track was reconstructed.

The amount of fire insurance protection carried has gradually increased from $2,200,000 for 1911 to $3,633,970 for 1915, while the annual premiums paid have been reduced from $22,000 to $13,082, equivalent to rates of $1 and 36 cents per $100 of valuation. During 1914 loans made to members of the newly formed employees' mutual savings, building and loan association totaled $56,950. At the end of the year the employees' mutual benefit association had 2690 members, $40,926 cash and investments on hand and 526 outstanding life insurance policies, covering $276,500 of insurance. The reserve created against coupons issued with city commutation tickets amounts to $183,549.

Miscellaneous comparative statistical data of the railway department of the company for 1913 and 1914 follow:

	1914	1913
Miles of track owned	165.02	164.87
Miles of track leased	27.51	27.51
Miles of track operated	177.72	177.14
Receipts per mile of track operated	$23,130.30	$23,830.36
Revenue passengers carried	97,874,919	100,073,659
Transfer passengers carried	38,814,573	36,963,958
Receipts per revenue passenger	$0.0416	$0.0418
Revenue car hours operated	1,712,079	1,685,014
Receipts per revenue car hour	$2.40	$2.51
Revenue car miles operated	14,688,176	14,596,686
Receipts per revenue car mile	$0.2799	$0.2892
Number of passenger cars owned	537	537
Maximum number of cars operated	471	462

Chicago City Railway

The gross earnings, expenses and distribution of residue receipts of the Chicago (Ill.) Surface Lines for the year ended Jan. 31, 1915, were as follows:

Gross earnings	$31,966,048
Expenses:	
Maintenance	$2,464,564
Renewals	2,557,284
Operation of power plants	2,781,907
Operation of cars	8,786,523
General expenses—including board of supervising engineers	1,945,924
Taxes	1,353,073
Total expenses of operation	$19,889,275
Residue receipts	$12,076,773
Divided:	
Chicago Railways, 59 per cent	$7,125,296
South Side lines, 41 per cent	4,951,477

The gross earnings of the Chicago Surface Lines amounted to $31,966,048, and expenses to $19,889,275, or 62.22 per cent of the gross, leaving residue receipts of $12,076,773. These were divisible 59 per cent, or $7,125,296, to the Chicago Railways, and 41 per cent, or $4,951,477, to the South Side lines, namely: the Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway. The income statement of the Chicago City Railway for the year ended Jan. 31, 1915, follows:

41 per cent of the residue receipts of Chicago Surface Lines	$4,951,477
Deduct:	
Joint account expenses, interest on capital investment of the Chicago City Railway and the Calumet & South Chicago Railway, and net earnings of the Southern Street Railway	3,612,889
Net earnings of Chicago City Railway	$1,338,588
City's proportion, 55 per cent as per ordinance	736,223
Company's proportion, 45 per cent, as per ordinance	$602,365
Add:	
Interest on capital, as certified by Board of Supervising Engineers	2,416,913
Income from operation	$3,019,278
Other income, net	279,548
	$3,298,826
Interest on bonds outstanding	1,529,409
Net income	$1,769,417
Dividends, 9 per cent	1,620,000
Surplus	$149,417

The Chicago City Railway produced a net income after the payment of all operating expenses and bond interest of $1,769,417, from which four quarterly dividends were paid, aggregating a total of 9 per cent upon the $18,000,000 of capital stock of the company. The dividend rate shows a decrease from 10½ per cent last year, largely owing to the decrease in gross receipts during the last half of the fiscal year. The beginning of the European war, Aug. 1, 1914, was followed by the closing of, or by a material reduction in the operating forces of, a large number of manufacturing plants in the city. This immediately affected the receipts adversely, and during the last six months of the year the gross receipts of the Chicago Surface Lines were $608,085 less than the receipts for the same period in the preceding year.

During the year the company built 7.04 miles of single track. The total mileage of single track now owned is 312.75 miles. During the year the company purchased and put in service 226 double truck passenger cars, and twelve cars are now under construction and being delivered. The company bought real estate and erected thereon substation buildings of 8000-kw capacity each at Forty-fourth Street and Kedzie Avenue and at Eighty-second and Halsted Streets and installed machinery and apparatus to the extent of 12,000 kw.

CONDITION OF PHILADELPHIA COMPANY

Mason B. Starring Issues Statement Showing Financial State of Philadelphia Company and Subsidiaries

Mason B. Starring, president United Railways Investment Company, which controls through stock ownership the Philadelphia Company, Pittsburgh, Pa., has issued the following statement on the affairs of the Philadelphia Company:

"Owing to the controversy between the preferred stockholders of the United Traction Company and the management of the Pittsburgh Railways, as to the desirability of the latter corporation applying earnings of United Traction to improvements and betterments instead of paying them out in preferred dividends, a good deal of discussion of Philadelphia Company and United Railway Investment Company securities has resulted, with some selling by holders who do not understand the situation.

"The thing that interests me most is to keep the security holders from sacrificing their securities because of some fear of the condition of the Philadelphia Company or its subsidiary corporations. The net income of the Philadelphia Company for the year ended March 31, 1915, will be more than $5,600,000, available for payment of interest. The interest on all classes of funded debts amounts to $1,913,639, so that there will be left for the payment of dividends and for improvements to the property about $3,700,000, and probably more.

"All interest and rentals of the companies leased or owned by the Pittsburgh Railways have been earned and will be paid. At the outbreak of the war the companies were in the midst of their usual summer work, and it was considered safer to issue script to the common stock for dividends than to borrow money on short time to make these payments, on account of high rates of interest and uncertainties of the money market. The condition of all the companies was never better than it is now."

In connection with the controversy mentioned by Mr. Starring, it may be noted that the protective committee for the stockholders of the United Traction Company has received word that the board of directors of the Pittsburgh Railways has passed a resolution to give the United Traction Company notice of the cancellation of the operating agreement between the companies. A committee from Pittsburgh was expected to confer with the protective committee on March 25 to suggest some plan for the future operation of the United Traction Company. Previous references to this dispute were made in the ELECTRIC RAILWAY JOURNAL of Jan. 9 and 16, and Feb. 13 and 20.

Chicago (Ill.) City Railway.—A quarterly dividend of 2 per cent has been declared on the $18,000,000 capital stock of the Chicago City Railway, payable on March 30 to holders of record of March 26. This dividend compares with payments of 2½ per cent quarterly from March, 1910, to September, 1914 (besides extra payments) and 1½ per cent in December, 1914.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—A certificate was recently filed at Indianapolis covering the reduction of the common stock of the Gary, Hobart & Eastern Traction Company from $125,000 to $100,000, and the creation of $25,000 of preferred stock.

Holyoke (Mass.) Street Railway.—Lee, Higginson & Company, Boston, are offering at 105 and interest $850,000 of first mortgage 5 per cent gold bonds of the Holyoke Street Railway. These bonds are dated April 1, 1915, and are due on April 1, 1935, but are callable at 107 and interest on and after April 1, 1920. The proceeds will be used to retire $250,000 of 5 per cent debentures due on April 1, 1915, and to pay off floating indebtedness incurred for construction and equipment of the railway. The Massachusetts Public Service Commission has expressed its formal approval of this issue. It has also ordered rescinded 2081 shares of capital stock, part of an issue of 4765 shares authorized by the Massachusetts Railroad Commission on June 24, 1913, and not now to be used.

Kansas City Railway & Light Company, Kansas City, Mo.—The holders of the certificates of deposit representing the first lien refunding 5 per cent gold bonds of the Kansas City Railway & Light Company have been notified that the protective committee under the agreement of April 3, 1913, has extended until April 3, 1915, the period within which to receive new securities or cash, pursuant to a sale or a plan for reorganization, or to obtain the deposited bonds.

Los Angeles (Cal.) Railway.—Vice-President Dunn states that no new application will be made by The Los Angeles Railway to the California Railroad Commission for permission to issue bonds, and that no modification of the application which was denied on March 5 is contemplated at least for this year. The commission recently refused to allow the Los Angeles Railway Corporation and the City Railway of Los Angeles to transfer their property to The Los Angeles Railway, as noted in the ELECTRIC RAILWAY JOURNAL of March 13. According to Mr. Dunn, whatever extensions will be made will have to be paid for from the earnings above fixed expenses, and with the "jitney" bus continally cutting into the company's business, these are now or nearly nil.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Holders of more than 75 per cent of the outstanding securities of the Oakland, Antioch & Eastern Railway and affiliated roads recently heard the report of the committee of seven appointed to study the affairs of the road. The committee heartily indorsed the policy of the present management and expressed approval of the existing plan for refinancing the system. Concerning foreclosure it declared its opposition in no uncertain terms. Since both the bonds and the stocks are owned by practically the same persons, the committee thought that a receivership would be of no special benefit, whereas by the bondholders waiving their interest for three years and the stockholders advancing $3, the roads would have a chance to work out their own salvation. The report was unanimously accepted by the stockholders, and the committee of seven was re-elected and made a permanent body, one additional member being named. At the request of counsel for the Oakland, Antioch & Eastern Railway, the California Railroad Commission has rescinded its authorization for the railway to mortgage certain real estate at Sacramento and to issue two notes amounting to $58,000 secured by such mortgage. It was stated that the authorization to issue the notes is not now desired or required by the company. Previous references to these notes were made in the ELECTRIC RAILWAY JOURNAL of Jan. 20 and Feb. 6.

Rockford & Interurban Railway & Rockford City Traction Company, Rockford, Ill.—The Illinois Public Utilities Commission has authorized the Rockford & Interurban Railway & Rockford Street Traction Company to issue bonds amounting to $86,000.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The question of the value of Key Route properties was debated before the California Railroad Commission on March 16, when an attempt was made to reconcile the conflicting estimates made by the commission and the company's engineers. The total value placed by the commission's staff varied from the companies own figures by $12,969,382. The testimony of George K. Weeks, president, established the fact that the different values were based on different areas as well as on different ratings. He stated that the company's own estimate of the total value of the system to-day was $36,492,710, composed of operative property, $25,040,824, and non-operative property, $11,451,886. It was decided that the engineers for both sides should get together and endeavor to straighten out the appraisals in the light of new data from the company. The Key Route is asking the commission for permission to issue $10,000,000 of additional bonds, but the commission asserts that with such an increase the ratio of bonded indebtedness to actual value will be 130 per cent as compared to 108 per cent at present. The corporation expects to show that the present ratio is 47 per cent.

Springfield Railway & Light Company, Springfield, Mo.—An initial quarterly dividend of 1¾ per cent, payable on April 1, has been declared on the $750,000 of 7 per cent cumulative preferred stock of the Springfield Railway & Light Company.

Third Avenue Railway, New York, N. Y.—At a meeting of the board of directors of the Third Avenue Railway on March 23 F. W. Whitridge, president, issued a statement showing that all the surplus of $518,111 earned in the eight months ended Feb. 28 had been expended for additions and betterments, together with an additional $100,000, bringing the total so expended up to about $624,000. Mr. Whitridge said that if anyone should spell a dividend for the company out of these figures he failed to see it. He presented a statement of the budget for 1915, showing that the actual necessary outlays for improvement of the property would require $1,159,400. The directors appointed a committee of James N. Wallace, Adrian Iselin, Harry Bronner, L. F. Strauss and Emlen Roosevelt to consider the future policy of the company as regards both dividends and the outlays for improvements. Mr. Whitridge stated that he took particular pains to have on the committee Messrs. Strauss and Roosevelt, two members of the committee who recently advocated the payment of dividends. The company has issued a circular to holders of the adjustment mortgage 5 per cent income bonds, outlining the conditions under which they may vote at the meetings of the company and urging them to avail themselves of this privilege.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—Edwin Drake, special master, will offer for sale at the county court house in Cleveland, Ohio, on March 30, between 12 and 1 o'clock, the following property of the Tri-State Railway & Electric Company: The street railway in Steubenville, Ohio, formerly owned by the Steubenville & Wellsburg Traction Company, together with its property and franchise rights; 12,995 shares of the capital stock of the Steubenville, Wellsburg & Weirton Railway; 6995 shares of the capital stock of the Beaver County Light Company; 45 shares of the capital stock of the Midland Electric Light & Power Company; 995 shares of the capital stock of the Wellsburg Electric Light, Heat & Power Company, and 115 shares of the capital stock of the Hancock County Electric Company. The railway in Steubenville, with its rights and franchises, constitutes one parcel and bids will be received separately for it in its entirety. All bidders must deposit $5,000 either in cash or certified check. The stocks named are all included in the second parcel and a deposit of $50,000 must be made. In either case, however, first-mortgage bonds will be accepted in lieu of cash or check, when properly assigned. The appointment of the receivers of this company and their preliminary report were noted in the ELECTRIC RAILWAY JOURNAL of March 22 and June 7, 1913.

Urbana & Champaign Railway, Gas & Electric Company, Urbana, Ill.—The Urbana & Champaign Railway, Gas & Electric Company has received permission from the Illinois Public Utilities Commission to issue $95,000 of 5 per cent bonds.

West End Street Railway, Boston, Mass.—The Massachusetts Public Service Commission has authorized the West End Street Railway to issue 8700 additional shares of common stock, amounting to $435,000 par value. These shares will be offered by R. L. Day & Company on April 1 at public auction to the highest bidder at not less than par. The proceeds are to be used to provide for additions.

DIVIDENDS DECLARED

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2 per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly 1¼ per cent, second preferred; quarterly, 1 per cent, common.

Halifax (N. S.) Electric Tramway, Ltd., quarterly, 2 per cent.

Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred; 50 cents, common.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred and common.

Porto Rico Railways, Ltd., Toronto, Ont., quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Springfield Railway & Light Company, Springfield, Mo., quarterly, 1¾ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '15	$29,054	*$17,782	$11,272	$6,722	$4,550
1 " " '14	29,798	*18,563	11,235	6,437	4,798
12 " " '15	349,119	*210,338	138,811	77,863	60,948
12 " " '14	378,915	*210,756	168,159	73,527	94,632

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Jan., '15	$194,212	*$120,141	$74,071	$62,568	$11,503
1 " " '14	184,509	*119,731	64,778	63,576	1,202
12 " " '15	2,523,323	*1,457,429	1,065,894	757,851	308,043
12 " " '14	2,366,719	*1,330,999	1,035,720	721,117	314,603

THE EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Jan., '15	$206,162	*$123,679	$82,483	$63,285	$19,198
1 " " '14	231,944	*150,275	81,669	48,102	33,567
12 " " '15	2,598,045	*1,589,618	1,008,427	717,133	291,294
12 " " '14	2,719,696	*1,632,180	1,087,516	588,880	498,636

GRAND RAPIDS (MICH.) RAILWAY

1m., Jan., '15	$104,728	*$67,014	$37,714	$13,740	$23,974
1 " " '14	102,585	*65,142	37,443	13,615	23,828
12 " " '15	1,288,710	*831,507	457,203	161,904	295,299
12 " " '14	1,299,426	*808,819	490,607	165,512	325,095

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m., Jan., '15	$49,527	*$38,608	$10,919	$15,578	†$4,659
1 " " '14	45,299	*39,359	5,940	15,338	†9,398
12 " " '15	681,150	*467,057	214,093	186,658	27,435
12 " " '14	675,901	*433,983	241,918	180,436	61,482

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., Jan., '15	$395,065	*$336,803	$58,263	$118,232	†‡$32,764
1 " " '14	404,062	*350,635	53,427	109,389	†‡28,864
7 " " '15	3,183,083	*2,375,283	807,799	827,339	‡45,676
7 " " '14	3,237,732	*2,372,088	865,644	747,857	‡206,501

WESTCHESTER (N. Y.) STREET RAILROAD

1m., Jan., '15	$17,394	*$22,025	$4,630	$1,349	†‡$5,971
1 " " '14	17,513	*21,226	3,713	1,164	†‡4,862
7 " " '15	159,199	*160,586	1,387	8,886	†‡10,191
7 " " '14	154,522	*149,692	4,830	7,580	†‡2,589

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE "JITNEY" BUS

Information Summarized from Fourteen Cities—Accidents Attracting Attention—De Luxe Service Proposed

An unusual amount of information in regard to the "jitney" is available this week, but the information does not lend itself any more readily to being given direction than the "jitney" itself. Concerned with something without organization the material itself is more or less disorganized in that it defied being knit into a connected narrative. While for this reason the account which follows necessarily is choppy, it shows beyond question that the hallelujah chorus with which the "jitney" was ushered in has given way throughout the country to a dirge with a staccato accompaniment from the public at large demanding adequate regulation and proper protection for the safety of patrons and pedestrians. Information is summarized from fourteen cities.

The first "jitney" in San Francisco was placed in operation during December, but the number of machines was very limited up to about Jan. 1. Probably the maximum number in operation at any one time has been in the neighborhood of 700. On March 17 it was estimated that 600 "jitneys" were then running in San Francisco. One-half of all the cars are five-passenger Ford automobiles. The remainder are cars of other makes, ranging from five to seven-passenger touring cars. Up to March 17 no regulations have been passed by the city, but an ordinance is now being considered. Thus far the operations of the "jitneys" in San Francisco have been confined to the streets over which the electric railways are operating and to the short-haul travel.

There have never been any "jitney" buses in operation in Denver. The situation was explained to those in authority along the lines contained in the pamphlet, "The Landlord," published by the Denver City Tramway, and the city commissioners passed an ordinance by a vote of four to one which makes it necessary that a franchise shall be obtained before "jitney" service is established. The pamphlet, "The Landlord," was referred to in the ELECTRIC RAILWAY JOURNAL of Feb. 6, and the terms of the regulatory ordinance were published in the issue of Feb. 13.

In Portland, Ore., the first "jitney" was started on Jan. 5. The maximum number of cars in service on March 17 was 350, divided as follows: 307 autos carrying five to seven passengers; four trucks carrying twelve to sixteen passengers; three trucks carrying sixteen to twenty-eight passengers, and thirty-six trucks carrying thirty to thirty-two passengers. Up to March 17 no restrictive legislation had been passed in Portland, but the City Council was at that time considering the matter. The terms of the ordinance at Portland were reviewed in the ELECTRIC RAILWAY JOURNAL of March 13, page 531, but the measure has since been revised. The opinion prevails that the number of passengers to be carried in the "jitneys" in Portland will be limited by the ordinance to the seating capacity of the car, but doubt is expressed as to the courage of the City Council to include in the ordinance a suitable provision for indemnity bonds. It seems likely now that the whole "jitney" matter will eventually go before the voters of the city at the coming June election in the form of an initiative or referendum petition.

In Oklahoma City "jitney" service was commenced on Jan. 24 with two cars, one a seven or eight-passenger and the other carrying five passengers. Six or possibly eight cars is the largest number that has been in operation in Oklahoma City at any one time. No "jitneys" are operating there now. Restrictive legislation has been passed by the City Commission, as referred to in previous issues of the ELECTRIC RAILWAY JOURNAL. To what extent the legislation has worked to diminish the number of "jitneys" it would be difficult to estimate, but the Oklahoma City ordinance was a drastic one, providing many regulations tending to diminish the running of the "jitneys." After the ordinance went into effect several of the "jitneys" abandoned their regular routes and carried a sign reading, "Auto livery, East Side," "North Side," etc. The plan was to carry passengers to any point within a specified distance for a "jitney." This did not last long, and although the weather has been favorable for automobile operation there were no "jitneys" in Oklahoma City on March 16. The Oklahoma Railway received assurances from hundreds of people of the city that its service and its treatment of them were satisfactory and that they would not patronize the "jitneys" under any circumstances.

The "jitney" made its appearance in St. Louis on Feb. 11. A few independent second-hand cars of small type had, however, been running in desultory fashion for a few days before that time. On March 16 there were 216 cars in operation, the maximum number in use at any one time. Practically all of the cars are of the five and seven-passenger variety. Two buses are employed from time to time. As stated in the ELECTRIC RAILWAY JOURNAL of March 20, the Commissioner of Streets and the president of the police board have drawn up a set of tentative rules which the police intend to enforce until an ordinance has been passed by the Municipal Assembly. Up to March 13 seventy-six "jitney" drivers had taken the examination prescribed by the police and only two failed. It is expected, however, that the regulations will tend to curb the reckless driving which had characterized the "jitney" in St. Louis in the past.

The "jitney" in Houston, Tex., dates from Nov. 28. The approximate maximum number of buses in operation at any one time was 750, which was the number in operation on March 16. All of them are of the five and seven-passenger type. Up to March 16 no restrictive legislation had been passed, but the City Council was at that time considering an ordinance which contained a provision for an indemnity bond but none against overcrowding. The indemnity bond is one inuring to the benefit of the injured party, whether passenger or pedestrian, the maximum amount to any one individual being $2,500 and for a single accident $5,000. The ordinance provides that a personal bond for the above amount may be accepted. The "jitney" operators state that they are unable to find any bonding company that will write this bond and they are opposing the passage of the ordinance.

The first "jitney" in Buffalo was placed in operation about three weeks ago. Up to March 13 there had not been more than three cars in operation and none were running at that time. The buses which were used in service in that city were ordinary five and seven-passenger touring cars. The municipal authorities are considering the matter of regulatory legislation.

The invasion of Atlanta by the "jitney" was incited and encouraged actively by the Atlanta *Georgian*, a Hearst newspaper, and on Jan. 28 the first "jitney" was placed in operation in that city. Thirteen cars has been the approximate maximum number of "jitneys" in operation in Atlanta at any one time. Three "jitney" bus concerns have applied for State charters as incorporated businesses. Two of the thirteen cars in operation on March 15 were seven-passenger cars, the remainder being five-passenger cars. No restrictive legislation has been passed in Atlanta, but, as stated in the ELECTRIC RAILWAY JOURNAL of March 20, legislation introduced by Councilman Lee is pending before a committee of the City Council. This ordinance would require a bond to the city in the sum of $10,000 for two cars or less under the control of one operator and $20,000 for more than two cars. It contains no provision against overcrowding.

Advertisements by the Georgia Railway & Power Company showing, first, why "jitney" buses must be regulated and then explaining term by term the provision of the ordinance have had a twofold effect: they have precipitated an issue that would have arisen some time later and called public attention to the "jitneys" themselves, and they have made it difficult for promoters to secure stock subscriptions. Furthermore, they have put the real interests behind the innovation, the automobile agents, dealers and branch managers, on the defensive in the public prints. In a five-column display advertisement in the papers of March 11 signed by six well-known automobile dealers and ten obscure names connected seemingly with the automobile trade, there appeared these phrases:

"We claim that the owner of an automobile has a right to make a living by the use of his car if he wants to and to sell your ride for a nickel or a dollar—just what you and he agree upon. He has a right to barter and trade and ride you for a nickel if he wants to.

"But he should not be made a common carrier.

"If they make him that, he must ride anybody who wants to ride and for whom there is room.

"He can't separate the races.

"Can you see what the trolley company is aiming at?

"Every man is entitled to work and earn his living. The man who owns an automobile and wants to ride passengers for a nickel should not be singled out and crushed. Make him a common carrier and he must serve the whites and the blacks. He is through before he starts."

The first "jitney" in Louisville was placed in operation on Feb. 8. The maximum number in operation has been about forty-five. It was reported on March 15 that eleven machines had been withdrawn, but about as many more had replaced these. The cars used have been six seven-passenger cars, three buses with a seating capacity of eleven each and the balance five-passenger cars. Restrictive legislation is pending before the City Council.

The number of buses in operation in Peoria, Ill., is from five to twenty-five. The service is very irregular and fluctuates with the weather, the maximum number of cars being in operation only during more favorable days and the rush hours. The first bus in Peoria was operated on Feb. 6. The capacity of the automobiles in this service is about evenly divided between five and seven-passenger touring cars, there being a larger percentage of five-passenger Fords than any other make of car. No restrictive legislation had been passed in Peoria up to March 17.

The Des Moines (Ia.) City Railway, in spite of the so-called competition of the "jitney," which appeared in Des Moines early in the year, has found traffic increased to such an extent that additional service is now required on two important lines. About fifty "jitneys" are in operation in Des Moines. Their drivers report average receipts of about $10 a day. The correspondent of this paper in Des Moines says that most of the "jitneys" in use in that city are old cars already headed for the junk pile.

The situation at Toledo is somewhat different from that of most other cities. The Toledo Railways & Light Company operates at a 3-cent fare during the rush hours and the "jitneys" charging a 5-cent fare are necessarily at a disadvantage. The "jitneys" have been operating in Toledo for about two months and on March 20 there were approximately twenty cars in operation. Three or four of these carry eight to twelve passengers, but the rest are but four-passenger machines. Already several have gone out of business. The operators bought second-hand machines and the cost of upkeep soon made serious inroads on their capital. Many of the "jitneys" in Toledo run on crosstown streets where no cars are operated. Legislation has been introduced in the Council to bond drivers in order to protect the people from injury, and the Council is sending to other cities for information as to what the legislative bodies there have done.

Labor organizations and the Building Trades Council in Kansas City are opposing the proposed ordinance for the regulation of "jitney" traffic. The measure is considered by the opponents to be too drastic, especially in its requirement for bonds, license fees, and in demanding a seat for every passenger. The regulation of "jitney" traffic in Kansas City, in so far as the element of competition with the street railway service is concerned, offers the paradoxical feature that the city is in effect a partner of the street railway company and under the new franchise will share even more largely in its earnings. In fact, under the receivership the city has practically an equal voice with the company in the management so far as service and traffic are concerned. Any action detrimental to the street railway would be equally detrimental to the city treasury.

Lieutenant Butler, the traffic expert of the police department of Los Angeles, reports that out of the 1800 licenses issued in Los Angeles prior to Jan. 1, only 600 permits have been renewed since the first of the year. More than 300 operators have retired from the field since Jan. 1 and there are only 700 "jitneys" in operation in the city at this time. A short time ago there were about 1200 "jitneys" operated in the city daily.

The committee on mercantile affairs of the Massachusetts Legislature has reported a bill regulating the "jitney" bus business. The bill is an amended draft of that introduced on petition of the Massachusetts Street Railway Association, and differs from the latter in not requiring "jitney" bus owners or operators to form incorporated companies, and in placing the entire regulation of these interests in the hands of boards of aldermen or selectmen, instead of giving regulative authority to the Public Service Commission. The bus owner or operator is required to file a bond of at least $2,000 for each motor vehicle operated to cover damages in case of injury to any person resulting from the operation of such vehicle, and the widest latitude is conferred upon the municipal authorities in granting permits and establishing rules under which such buses shall be run.

The introduction of "jitney" service in Philadelphia has caused the Board of Trades' committee on municipal affairs to recommend to Councils and the Department of Public Safety that legislation be enacted at once to control the service there.

Another bill aimed at the "jitney," which would enable traction companies to compete with the new transportation concerns, has been introduced into the Pennsylvania Legislature. The proposed measure would enable street railways to enter into direct competition with the bus lines by operating automobiles in conjunction with their cars. The bill reads: "That every street passenger railway company incorporated under the laws of this commonwealth and every motor power or other company lawfully operating a line or lines of street passenger railway, shall have power and authority to own, lease and operate lines of self-propelled omnibuses in connection with the lines or systems of street passenger railways so owned, but only after obtaining consent of the local authorities."

A. L. Kempster, general manager of the Puget Sound Traction, Light & Power Company, Seattle, Wash., is quoted in part as follows in regard to the bus situation in that city:

"I understand that the 'jitney' bus people are arranging to attack the validity of the emergency clause in the law passed by the Legislature over the Governor's veto. This would open the law to the referendum and leave the situation as it has been since the beginning of the 'jitney' bus in Seattle. Should such be the case, my company will be unable to temporize further, and the reductions in service already put into effect will be as nothing compared to those we shall be compelled to make unless some relief is given. The Puget Sound Traction, Light & Power Company has retained scores of employees on its payrolls and has continued service where patronage did not exist, in the hope that the situation would clear without the public being greatly discommoded. We shall endeavor in the future to do all in our power for the convenience of the public, but it stands to reason that we cannot operate as many cars and cover the same territory that we have been covering if our short-haul business is to be taken from us indefinitely. We have borrowed millions of dollars to construct lines in territory that has never yielded a profit, and in so doing have mortgaged the profits of the paying lines. Now we find ourselves confronted with the possibility of indefinite continuance of a situation which has brought about enormous losses and we cannot do other than retrench immediately. I do not know that the efforts of the 'jitney' people will be successful in the present instance, but I do know what our course will be if the effort succeeds."

Second in importance to the question of adequate regulation is unquestionably the matter of accidents. From all parts of the country reports are increasing of the carelessness of the operators of the "jitney" and of the increasing hazard which attends riding in cars in competition with the railways and with each other for business. How the casualty men regard the matter has been referred to previously in this paper. Even in cities where regulatory ordinances have not yet been enacted, temporary measures have been adopted in the interest of safety. Among these cities are St. Louis, Pueblo and Fort Worth, in all of which the local authorities have invoked such powers for safety as attach to the policing authority. In Los Angeles, where the "jitney" idea originated, street accidents have increased 22 per cent since the introduction of the "jitney." In short, accidents averaged 14.9 per day in October, and 23.3 per day in the last two weeks of November, with "jitneys" involved in 26 per cent of the total. In the first eight days of December there were eight accidents per day traceable entirely to "jitneys." In Akron, Ohio, a city of 69,067 population, where the "jitney" has been in operation only three or four weeks, one man has been killed, two others dangerously hurt, one or two horses killed and a score of vehicles damaged. The hazard of suits at law in connection with the "jitney" was stated strikingly at the recent "jitney" ordinance hearing at Los Angeles. E. B. Drake, an attorney whose practice includes personal injury suits, was quoted as follows:

"I am not against the "jitney" bus. I am in favor of it. The more "jitneys," the more business for me, but there is no use suing some one and getting a judgment unless you can collect. I have here the papers in the case of a client, a lad who was mutilated for life. I was given a judgment against a "jitney" bus driver who admitted in his deposition that his own negligence had caused the injury. He can neither speak nor write English, has not paid for his machine yet and has no property that can be attached. Five thousand dollars is not enough for a bond. If there are ten passengers injured that $5,000 would not buy peanuts all around, let alone the attorney's contingent fee. The bond should be at least $10,000."

A 10-cent auto bus line has applied to the City Council for a franchise to operate between the high-class residential districts north and south of the Chicago business district. Montague Ferry, the commissioner of public service, has presented to the Council a measure providing for the operation of 10-cent auto bus lines in the city of Chicago. The provisions of this measure are that the fare shall not be in excess of 10 cents for one way; that the company shall file with the city a published schedule every three months; that no auto bus shall be filled beyond its seating capacity; that its equipment be kept in safe, clean and sanitary condition; that no baggage or packages be carried in the aisles which would obstruct the movement of passengers, and that each bus carry signs designating its route. The proposed ordinance also contains the following specifications to govern the over-all dimensions and the weight of buses: height, 11 ft.; length, 23 ft.; width, 7 ft., and weight 16,000 lb. It is also proposed that the companies shall protect the city against all claims for damages.

NATIONAL "JITNEY" CONVENTION

Meeting of Automobile Men Scheduled to Be Held in Kansas City in May

The men who organized and developed the "jitney" transportation service in Kansas City are taking the necessary preliminary steps to effect a country-wide organization, and a meeting of "jitney" interests will be held in Kansas City on May 4, 5 and 6. The call for the national convention was sent out from the office of the Kansas City "Jitney" Transportation Company, 1133 Grand Avenue, a small upstairs executive office of the Kansas City "Jitney" Association. Downstairs is the operating department, where assistants plan schedules and the "jitney" drivers report. The call for the nation-wide meeting is on the letterhead of the Kansas City "Jitney" Livery Company, of which W. H. Miller is manager and E. K. Carnes traffic manager.

The Kansas City Jitney Association is composed of all drivers and owners who have cars in the "jitney" service. There are 215 touring cars registered and twenty-five buses registered. The members of the association are not under any specific and binding obligation to anybody, but are amenable to suggestions from the officers and managers and strive to conform to the general ideas of service as promulgated by the management. Every member of the association is supposed to pay $1 a week. The Kansas City "Jitney" Transportation Company is a slightly more concrete body, the members of which sign a contract to observe the schedules to which they are assigned and to obey the rules of the association. The Kansas City "Jitney" Livery Company is composed of owners and drivers who are on special service, particularly available for night calls. The dues in the association for the transportation company are $1 a week, each member keeping all he makes.

So many inquiries have come to the managers of the Kansas City association in regard to the operation of cars, the making of schedules, organization work, etc., that a mass meeting of "jitney" people for general discussion of these subjects seemed advisable. E. K. Carnes, therefore, is sending to about 200 cities letters announcing the meeting in Kansas City on May 4, 5 and 6. The letter follows:

"We believe that you are aware of the fact that Kansas City is the third largest automobile market in the world (New York and Chicago alone leading us). More cars are owned per capita in Kansas City territory than in any other. We are the second largest railroad center, consequently easy of access from all parts of the country, and this city is famed for its fine parks, boulevards and drives, as well as entertainment facilities.

"The success of the 'jitney' interests throughout the country is dependent entirely upon their ability to combat successfully the adverse, unfair and piratical legislation proposed at all points, instigated and financed by special interest monopolies and their allied 'invisible government.' Let us take concerted action on the big problems that are confronting us daily.

"No man can say at this time what the near future will develop, but we feel sure this is a pioneer movement destined to revolutionize the transportation problem and the carrying of people in our cities and suburbs. The people flocking to us by the thousands to avail themselves of the quick, pleasant mode of transportation we are offering is conclusive evidence of the above fact.

"We are receiving so many letters daily from all parts of the country that we are calling, in this city, on May 4, 5 and 6, a national convention of 'jitney' people for an interchange of views bearing upon vital points, such as legislation, insurance, safety in operation, licensing of drivers, style of equipment best adapted to the different classes of service under different conditions, etc., and at the same time lay the foundation for a strong nation-wide organization. We feel that such a move will strengthen us in every way, give the public more confidence in the stability of the service, and bring to our aid the manufacturers throughout the whole country with their valuable suggestions and advice, and in every way advance the general movement in all sections.

"We invite your co-operation at this convention and would be pleased to hear from you at an early date as to the number of delegates you expect to send."

Many of these letters are being sent out on the mere chance that there is a "jitney" association, and others on the assumption that the local automobile agents will find it to their advantage to organize one.

It is said that manufacturers and dealers in Kansas City, who have to do with both passenger and truck cars, excepting only the electric vehicle companies, have been more or less sympathetic with the movement. In fact, the local Motor Car Dealers' Association, of which E. E. Peake is secretary, has given substantial aid to the "jitneys," particularly through the participation of its attorney in the fight of the "jitney" association to secure a favorable regulating ordinance.

In Kansas City the recognized "jitney" association has two stands, where its cars are scheduled. The other associations have stands elsewhere in the business district; and one has recently organized to promote package as well as passenger delivery. The Kansas City association is trying to work out a plan of inter-insurance among "jitney" owners for public liability; and it reports that several stock companies are figuring on rates for "jitney" insurance. The "jitney" associations include small and large passenger cars of all vintages; makeshift buses on truck or passenger car chassis, and large buses substantially built for the "jitney" service. There are varying schedules of charges, most of the morning and evening traffic being by passenger cars and buses between specified points at a fare of 5 cents. The association also includes, however, the drivers who ply between the union station and hotels or downtown points and charge 10 cents a trip per passenger, and the cars in special service for which the schedule of prices is based on $1.50 an hour for a five-passenger car. A garage, built with private capital, is being encouraged by the association, where 100 cars may be stored, preference being given to association members.

FINDING IN LAWRENCE TRANSFER CASE

The Massachusetts Public Service Commission has issued an order refusing to grant the petition of the Lawrence Chamber of Commerce for the general establishment of free transfer privileges in Lawrence to all passengers traveling between Haverhill and Lawrence on the Bay State Street Railway. The petitioners based their claim upon the ground that similar transfers are given to and from any part of Haverhill and contended that this constituted an unjust discrimination against the city of Lawrence.

In dealing with the question the board examined existing rates of transportation in and between other large centers. The distance between the cities of Lawrence and Haverhill is 10 miles, which is approximately the distance between Lawrence and Lowell. The fare between Lawrence and Haverhill is 10 cents, while that between Lawrence and Lowell is 15 cents. A transfer to and from all parts of Lowell and of Lawrence is given with the payment of this 15-cent fare. Persons traveling between Lowell and Nashua, N. H., approximately 15 miles, paying 20 cents, are given free transfers in Nashua but no transfers in Lowell. Passengers between Lawrence and Salem, about 21 miles, pay 25 cents, without transfer at either end. The distance between Lowell and Reading is about 15 miles, and the fare is 15 cents, without transfer at either end.

The commission states that the situation presented by the people of Lawrence is not uncommon, and points out that "the establishment of a 10-cent fare for a distance of 10 miles between two municipalities, with free transfers at both ends, would be an extension of fares that would create rather than remove discrimination." A comparison of fares in and about Lawrence with charges for transportation in other cities and their suburbs shows that the people of Lawrence are generally favored with low cost of transportation, and this is instanced in the fact that in Lawrence transfer limits are generally outside the city boundaries, while in Lowell transfers are confined largely to city limits.

The board further points out that inequalities in fare that exist to-day in different communities are in part the result of the willingness of those who originally promoted street railways to trade in fares and the disposition on the part of some local boards to take advantage of that willingness. That the practice in Haverhill in this respect differed from that in Lawrence appeared in the evidence, but was not controlling in its importance. The board says that "any change in fares which would work a substantial diminution in revenue, under present conditions, can only be approved when it is shown that such change is necessary to remove an unjust discrimination." On account of the fact that the aggregate mileage in interurban travel by the Berkeley Street and Prospect Hill branch lines in Lawrence between Lawrence and Haverhill is less than via the main line alone the board feels that transfer facilities should be inaugurated on these lines only, and so orders, but the company is sustained in its objections to granting free transfers elsewhere in Lawrence in connection with the Haverhill service.

NEW COMPANY PUBLICATION

The Portland Railway, Light & Power Company, Portland, Ore., has begun the publication of a pamphlet which it plans to distribute each week to patrons of all of its city and interurban lines. The first issue was dated March 10, and contained an outline of the scope of the publication. The issue is to be 50,000 copies. The chief endeavor of the company will be to create a better feeling toward the company among its patrons and the public in general by commenting in a good-natured spirit upon the numerous problems involving service in all its phases. Included in the publication each week will be one page or paragraph entirely informative or educational in character, dealing with investments, interest, taxes, operation, and in a general way with what the company has done and is doing in the way of maintaining reliable service. It is planned to discuss frankly some of the problems which through misunderstanding have aroused criticism and prejudice. The publication is 4 in. x 7 in. It will be issued under the supervision of W. P. Strandborg, publicity agent of the company, who was formerly connected with the staff of the Evening *Telegram* of Portland.

GROUP INSURANCE PLAN

Policy Is Being Written to Cover the Employees of Missouri Interurban System

A group insurance policy providing $500 death benefits is being written in the Equitable Life Assurance Society on the 121 employees of the Kansas City, Clay County & St. Joseph Railway, including J. R. Harrigan, general manager, and all other employees, all of whom are now members of the mutual benefit association of the railway. R. J. Lyddane, general agent in Missouri for the Equitable company, explained to the members that because of the character of the policy, including all the members of a group exceeding 100, the exceedingly low rate, which figures about $10 a thousand, was possible.

The mutual benefit association provides not only occasional social meetings for the men, but picnics for their families and many other features which have resulted in holding high the standard of their conduct and living. The association has been receiving dues at the rate of 10 cents a week from each member, the company duplicating the amounts paid in. The members have received weekly indemnities for accident and health incapacitation, and there has been life insurance of $100 for each. The association has accumulated a fund of $1,200 since its organization. Under the group insurance policy the Equitable Company, which does not write accident and health insurance, insures merely for death, the indemnity payable being $500, or $400 more than was provided in the association's plan. The company's part of the fund received, which will continue to be an amount equal to the 10 cents a week contributed by the members, will be paid to the Equitable Company, and the members' dues will be applied by the association to weekly indemnities on accident and health claims.

An assessment of $1 a member was made previously upon the death of any member. This assessment will no longer be required under the arrangement with the Equitable Life Assurance Society. The benefits received by members of the mutual organization of the street railway company employees in case of injury or sickness will continue to be $6 a week, the general fund being sufficient to carry the "risk" for some time even without the weekly payments of 10 cents apiece by each member.

Fare Increase Asked.—The Berkshire Street Railway, Pittsfield, Mass., has filed a petition with the Public Service Commission asking authority to increase fares.

Prizes for Traffic Suggestions.—The Municipal Art Society of New York has announced an offer of prizes of $300, $200 and $100 for the best three plans for engineering changes to facilitate traffic at such congested street intersections as Forty-second Street and Fifth Avenue in New York City.

Suit to Recover Mail Pay.—Attorneys for several Eastern railroads on March 18 filed a brief in the Supreme Court in support of their contention that the government has illegally retained some $35,000,000 due to the railroads for transportation of mails. The brief is in a test case to be argued orally on April 5.

Cup for Ball Players.—H. P. Waugh, of the Interborough Rapid Transit Company, New York, N. Y., announces in the *Interborough Bulletin* for March, 1915, that Harry N. Hempstead, president of the Giants, had presented a silver cup to be competed for yearly by members of the Interborough League, composed of employees of the Interborough Rapid Transit Company recruited from various departments.

Car Capacity Order Extended.—Acting upon the observations made by his inspectors Health Commissioner Goldwater has issued orders to the Brooklyn (N. Y.) Rapid Transit Company to keep the loading of its Flatbush-Seventh Avenue and Third Avenue lines down to the limit that he prescribed for the Graham Avenue cars. That is, not more than half as many standing as seated passengers are to be permitted on the cars.

New Brooklyn Cars in Operation.—Two all-steel subway cars of the type which will be used throughout the dual subway system when completed have been placed in operation on the Sea Beach line of the Brooklyn (N. Y.) Rapid Transit System between Eighty-sixth Street and New Utrecht Avenue in place of the shuttle service surface cars formerly operated between these two points. The design of these cars was described in the ELECTRIC RAILWAY JOURNAL of June 6, June 13 and Dec. 26, 1914, and the electrical equipment in the issue of March 13, 1915.

Hitching Sleds to One-Man Cars. — The item headed "Hitching Sleds to One-Man Cars," which was published in the ELECTRIC RAILWAY JOURNAL of Feb. 13, page 355, was in error in that Regina, Saskatchewan, instead of Brandon, Manitoba, was referred to as a city in which instructions had been issued to the police force to take vigorous measures to suppress the practice indulged in by youths of the city of tying their sleds to the cars of the municipal railway. The railway act of the province of Saskatchewan does not permit the Regina Municipal Railway to operate one-man cars.

New Fare System Satisfactory.—The Union Traction Company of Indiana, Indianapolis, Ind., has included in the pamphlet report of the company for the year ended Dec. 31, 1914, a review of the new system of fares put into effect on Jan. 1 with the approval of the Indiana Public Utility Commission. The company says that experience indicates that the new system is not objectionable because of the difficulty of making change, and that its fairness commends it to the public. References to the change to the "copper zone" system were contained in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1914, page 1221, and Dec. 19, 1914, page 1366.

Interchangeable Coupon Tickets.—The Auburn & Syracuse Electric Railway, the Buffalo, Lockport & Rochester Railway, the Empire United Railways and the New York State Railways have changed their rules and regulations governing the sale and use of interchangeable coupon ticket books (price $10 per book) by eliminating from the list of carriers over whose lines such books will be honored for passage the Cortland County Traction Company, the Elmira & Seneca Lake Traction Company and the Fonda, Johnstown & Gloversville Railroad, effective on April 1, 1915. Such ticket books sold prior to April 1, 1915, will be accepted for passage over the lines of carriers eliminated, subject to terms of contract under which sold.

Service Stripes in Manila.—The Manila Electric Railway & Light Company, Manila, P. I., is to issue service stripes and insignia for excellent service to its inspectors, graduate conductors and motormen, of the transportation department, and certificates of excellent service to its employees of other departments. Vice-President and General Manager C. Nesbitt Duffy said recently: "The company decided to issue service stripes, insignia and certificates for excellent service to those employees who are deserving of same, as a mark of special recognition because of the excellent service rendered the company and the public in the performance of their duties as employees. The years of service of the employees range from one to ten years. Many transportation department employees will display the double stripe, indicating five years of service, more than 100 will be entitled to wear the metal diamond shaped insignia denoting 'excellent service,' some having earned five or more."

New Signals for St. Louis Cars.—A new method of signaling the motorman to stop and start the car will soon be put into use on the Grand Avenue line of the United Railways, St. Louis, Mo. Briefly, this system consists of an electric circuit in which the rear door, in closing, makes a contact which lights a miniature colored lamp directly in front of the motorman. When the lamp is lighted the motorman knows that the door is closed, and when the lamp is not lighted he knows that it is open. In operation the conductor closes the door when all passengers have boarded the car. The closing of the door automatically gives the signal to the motorman by lighting the miniature lamp. The motorman then starts the car without further signal. When a trail car is in use the signal is not given until the doors of both cars are closed. For stopping the car the present buzzer for passenger use will be removed to the motorman's cab. The motorman will stop the car at the next stop on passengers' signals without further signal from the conductor. The present bell and bell cord will be retained for emergency use.

Personal Mention

Mr. J. V. Collins has been appointed electrical engineer of the Charles City (Ia.) Western Railway.

Mr. C. L. Proctor, for the last six years general superintendent and purchasing agent for the Athens Railway & Electric Company, Athens, Ga., has resigned to accept a position with the Empire District Electric Company at Joplin, Mo.

Sir Albert Stanley, general manager of the Underground Electric Railways, Ltd., London, England, is to present a paper at the International Engineering Congress, at San Francisco, next September, on the subject of "Traffic in London."

Mr. Eliot Wadsworth, of the firm of Stone & Webster, Boston, Mass., sailed for Europe on March 20 on the American Line S.S. *St. Louis*, to prepare at Berlin for executive duties in connection with Polish relief work under the auspices of the Rockefeller Foundation, New York.

Mr. W. Leon Pepperman, assistant to the president of the Interborough Rapid Transit Company, New York, N. Y., formerly chief of office of administration of the Second Isthmian Canal Commission, is the author of "Who Built the Panama Canal?" published recently. The book deals largely with the work done by Mr. Theodore P. Shonts, president of the Interborough Rapid Transit Company, in formulating the plans for the canal during the time that he was at the head of the Isthmian Canal Commission from the spring of 1905 to February, 1907.

PROF. A. S. RICHEY

Prof. Albert S. Richey, author of the "Electric Railway Handbook," which has just been published, was graduated from Purdue University in 1894 with a B.M.E. degree and took the E.E. degree at Purdue in 1908. After leaving school in 1894 Professor Richey was electrician, chief electrician, electrical engineer and chief engineer successively, first with the Citizens' Street Railway at Muncie, Ind., and later with the Marion (Ind.) City Railway and the Indiana Union Traction Company and other companies which are now included in the system of the Union Traction Company of Indiana. Professor Richey was in active charge of the electrical work during the building of all these various interurban lines. While connected with these companies he also did considerable engineering work for other interurban electric railways in Indiana and Illinois. In 1905 he was appointed assistant professor of electric railway engineering at Worcester Polytechnic Institute, Worcester, Mass., and was made professor of electric railway engineering in 1907. While he has been connected with the Worcester Polytechnic Institute, Professor Richey has done an increasing amount of consulting engineering work, principally with the electric railways in New England, although to some extent in New York, New Jersey, Pennsylvania and Indiana. He has also been a member of the power distribution committee of the American Electric Railway Engineering Association for several years and is at present chairman of that committee. For the last three years he has been chairman of the committee on electrolysis of the American Electric Railway Engineering Association and is at present also a member of the committee on standards of the American Electric Railway Engineering Association. He was one of the representatives of the American Electric Railway Engineering Association on the national joint committee on overhead and underground line construction and is a representative of the American Electric Railway Association on the national joint committee on electrolysis. He is also a member of the railway committee of the American Institute of Electrical Engineers.

Mr. M. H. Bronsdon, chief engineer of power and lines of the Rhode Island Company, Providence, R. I., has been appointed to the newly created office of deputy commissioner of public works of the city of Providence, in which capacity he will succeed Mr. Otis F. Clapp as city engineer. Mr. Bronsdon was chief engineer of the Rhode Island Company from March, 1907, until August, 1912. He then engaged in general engineering work in San Francisco, but returned to the Rhode Island Company as chief engineer in December, 1914. The appointment of Mr. W. N. Cargill to the position of chief engineer of power and lines of the Rhode Island Company to succeed Mr. Bronsdon was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20, 1915.

C. E. LEARNED

Mr. Clarence E. Learned, the newly-elected president of the New England Street Railway Club, is the fifteenth chief executive of the organization, which now has some 800 members affiliated with all branches of the electric railway and many allied industries. Mr. Learned was born in South Boston, Mass., on March 5, 1858. He was educated in the South Boston and South End grammar schools, and in 1876 entered the employ of the banking house of Richardson, Hill & Company, Boston, where he remained two years. He then accepted the post of bookkeeper with Oscar Foote & Company, Boston, fertilizer and grain dealers. Mr. Learned's father was killed in a railroad accident in 1878, following which the new president took charge of his father's business for about two years, later returning to the organization of William H. Dow & Company, Boston, successors of the Foote concern. Mr. Learned traveled in New England for this house until 1886. After serving for a year as traveling passenger agent of the Boston & Hingham Steamboat Company and for a time engaging in newspaper work on the Boston *Herald* he was asked to join the forces of the West End Street Railway, Boston, by Mr. Henry M. Whitney, in 1888, as chief inspector, later becoming superintendent of the inspection department of the Boston Elevated Railway, the successor to the West End road. Mr. Learned is a Mason, belonging to the Boston Commandery. He is a Shriner, is affiliated with the Elks and is a member of the Boston City Club. He has been second vice-president of the American Electric Railway Transportation & Traffic Association, and has served on the committee on the training of employees of that association and is at present a member of the committee on fares and transportation. He was married at West Somerville, Mass., in 1882, and resides with his wife and one daughter at Wakefield, Mass.

OBITUARY

Frederick Winslow Taylor, author of "The Principles of Scientific Management" and "Shop Management," and well known as an efficiency engineer, died at Philadelphia, Pa., on March 21. Mr. Taylor was fifty-nine years old. He was graduated from Stevens Institute in 1883 and began his business career with the Midvale Steel Company at Philadelphia in 1878. He was president of the American Society of Mechanical Engineers in 1905 and 1906.

Charles Francis Adams, an original member and for seven years chairman of the Massachusetts Railroad Commission, died at his winter residence in Washington, D. C., on March 20. Mr. Adams was born in Boston in 1835; was a great grandson of President John Adams and a grandson of President John Quincy Adams. He was a son of Charles Francis Adams, minister to Great Britain during the Civil War, and had a distinguished career in military, historical, legal and railroad fields. He served on the Massachusetts commission from 1869 to 1879 and was at one time president of the Union Pacific Railroad. In 1897 he investigated the relations between street railways and municipalities in this country and Europe.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Lordship Company, Bridgeport, Conn.**—Chartered in Connecticut to operate the 3-mile electric line now being constructed by the Wilkenda Land Company on Hollister Avenue between Stratford Avenue and Lordship Manor, in Bridgeport. Contracts for the system, including a concrete carhouse, have been awarded the F. T. Ley Company, Springfield. Power will be bought of the Connecticut Company, but otherwise the lines of one will have no connection with those of the other company. Capital stock, $500,000. Walter B. Lasher, Frederick A. Bartlett and John T. Kenworthy are among those interested.

FRANCHISES

Fresno, Cal.—The Fresno Traction Company has received a franchise from the Council for an extension from the Wishon Avenue line to the Normal School grounds in Fresno.

New Britain, Conn.—The Hartford, New Britain & Meriden Railway has asked the Council for a franchise to extend its lines by a different route to New Britain. [Jan. 2, '15.]

New Britain, Conn.—The New Britain, Kensington & Meriden Railway has asked the Council for an extension of time on its franchise in which to complete the construction of its line between Meriden and New Britain. E. A. Moore, New Britain, president. [May 16, '14.]

Louisville, Ky.—The Louisville Railway Company was the only bidder present at the public sale by the city of the franchise providing for a double-track electric railway extending north from the terminus of the company's Chestnut Street line to Madison and thence west to Shawnee Park, in Louisville. This means construction of approximately 2 miles of double track. Work is to be begun as soon as the weather permits.

Ludlow, Ky.—The Council of Ludlow has granted the South Covington & Cincinnati Street Railway a twenty-year franchise. The company is to pay the city $250 and contribute $10,000 toward the construction of a permanent viaduct across Elm Street, between the railroad and Locust Street. A twelve-minute schedule will be maintained through the day, with a five-minute service during the rush hours, morning and evening.

Boston, Mass.—The Boston & Eastern Electric Railway has asked the Council for an extension of time on its franchises to April 1, 1917, in which to build its proposed line. The project entails a tunnel between Boston and East Boston and routes connecting Lynn, Peabody and other towns and cities east and north of Boston.

East Chester, N. Y.—The Westchester Electric Railway has received a franchise from the Council for the extension of its North Pelham-Mount Vernon line from the North Pelham village line to Union Corners, East Chester. The extension will open up two new sections, Chester Heights and Chester Park, and connect them with the New York, Westchester & Boston Railroad. Before the new line can be placed in operation it will be necessary to reconstruct a bridge over the Hutchinson River, near North Pelham.

Patchogue, N. Y.—The Suffolk Traction Company has received from the Council a three-year renewal of its franchise within the incorporate limits of Patchogue.

Cleveland, Ohio.—The Cleveland Short Line has received a franchise from the Council for several short extension of its tracks in Cleveland.

Findlay, Ohio.—The Toledo, Bowling Green & Southern Traction Company has notified the Council that the company will accept the twenty-year franchise recently granted by the Council.

TRACK AND ROADWAY

Lethbridge (Alta.) Municipal Railway.—The City Council of Lethbridge has been asked to undertake the extension of this municipal railway to Hardieville.

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company to begin work soon on a new line on the south side of Front Street in New Westminster.

***Sacramento, Cal.**—A system of State owned and operated electric railway lines extending along the state highways, now being built under the $18,000,000 bond issue, is urged in a resolution submitted to the Assembly recently by Mr. Shartell of Alturas. This is a separate and distinct movement from the proposed State purchase of the Western Pacific Railway. It is stated that California in building the extensive highway system has a right-of-way with grades suitable for electric lines.

San Francisco (Cal.) Municipal Railway.—Bids are being awarded for the construction of the Beach terminal loop for the Geary Street municipal line in San Francisco.

Connecticut Company, New Britain, Conn.—Surveys are being made to extend the double tracks from the Electric Field to a point near the Trumbull Electric Company's plant in Plainville this summer. This will complete a double track line from New Britain to Plainville. Extensive plans are being made by this company for strengthening all its bridges about New Haven over which heavy electric railway traffic is operated.

Washington Railway & Electric Company, Washington, D. C.—This company has been authorized by the Public Utilities Commission to issue $353,000 of general improvement 6 per cent debenture bonds to defray the expenses of work largely carried out.

Capital Traction Company, Washington, D. C.—This company has asked the Public Utilities Commission for permission to extend its lines along Seventeenth Street and I Street northwest in Washington. The route would begin at Seventeenth and U Streets; extend south on Seventeenth to I Street; thence easterly on I Street to Thirteenth Street; southerly on Thirteenth Street to H Street, and easterly on H Street to Seventh Street, connecting with the company's present lines at that point.

Miami (Fla.) Traction Company.—Plans are being made by this company to build a line on the Southside in Miami. B. B. Tatum, Miami, president. [Feb. 6, '15.]

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Work has been begun laying track and overhead work is well under way by this company on its 18-mile line between Lewiston, Idaho, and Clarkston, Wash. H. C. Hartung, Lewiston, general manager. [Feb. 27, '15.]

Danville Street Railway & Light Company, Danville, Ill.—Residents of Oaklawn, a Danville addition, have petitioned this company to construct a line from Junction Avenue, east along Wellington Street to Illinois Street to intersect the line on that street, a distance of several blocks.

Illinois Northern Utilities Company, Dixon, Ill.—Contracts have been awarded by this company to build 1½ miles of new track in Dixon.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—Preliminary details for the construction of the electric line to connect Benton, West Frankfort, Herrin, Marion and Johnston City have been completed and work will be begun within a few weeks on the roadbed. W. H. Schott, president. [March 6, '15.]

Chicago & Joliet Electric Railway, Joliet, Ill.—An extension of the Hickory Street line in Joliet from its present terminal at Smith Street to Theilers Park is being planned by this company.

Murphysboro & Southern Railway, Murphysboro, Ill.—During the next few weeks this company will award contracts to build 7 miles of new track in Murphysboro. The company will also build one 17-ft. steel span bridge and one 60-ft. steel viaduct.

St. Joseph Valley Railway, Elkhart, Ind.—Application will be filed at once by this company with the Secretary of State of Ohio for a supplementary charter to build an interurban railway to connect Angola, Ind., and Toledo, Ohio.

Arkansas Valley Interurban Railway, Wichita, Kan.—At a special adjourned meeting March 4 the City Commissioners passed an ordinance providing for an election to vote on a $30,000 issue of terminal aid bonds for this company, which is ready to begin construction on the extension from Halstead as soon as the bonds are voted. The election was set for March 29. Charles D. Bell is local manager for the company at Hutchinson.

Duluth (Minn.) Street Railway.—Construction this year of a double track extension from West Duluth to New Duluth has been ordered by the Council in Duluth. This company is to have its new line in operation by Dec. 1.

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—About 20 miles of grading has been completed by this company on its proposed electric line to connect Minneapolis, St. Cloud and Little Falls. Capital stock, authorized, $1,000,000. E. G. Potter, 433 Andrews Building, Minneapolis, president. [Feb. 20, '15.]

Metropolitan Street Railway, Kansas City, Mo.—Arrangements are being made by this company to begin immediately the reconstruction of its tracks on Walnut Street from Seventh Street to Twelfth Street in Kansas City, preliminary to the paving of that street, which carries the heaviest street railway traffic of any part of the Metropolitan's lines.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—Work has been resumed by this company on its line in Randolph. This 12-mile line will connect Randolph Springs, Moberly and Huntsville. Charles H. Dameron, Huntsville, president. [Jan. 23, '15.]

City Light & Traction Company, Sedalia, Mo.—During the next few weeks this company expects to rebuild its track and repave some of its lines in Sedalia.

Missouri Interurban Railroad, Sedalia, Mo.—This company reports that no definite plans have yet been decided upon when construction will be begun on its proposed 40-mile line to connect Sedalia, Prairie Home, Smithton, Otterville and Bunceton. B. H. Colby, Security Building, St. Louis, chief engineer. [Jan. 24, '14.]

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Plans are being made by this company for an extension of its North Olden Avenue division from East State Street to North Clinton Avenue in Trenton.

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y.—An issue of $140,332 corporate stock has been authorized by the Board of Estimate to provide terminal facilities for this company on both sides of the bridge structure. These terminal facilities are estimated to cost $240,000. Under the revised plans the terminal of the company will be ultimately located on an embankment, which is to be erected at the corner of the Bowery and Bayard Street, on the Manhattan side of the bridge structure.

Brooklyn, N. Y.—The Public Service Commission, First District, will shortly advertise for bids for the construction of Section No. 2 of Route No. 12, the Eastern Parkway subway in Brooklyn, to be operated by the Interborough Rapid Transit Company, bids to be opened April 20 next. The Eastern Parkway subway is an extension of the existing subway, and runs from its terminus at Atlantic and Flatbush avenues, Brooklyn, out Flatbush Avenue to Eastern Parkway and out Eastern Parkway to Buffalo Avenue as a four-track line, with a three-track elevated extension from that point out East Ninety-eighth Street and Livonia Avenue to New Lots Avenue, and a two-track subway branch down Nostrand Avenue to Flatbush Avenue. It is already under construction in Flatbush Avenue west of Prospect Park Plaza. Section No. 2 covers that portion of the line extending from Prospect Park Plaza under Eastern Parkway to a point east of Nostrand Avenue. The subway will be built on the double-deck plan, devised for the purpose of saving the trees in Eastern Parkway.

International Railway, Buffalo, N. Y.—An extension of its line down South Park Avenue to the south city line in Buffalo is being planned by this company.

New York, N. Y.—The Public Service Commission, First District, has approved the form of contract submitted by the Interborough Rapid Transit Company for the construction of a portion of the West Farms subway connection.

This section, which is authorized by the dual system contracts, leaves the Third Avenue elevated line at about 134 ft. north of the center line of East 143d Street, and runs through Willis and Bergen Avenues to a point near 149th Street, and thence to a connection with the Lenox Avenue branch of the existing subway. It is authorized under the certificate covering the rights for elevated railroad extensions, and as such is to be built by the company at its own expense. The only condition attached to the approval of the contract is that the company must get bids from at least six responsible bidders and submit the bids to the commission for its approval.

Black River Traction Company, Watertown, N. Y.—During the next few months this company plans to spend $15,000 on improvements of its lines in Watertown.

Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.—Preliminary arrangements are being made by this company to build its electric line between Ossipee and Durham via Altamaha, Glencoe, Carolina, Hopedale, Burlington, Graham, River Falls and Chapel Hill. John M. Cook is among those interested. [March 13, '15.]

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—This company announces that it will place in operation its line between Newton Falls and Levittsburgh on April 1. Work will continue on the section of the line from Ravenna to Cleveland during the coming summer. The line to connect Alliance and Akron is well under way and will be in operation as far as Marlboro within the next few months.

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—Work will soon be begun by this company on its line to connect Chardon, Hampton, Rock Creek and Jefferson, a distance of about 30 miles. F. A. Pease, Cleveland, engineer. [Aug. 15, '14.]

Ohio Valley Traction Company, Portsmouth, Ohio.—Contracts will be awarded at once by this company for the extension from Sciotoville to Ironton.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—During the next few weeks this company expects to build about 4500 ft. of double track with 100-lb. rails.

Brantford, Ont.—The Council has approved of the plan for the extension of the Brantford Municipal Railway in the form of a loop for Eagle Place, and gave permission to the Street Railway Commissioners to proceed with the work.

Toronto, Ont.—Early in April the Works Department will begin the laying of a permanent electric railway track on Bloor Street, to replace the temporary civic line.

***Sutherlin, Ore.**—Plans are being considered to build an electric railway from Sutherlin to Umpqua via Garden Valley and Coles Valley, a distance of 14 miles.

***Johnstown, Pa.**—It was announced recently that negotiations for the construction of an electric railway from Johnstown to Rockwood eventually to connect with the Pennsylvania & Maryland Street Railway line by an extension of the latter railway from Garrett to Rockwood, have been completed. J. A. Vandergrift & Company, Inc., New York City, will finance the railway project. The Penn Electric Service Company will furnish the power, while the Johnstown Traction Company's right-of-way into Johnstown will be used from Kelso Mines, about 5 miles from the central part of Johnstown. This proposed line will extend through Shamrock, Murdock, Roberts, Edgewood, Somerset, Harrison, Acosta, Jenner, Ferrelton, Boswell, Jerome and Holsopple; then northward to Davidsville and down Tire Hill to the Kelso Coal Company's operations, where a junction will be effected with the Windber line of the Johnstown Traction Company.

Pittsburgh (Pa.) Railways.—Residents of South Hills have asked this company to complete the double-tracking of the Beechview line out to Mount Lebanon as soon as possible.

Pottstown & Phoenixville Railway, Pottsville, Pa.—The extension to Linfield has been completed and work has been begun on the Spring City side of the Schuylkill River. The bridges and about half of the grading are completed for the line from Spring City. The plans for approval of the bridge across the Schuylkill River are now being considered by the War Department at Washington; work will be begun at once on the concrete piers. The line from Phoenixville will be shortened to Spring City by a cut-off on the line outside of Phoenixville extending direct up along the canal to Spring City, which will be used by the high-speed cars only. A schedule from Pottstown to Philadelphia of one hour and a half will be established.

Reading Transit & Light Company, Reading, Pa.—A new electric railway route to Philadelphia will develop as the result of plans of this company to build a connecting link between Boyertown and Pottstown, announcement of which was recently made. This also will mean a direct electric route to Philadelphia from Lancaster by way of Reading.

***Iloilo, P. I.**—The first suburban electric railway to be built in the Philippines outside the city of Manila, and the first to be built with Filipino capital in the Philippines, is to extend between the city of Iloilo and the adjoining towns of Jaro, Arevalo and Oton. An application for a franchise has been included in a bill introduced in the Assembly recently by Delegate Mapa of Iloilo.

Beaumont, Liberty & Houston Traction Company, Houston, Tex.—Preliminary arrangements are being made by this company to begin work on this proposed line between Houston and Richmond. Edward Kennedy, president. [Nov. 21, '14.]

Marshall (Tex.) Traction Company.—During the next few weeks this company expects to rebuild in Marshall ½ mile of roadbed with concrete base.

Petersburg & Appomattox Railway, Petersburg, Va.—Preliminary surveys have been begun by this company on its line between Petersburg and City Point. T. M. Wortham, Petersburg, president. [March 20, '15.]

Virginia Railway & Power Company, Richmond, Va.—An extension of the Grove Avenue railway from the intersection of Canal Street up to High Street near the baseball park in Petersburg is being considered by this company. The company is asked to extend its Forest Hill line for a mile from the present terminus in Richmond.

SHOPS AND BUILDINGS

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—This company has awarded a contract to build a new carhouse in Lewiston.

Murphysboro & Southern Railway, Murphysboro, Ill.—During the next few weeks this company will award contracts to build two new carhouses in Murphysboro.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to build a new passenger station in Malden.

Boston & Worcester Street Railway, Boston, Mass.—During the next few weeks this company expects to award contracts to build a new carhouse to replace the one destroyed by fire in Westboro. The location for the new structure has not been decided upon.

Niagara Gorge Railroad, Niagara Falls, N. Y.—This company is completing its new fireproof office and carhouse in Niagara Falls.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio.—Citizens of Shelby have asked this company to consider the question of locating its new power house and carhouses in Shelby.

POWER HOUSES AND SUBSTATIONS

Ohio Valley Traction Company, Portsmouth, Ohio.—Plans are being made by this company to build three new substations. They will be located at Franklin Furnace and Hanging Rock. The structures will be 40 ft. x 20 ft. and one story in height.

Gallipolis & Northern Traction Company, Gallipolis, Ohio.—We are advised that after May 1, 1915, this company expects to close its power house in East Gallipolis and buy its current from the Gallipolis Electric & Power Company, in Gallipolis, Ohio.

Toronto (Ont.) Suburban Railway.—This company has taken out a permit at Galt, Ont., for the erection of a new transformer station.

Manufactures and Supplies

ROLLING STOCK

Murphysboro & Southern Railway, Murphysboro, Ill., expects to purchase three standard interurban cars.

Scioto Valley Traction Company, Columbus, Ohio, has purchased one 60-ft. steel center-entrance passenger car from the Cincinnati Car Company.

Ohio Valley Traction Company, Portsmouth, Ohio, is reported as having ordered four 65-ft. combination passenger and baggage interurban cars from the G. C. Kuhlman Car Company.

Iowa Railway & Light Company, Cedar Rapids, Ia., has purchased one 50-ton electric locomotive, the body and trucks to be furnished by the St. Louis Car Company, and the electrical equipment by the General Electric Company. The latter consists of four GE-207, 600-1200-volt motors with Type M control.

Hagerstown & Frederick Railway, Frederick, Md., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 27 as expecting to purchase new car equipment. has ordered from The J. G. Brill Company two 37-ft. Brill patented semi-convertible combination passenger and baggage cars and one 19-ft. near-side vestibule car.

Marshall (Tex.) Traction Company has orded three 21-ft. 6-in. all-steel one-man car bodies from the Cincinnati Car Company through its Eastern sales agent, W. R. Kerschner, Inc., New York. The order was placed through H. E. Molé, consulting engineer American Public Securities Company, 50 Liberty Street, New York.

Empire United Railway, Syracuse, N. Y., is reported as rebuilding a car in its own shops, with the view of securing unusual lightness and thereby effecting economies in power consumption. The results obtained from this sample car will probably serve as a basis for the purchase of new light equipment.

Charles City (Ia.) Western Railway has ordered two single-truck city cars, one double-truck interurban car, and one 35-ton electric locomotive from the McGuire-Cummings Manufacturing Company. The three cars will be of all-steel construction and equipped with GE-217, 50-hp motors with Type K control. The electric locomotive will be equipped with four GE-205, 80-hp motors with Type M control.

Interborough Rapid Transit Company, New York, N. Y., has ordered from the Pullman Company 478 all-steel car bodies to replace the composite bodies now being used in the subway. The steel bodies will be placed upon the trucks now used under the composite cars and the present motors will also be used on the new cars. It is the intention of the company to use the composite car bodies on the elevated lines, as they are replaced by the all-steel bodies in the subway. The car bodies will be duplicates of the steel bodies now operating in the subway. The contract calls for delivery to commence within 100 days, at the rate of twelve bodies per day.

Metropolitan Street Railway, Kansas City, Mo., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20 as having ordered fifty single-end, double-truck closed prepayment motor cars from the American Car Company, has specified the following details for this equipment:

Date of delivery.June 1, 1915
Seating capacity..........48
Estimated weight of car body, fully equipped, 18,600 lb.
Bolster centers, length, 19 ft. 7 in.
Length of body..29 ft. 10 in.
Length over bumpers, 44 ft. 10 in.
Width over sills...8 ft. 6 in.
Width over all.....8 ft. 8 in.
Height, rail to sills...31 in.
Height, sill to trolley base, 11 ft. 6½ in.
Body........wood and steel
Gears and pinions, GE, grade K
Gongs........Amer. Car Co.
Hand brakes, Peacock & Amer. Car Co.
Heaters, Consol., RU thermostat
Headlights.....Golden Glow
Journal boxes, Brill 3¾ in. x 7 in.
Motors, 4 GE-247-D, inside hung
Paint...Chicago Varnish Co.
Registers .....International
Sanders, Met. St. Ry., foot pedal
Interior trim.........cherry
Headlining ....Agasote
Roof ....arch
Underframe ....steel
Air brakes, GE. CP-27, with emergency feature.
Axles.....Jones & Laughlin
Bumpers......8-in. channel
Conduits and junction boxes, National Formed Metal Products Co.
Control K-35
Couplers, Met. St. Ry., modified
Curtain fixtures, Forsyth short tip, ring fixture, Rex rollers.
Curtain material..Pantasote
Destination signs....Hunter
Fenders ....Eclipse
Sash fixtures, Forsyth beadless brass (lower only).
Seats, Brill non-reversible, offset rail across top of back
Seating material.....rattan
Step treads, Universal anti-slip
Trolley catchers.......Earll
Trolley base....U. S. No. B
Tracks...........Brill 77-E
Varnish ....Murphy
Ventilators, Ry. Utility Co., honeycomb
Special devices: Consol. door lamp signal, Aluminum stanchions, Forsyth pressed-steel carlins

TRADE NOTES

Railroad Track Work Company, Philadelphia, Pa., which recently shipped one of its reciprocating grinders to Nashville, Tenn., is demonstrating a machine in Louisville for the Louisville Railway. It has been in use on several of the streets for the last week, the local company having much to contend with in the way of corrugated rails.

Burke Electric Company, Erie, Pa., has recently made arrangements whereby George Hills, an expert on electric welding, has become head of its arc welding department. Mr. Hills will be located at the main office and works at Erie, Pa.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a sheet describing its portable hydraulic wheel press and sand dryer.

General Electric Company, Schenectady, N. Y., has issued bulletin No. 43900, superseding No. 4925B, which describes its combined unit series mercury arc rectifier, for converting alternating into direct current for the operation of series luminous arc lamps. The rectifier set consists of the constant current transformer, d.c. reactor, tube tank, exciting transformer, static discharger and pilot lamp mounted on a common base.

New Jersey Meter Company, Plainfield, N. J., has issued a bulletin describing its "Tool-om-eter" or compressed-air meter. It has a capacity of 10 cu. ft. to 100 cu. ft. of free air per minute. This meter shows direct on a scale, in cubic feet of free air per minute, the flow of air in a pipe or hose. It measures the air consumption of any machine or application of compressed air and the actual net production of air by any compressor or pump within its capacity. These meters have only one moving element which floats on air and consequently does not cause friction and is nonwearing.

NEW PUBLICATION

The Law of Carriers of Goods. By Ralph Merriam. La Salle Extension University, Chicago, Ill. 1914. 180 pages. Cloth, $1.25.

The object of this book is to furnish the reader with a knowledge of the elementary principles of the law of carriers of goods, and to train him for the analysis and application of court decisions on this subject. It is neither exhaustive nor super-technical in character, but is so written as to equip the ordinary man for the investigation of particular traffic questions that may arise in his business. The first subject discussed is the general principles of common carriage, and attention is then turned in succession to the following topics: Duty of carriers to accord undiscriminating service at reasonable rates, delivery to carriers, exceptions to the rule of extraordinary liability, limitations of liability, liability of initial and connecting carriers, delivery by carriers, bills of lading, actions against carriers, carrier's compensation and carrier's lien. Each chapter is followed by test questions, which serve aptly to bring out the main points of the preceding discussion in a comprehensive manner.

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DECLARING DIVIDENDS OUT OF SURPLUS

In reply to a recent criticism in regard to paying unearned common stock dividends in 1914, Alva Johnson, president Baldwin Locomotive Works, said that a spasmodic payment of dividends tends to make stock become speculative in character. That permanence of income is one of the prime essentials of an investment security is well known, but not until the last few years have corporation managers endeavored to insure this feature to any of their stock issues. It is impossible to prevent fluctuations in earnings, but by means of a dividend reserve it is possible to give dividends a real stability. Under this plan a stated dividend of 6 per cent or 7 per cent, for example, is paid each year, and if the earnings in any year warrant a larger disbursement, the excess is carried to the dividend reserve, instead of every last possible cent being paid out in the current year. The accumulated reserve merely averages the prosperous years with the poor years and constitutes a guarantee to stockholders against reduction because of temporary adverse conditions. The plan stabilizes prices as well as dividend rates, increases the investment demand for the stock and puts no additional burden on the public. Too little attention has heretofore been paid to the fact that one of the prime functions of surplus is to tide over a decrease in earnings. When the surplus is thus used judiciously, so as not to give a wrong impression of prosperity, the method is economically sound.

RECORDS AS EVIDENCE

The satisfactory publicity experience gained by the steam roads when they applied for increased freight rates before the Interstate Commerce Commission has begun to reflect itself in the Western roads' negotiations for increased intrastate passenger rates, as well as in the presentation of their case before the Railroad Board of Arbitration now investigating the demand for an increase in wages made by engineers and firemen of the Western district. Casting aside as passé the old method termed by President Wilson as "insidious lobbying," the steam roads are discussing their problems with the local commercial and industrial bodies in the districts or states where applications for increased rates are before the legislatures. In many instances the managers have resorted to what is styled by politicians as "stump" speaking, and it is believed that no more efficient method of piloting legislation is to be had than this of going to the source. As a result of this policy of taking their plea to the people, the real governing body, when problems are presented to them in comprehensive form, it appears quite probable that many of the state 2-cent laws will be revised to permit the passenger fares to be increased to 2½ cents on intrastate trips. Pursuant to this same policy, and in response to claims made by the engineers and firemen before the Railroad Board of Arbitration, the Western railroads simply presented their payroll records to the board as an exhibit. It is said to be the first time in such arbitrations that steam roads have resorted to this method of refuting the claims of their employees, and it is quite certain that no more convincing or compelling argument can be presented than actual records. Such a policy is in accord with the spirit of the code of principles recently laid down by the American Electric Railway Association, and it may be that electric railways, by carefully studying the publicity work done by steam roads, may profit by their experience.

"A READY-MADE OPPORTUNITY"

Advertising for advertising is a wholly legitimate proceeding—unless it leads the advertiser to distort facts in order to prove his case. These observations are apropos of a page advertisement which appeared in the Philadelphia *Public Ledger* under the heading of "A Ready-Made Opportunity." It was signed by the publishers, and the opportunity described was nothing less (nor more) than the building of auto buses, the future of which as factors in city transportation was presented in alluring paragraphs. The so-called jitney has spread "by the strange telepathy of success"; the motor bus (possibly by the same occult means) is seen to be the favored vehicle of the future, therefore it behooves motor-bus builders to "make the jitney bus a great Philadelphia industry." This advertisement ignores some important considerations, among others the fact that there is no proved instance of jitney-bus success. The "ad" writer's enthusiasm would have waned if he had investigated the matter far enough to ascertain that the supply of jitneys is kept up largely by the fact that as fast as one man finds out that there is nothing in it and that he can't compete with the electric railway, another innocent steps into the game only to be swallowed up in bankruptcy as was his predecessor. Jitneys where they most flourish are now decreasing in number, as, for example, in Memphis, Tenn.; Columbus, Ohio, and Fort Worth, Tex., among many other places. The above applies to the nomadic second-hand touring car. As to the motor bus, properly speaking, outside of New York it has perhaps been operated most systematically, under the most favorable conditions and with the best type of vehicle, in Washington, D. C., and Birmingham, Ala. Ask the motor-bus pioneers in these cities what they think of the "ready-made opportunity" in motor-bus operation and the reply will not be calculated to entice anyone into motor-bus building or motor-bus advertising. Those manufacturers who have looked into the jitney proposition are not seeking business from this quarter for the reason, as one put it, that he preferred solvent customers. We do not wish to be understood as believing that there is no field for the auto bus. But the field lies where a comparatively high fare can be charged and where there is no railway competition. As a competitor on at all equal terms it has no chance.

AUTO BUSES FOR RUSH-HOUR SERVICE

Several correspondents have written to us of late suggesting that railway companies might find it profitable to use auto buses to help out their service during the rush hours. They argue that under such circumstances the bus would be used for only a few hours a day and so would not be subject to the high rate of depreciation which exists in regular jitney service. It is proposed that these buses would be operated as part of the electric railway system with full transfer privileges but with one-man service, which would not be possible with the electric cars.

The basic thought underlying this suggestion is that cars which serve the peak traffic operate under an extremely low daily load factor and that buses, with their lower overhead charges, should prove less expensive in the long run. Of course, it is true that bus operation, taken in its entirety, involves less investment than is the case with street railway cars and that the overhead charges on the extra equipment required for rush-hour service is very high when calculated on a car-mile basis. But even under these circumstances we cannot see a gain in the plan proposed.

That portion of the railway company's overhead charges which is affected by rush-hour traffic is, in the main, limited to the power house and the cars themselves. The investment in track and overhead line is not increased except where a congested loop in the center of a town sets physical limits upon the number of cars that can be moved. Even under these circumstances the great bulk of track mileage is never worked at its full capacity, and the investment required for the introduction of additional service is confined to that necessitated by rerouting through the congested section.

On a broadly general basis the investment in facilities for power that is required for additional service is of the order of $3,000 per car; and the car itself may be said to be worth $5,000; so that an investment of roughly $8,000 is involved for each new unit, neglecting incidentals like housing, repair facilities and the like. Such a unit will seat between fifty and sixty passengers and will provide standing room in addition. A motor bus of equal capacity appears to be impracticable, and according to present standards two twenty-six or twenty-eight passenger buses would have to be considered as the equivalent in seating capacity of a single surface car, although they would have practically no standing capacity. The cost of such buses appears to vary from $3,000 to $5,000 each, or, for the two units assumed (by neglecting standees) to be equivalent to the $8,000 electric railway car, the investment in buses would be between $6,000 and $10,000. Obviously the maximum saving in first cost effected by purchasing the cheapest kind of a bus would not warrant its use even for one trip per day in preference to the street car, in view of the fact that its direct operating cost is more than twice that of the larger unit. We would have, then, with two twenty-six or twenty-eight-passenger buses, no less investment and higher operating expenses. In this comparison it is assumed, of course, that the speeds of the bus and of the electric railway car are the same, and in general this will be the case, because the boarding and alighting facilities of a twenty-six-passenger bus are distinctly inferior to those of a fifty-passenger car.

THE BRASS BAND IN THE SAFETY MOVEMENT

Recently a pioneer in the safety-first movement remarked that he did not believe in the button, banner and painted sign method of promoting a safety campaign because it ought to be a practical every-day undertaking, comparable with any other efficiency work, and would produce satisfactory financial results if conducted in a scientific manner. It is also our belief, after observing the methods of conducting the safety movement on a number of properties, that some pay too much attention to the publicity features connected with the beginning of the movement rather than to the more prosaic work of following up the undertaking after it has been begun. The Durbar at Delhi may have been an awe-inspiring spectacle, but the cosmopolitan American demands tangible evidence before he is convinced. In other words, he wants a good show after the parade.

A public utility company that had experienced a marked increase in the amount of money paid out in claims for injury recently decided that something should be done to reduce the rate of increase or, if possible, show a decrease in following years. The accidents from which claims arose were due principally to carelessness on the part of the public, on the part of the employees, or on the part of the company in not providing protective devices. It was therefore decided that a comprehensive safety movement was necessary, but that it had to be along practical lines to produce the best results. The first step taken was to make a careful analysis of the causes of accidents and then to remove the causes where this could be done by providing protective devices. The human side of the question was then taken up, and children were instructed in safety precautions at the public schools, the public was taught by circulars, individuals by personal instruction and the employees through their organizations, the management devoting a great deal of attention not only to starting the safety idea but to keeping it uppermost in everyone's mind. Having begun the good work auspiciously the management is confronted with the task of conserving the aroused interest.

But how can this be done? What will prevent the interest from flagging after the novelty has worn off? What will keep the safety movement from fading and dying after beginning with a burst of glory like the rocket? One way is by effecting a permanent organization to carry it on, acting either through one official who gives most of his time to this work, or through a committee system. The results of campaigns should have due publicity and the economic and humanitarian details should be used to sustain interest and spur to fresh endeavors. Above all, the company should not fail to practise its safety doctrines before the public.

The erroneous method of practising safety-first preaching is illustrated by a recent collision in which two careless automobile drivers figured conspicuously. The machine driven by the offender in this case bore a large safety-first banner. Similarly an electric railway safety movement with brass band accompaniment followed by little or no display of conviction and sincerity of purpose is quite certain to fail. "Eternal vigilance is the price of safety."

PROTECTING ELECTRICAL APPARATUS FROM SELF-DESTRUCTION

The subject of feeder-tap protection of d.c. apparatus, particularly rotary converters, discussed last week at the Illinois Electric Railways Association meeting by Charles H. Smith, deserves more than passing notice. This is true partly because it is important that the protection to the apparatus should be furnished and partly because an important fundamental principle is illustrated. In the high-frequency rotary it is necessary to place the brush studs fairly close together, and this necessity, with the accompanying flash-overs, long hindered progress in this type of equipment, although sixty-cycle machines were built in small sizes in the very early rotary converter days. An earlier appreciation of feeder-tap protection might have accelerated this progress. Mr. Smith states that since his original article was published in January an important 1500-volt d.c. system in the West acted upon his suggestion of limiting short-circuit current by means of feeder resistance and thereby eliminated flashing troubles. An article by Nicholas Stahl, also in last week's issue, refers to the same principle as applied on a Southern 1500-volt, sixty-cycle system. Mr. Smith recommends for 600-volt systems a minimum feeder length of 2500 ft. and for 1200-volt systems a minimum of 5000 ft. It is interesting to note that, in the distribution described by Mr. Stahl, the closest tap point is a mile from the substation. If converter flashing is giving trouble anywhere, the location of the close-by feeder taps will at least bear examination.

Direct-current apparatus, particularly the rotary converter, lacks the self protective quality which a.c. apparatus inherently possesses. Alternating-current reactance, a bugbear when generating units were small and voltage regulation was considered all-important, is now a real asset to alternators, transformers and a.c. motors. This reactance, which at normal loads does not produce serious voltage drop, is an ever-present and nearly instantaneously-acting protection under short-circuit, the effects of which would otherwise be destructive in modern high-power apparatus. With the d.c. machine there is no protection but the circuit breaker, reliable, to be sure, but not quick enough to prevent the starting of flash-overs if conditions are favorable to them. This is particularly true when the a.c. power supply behind a rotary is large compared with its rating because, while the overdraft of current extends through the rotary to the a.c. supply line, it is not a short-circuit there and does not bring out the protective qualities of the reactance. While energy-consuming resistance as furnished by feeders is not to be compared with a.c. reactance as a protective quality, it is the best available protection, and, as high d.c. voltage and frequency become more popular, its value in the distributing system will be increasingly appreciated.

TWO MORE FAVORABLE DECISIONS

We have made previous references to the increasing inclination in the United States to treat the transportation agencies of this country more fairly. Two of the most recent and conspicuous examples of this along judicial lines were the recent United States Supreme Court decisions in the West Virginia passenger rate case and the North Dakota lignite rate case.

In the first one, the State law fixing the passenger rate at 2 cents a mile was declared invalid, because thereunder the company was forced to carry passengers, if not at or below cost, for merely a nominal reward considering the volume of the traffic affected. In the North Dakota case, the point at issue was the right of the State to segregate lignite coal and enforce low rates on this commodity, provided the carrier was able to earn a fair profit upon its entire interstate business. The court held that each class of traffic must bear its direct costs and also its proportionate share of overhead expenses, and that when thereby the carrier is denied a reasonable reward for its services, the State has exceeded its regulating authority. The amounts involved in these cases were insignificant, but the principles established are vitally important. As the court says, the power of regulation is broad, but a state does not enjoy the freedom of an owner, and it has no arbitrary power over rates.

Of late the power of states over rate regulation has been becoming definitely limited by the Supreme Court decisions. In the Minnesota rate cases it was declared that a state had authority to fix intrastate rates as long as they were not confiscatory. Later the Shreveport decision established the fact that in a conflict between intrastate and interstate rates in the predominant sphere of interstate competition, the interstate rates must be used. Now, in these present cases it is decreed that a state cannot compel railroads to do a certain class of business at non-compensatory rates and that the absence of a reasonable reward and not the presence of a positive loss is the determining factor in establishing the validity of rates.

While this ruling now affects electric railways in the main only indirectly, it is hoped that it gives the clue to more equitable administrative and judicial decisions in all future rate cases affecting such carriers.

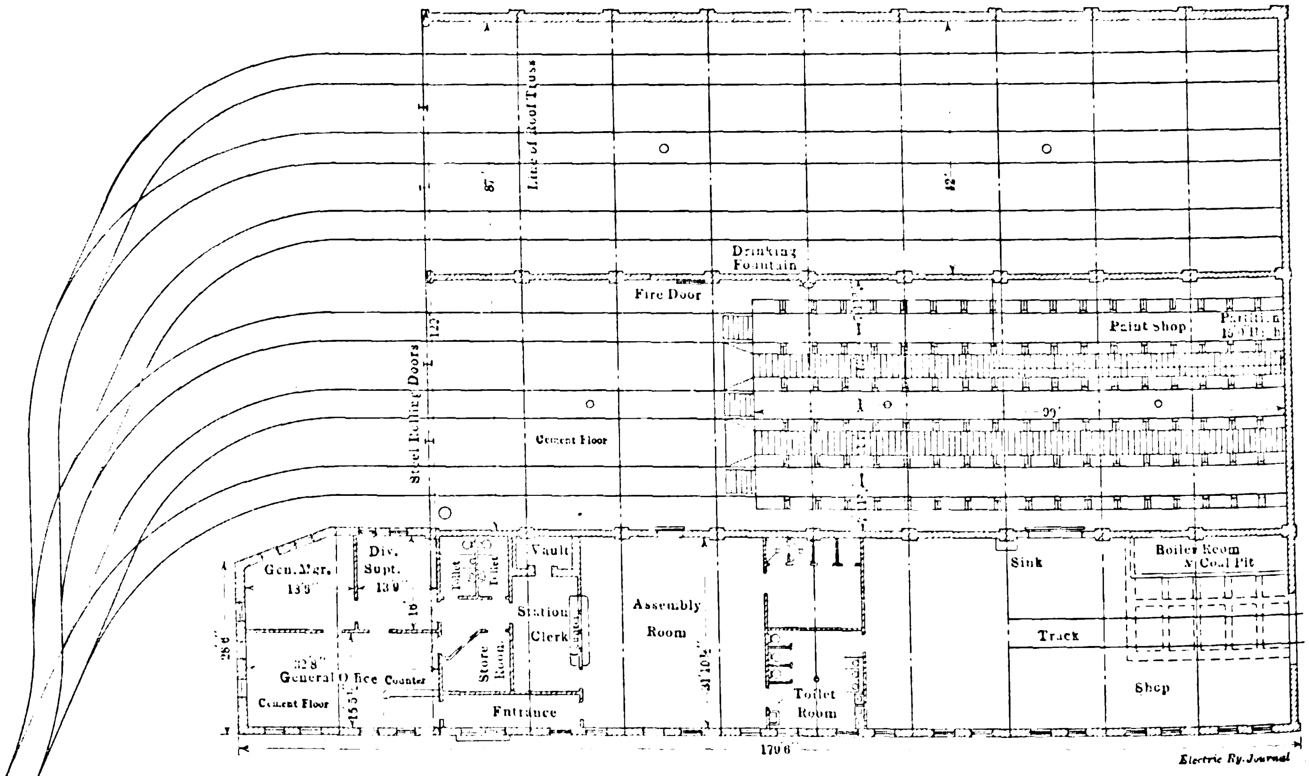
A Carhouse for a Residential District

The New Carhouse and Repair Shops of the Evanston (Ill.) Railway Combine the Artistic with the Practical—Attention is Directed to the Pit Construction, the Heating Plant and the Sand Equipment

That carhouses and shops can be built at reasonable cost in residential districts to please the esthetic ideas of a most particular community and to the railway company's ultimate advantage has been clearly demonstrated in the case of the new carhouse and shops of the Evanston (Ill.) Railway. These are located in an attractive suburban residence town and occupy part of a golf club course without detracting in any way from its appearance.

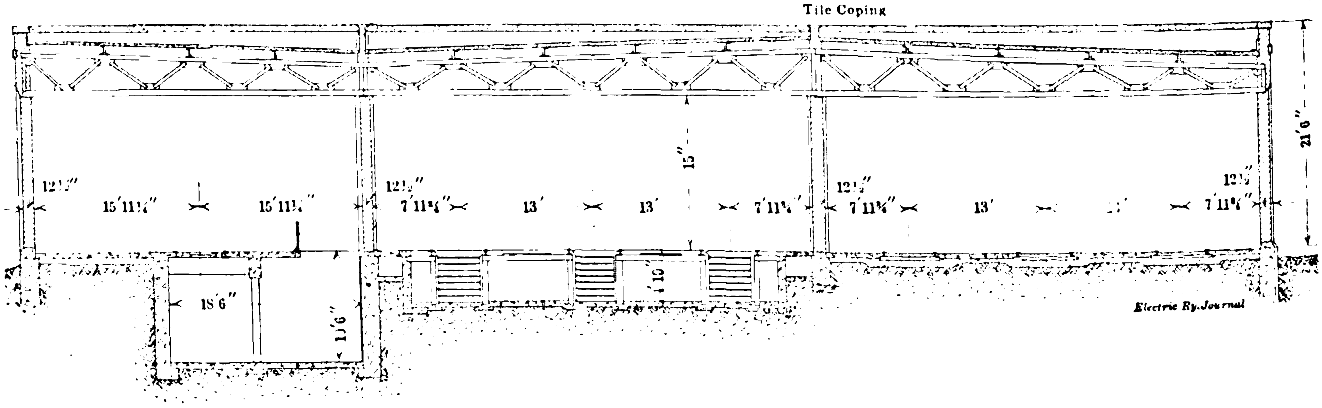
In August, 1913, the portion of the street railway lines in the city of Evanston owned by the County Traction Company was purchased by the Evanston Railway Company, a new organization. This purchase included only the old rails and the overhead lines. The cars were owned by the Chicago Railways Company, which maintained them, and the franchise had expired. The new owner obtained a twenty-year grant under the Mueller law and began immediately to rehabilitate the property, so that it is in excellent physical condition, with its tracks in good repair, with new cars of the latest type in operation, and a new carhouse and shops just completed. While the railway system is quite small, at present comprising but about 10 miles of track and twelve cars, it is beginning with a "clean slate," so to speak, and bids fair to grow in importance, since the territory it serves is expanding. Extensions in the near future are planned, and should increase the traffic and aid in the future development of the community.

The new office building and carhouse is situated at about the center of the system. The site selected was the only available property of a size sufficient for present needs and future expansion. It is within a short distance of the north branch of the Chicago drainage canal and near the terminals of the Northwestern Elevated and the Chicago & Milwaukee Electric Railroads. The site adjoins a high-class residence district, and at



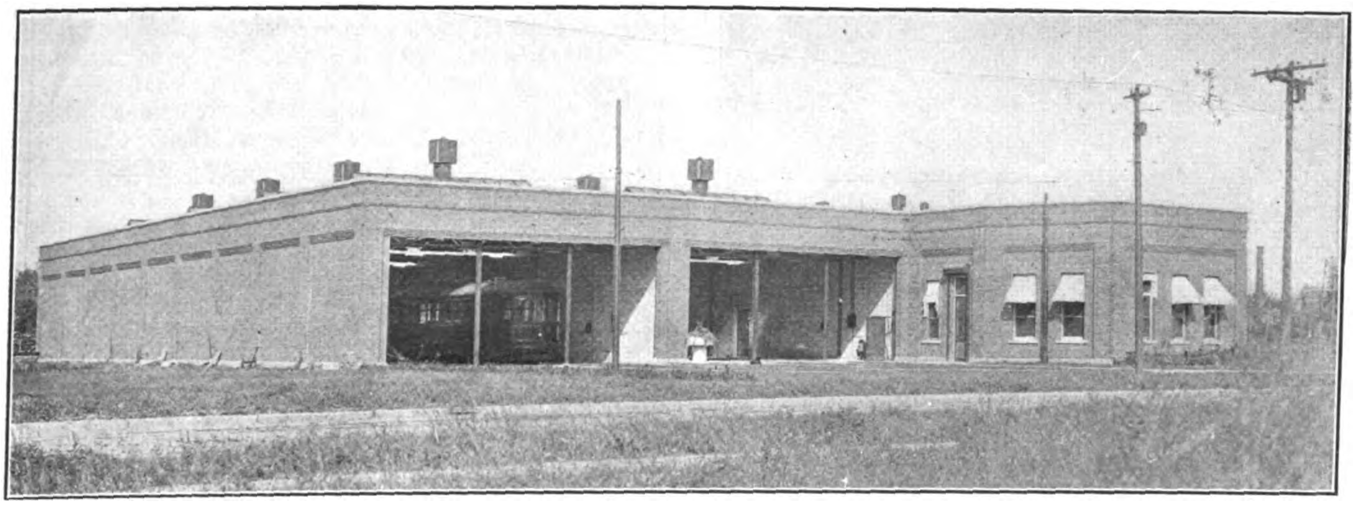
Line of Roof Truss
87'
42'
Drinking Fountain
Fire Door
Paint Shop
Partition 15' 0" H.
Steel Rolling Doors
Cement Floor
Gen. Mgr. 13'9"
Div. Supt. 13'9"
Vault
Station Clerk
Store Room
Assembly Room
General Office
Counter
Cement Floor
Entrance
Toilet Room
Sink
Boiler Room & Coal Pit
Track
Shop
170'6"
Electric Ry. Journal

EVANSTON CARHOUSE—FLOOR PLAN



Tile Coping
21'6"
12½"
15'11¾"
7'11¾"
13'
15'
18'6"
4'10"
15'6"
Electric Ry. Journal

EVANSTON CARHOUSE—CROSS-SECTION OF BUILDING, SHOP AT LEFT, CARHOUSE AT RIGHT



EVANSTON CARHOUSE—GENERAL VIEW OF BUILDING

first the property owners strenuously opposed the location of the carhouse in their neighborhood. Their objections were overcome, however, when the plans for the layout were displayed, and since the completion of the improvement the neighbors have taken considerable pride in its appearance.

GENERAL LAYOUT

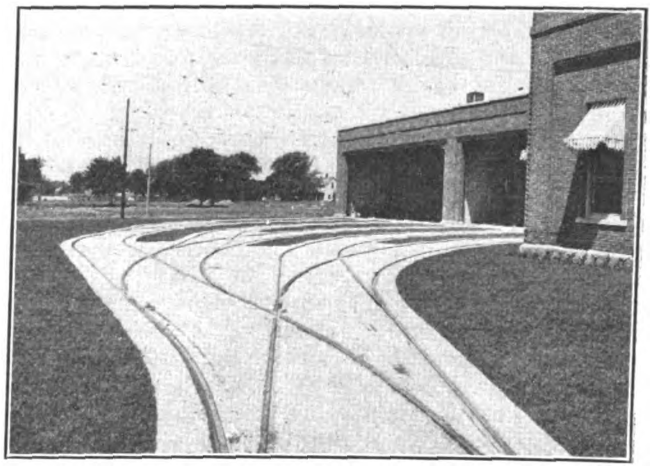
As is shown in the accompanying illustrations, the buildings comprise two car-storage bays, 42 ft. x 146 ft. in size, and a section 34 ft. over-all width by 179 ft. 6 in. long, which is occupied by the operating department, general offices and repair shop. This was deemed the most economical arrangement for a railway of small size.

Six tracks enter the car-storage bays from a ladder on the property, an arrangement necessary to preserve unbroken the sidewalk along the front of the property. At the same time it permitted the use of 4½-in. 60-lb. T-rail with a steel-bound insert, frogs, switches and mates, thus minimizing the cost of special work. The tracks enter the carhouse at 13-ft. centers, leaving a 4-ft. aisle between the cars and a 3½-ft. walkway beside the inspection and repair pit. The tracks in one bay are used exclusively for car-storage purposes, while the other bay adjoins the repair shop and practically forms part of it. In this bay the three tracks pass over an inspection and repair pit 90 ft. in length, which occupies the rear end of the bay.

BUILDING CONSTRUCTION FEATURES

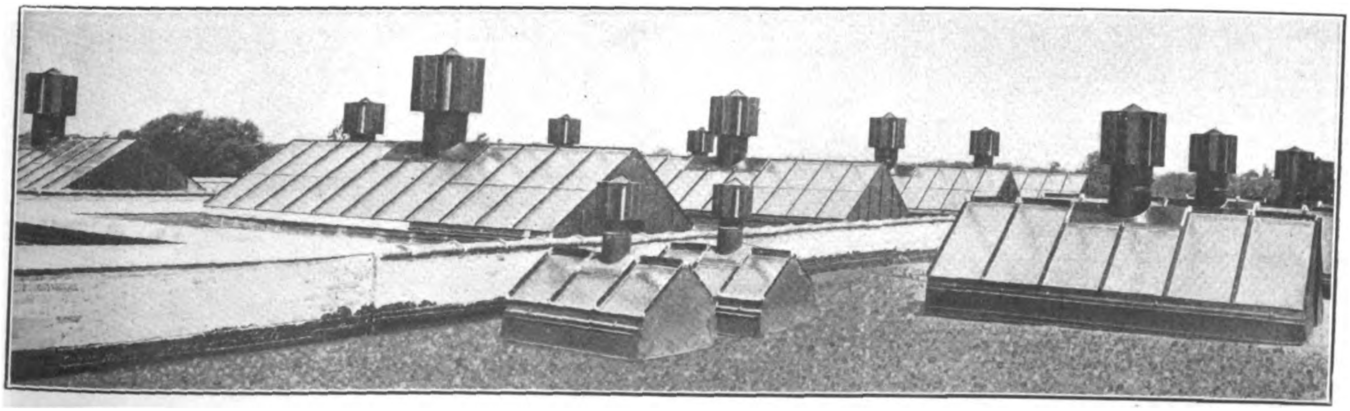
Architecturally this carhouse is quite plain, but the walls are faced on all sides with cherry-red vitrified brick neatly laid in white mortar. Corbeled panels and belt courses, with plain limestone coping and sills, furnish the only decorative effect. The unadorned appearance of the structure, however, is entirely offset by the neatly-cut lawn and hedge and the well-placed and well-kept flower beds.

In order that track entrances to the building should be in keeping with the rest of the layout they were paved with concrete between the rails and 18 in. outside. This not only conduces to attractive appearance but also provides a driveway for teams delivering materials. Furthermore, derailed cars may be replaced to the track without difficulty. The locations of the tubular steel poles supporting the overhead were so chosen as to keep the track entrances entirely clear.

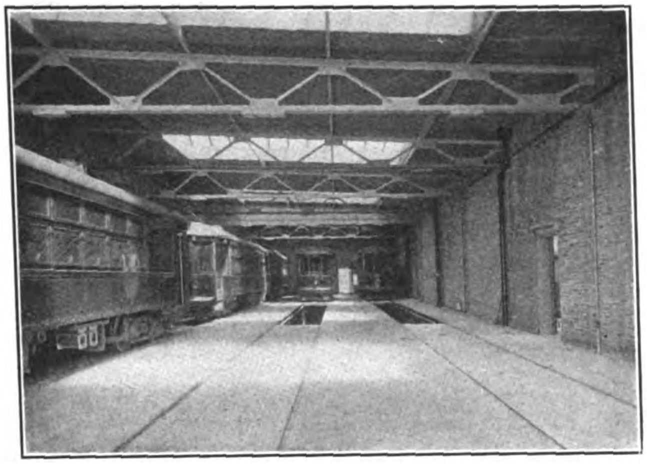


EVANSTON CARHOUSE—VIEW SHOWING METHOD OF PAVING TRACK

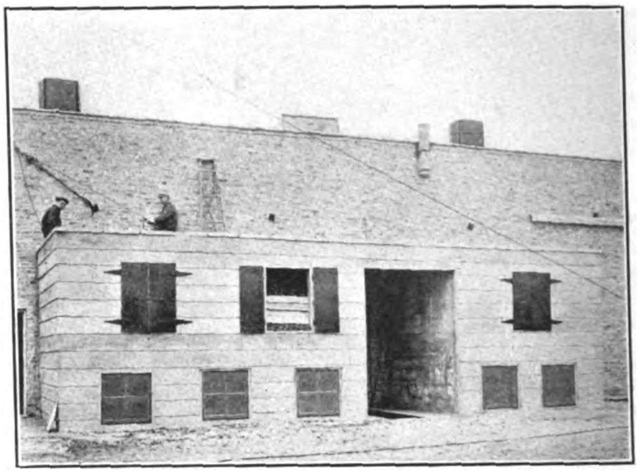
The building is of modern, fireproof construction,



EVANSTON CARHOUSE—VIEW OF ROOF AND SKYLIGHTS



EVANSTON CARHOUSE—INTERIOR VIEW CAR-STORAGE BAY



EVANSTON CARHOUSE—VIEW OF SAND AND COKE BINS

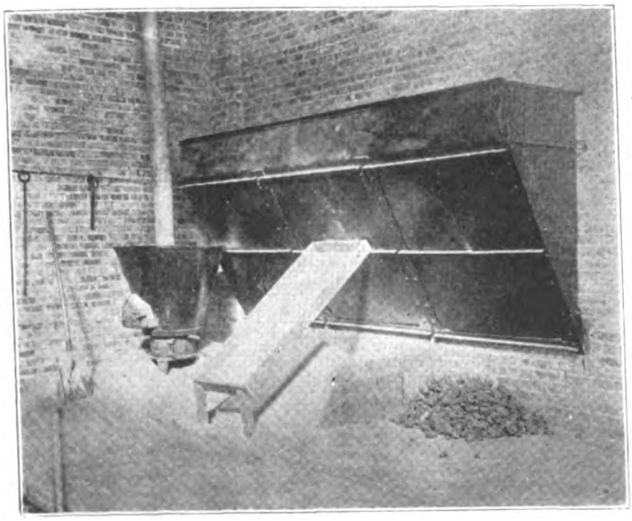
with concrete foundations, floors and roof, brick walls, and steel roof trusses. The three bays in the building are separated by 13-in. fire walls with openings fitted with automatically closing underwriter's fire doors. The roof is of reinforced-concrete flat-slab construction with a liberal supply of Drouvé skylights. Each skylight is fitted with a Peerless ventilator, manufactured by the Auto Utilities Manufacturing Company, Chicago. These ventilators vary in diameter from 10 in. to 30 in., with the size of the skylight opening. Hips and valleys for roof drainage were formed by depositing concrete on the slab, and all drain to down-spouts, inside the building beside the walls. The roof was waterproofed with a five-ply tar-and-gravel covering.

The repair and inspection pits occupy the rear 90 ft. under the three tracks in the bay adjoining the repair shop proper. They are built in the usual manner, with one large pit under the three tracks, structural-steel bents carrying the track rails and concrete slabs forming the aisles between tracks. The outer rails of the two outside tracks are not supported, as usual, on the concrete walls of the pit. Instead, these walls are placed 3 ft. 6 in. outside the rails, and the additional space thus provided, roofed over by the floor, is fitted with reinforced shelving for storing the various repair parts usually replaced from the pit.

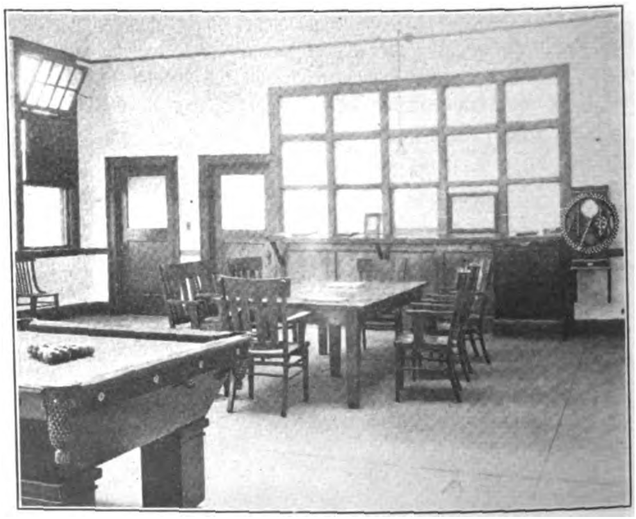
To economize space and at the same time to facilitate the delivery of coal to the heating plant and the removal of cinders the heating plant boiler was installed in the basement beneath the repair-shop floor. A coal-delivery track enters the repair shop from the rear of the building, and is carried over the basement on a concrete beam-and-column structure. From this track coal may be dumped into the basement through two 24-in. manholes between the rails. The boiler and indirect radiation equipment occupy one corner of the shop floor, the former in the basement and the latter above it on the shop floor.

The reinforced concrete sand-receiving bin and sand-drying and storage outfit are quite complete. The former serves to receive sand from wagon delivery and is located immediately back of the storage bay. The bin, of 15-yd. capacity, is of a rectangular section with the floor sloping to an opening in the rear wall of the car-storage bay. The lowest point of the receiving bin was so located that sand will flow by gravity to an opening in the wall just above the car-storage bay floor level. From this opening the sand is scooped into the sand drier or deposited on the floor in the space provided for that purpose. After the sand has been dried it is screened and stored in a 4-yd. steel bin mounted on the partition wall between the two bays. This bin supplies sand to valves on the opposite side of the wall, where it is convenient for the car crews and the inspection force.

As shown in one of the accompanying illustrations, the sand-receiving bin forms one wing of a reinforced-concrete structure, of which a 30-ton coke bin is the other. The two are separated by an enclosure which will serve to house a line repair wagon. The coke bin, like the one for sand, is built with a sloping floor, which

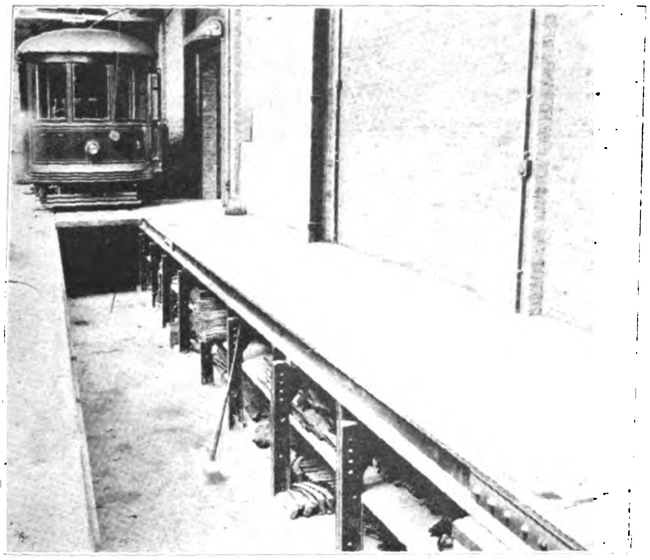


EVANSTON CARHOUSE—VIEW OF SAND-DRYING OUTFIT



EVANSTON CARHOUSE—VIEW IN TRAINMEN'S QUARTERS allows the coke to flow by gravity to an opening in the rear wall of one of the car-storage bays. At this opening fuel for the forced hot-air heaters on the cars is readily available. The basement space beneath the bins serves as storage space for scrap materials and provides an oil-storage room.

The front portion of the repair-shop bay is divided into offices for the general manager, the superintendent and the station clerk, and an assembly room for the employees. The employees' quarters have been furnished with tables, chairs, a billiard table, shower baths and individual metal lockers. The station clerk's office adjoins the assembly room, being separated from it by a glass partition, built with a counter on each side. Across this the conductors receive supplies and make turn-ins.



EVANSTON CARHOUSE—VIEW SHOWING SHELVING IN PITS

The heating system for the offices and shops is of the indirect hot-air blower radiation type, furnished by the B. F. Sturtevant Company. This system was adopted because it could be installed in pits, shops or offices, and serve both as a heating and ventilating system for winter or summer. All outlets are overhead, except those in the pits, each being fitted with a regulating valve and diffusers. In the offices the diffusers are installed in the center of the ceilings and connect to the hot-air ducts provided between the ceiling and the roof. The heating plant was not selected until after the building was completed, but, in designing the structure, the ducts were so arranged that they could be used in either a direct or an indirect heating system.

Flow of Energy Discussion in Chicago

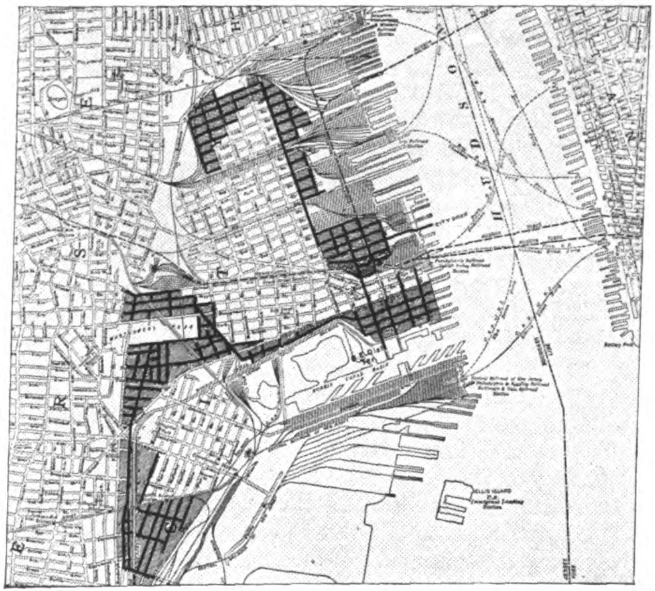
At a joint meeting of the Chicago section A. I. E. E. and the Western Society of Engineers, held in Chicago on March 22, Robert A. Philip, chief electrical engineer Stone & Webster Engineering Corporation, presented a paper designed to picture graphically the tranformations of energy which occur in an electrical generating, transmitting and distributing system. He gave a series of diagrams of the "ribbon" variety showing by the widths of the ribbons the amounts of power passing different points in the system, all arranged in such a way as to associate the apparatus with the respective power losses. Energy flow and magnetizing power were considered separately and a simple method for obtaining a working grasp of the subject of power factor was developed. The full text of the paper, under the title "Flow of Energy," appears in the April *Proceedings* of the American Institute of Electrical Engineers.

Industrial Development Railway for Jersey City

Linking of Six Trunk Line Railroads Contemplated—Extraordinary Facilities for Handling Freight Shipments Will Be Provided

The Chamber of Commerce of Jersey City, N. J., is planning one of the most elaborate electric railways for industrial development that has yet been attempted. The scheme, which involves the linking together of the six trunk-line railroads that now terminate separately on the west bank of the Hudson River opposite New York City, has recently been outlined in detail in a report by F. Van Z. Lane, resident engineer. Its establishment is subject to action of the New Jersey State Legislature on a bill initiated by the Jersey City Chamber of Commerce to permit the building of the railroad by the city. The informal approval of the New Jersey Public Service Commission has already been obtained.

The plan comprehends the building of the network of lines shown in the accompanying illustration by funds raised from the sale of twenty-year city bonds. The cost of the 5 miles of main line and 16 miles of sidings which will be installed is estimated at $1,500,000. In return for this expenditure there will be directly served an area of more than 15,000,000 sq. ft. of ground which will possess exceptional advantages for warehouse and manufacturing sites owing to the extraordinary facilities for handling freight shipments to or from any part of the country. This is expected to increase the taxable value of the real estate in this city by $50,000,000. Operation will probably be conducted by individual capital, the plan being to lease the road, if necessary, at a rental which will equal the cost of the obligation of the city, including interest and sinking fund, as the indirect return to the community will be so great as to preclude any need for the investment to pay direct profit.



INDUSTRIAL DEVELOPMENT RAILWAY FOR JERSEY CITY—PROPOSED MAIN ROUTE AND SIDINGS

The record of passenger train performances on the steam railroads of the State of New York for January, 1915, shows that during the month the number of trains run was 60,807. Of the number of trains run 87 per cent were on time at the division terminal. The average delay for each late train was 22.6 minutes and the average delay for each train run was 2.8 minutes.

Report on Detroit Traffic

The Changes Recommended Embrace Re routing, Two-Car Units, Skip Stops, Street Collectors During Rush Hours, Street Improvements to Facilitate Traffic, and Other Suggestions

A comprehensive report on electric railway traffic conditions in Detroit has just been made to the street railway commissioners of that city by Barclay Parsons & Klapp, consulting engineers, of New York. It contains 291 pages, twenty-one large maps or diagrams, and is the result of an extensive study of the subject in that city by H. M. Brinckerhoff, a member of the firm. A short account of the report appeared in the issue of this paper for March 20, page 595. A longer abstract appears below.

The report first refers to the recent rapid increase of the population of the city. Prior to 1900 this increase followed closely that of the other large lake cities—Buffalo, Cleveland, Milwaukee and Chicago. During the last fourteen years, however, a rate of growth has occurred greatly in excess of other cities of about the same size, placing Detroit to-day in population ahead of all these cities except Cleveland and Chicago. In per cent this increase has amounted to 76½ for the fourteen years. In population density, the city averages 14,310 per square mile, which is about the same or possibly less than similar American cities. On the other hand, the population has a singularly even distribution, and the average number of persons per dwelling is five and one-half, which is much below that of other cities of the same general size.

Detroit is essentially a manufacturing city, and the factories are widely distributed throughout the city. This fact has an important bearing on the electric railway traffic of Detroit. A tabulation of the factory workers shows that of 45,600, 13,000 are within walking distance of their factories, 20,600 use street transportation outside of the congested districts, and 12,000 use lines which transfer near the heart of the city.

The street railway traffic in Detroit increased from 1904 to 1908 approximately at the same rate as the average of the transportation systems of the thirty-two largest cities of the United States. From 1908 to 1914 inclusive, however, the annual rate of increase has exceeded the average, the average rate being 7.8 per cent, whereas in Detroit the rate was 17.1 per cent. The report adds that American cities up to 700,000 to 800,000 population have an increasing and constant rate of traffic growth, but from this point on the rate of increase of traffic in proportion to the population is markedly less. In point of size Detroit has arrived at this apparently critical stage, so that caution must be exercised in making future predictions on the figures just mentioned.

CITY RAILWAY SYSTEM

The principal car routes in Detroit follow the main radiating thoroughfares, and fourteen of the twenty city lines pass directly through the hub or central district surrounding the City Hall. This has brought about a large congestion of traffic in the center of the city during the morning and evening rush hours, so severe as to cause interruption, slow and otherwise unsatisfactory service at these times. Factories now form a girdle surrounding practically 70 per cent of the population of Detroit. The travel of the workmen to these factories is an additional reason for the heavy passenger movement in the morning from various residential parts of the city toward the common center and outward again to the factories, with a reverse movement over the same routes in the evening. It is largely for the purpose of finding a solution for this congestion problem that the report was made.

SUGGESTED CHANGES

The first suggested change is rerouting. The report points out that with the development of electric railway operating conditions, changes of some inconvenience to the individual passenger but of great convenience to the public as a whole have been necessary. In the early days it was not unusual for a car to stop midway between blocks. As the demand for more rapid service grew, the rule of stopping only at corners became necessary. Again, station stops came into use, and transfers were introduced. Rerouting may involve some inconvenience to part of the passengers, but if it will facilitate the situation as a whole it should be employed. In consequence, the report suggests the use of two-car trains and skip stops and recommends a number of changes in route by which the number of congested crossings is reduced, principally by looping lines near the center of the city instead of making them cross each other. The estimated cost of making these changes is $400,000.

The report also considers the question of a subway on Woodward Avenue, the line of heaviest traffic. In 1914 this line carried 47,467,294 passengers, the average number of passengers per mile of single track being more than 3,000,000. Two plans were considered. The first was for a subway 6 miles in length or with a total length of single track of 12.34 miles and stations one-third of a mile apart. It was estimated, however, that with stations at this interval a person traveling less than 2 miles would not save enough time by use of the subway over the surface car to warrant the walk to the station of a block or two. For a trip of 1½ miles or less the time occupied in descending and ascending stairs and waiting for trains would offset the saving made by the higher speed in the subway. It is estimated that not more than 23,000,000 of the total number of passengers on Woodward Avenue during 1914 would have used the subway. This was not sufficient to warrant the construction of the line. On the other hand, a short subway loop to begin at Grand Circus might well be considered and would be necessary if traffic should increase greatly, as now seems probable, during the next six years. Such a system would be available as the terminal of a complete subway system later and would cost about $2,500,000.

RECOMMENDATIONS

The recommendations were briefly as follows:

1. Entire rerouting of the various lines entering the heart of the city by a system of loops to eliminate as far as possible the present crossing interferences.
2. Two-car units on Woodward Avenue during rush hours, to be followed later as traffic may require on some of the other heavy lines.
3. Additional car service on certain lines. This will be possible after rerouting and the use of larger car units.
4. Extensions on certain crosstown and belt lines.
5. A larger bridge and through cars to Belle Isle.
6. Skip stops on Woodward Avenue, Michigan Avenue, Jefferson Avenue and Grand River Avenue, cars stopping at all alternate street corners in one direction and at the intermediate corners returning.

7. Street collectors to load passengers at the front doors of prepayment cars during the rush hours in the downtown districts. This plan has been in use since Dec. 14 on the Woodward Avenue line.

8. A change in the division rail on the rear platform of the pay-as-you-enter cars to allow this rail to be removed by the conductor at heavy loading points. By this means passengers can enter the car by both rear doors simultaneously, thereby cutting down the loading time materially.

9. The use of non-stop cars through the crowds of factory workers on some of the main car lines at certain hours of the day to take care of the general traffic travel to points beyond the factories.

10. Improvements in the way of paving, lighting and widening certain streets so that they can better care for vehicle traffic. Automobiles should be encouraged to use these streets.

11. An ordinance providing for stopping automobiles with the street cars on certain streets to facilitate the safe and rapid loading of the cars.

12. The enforcement of rigid parking regulations at the ends of the blocks near the safety zones to facilitate loading operations and prevent delays to the cars.

13. Certain rerouting for interurban cars and city cars pending the completion of the track changes.

Four additional recommendations were made in regard to the proposed short subway loop in line with the policy outlined above.

DISCUSSION OF RECOMMENDATIONS

In discussing the recommendation for street collectors the report says that a collector in the street receiving fares at the front or exit door of the car and at the same time assisting passengers, as well as acting as inspector, has been found to be of great assistance and secures the prompt movement of cars upon the blowing of the traffic officer's whistle. In congested traffic movement, the question of a few seconds in a single operation is vital. The time actually occupied by a car in passing over crossing tracks is very small compared to the time required to start and reach the crossing, and when to this time is added a delay of some seconds through passenger loading before the car starts an unnecessary loss of time occurs during which the crossing is idle. Where the loading is very heavy it is frequently advantageous to all concerned to shut off passengers crowding on the first few cars and to dispatch these cars rather than delay the whole line to allow a few additional passengers to board. This can be done by the street collector, who must co-operate with the traffic officer at the crossing.

The change recommended in the car platforms is to convert the rail dividing the entrance from the exit steps of the rear platform of the car into a removable one. This makes it possible to load passengers at three entrances, one in front and two at the rear. This would approximately cut the loading time to one-third.

In referring to skip stops and two-car units the report mentions the practice on the Superior Avenue line in Cleveland. On this street, where formerly conditions of bad crowding and congestion of cars obtained with the operation of single units, by the introduction of two-car units and the reduction of the number of stops from fifteen to nine per mile, the headway has been changed from one minute to one and one-half minutes, and the congestion of cars on the street has been eliminated. In 1913, 40 per cent more passengers were carried than in 1910, and the capacity of the line is still well under the limit.

The report also refers to trailer or two-car operation as being used with success in Buffalo, Milwaukee, Pittsburgh and other places. In Detroit, on the principal thoroughfares where recommendations are made for trail-car operation with skip stops, especially on Woodward Avenue, it is estimated that by using a large light-weight trailer and reducing the number of possible stops per mile from about twelve as at present to eight, the schedule speed will be raised about 10 per cent and the capacity of the line 50 per cent.

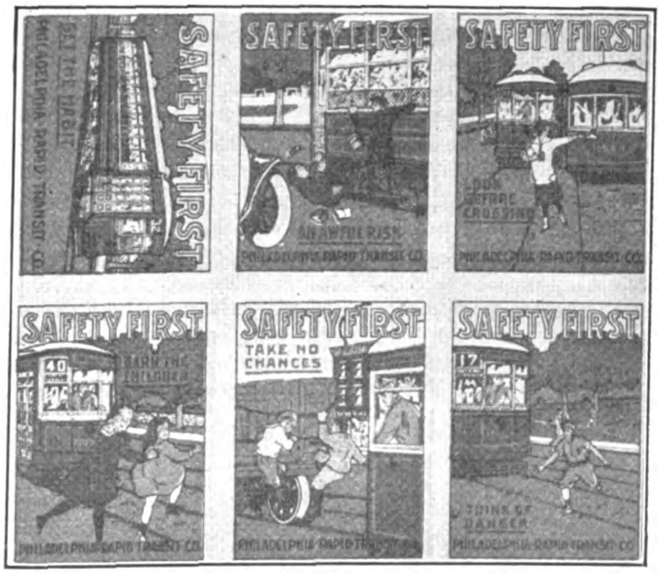
DIAGRAMS, TABLES AND MAPS

The report is accompanied by a number of interesting diagrams, tables and maps. The tables show the result of traffic counts conducted by the engineers during the period from Aug. 1 to Dec. 15, 1914, and give for each line and important cross streets the passengers on and passengers off during the four periods of the day, namely, from 5:30 a. m. to 9 a. m., from 9 a. m. to 4 p. m., from 4 p. m. to 6 p. m., and from 6 p. m. to midnight. Among the maps is an interesting one showing the results of the investigation of the amount of riding by workers in the different factories. The factories were divided into eleven groups and the city into fifty-two sections, and the number of workers traveling from each section to each group of factories was determined. The map shows this information graphically by a set of eleven rectangles printed in each of the fifty-two sections.

The map also includes diagrams of maximum schedule cars per hour under the proposed rerouting, the track changes proposed and an isochronal map based on the present and proposed transportation facilities.

Philadelphia Rapid Transit Company Distributes Safety-First Poster Stamps

Utilizing the poster-stamp collecting fad to promote its safety campaign, the Philadelphia Rapid Transit Company is distributing 1,000,000 of an artistic and striking series of safety-first stamps. These poster stamps are designed especially to convey to school children a warning, in picture form, of the dangers existing in busy city streets. The series includes six stamps, each one printed in four colors, and five of them illustrate situations most often resulting in injury to reckless or thoughtless boys and girls. The picture in each case so vividly presents its story of danger as to make it plain even to very young children. Catchy and appro-


SAFETY FIRST
GET THE HABIT
PHILADELPHIA RAPID TRANSIT CO.
SAFETY FIRST
AN AWFUL RISK
PHILADELPHIA RAPID TRANSIT CO.
SAFETY FIRST
LOOK BEFORE CROSSING
PHILADELPHIA RAPID TRANSIT CO.
SAFETY FIRST
40
PHILADELPHIA RAPID TRANSIT CO.
SAFETY FIRST
TAKE NO CHANCES
PHILADELPHIA RAPID TRANSIT CO.
SAFETY FIRST
17
THINK OF DANGER
PHILADELPHIA RAPID TRANSIT CO.

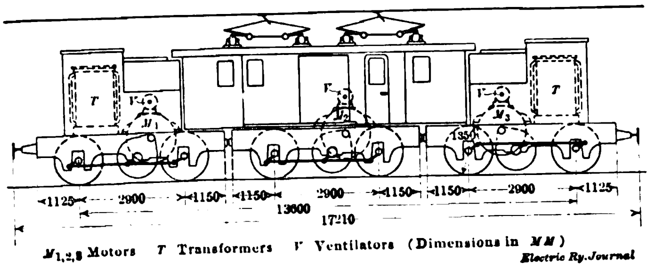
SIX POSTER STAMPS FOR PHILADELPHIA SCHOOL CHILDREN priate words of warning add emphasis to the posters. The sixth stamp handsomely exhibits the near-side car which, since its installation in the Philadelphia system, has eliminated many of the types of accidents formerly of frequent occurrence in street railroading.

Silesian Single-Phase Electrification

Details of a 310-Mile Electrification Which Was Undertaken to Improve Heavy Freight Service and to Increase Pleasure Travel on One Section

The Silesian electrification of the Prussian State Railways between Lauban and Königszelt had attained the point of trial runs just before the outbreak of the present war. As the installation was so advanced it is deemed advisable to describe its principal features, although complete electrical operation appears to be indefinitely postponed.

The network for which electric service is planned comprises the following: Double-track main line between Lauban and Königszelt, 80 miles; single-track main line, Niedersalzbrunn-Halbstadt, 21.7 miles; double-track main line, Ruhbank-Landeshut, and single-track line, Landeshut-Liebau, totaling 10.5 miles; single-track branch line, Hirschberg-Grünthal, 32.9 miles and a single-track branch line, Hirschberg-Schmiedeberg-Landeshut, 24.8 miles. The total length measured as route is 170 miles and as single track, including sidings, yards, etc., 310 miles.

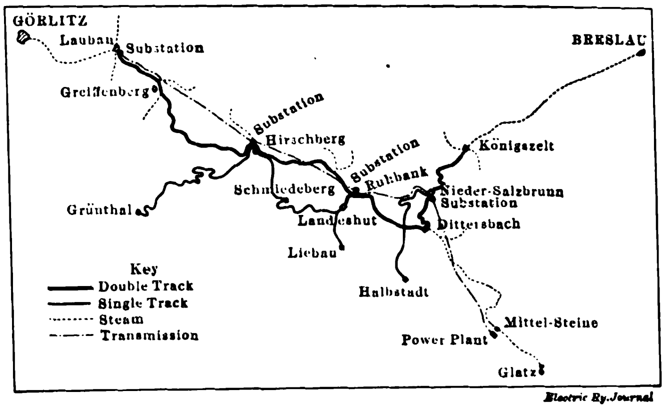

T
V
M1
V
M2
V
M3
T
1350
1125
2900
1150
1150
2900
1150
1150
2900
1125
13600
17210
M1,2,3 Motors T Transformers V Ventilators (Dimensions in MM)
Electric Ry. Journal

LAUBAN-KÖNIGSZELT ELECTRIFICATION—DISPOSITION OF APPARATUS ON LOCOMOTIVE

The lines are in a mountainous district where normally there is heavy coal, industrial and passenger business. The plan decided upon was to operate passenger express trains up to 500 metric tons and freight trains up to 1200 metric tons. The physical features are considered severe because of the large number of curves and grades, and the snowfall in this mountain region is also an important factor.

ENERGY SUPPLY

Energy is purchased by the Prussian State Railways from a private central station company at 2.75 pf (0.69 cents) per kilowatt hour, measured at the transmission voltage. The central station company also maintains the transmission lines and substations for an annual sum which covers amortization, interest charges and extraordinary maintenance. The State Railways own the contact line, distribution system and rolling stock.

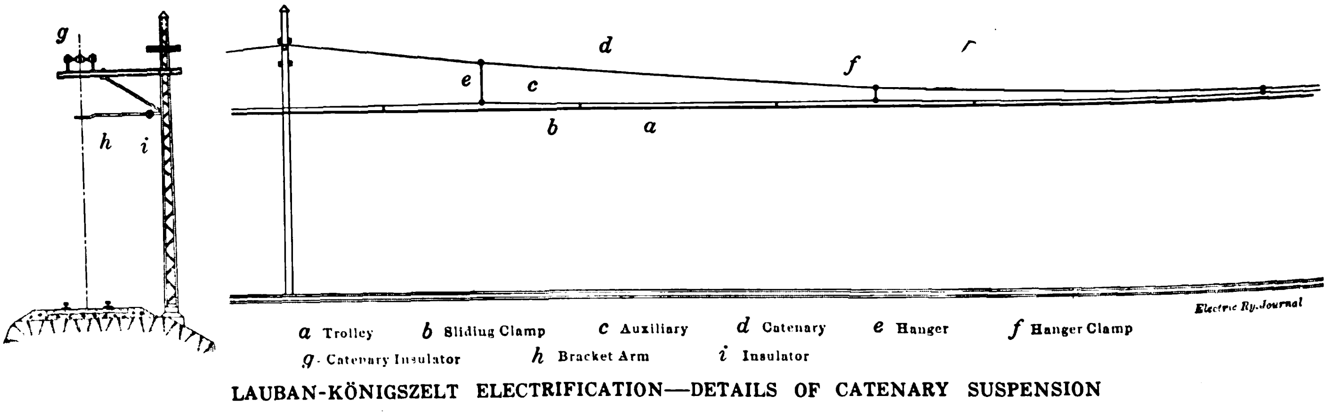

GÖRLITZ
Lauban
Substation
BRESLAU
Greiffenberg
Substation
Hirschberg
Substation
Ruhbank
Königszelt
Schmiedeberg
Nieder-Salzbrunn
Substation
Grünthal
Landeshut
Dittersbach
Liebau
Key
Double Track
Single Track
Steam
Transmission
Halbstadt
Mittel-Steine
Power Plant
Glatz
Electric Ry. Journal

LAUBAN-KÖNIGSZELT ELECTRIFICATION—MAP

The power plant is located on the Steine river about 1.24 miles from Mittelsteine. Fuel is brought by cars from mines near by. The initial railway generating equipment comprises six 1000-kva, 1000-r.p.m. machines which deliver 3500 volts single phase at 16 2/3 cycles. Three three-phase, 2000-volt, fifty-cycle units are also installed for local industrial purposes. The railway energy as generated is raised to the transmission potential of 80,000 volts by means of six 5000-kva single-phase transformers.

The transmission line is built with suspension insulators. The curvature of the railway line and the possible interference with the reading of signals led to running the transmission across country wherever possible with the result that 76.8 miles of transmission correspond to 101 miles of railway. Further reduction in the number of suspension points was secured by making the transmission spans average 656 ft., whereas the railway spans are but 328 ft. on tangents and 230 ft. on curves.

The four substations are located in the following order: From the power plant to Niedersalzbrunn, 23.56 miles; from Niedersalzbrunn to Ruhbank, 11.78 miles; from Ruhbank to Hirschberg, 16.74 miles and from Hirschberg to Lauban, 24.8 miles. The individual feeders necessarily parallel the railway and exceed the length of the overland 80,000-volt line by 24.18 miles. The feeders are in duplicate which are normally connected in parallel but are capable alone of conveying enough energy to propel twenty-four trains in each section. For this purpose the pairs of feeders are divided into four sections as follows: No. 1, 90 sq. mm (approximately No. 000 B & S); Nos. 2 and 3, 65 sq. mm (approximately No. 00) No. 4, 30 sq. mm (approximately No. 2).


g
h
i
d
e
c
f
b
a
Electric Ry. Journal
a Trolley
b Sliding Clamp
c Auxiliary
d Catenary
e Hanger
f Hanger Clamp
g Catenary Insulator
h Bracket Arm
i Insulator

LAUBAN-KÖNIGSZELT ELECTRIFICATION—DETAILS OF CATENARY SUSPENSION

The substations are equipped with 1600-kva translates to a process of manufacturing an alloy of iron formers to step down the 80,000-volt transmission current to 15,000 volts trolley potential. Niedersalzbrunn and Hirschberg have five units, Ruhbank has four, and Lauban has three.

CATENARY LINE.

In the autumn of 1911 a trial overhead line about 4920 ft. long was erected at Jacobsthal on the Hirschberg-Grünthal division. Two severe winters demonstrated the advisability of using the same construction for the complete electrification. The overhead line between Greiffenberg-Hirschberg-Mersdorf-Ruhbank and Ruhbank-Landeshut-Liebau is of the Siemens-Schuckert double catenary type as used on the Dessau-Bitterfeld electrification of the Prussian State Railways. The contact wire is of hard-drawn copper of 100 sq. mm (about No. 0000 B & S) section. It is attached to the auxiliary catenary by means of sliding clamps. The auxiliary wire is clamped to the main catenary by means of hangers which are located in the centers of every other of the spans formed by the clamps of the trolley and auxiliary wire. On single-track sections the supporting points are poles and brackets; on double-track sections, bridges are used. In both constructions the spacing on tangents is about 328 ft., and the insulator over which the catenary is carried is installed between a pair of uprights. At brackets, an insulator is also installed in the horizontal arm to limit the sidesway of the trolley and auxilary catenary.

The clearance between the head of the rails and the contact wire on the right-of-way is 17 ft. and at stations, 19.7 ft. The main catenary has a sag of 9.8 ft. in the span length of 328 ft. so that the insulator supports are carried at a height of about 29.5 ft. Chain-hung weights of the customary type are used at intervals of 0.93 mile to take care of expansion and contraction. The main catenary is usually sherardized steel, but bronze is used in smoke-laden territory. The towers are of exceptional height on those portions of the line where the ground is liable to sink on account of mines in order to permit readjustments of the contact line to the standard clearance. Practically all of the towers are of steel, but a number of reinforced concrete poles were installed for experiment.

LOCOMOTIVES AND MOTOR CARS

The principal requirement set for the electric locomotives was that they should be capable of hauling alone the maximum train weights which had formerly required the temporary assistance of a second steam locomotive. A higher rate of acceleration was also desired. In general the electric locomotives were expected to reduce the average running time from 10 to 20 per cent and in some instances even from 30 to 40 per cent. The present order calls for twenty locomotives for heavy express passenger service, thirty-five freight locomotives, seven locomotives for light passenger service and thirteen combination passenger and freight locomotives of lighter construction (15 tons per axle) for use on the branch lines. Six motor car trains (one motor car and two "control" trailers) are also called for.

When the war began there were under construction fourteen locomotives for high-speed passenger service, thirty for freight service, seven for light passenger service and five motor-car trains. Of this order the Siemens-Schuckert Company is to deliver nine type AAA+AAA (six non-coupled driving axles) locomotives equipped with six geared motors each; and twelve type B+B+B (three double trucks, all with coupled axles) freight locomotives carrying three motors each with three sets of geared jack shafts and driving rods, as shown in an accompanying illustration.

The average running speed of the freight locomotives is to be 12.4 m.p.h. and the maximum speed 27.9 m.p.h. In both types gearing was used to employ smaller motors at reasonably high speeds. In general the constructions approach the standard form of motor-car transmission except that the locomotive motors are rated at 700 hp to 800 hp each. The motors are spring-supported through connections with the locomotive frame instead of resting rigidly on the driving axles.

Enlarging the Geary Street Municipal Carhouses at San Francisco

A Two-Story Addition to the Older Carhouses Has Recently Been Built at Reasonable Cost

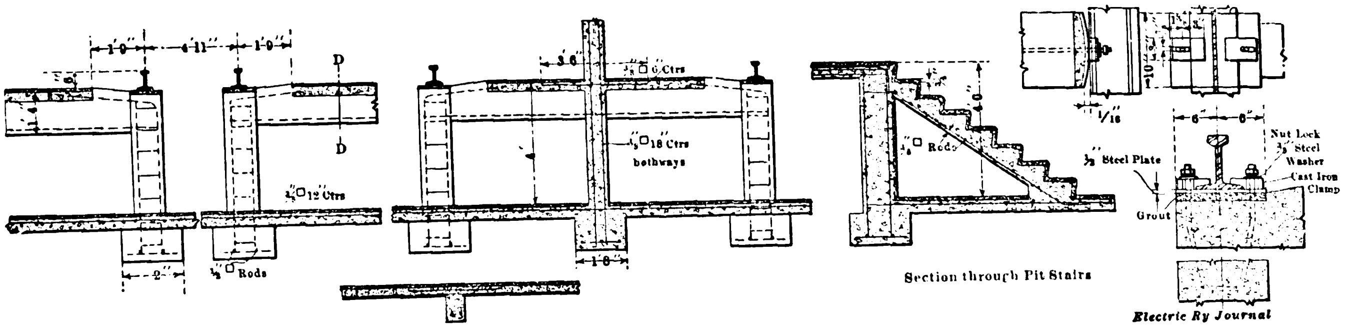
When the Muncipal Railroad took over the old Geary Street Railroad properties, a concrete carhouse was built on Geary Street at Presidio Avenue with a capacity of sixty-four cars, or sufficient for more rolling stock than was at that time in use on the municipal line. After the decision to build the Van Ness Avenue and other lines was made and 125 cars were ordered, plans were at once made for the extension of the carhouse, and the adjoining property previously acquired by the city for this purpose was utilized. It was decided that the location of the carhouse first constructed was the best for this first extension, because it is convenient to the new municipal line on Van Ness Avenue running to the Exposition grounds and on which heavy traffic is expected this year.

As still more housing capacity becomes necessary carhouses will be erected in other parts of the city. The first of these is now under construction at Seventeenth and Hampshire Streets where a two-story structure with a capacity of 171 cars has been planned. Only the ground floor with a storage capacity of eighty-two cars will be constructed under the present contract. Plans are now being drawn for a further addition to the Geary Street car house for use as executive offices of the Municipal Railways, and which will cost $30,000. This will be made on the Geary Street frontage, where the columns of the original structure were designed for this possible addition.

In making the extension to the Geary Street carhouse, which was recently completed, it was necessary to cut away the rear wall and add two floors, 114 ft. x 276 ft. in plan, thus covering the remainder of the property purchased for future extension. The car capacity of the original structure, which is also used for executive offices, etc., was sixty-four 47-ft. cars, and the new carhouses will provide space for seventy additional cars. It is to be noted that the plan adopted gives this additional storage on an area only 50 per cent of that occupied by the old building.

PREPARING FOR THE ADDITION

The grades of the streets intersecting at the carhouse are such that trackage will be available in the enlarged structure on two levels, as the level of the main entrance on Geary Street becomes the second story when extended over the area occupied by the addition which fronts on Presidio Avenue. This advantage, however, was not gained without expense, as it was necessary to excavate 24,000 cu. yd. of earth and rock from the site of the addition before it was brought down to the level of the Presidio Avenue grade, and then it was deemed wise, in the design of the wall against the uphill side, to allow for partial hydrostatic thrust from the bank which is nearly 40 ft. high.



GEARY STREET CARHOUSES—DETAILS OF PIT CONSTRUCTION

Another feature of the work was the removal of the rear concrete wall of the old building. The wall had been founded at different levels, according to the slope of the hill, and in order to excavate to the desired level for the addition, it was necessary to take out the greater part of the old wall footings. Also the wall had to be broken through on the Geary Street level so as to give direct access to tracks on the second floor of the addition, and it was found cheaper to do this before the excavation was completed. In preparation for the removal, the wall panels were first cut through on three sides by compressed air drills, and where necessary hack saws were used to cut the reinforcing.

The slabs were then thrust out by means of a hydraulic jack which worked against an inclined 14-in. x 14-in. timber braced against the top of the slab to be broken out. A sufficient bearing for this thrust was found on the concrete floor beams of the structure. After the panels had been broken out in this manner they were further broken up into pieces sufficiently small for convenient handling by means of a drop hammer operated by a steam winch. When the first slabs were cut on three sides a line of holes was also drilled along the bottom of the panel to insure its breaking along the floor line, but this was found to be unnecessary as the break along the bottom was the same whether marked out by drills or not. Eight panels in all were taken out; of these six were 19 ft. high by 26 ft. wide, while two were 17 ft. high by 23 ft. wide. After the removal of the slabs, temporary timber footings were set at the lower floor level to carry the weight while the old concrete foundations were taken out and the new walls poured.

TRACK DESIGN

On the lower floor of the addition eight tracks are provided for, while sixteen are laid out in the upper story, at right angles to those below. On both floors four tracks is the maximum between fire-wall partitions. The rails on the upper floors were laid on concrete beams cast monolithic with the floor slab and carried on concrete girders reinforced with 1-in. deformed bars. These girders have clear spans of 28 ft., spaced about 27 ft. on centers. The central section is 3½ ft. deep and 1½ ft. thick. The floors are reinforced with ⅜-in. rods, and are 4 in. thick.

In the lower floor the major portion of the trackage was placed over pits, and a form of construction was adopted, as shown in the illustration, in which there is nothing but the rails themselves to obstruct the pits between the rail supports. The rails used weigh 80 lb. per yard and are expected to carry the normal loading of the 27-ton cars between supporting posts, which are placed every 5½ ft. These posts are rounded at the point of support and are capped by an iron plate curved in the direction of the rails, so that any cross bending could not spall off the concrete. The plates are set to grade by grouting them in after the rough work on the posts has been finished. Although the bolts for drawing the rail down to the post are cast in the rough concrete, the clamps that secure the rail have slotted bolt holes which permit of any slight adjustment required in lining them up.

Drainage on the lower floor could be easily provided by a system of sub-tiles, but on the upper floors special provision was required, as it was desired to avoid laying the tracks on a grade because of the danger of moving cars. The deep floor beams and limited headroom beneath prevented the use of longitudinal mains. Lines of 4-in. drain pipes were therefore run alongside the four lines of floor girders, and low points were provided in the flange grooves where these cross above the drains. These grooves were given a slope of 2 in. in the 13-ft. length between high and low points, and the floor slabs were sloped at ¼ in. to the foot. To prevent leakage into the concrete on the side of the rail opposite the flange groove, an asphalt filler was poured into a ½-in. space, the depth of the rail head which was left between rail and concrete.

Excavation at the site was commenced on March 20, and the construction was to be completed in October. The cost of the addition, including excavation, was estimated to be close to $160,000, and the value of the property which the addition occupies is placed at $55,000. Exclusive of real estate, the cost of the addition figures out at about 12 cents per cubic foot of content. The entire work was done by James L. McLaughlin, general contractor, according to designs prepared by R. J. Wood under the supervision of M. M. O'Shaughnessy, city engineer.

New Jersey Supreme Court Ruling on Free Electric Service

The Supreme Court of New Jersey has set aside an order of the Board of Public Utility Commissioners directing the Public Service Electric Company to furnish free electric service to public buildings in Plainfield. Provision for such service was contained in the franchise granted the Plainfield Gas & Electric Company, of which the Public Service Company is the successor. The electric company claimed that under the "seven sisters" corporation laws it was debarred from furnishing gratuitous service to any person or corporation, whether municipal or otherwise, on the ground that to do so constituted a discrimination. The commission tried to differentiate between a gratuitous service furnished in accordance with a contractual obligation, made as part consideration for the granting of a franchise, and a gratuity or concession otherwise granted by a corporation.

The American Museum of Safety has leased new offices at 14 to 18 West Twenty-fourth Street, New York, N. Y. The museum was formerly located at 29 West Thirty-ninth Street.

Way Records on Cost per Section Basis

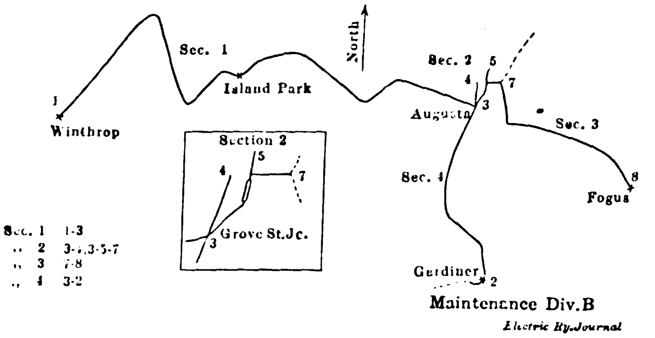
The Writer Shows How Detailed Statement of Conditions and Equipment on Each Section May Be Maintained with Little Work After the Initial Comprehensive Survey and Inventory

BY FRANK W. HULETT, ENGINEER LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

The proper regulation of maintenance of way accounts forms one of the great problems of electric railway operation. There are many instances when the proper regulation of this expense has shown a saving of thousands of dollars in a year. It is this problem that we took hold of last summer, and while the way we worked it out may seem crude, it seems to show great possibilities.

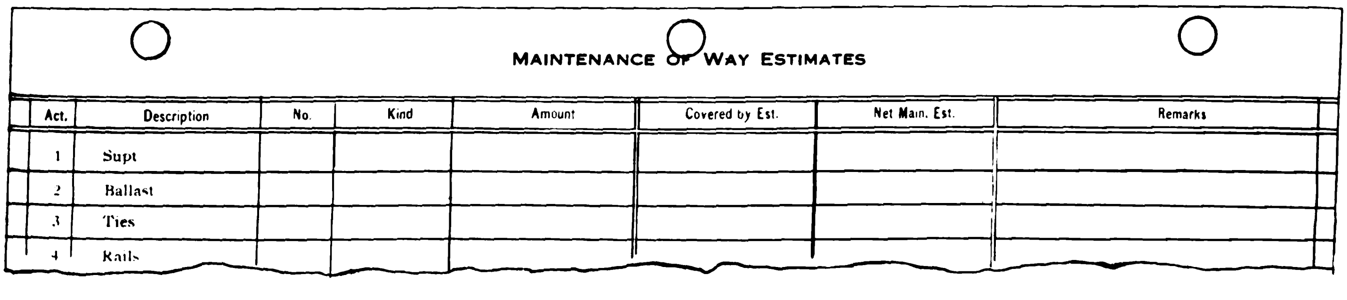
We started with the idea of sectionalizing the expense, which has been done on many roads, and that idea worked itself out in the following form.

Our system was divided into several divisions and each division subdivided into sections. We found the logical number of divisions to be five, and lettered them *A*, *B*, *C*, *D* and *E*, and then subdivided each so that altogether we had nineteen sections. All maintenance work done in these sections is charged directly to them, including supplies, labor, etc.



SECTIONALIZING WAY COSTS—DIVISION OF SYSTEM INTO SECTIONS

Before the beginning of the year an estimate is made for each section. This estimate is made by the engineer from his knowledge of conditions and with the aid of the various section foremen. No attempt is made to distribute the accounts for superintendence, cleaning and sanding track, snow expense and the building and structures. These we estimate from past experience for the whole year, since it is impracticable to try any segregation of these accounts.



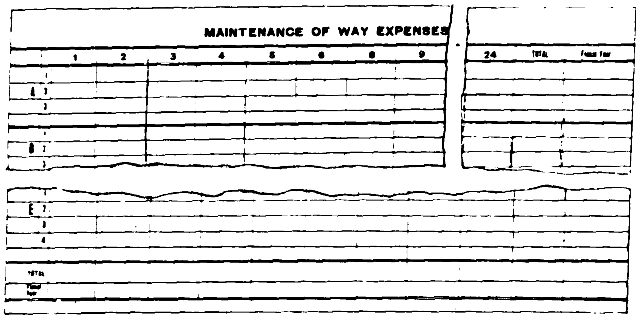
MAINTENANCE OF WAY ESTIMATES

Act.	Description	No.	Kind	Amount	Covered by Est.	Net Main. Est.	Remarks
1	Supt						
2	Ballast						
3	Ties						
4	Rails						

SECTIONALIZING WAY COSTS—FORM 1—ESTIMATE FOR A GIVEN DIVISION AND SECTION

The attempt is made to estimate the amount necessary to maintain the track and overhead in perpetually good condition. For instance, we assumed that ties could be depended upon to last about twelve years. Therefore we reckoned upon renewing 8 per cent of the ties each year. Of course, in those sections where the track is buried and paved the ties have a longer life. Proper discrimination has to be shown in these cases. In the same way with the overhead and poles, the attempt is made to maintain year by year and not to have a large renewal in any one year.

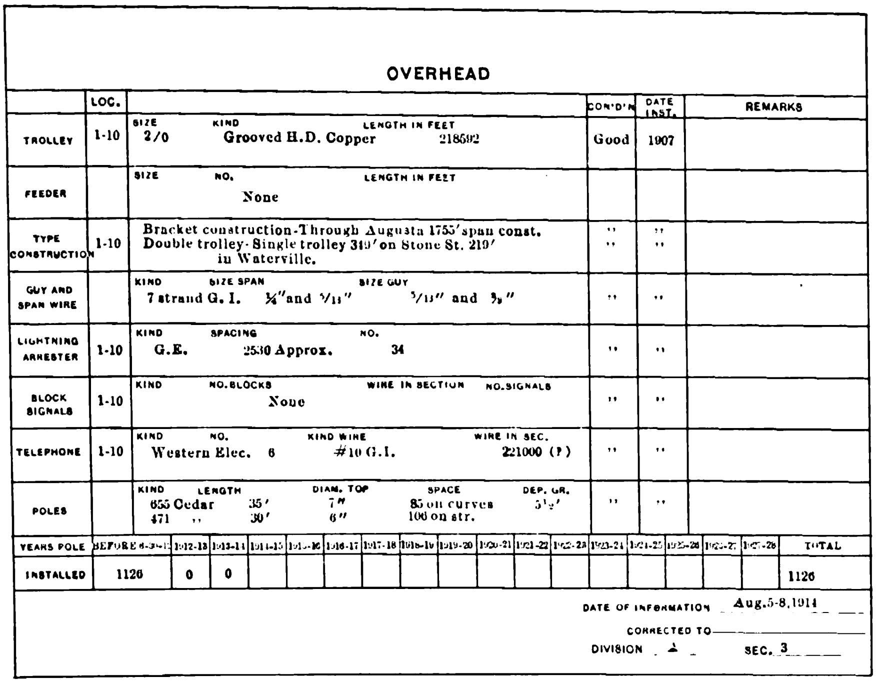
As can be seen from Form No. 1 (reproduced in part), these estimates are made on a regular printed form, which gives in a concise manner the information upon which the estimate is based. The first two columns show the number and kind of material used, and the next three are for the estimated value thereof. Of the latter, the first includes the entire expense that the engineer feels is necessary to maintain this section properly. The second is a résumé of the cost of such estimates for appropriations that he may have asked for in this section. These values are included in the first column, but in the third, which is the net maintenance estimate requested, they are not included. The point is that if appropriations are approved, the last column of the maintenance estimated is in effect, and on the other hand, if the estimated appropriations are not approved, the first column is considered.


MAINTENANCE OF WAY EXPENSES
1
2
3
4
5
6
8
9
24
Total
Fiscal Year
A
B
E
TOTAL
Fiscal Year

SECTIONALIZING WAY COSTS—FORM 2—EXPENSES FOR EACH SECTION OF EACH DIVISION FOR EACH ACCOUNT

It is then the plan to redivide the estimates after approval so that the greatest force and greatest expense can be taken care of during the months that the most work is necessary at the expense of the slacker months, but still maintain an equitable maintenance figure for the entire year.

Before the introduction of this practice a great deal of doubt was felt as to the problem of proper and correct distribution of the accounts. In operation, however, this seems to meet with less trouble than anticipated. We use the Interstate Commerce Commission



OVERHEAD

	LOC.		CON'D'N	DATE INST.	REMARKS
TROLLEY	1-10	SIZE KIND LENGTH IN FEET 2/0 Grooved H.D. Copper 218592	Good	1907	
FEEDER		SIZE NO. LENGTH IN FEET None			
TYPE CONSTRUCTION	1-10	Bracket construction-Through Augusta 1755′ span const. Double trolley-Single trolley 319′ on Stone St. 219′ in Waterville.	″ ″	″ ″	
GUY AND SPAN WIRE		KIND SIZE SPAN SIZE GUY 7 strand G. I. ¼″ and 5/16″ 5/16″ and ⅜″	″	″	
LIGHTNING ARRESTER	1-10	KIND SPACING NO. G.E. 2530 Approx. 34	″	″	
BLOCK SIGNALS	1-10	KIND NO. BLOCKS WIRE IN SECTION NO. SIGNALS None	″	″	
TELEPHONE	1-10	KIND NO. KIND WIRE WIRE IN SEC. Western Elec. 6 #10 G.I. 221000 (?)	″	″	
POLES		KIND LENGTH DIAM. TOP SPACE DEP. GR. 655 Cedar 35′ 7″ 85 on curves 5½′ 471 ″ 30′ 6″ 100 on str.	″	″	

YEARS POLE	BEFORE 6-30-12	1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919-20	1920-21	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28	TOTAL
INSTALLED	1126	0	0															1126

DATE OF INFORMATION Aug. 5-8, 1914
CORRECTED TO
DIVISION A SEC. 3

Electric Ry. Journal

SECTIONALIZING WAY COSTS—FORM 3—DETAIL REPORT OF OVERHEAD CONSTRUCTION OF A GIVEN SECTION

accounting system, and all labor is charged by the foremen and checked by the engineer to its proper account, affixing its proper division letter and section number, as 8 A-3, 15 B-1, etc. The stock is taken care of by the same method. Then at the end of the month the stock amounts are drawn off by the stock clerk, and the total for each account is written in Form 2. Each payroll also is drawn off by the timekeeper. These are then combined and give a total maintenance of way expense for the month, distributed as to the exact location in which the work was done.

SURVEY DATA

In connection with this plan a mileage survey was made of the entire road. As we had no accurate information either in regard to mileage or track and overhead construction to build upon, this survey for its kind was made very extensive. Everything that could be of any possible help or information was located, such as location and kind of lightning arresters, locations and size of culverts, bridges, ends of various sections of rail, kinds of joints and bonds, beginning and ends of feeders. This information was drawn off on a form similar to Forms 3 and 4.

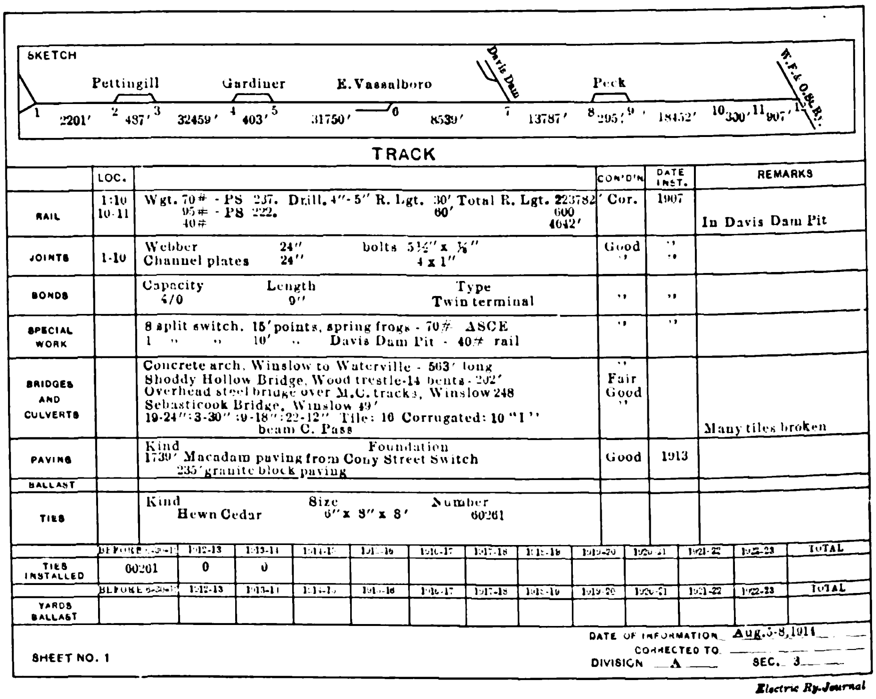
The description is divided into several heads. For instance, "Rail" is one heading, and under that is given the location of each and every section of rail, weight and section number, drilling, rail length, total length of rail, date installed and condition. A sketch at the top of the sheet shows in a general way the location of the several sections under advisement. At the foot of the sheet the yards of ballast and the ties installed are noted each year. I think this latter feature is one that will appeal to nearly every engineer and roadmaster at the very beginning.

On account of the variety of information necessary in some sections, a second sheet was found necessary. That is similar to the first sheet except that the sketch and the form for noting the yards of ballast and ties were omitted.

A somewhat similar sheet was devised for the overhead along the same lines. We also made a sketch on the same-sized paper of each division to show thereon a subdivided section. At the bottom were tabulated the mileage statements, showing the mileage in each division for each section, both in feet and miles, and a total for the division. All of these sheets and sketches are on 8-in. x 11½-in. forms and are bound together in loose-leaf forms as records that will be of incalculable value, and which by careful revision each year can be kept up to date with very little work.

One of the greatest advantages of this system is that it permits the engineer to watch the expenses carefully, particularly on a large road where he cannot often keep in proper touch with each section. With this system, if the monthly statement shows that a section has an undue increase in the expenditures or, by the same token, undue decrease, it is quickly noticeable and the reason thereof can be ascertained. Of course, the reason may be entirely proper, or it may show that unnecessary work is being done at this point. On the other hand, if a section shows that little or no expense has been incurred, it can be carefully examined as to proper maintenance.

I do not think that we have the perfect forms for maintenance records by any means, but I do believe that these forms will find favor with a great many engineers. By their careful revision an engineer can have at his hand at all times a very extensive record of all his track



SKETCH
Pettingill
Gardiner
E. Vassalboro
Davis Dam
Peck
W.F.& O.Ry.
1
2201′
2
487′
3
32459′
4
403′
5
31750′
6
8539′
7
13787′
8
295′
9
18452′
10
300′
11
907′
12

TRACK

	LOC.		CON'D'N	DATE INST.	REMARKS
RAIL	1-10 10-11	Wgt. 70# - PS 237. Drill. 4″-5″ R. Lgt. 30′ Total R. Lgt. 223782′ 95# - PS 222. 60′ 600 40# 4642′	Cor.	1907	In Davis Dam Pit
JOINTS	1-10	Webber 24″ bolts 5½″ x ⅞″ Channel plates 24″ 4 x 1″	Good ″	″ ″	
BONDS		Capacity Length Type 4/0 9″ Twin terminal	″	″	
SPECIAL WORK		8 split switch, 15′ points, spring frogs - 70# ASCE 1 ″ ″ 10′ ″ Davis Dam Pit - 40# rail	″	″	
BRIDGES AND CULVERTS		Concrete arch, Winslow to Waterville - 563′ long Shoddy Hollow Bridge, Wood trestle-14 bents - 202′ Overhead steel bridge over M.C. tracks, Winslow 248 Sebasticook Bridge, Winslow 49′ 19-24″:3-30″:9-18″:22-12″ Tile: 10 Corrugated: 10 "I" beam C. Pass	″ Fair Good ″		Many tiles broken
PAVING		Kind Foundation 1739′ Macadam paving from Cony Street Switch 235′ granite block paving	Good	1913	
BALLAST					
TIES		Kind Size Number Hewn Cedar 6″ x 8″ x 8′ 60261			

	BEFORE 6-30-12	1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919-20	1920-21	1921-22	1922-23	TOTAL
TIES INSTALLED	60261	0	0										

	BEFORE 6-30-12	1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919-20	1920-21	1921-22	1922-23	TOTAL
YARDS BALLAST													

SHEET NO. 1

DATE OF INFORMATION Aug. 5-8, 1914
CORRECTED TO
DIVISION A SEC. 3

Electric Ry. Journal

SECTIONALIZING WAY COSTS—FORM 4—DETAIL REPORT OF TRACK CONSTRUCTION ON A GIVEN SECTION and overhead. I have found it useful in answering little questions that have frequently come up in the short time since we have completed it. I anticipate that the man to follow me will find it of still greater value to him, as he will not have been obliged to compile it from the beginning as I did, and therefore will be familiar with many of the things from memory.

Semaphore with Automatic Whistle to Direct Street Traffic in San Francisco

A semaphore for directing street traffic at busy crossings has been tried out in San Francisco and has been found so successful that three have been ordered for installation on Market Street. The accompanying illustration shows one of the semaphores at Market and Third Streets, San Francisco, arranged for electrical control from the traffic officer's stand at the left of the picture. The arrow shown in this view is three-fifths the size specified after the preliminary trials were completed.

The device consists of a double-pointed arrow bearing the word "stop" on either face, and which can be turned through 90 deg. by a small 110-volt motor mounted in a metal box just above. The motor also operates a police whistle which sounds two blasts as the arrow is turned one way and a single blast when it is returned to the opposite position. When the crossing is to be cleared for the fire department, the arrow is made to revolve continuously and the whistle blows until shut off.

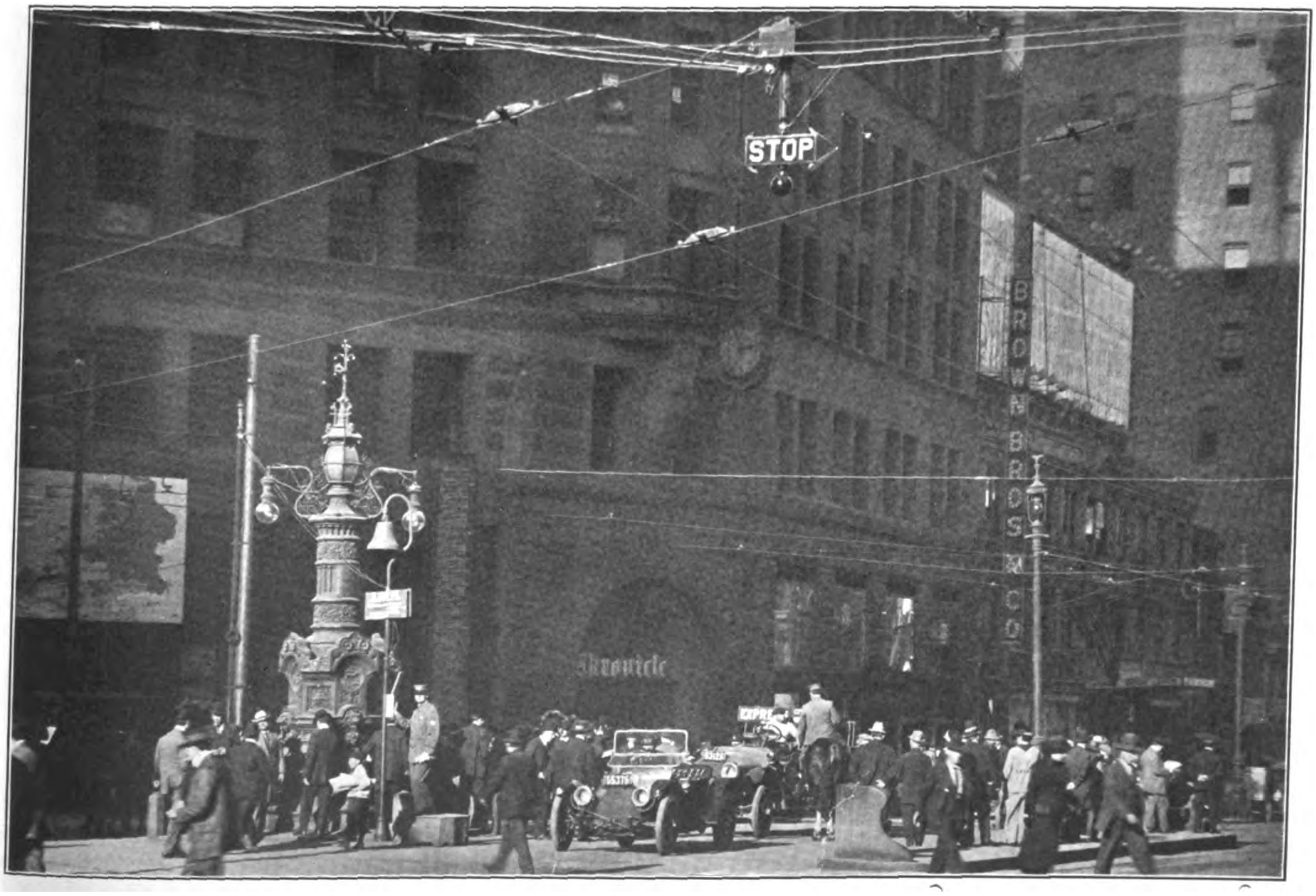
At night the arrow is lighted by two 40-watt tungsten lamps, and a third lamp, located in the red globe below the arrow, is automatically put on the circuit when the alarm signal is given.

The switch box operated by the traffic officer has five controls; two govern the position of the arrow, a third operates the lights, a fourth controls the alarm signal and a fifth raises or lowers shutters to conceal the lettering on the arrow during the night hours when the semaphore is not in use. The arrow is hung so as to be about 2 ft. below the trolley wires, and is supported on small steel cables strung from buildings or poles. The weight of the semaphore complete is about 45 lb. Except for the glass, all exposed parts are made of galvanized iron, and the motor is set on a steel plate which forms the bottom of the box. The arrow in the new semaphores will be 51 in. from tip to tip.

Experience with the device is reported to be very satisfactory. In a very short time drivers of vehicles became accustomed to watching the semaphore, and as its meaning is unmistakable, much confusing is saved It is claimed that it reduces the number of traffic officers required at wide crossings and lends dispatch and safety to traffic movements. The device was invented by B. M. Harris, of San Francisco.

Railroads, Political Demagogues and the Press

The Philistine contained the following in a recent issue: "Railroading is a most exacting business. Sixty-one per cent of the railroads in America, during the past twenty years, have gone bankrupt and have been turned over to the gentle ministrations of the receiver. To succeed, a railroad, even under favorable conditions, must have the hearty good-will and co-operation of the people living along its line. Beyond this its officers must have the confidence and respect of the financial world. Killing the credit of a railroad is like destroying the good name of a woman—it benefits no one. In degree all of the railroads of America are suffering from assaults by the political demagogue and the coyote press."



STREET TRAFFIC SEMAPHORE WITH AUTOMATIC WHISTLE AT SAN FRANCISCO

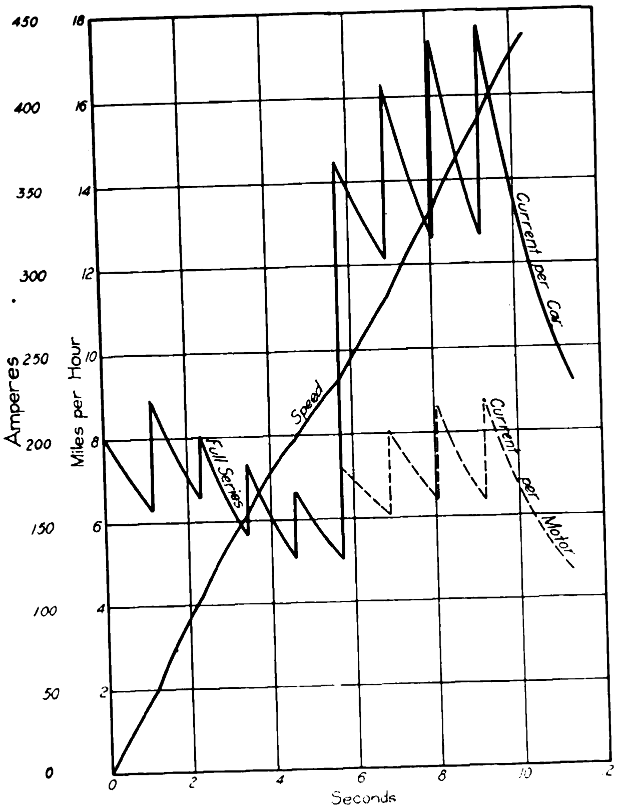
COMMUNICATIONS

Time Element in Controller Notching

University of Illinois
Urbana, Ill., March 26, 1915.

To the Editors:

The writer has been very much interested in the discussion on methods of determining starting resistances for railway motors, which has been carried on in your columns for the past few weeks. The opinion of all the correspondents is that the correct calculation of resistances is very desirable, the differences being mainly in the methods used for arriving at the desired results. That suggested in my article in the issue of Feb. 13, 1915, was brought out principally to present a graphical solution available to anyone who has at his disposal only the manufacturer's characteristic curves for the motor in question. It was not intended to supplant the method given in Mr. Castiglioni's article in the issue of Dec. 26, 1914, where a large number of calculations have to be made, although I believe it can be so used with a comparatively small amount of additional labor.



TIME ELEMENT IN CONTROLLER NOTCHING—IMPROPER OPERATION OF CONTROLLER

The principal difference in the two methods is that by the use of Mr. Castiglioni's charts the proper value of resistance is found as a proportion of the motor resistance, while I find them by determining the $I R$ drop. Certainly it is no more difficult to divide by the current the value of $I R$ drop thus found than to multiply the motor resistance by the proper factor. My method has the further advantage of giving on a single diagram the construction for any value of line potential, so that correction may be made for any line drop which may be met in actual operation. This can be cared for in Mr. Castiglioni's method only by the preparation of separate charts for each value of line voltage by a rather tedious calculation.

When it is desired to adjust the resistances so that the same taps can be used for series and parallel connections of the motors, a certain amount of "juggling" must be done with either method. I cannot see that there is any great difference in making such an adjustment with either diagram. The way of doing this is indicated in the penultimate paragraph of my article.

One point which has not been brought out in the discussion is the determination of the time spent on each point of the controller, to keep the current within the desired limits. If this is done, the lengths of time required for successive steps will be found different. For instance, in the example which I gave, the number of seconds on each step should be as follows:

Notch No.	1	2	3	4	5	6	7	8	9
Seconds	1.32	1.16	0.91	0.72	0.60	1.83	1.49	1.16	Continuous.

If the controller is operated in this manner, the current will vary within the given limits, and the acceleration will be smooth. This method is actually used when a current limit relay is in the circuit to allow the progression of the controller at the proper time, as in some forms of multiple-unit control. When a hand-operated controller is used, it is customary for the motorman to turn his controller handle at a uniform rate, stopping the same length of time on each point. When this is done it is impossible to keep the current exactly within the desired limits. For instance, in the example cited, if the controller handle is turned at a uniform rate, the time on each point will be 1.15 seconds, if the total time of turning the handle is the same as in the automatic operation.

The result is shown in the accompanying diagram. To prevent the occurrence of the current peaks, it is necessary to readjust the resistance taps. Even when this is done, the current cannot be kept to the same value at all points, so that some variation from the predetermined limits must be allowed for. In case the motorman turns his controller handle at some other rate, a different result will be obtained.

I thoroughly agree with Mr. Castiglioni that the proper design of starting resistors is a problem for the engineer, rather than for the superintendent. To state that theory and practice do not agree when applied to the present problem, as is done by one of your correspondents, is but evading the main question. There has been too much of this "near engineering," and, with the introduction of modern methods, it is bound to pass out, as have similar kinds of refined guessing.

A. M. Buck, Assistant Professor
of Railway Electrical Engineering.

[Note. In the discussion of this subject one fact seems to us to have been overlooked, namely, that the curves plotted by Mr. Castiglioni do not require replotting by other users, as they are in terms which apply to any motor under any operating conditions. They were intended to save calculators much tedious slide-rule work just as do logarithmic tables and tables of trigonometric functions.—Eds.]

Locomotive Maintenance Costs

New York, March 31, 1915.

To the Editors:

I note in last week's issue your comparison of maintenance costs between steam locomotives and certain electric locomotives. How did you arrive at the figure of 13½ cents per mile for the steam locomotive? Please state also what you mean by "electric unit." Does this term include only the cost of the locomotive itself, or does it cover the cost of the entire electrical equipment per locomotive, that is to say, the power-house and distribution system? Electrical Engineer.

[Note. The charge for steam-locomotive maintenance to which our correspondent refers was general in character and was based on the costs per locomotive-mile obtaining on a number of the Eastern roads. The figures published in the last report of the Interstate Commerce Commission were used, these being reduced to an equivalent drawbar-pull basis with the 76-ton average adhesion of the New York Central electric locomotives. Thus, in the Interstate Commerce Commission report, the cost of the New York Central steam locomotives, which average 75 tons on the drivers, is given as 12 cents per engine-mile; the New Haven 51-ton locomotives, 10.2 cents; the Pennsylvania Railroad 75-ton locomotives, 13.2 cents, and the Erie 74-ton locomotives, 11.9 cents. The equivalent figures, allowing 10 per cent for the intermittent torque and 2 per cent for the resistance of the tender, are respectively: New York Central, 13.7 cents; New Haven, 17.3 cents; Pennsylvania, 15.1 cents; Erie, 13.9 cents. The saving, at an annual mileage of 36,000 and 10 cents per mile, was calculated to be 8 per cent on $45,000, the cost of a locomotive alone. This figure does not include any investment in the power-generating or distributing systems. If the latter had been considered it would have been necessary also to include the saving in coal, which in one case of electric operation has been reported to be half the entire coal bill.—EDS.]

ASSOCIATION NEWS

COMMITTEE ON COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

The committee has just issued a very attractive booklet designed to interest member companies in the formation of sections. The booklet is novel in make-up and brings together all of the latest information which bears upon the subject of company membership. Some of the successful plans of present company sections are outlined and the benefits to be derived are concisely stated. The booklet is illustrated with thumb-nail portraits and a view of a large company section gathering. Copies can be secured from Secretary Burritt.

MILWAUKEE SECTION

The regular monthly meeting of the Milwaukee Electric Railway & Light Company Section was held on March 26 with a large attendance, the local N. E. L. A. members being guests of the section. Harry G. Abendroth presented a paper on the development of the street railway system of Milwaukee. He traced the history from the day when a street car was as much of a novelty as the jitney bus is in Milwaukee to-day. The paper contained a review of the careers of the several companies operating in the city from 1856 to date, including their corporate organizations, the types of track construction used, etc. The story was given a vital interest by means of illustrations, which included pictures of men who had been prominent in the development of the present system, some of whom are still with the company. Many interesting stories relating to events dating back to the horse car days were related. The information for the paper was collected from persons familiar with the local developments and from the company records.

MANILA SECTION MEETING

The second meeting of joint company section No. 5 was held in Manila on Feb. 9. The novel announcement was made that two papers, for which the topics and speakers were to be selected by the executive council, would be read at each meeting. A resolution of thanks to C. N. Duffy for his efforts in establishing the section was passed, as was also one to C. Loomis Allen, president of the American Electric Railway Association, for a letter of encouragement which was read.

The topic of a paper by E. A. Barretto was "Benefits of Savings Banks to Employees." As the title implies, the paper and the discussion which followed it had to do with the encouragement of saving by company employees, and as a result the speaker agreed to work out the details of a savings system to be reported at the next meeting. Mr. Farrant read a paper recounting the experiences of a recently completed tour around the world.

NATIONAL ELECTRICAL SAFETY CODE

In the current issue of *Electrical World* Dr. E. B. Rosa, chief physicist of the bureau of standards, outlines the present status of the work of the new safety code and the plans for its completion and maintenance. The bureau of standards undertook this work because it is a scientific institution which deals not only with scientific questions but also with engineering and industrial problems and represents the public in the most general sense. Inasmuch as no other national agency seemed likely to take up the work and it appeared to be directly in line with other work which the bureau was doing, a special appropriation was secured from Congress, becoming available on July 1, 1913.

In the preparation of these rules the bureau had the co-operation of interested associations, and many conferences with representatives of these and of operating companies were held. The bureau employs a number of specialists who are devoting themselves to this work.

On Aug. 1, 1914, a circular, No. 49, entitled "Safety Rules to Be Observed in the Operation and Maintenance of Electrical Equipment and Lines," was published in preliminary form and several thousand copies were distributed. Many valuable criticisms have been received and will be considered in the final revision. There will shortly be issued another circular covering construction safety rules and this will be distributed on a large scale also.

A conference on the operating rules was held on March 26 preliminary to the publication of the regular edition, and a general conference will be held in Washington on July 1 and 2 at which the revised rules will be submitted for consideration, modification and ratification. This conference will be asked to approve the appointment of a permanent joint committee to co-operate with and advise the bureau, and to discuss and approve amendments of the code. The bureau will suggest a committee of forty-eight members, possibly made up somewhat as follows: Twelve representatives of state, industrial and public service commissions; six representatives of inspection departments of cities, and three representatives each from the National Association of Municipal Electricians, the International Brotherhood of Electrical Workers, the American Institute of Electrical Engineers, the National Electric Light Association, the American Electric Railway Association, the telephone interests, the National Fire Protection Association, the Workmen's Compensation Service Bureau and the casualty insurance interests, the National Safety Council and the National Bureau of Standards. The organizations mentioned will be asked to appoint delegates to the July conference.

The Commissioner of Bridges has notified the Public Service Commission for the First District of New York that the Manhattan Bridge will be in readiness for the operation of trains from the Fourth Avenue subway by next June. The commissioner will see that the surface railways which now operate over the bridge tracks, intended to be used by the subway, are removed to other tracks.

Equipment and Its Maintenance

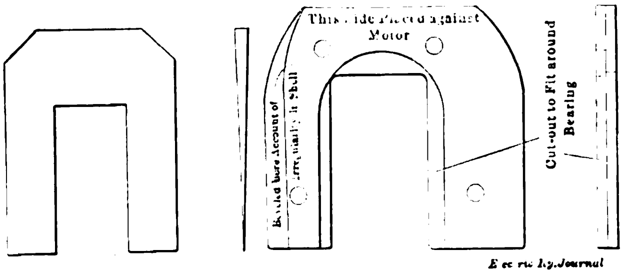
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Points on the Installation and Removal of Pinions—II

BY R. H. PARSONS, ELECTRICAL FOREMAN

Removing Pinions.—The removal of pinions is attended by as little labor and damage as their installation if our friend, heat, is employed. It always has been the practice to use a wedge and sledge for pinion removal. The reasons against using wedges are many, unless these reasons are offset by improvements in the wedges which will protect the other parts of the motor from injury by them. I would recommend the use of the wedge only with the aid of heat, as illustrated in the accompanying sketches.


This Side Placed against Motor
Beveled here Account of Irregularity in Shell
Cut-out to Fit around Bearing
Electric Ry. Journal

FIGS. 1 AND 2—WEDGE WITH DOUBLE SIDES, AND PROTECTION FOR MOTORS WITH BRASS BEARINGS

The original trouble experienced with the wedge was that single wedges were used, one on each side of the pinion. First one side would be driven and then the other until the pinion came off. If the pinion came off easily no harm was done, but if it showed an inclination to cling, something had to give under the heavy hammer blows. A sprung shaft would follow because greater force had been exerted on one side of the pinion than on the other.

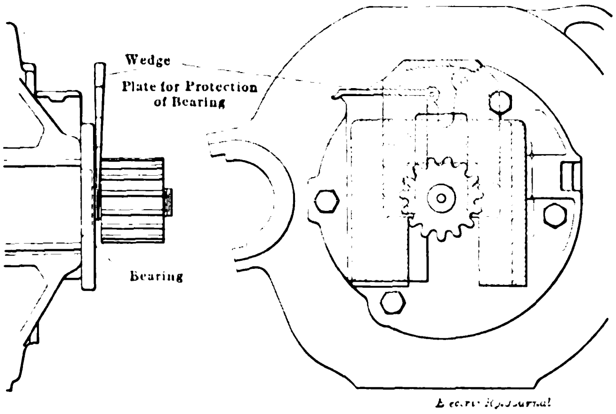


FIG. 3—APPLICATION OF PLATE AND WEDGE FOR REMOVING PINION

The first improved wedge was one made like that shown in Fig. 1. This wedge is double and has a long rather than a short taper. It will give some satisfaction on the older motors where iron bearings are used because the wedge can be placed between the bearing and the pinion. If this wedge is used on a heated pinion a few taps with a light hammer will remove the pinion without damage to adjacent parts.

The newer types of motors on which the better grades of pinions are used have but a slight space between the pinion and frame, and since the bearing is of brass it cannot stand the backing of a wedge. These are the motors, also, which are in service for long periods before overhauling and which have tight pinions. On these motors, therefore, care and judgment are more necessary than ever.

Fig. 2 illustrates a plate which has been designed to rest against the end of the motor frame and to slide down around the bearing. This plate is thick enough to extend slightly nearer the pinion than the bearing, so that the wedge may be used between the plate and the pinion without touching the bearing. Fig. 3 shows how this plate is used. The idea is to make a solid backing for the wedge so that it will not be forced into the bearing or into the oil chamber of the oil well in the housing.

After the plate has been put on over the shaft the wedge is placed into position between the plate and pinion and driven down until all the lost motion has been taken up. The wedge then receives a couple of light blows to create just enough strain on the pinion to aid its removal.

Fig. 4 represents a gas heater and stand with the usual supply of gas and compressed air in one pipe. That part of the pipe which acts as the burner is bent in a circle, with an inside diameter which leaves about 1-in. space around the pinion. The inner circle of the burner is drilled for ⅛-in. holes 1 in. apart through which the air and gas mixture escape, making a solid flame to envelop the pinion completely. This flame is applied to the pinion for about one minute, after which a few sharp blows on the wedge will loosen the pinion enough to permit its removal by hand after the flame has been shut off.

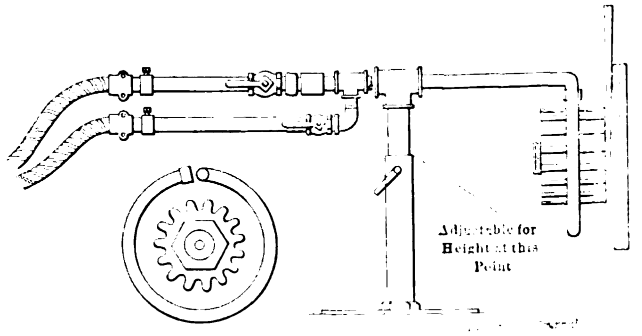


FIG. 4—GAS TORCH FOR HEATING PINIONS ALL AROUND AT ONCE

The whole operation of setting the plate and wedge, getting the gas outfit to the motor, lighting the burner and removing the pinion takes about three minutes, and never more than five minutes. The pinion actually is not heated enough to melt the gear grease thereon, and no damage has been done.

If space allows, after the plate has been placed behind the wedge, a plate of light metal could be inserted between the pinion and the wedge to prevent the teeth of the pinion from cutting the wedge.

It is not necessary to give dimensions for plates and wedges since they must be adapted to the type of motor used, but the same design is applicable to all motors. Where gas is not available oil or gasoline torches can be utilized. The chief care to be exercised is to see that the pinion is not heated at any one spot or to so high a temperature that the heat treatment of the pinion itself is destroyed. To avoid these dangers, a metal sleeve shaped like a pipe should be made to fit over the pinion. The flame should be played on this barrier rather than directly on the pinion. The heat will be conducted around the sleeve and the pinion will soon expand enough to come off easily. If heated too much the shaft begins to heat and expand with the pinion so that all the good of the heating has been destroyed. As for the use of the hammer, a man who removes pinions can tell after the experience of two or three trials just when the pinion has reached that temperature which will permit it to be removed from a shaft that practically is still cold.

The Selection of City Motor Equipment

BY G. W. REMINGTON

A great deal has been written pertaining to the selection of the electrical equipment for city street cars. At the risk of some repetition the writer has prepared these notes in the hope that the subject may, from a somewhat different viewpoint, endow prospective customers with a still greater appreciation of its importance.

It is not possible to place in the order of their relative significance the factors which go to make up the economic selection of the equipment, for the reason that what is of prime importance in one case may be of no great consequence in the next. Thus in frequent-stop service, where the energy per car-mile usually represents a larger proportion of the total operating expense than when the stops are infrequent, the factors which govern this are of relatively greater import. Inasmuch as this is so, factors such as car weights, motor efficiency, type of control, distribution efficiency, etc., have no great significance as comparisons and are of most interest when considered for specific cases.

Such futile phrases as "5 cents per pound per annum," quoted largely a few years ago as the cost of carrying additional weight, and practically all other generalities which may cling in the mind of the prospective purchaser should be forgotten. The selection of the electrical equipment for his cars should be made without attaching much importance to the results obtained on some other road which may, without a critical inspection, appear to be operating under the same conditions.

The following headings cover the points to be kept in mind: (1) Continuity of service; (2) commercial considerations; (3) operating expense; (4) salvage value.

Continuity of Service—The value of an uninterrupted service is indeterminate, as a delay may easily entail many times the cost of repairing the fault which caused the interruption. The effect of service on public confidence has a direct bearing on the very existence of the road through its revenue, and therefore should receive most careful attention. This has been especially true since the advent of the public service commissions, to which the public has easy access for the correction of repeated failures in this respect.

The failures of the electrical equipment may be either mechanical or electrical, and frequently these are so closely associated as to make a correct diagnosis difficult. The selection of additional equipment, which will be most free from failures, obviously depends, however, to a large extent on the accuracy of this diagnosis, thereby assuring that in the endeavor to lessen, for instance, the number of brush-holders destroyed through flashovers, the purchaser may not insist on motors which will "carry 250 per cent load with practically no sparking" if the real reason for past troubles has consisted in the design of the brush-holder springs.

It is the writer's opinion that too little attention is usually given to the keeping of carhouse records of this nature.

Commercial Considerations.—These are meant to include the first cost, terms of payment, guarantees obtainable, diplomatic reasons for placing the order with this or that manufacturer, and deliveries. Any of these may properly result in the selection of apparatus which would not be purchased were the general headings 1, 3 and 4 alone to be considered. It will be appreciated that this, unfortunately, from the standpoint of the operating department, frequently represents 75 per cent of the influence which governs the purchase.

Operating Expense—It will be readily appreciated that a certain total seat-miles which may be required per day can be provided by a number of combinations of schedule speed, headway between cars and seating capacity. On a new electrification a compromise of all of these factors which will best satisfy the demands of the community served is usually made. As the number and size of equipments necessarily vary with these different combinations it will be plain that the platform expense, maintenance and depreciation, and amount of power required will vary also, but as before mentioned these facts must be more or less neglected and a compromise attained.

More frequently new equipment is intended for use on cars which will operate on lines with other cars already running and the schedule speed is therefore fixed by them. It will be assumed that the purchaser has the following information: Weight of car body and trucks; number of trucks; seating capacity of car; diameter of wheel; profile of road; time required for a trip in each direction; number and location of stops in each direction; average duration of each stop; average layover at each end of the line; maximum voltage; average voltage.

It is impossible for the purchaser, without a full knowledge of the resistances, core loss and capacity for heat dissipation of the motor to determine whether the one he may have in mind will perform his work with safe temperature rise. Even with these data at hand and after their correct application it is necessary to make further corrections to take care of the additional ventilation afforded through the motion of the car itself, position of the motors on the car, etc. It is therefore strongly recommended that the customer give the above data to the manufacturer, that they be reduced to a "typical run" which can be made under test conditions for purposes of check by the customer, and that the manufacturer be requested to accompany his quotation with both calculated and guaranteed schedule speed, temperature rise and energy consumption.

The object of requiring both calculated and guaranteed values is plainly to insure that the same leeway or factor of safety is provided by all bidders. The justice of this can be seen after inspecting the speed-time-energy curves shown.

Graph *A* represents a schedule speed of 10.55 m.p.h. (including a ten-second stop) while making seven stops per mile with an 18-ton car. To accomplish this the two motors must be capable of commutating 83 amp each at 600 volts and the energy required is:

Series, 83 amp. × 600 volts × 4.3 sec. = 214,000
Parallel, 166 amp. × 600 volts × 5.3 sec. = 528,000

Total during controller period............ 742,000
During motor curve running............ 593,800

Total for the cycle...................... 1,335,800 watt-sec. or,

$$\frac{1,335,800 \times 5280}{1000 \times 3600 \times 755} = 2.61 \text{ kw-hr. per car-mile.}$$

If the schedule is to be increased 3 per cent. as shown by graph *B* the car must be accelerated at a constant rate of 1.53 m.p.h. per second as before (this being about as fast as practicable) up to a speed of 28 m.p.h., where before it was necessary to maintain this rate only up to 14.6 m.p.h. The commutating capacity of the motors must therefore be increased 92 per cent with a proportional increase in the normal rating of the motors and control, and the energy required becomes:

Series, 160 amp. × 600 volts × 7.8 sec. = 748,000
Parallel, 320 amp. × 600 volts × 8.4 sec. = 1,610,000

Total during controller period........... 2,358,000
During motor curve running............ 0,000,000

Total for the cycle...................... 2,358,000 watt-sec. or,

$$\frac{2,358,000 \times 5280}{1000 \times 3600 \times 755} = 4.57 \text{ kw-hr. per car-mile,}$$

which is equal to an increase of about 75 per cent.

In other words, a small variation in the factor of safety may mean a very large variation in the selling price. It is clear that much responsibility rests on a correct definition of the service actually to be performed as the expense entailed in asking for more than is really required may assume large proportions.

If the additional cost of operating motors too large for the work were limited to the increased interest on the investment it might be condoned as this would be offset in part by decreased maintenance and depreciation due to the lower temperatures reached and the fact that the average motor efficiency, in a cycle like that shown, would be slightly higher. However, considering the increased weight to be carried, more expensive repair parts, etc., it will be found uneconomical, in most cases, to use motors which show a temperature of much under 75 deg. Cent. in continuous service. This refers to motors insulated with cotton, varnished cambric and other vegetable fabrics. If the insulation is mica throughout a higher minimum temperature should be used, probably 85 deg. Cent.

If the cars on which the proposed motors are to be mounted are single truck the customer is relieved from deciding between two and four motors, and his principal aim will be to select a motor of such mechanical design as he can most conveniently handle with his shop equipment.

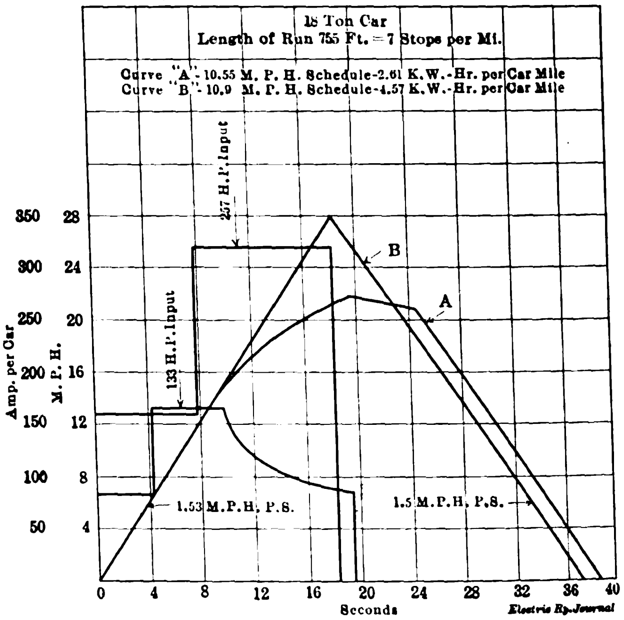
The manufacturer's guarantee of the power which will be required relieves him also of consideration of the weight, except as it may have to do with the effect on the track, breaking of axles, etc. That is to say, it is possible, due to the fact that one motor, through having a slow speed armature and thus capable of being geared to nearer the correct car speed for the work to be done, may be heavier than another and still require less power per car-mile. In this case the decreased cost of power must be balanced against the increased cost in other regards.

If the car is double truck and permits the use of a four-motor equipment, the following disadvantages will usually be found as compared to a two motor: Greater first cost; more car wiring and motors to inspect and maintain; more controller, gear, pinion and gear case maintenance, and greater total weight. These are offset wholly or in part by more even distribution of weight on the track, less liability of wheel slippage under extreme conditions of grade or bad track, and lighter parts to handle.

Depreciation and Salvage Value—Of the five factors which go to make up depreciation (obsolescence, deterioration, loss of useful association, inadequacy and fall in prices) deterioration is practically negligible, there being few if any parts of a railway motor which actually wear beyond repair.

A few years ago the mechanical design of several motors in the market was such that when subjected to continual vibration certain bearing surfaces on the frame, bearing housings, etc., would peen out to the impairment of their life. Various types of gear cases and the methods of suspending them were also such as to result in very short life. However, in practically every case where there is any marked deterioration it will be found chargeable to some radical design, mistakenly instituted as an improvement or to satisfy the demand of the customer.

Virtually all of the depreciation of the motor consists of obsolescence, probably not 1 per cent of the motors sold being retired on any other account. It would therefore appear that the depreciation can best be controlled by the selection of motors embodying, in the way of ventilation and mechanical construction, the latest features which may have demonstrated their virtue by actual use, even though this may entail some sacrifice in the way of interchangeability.



SPEED-TIME CURRENT CURVES SHOWING HEAVY INCREASE IN ENERGY FOR SLIGHT INCREASE IN SPEED

Other things being equal, the motors which will have the greatest salvage value will be those with no radical features of design, as they thus more readily find a market for future use as motors and reach that market without great depreciation. If the salvage value consists of the scrap value it is obvious that the motor should contain as much copper and brass as possible, but as the salvage value is small at best it does not deserve much consideration.

CONCLUSION

There are then no general rules for the selection of the motor equipment. It is possible to say that "other things being equal" the slowest maximum speed consistent with the schedule speed desired should be used, as this condition represents the smallest energy consumption, which is always a large item in the cost of operation. Numerous other similar statements could be made with this qualification, but with the many variables involved "other things" never are equal and the equipment must therefore always be selected to suit specific conditions.

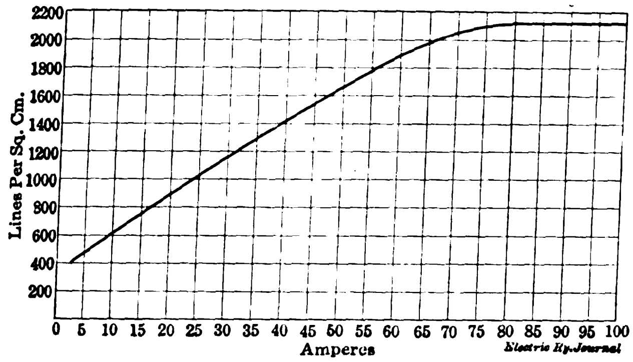
Equipment Defects—Controller Blow-Out Coils—III

BY C. W. SQUIER, E. E.

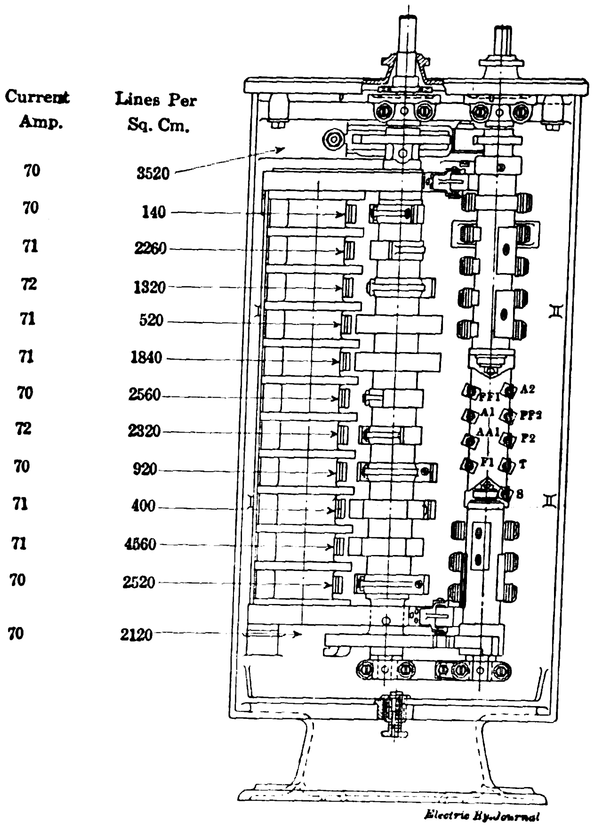
Magnetic Flux Distribution.—To illustrate more fully the distribution of the magnetic flux in controllers with the various types of blow-out coils discussed in previous articles, the accompanying controller illustrations with tables are presented to show the results of some tests of flux densities made on five different types of controllers. A careful comparison of the figures will show how the flux varies at different points in the same controller and also how the different types of blow-out affect the flux density at the contacts.

The figures obtained for the B-18 and Westinghouse No. 210 controllers show how the flux density decreases with the distance away from the coil where a single blow-out coil located some distance away from the contacts is used. Thus in the B-18 controller 4000 lines per square centimeter were found at the contacts nearest the blow-out coil and the flux at the contacts on the same side of the controller gradually decreased until at the top contacts but 1800 lines per square centimeter were found. A still greater variation was found in the No. 210 controller which showed 2120 lines per square centimeter for contacts adjacent to the blow-out coil, and this decreased to 360 lines per square centimeter at the top of the controller.

The uniformity of flux obtained by using a long coil extending the entire length of the contacts is clearly shown by the results obtained with the H1A and T1A controllers which have pole-piece blow-out and field-type blow-out respectively. There is, however, a slight decrease in the flux density at the center of the controller as compared with the ends.

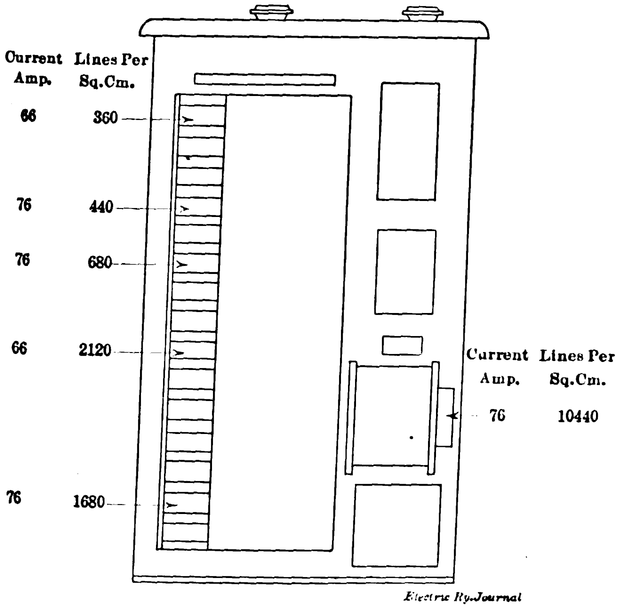


SATURATION CURVE OF T1A CONTROLLER TAKEN OVER CENTER FINGER LEFT-HAND SIDE



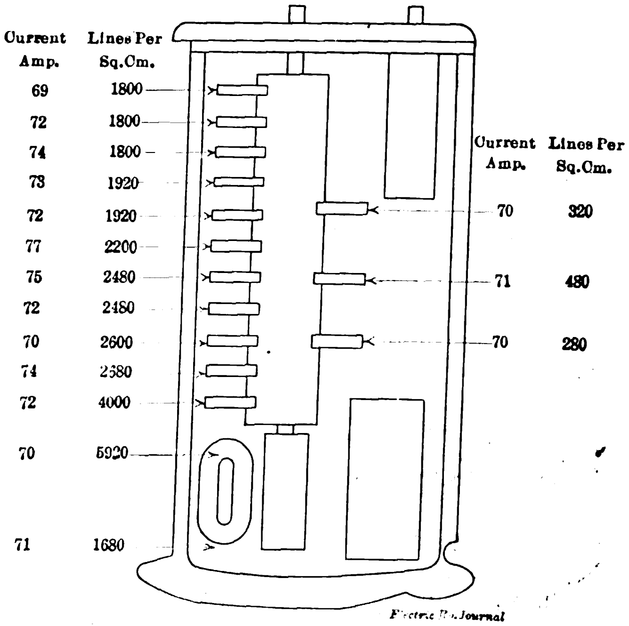
Current Amp.
Lines Per Sq. Cm.
70 3520
70 140
71 2260
72 1320
71 520
71 1840
70 2560
72 2320
70 920
71 400
71 4560
70 2520
70 2120
A2
PP1
A1
PP2
AA1
P2
F1
T
8
Electric Ry. Journal

FLUX DENSITY DB1 CONTROLLER WITH METALLIC SHIELD BLOW-OUT



Current Amp.
Lines Per Sq.Cm.
66 360
76 440
76 680
66 2120
76 1680
Current Amp.
Lines Per Sq.Cm.
76 10440
Electric Ry. Journal

FLUX DENSITY NO. 210 CONTROLLER WITH DIRECT FLUX BLOW-OUT



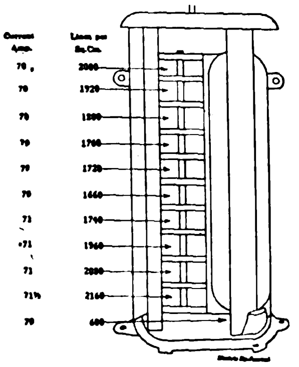
Current Amp.
Lines Per Sq.Cm.
69 1800
72 1800
74 1800
73 1920
72 1920
77 2200
75 2480
72 2480
70 2600
74 2580
72 4000
70 5920
71 1680
Current Amp.
Lines Per Sq.Cm.
70 320
71 480
70 280
Electric Ry. Journal

FLUX DENSITY B-18 CONTROLLER WITH 4000 LINES PER SQ. CM. AT CONTACTS NEAREST THE BLOW-OUT COIL

The results obtained with the metallic-shield type of blow-out used in the Dick-Kerr controller show a great irregularity of flux due to the number of poles used.

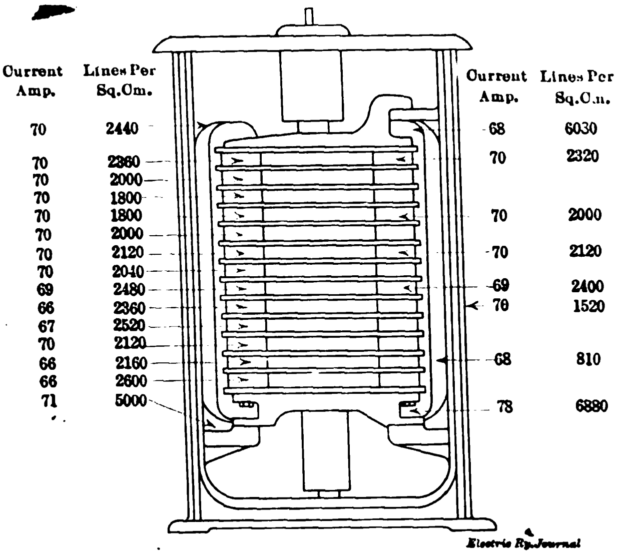
SATURATION OF THE IRON IN POLE PIECES

In connection with these tests a great number and variety of saturation curves were also made from the



FLUX DENSITY OF H1A CONTROLLER

results obtained. These curves show how the flux density increases with the current up to the saturation of the cores and pole pieces. One of these curves representing the center contacts of the T1A controller is shown in an accompanying illustration. It is seen from this curve that the number of lines of force increased with the current up to 80 amp, the saturation point, after which the magnetic flux remained constant despite an increase in the current. This would indicate that even though the contacts were designed to carry without danger a much larger current the ability of the controller to open the circuit safely and to blow out the arc is limited by the saturation of the iron in the magnetic circuit.



FLUX DENSITY T1A CONTROLLER, SHOWING UNIFORMITY ALONG ENTIRE LENGTH OF CONTACTS

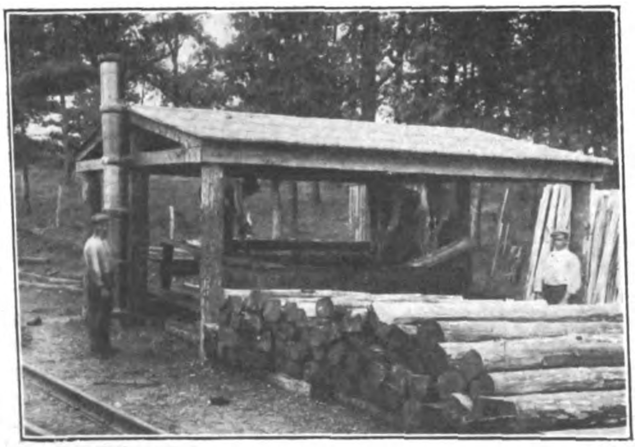
David W. Cade, one of the oldest employees of the Louisville & Northern Railway & Light Company in point of service, died recently at the age of sixty-five years, having been 27 years in the employ of the company or its predecessors. He entered the service in 1888 as a mule car driver.

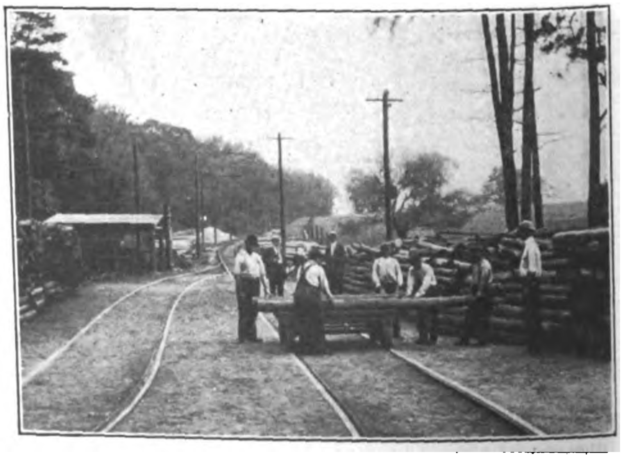
Tie Treating on the Boston & Worcester Street Railway

About three years ago the Boston & Worcester Street Railway erected a tie-treating plant at Natick Junction, Mass., to treat ties with anthracine oil. This plant is illustrated in the accompanying halftones. On this system the ties consist of local chestnut and red oak. The standard size is 6 in. x 8 in. x 8 ft., and the price about 50 cents each in the rough. Of these ties 27,582 were treated at Natick Junction in 1913 at an average cost of 17.6 cents each.

The general arrangements of the plant in relation to the storage yard and of the treating plant itself are shown in the illustrations. The untreated ties were stored on one side of the plant after peeling and shaving. They were transferred to the treating tank on a Buda hand car, provided with ½-in. x 2½-in. steel reinforcing strips at the sides in place of the usual oak strips. The cost of removing the outer bark was considered a maintenance charge and was not debited against the treating process, although a transportation charge for tie shifting in the yard was included. The treatment consisted of a five-minute immersion in a 10-ft. x 5-ft. 6-in. x 30-in. steel tank, ¼ in. thick, mounted under a shelter on a 4-ft. x 2-ft. x 10-ft. firebox of paving blocks. The tank was provided with a cover reinforced with steel tees so that ties after treatment could be placed upon it for draining. The shelter, which was 8 ft. high, consisted of matched roofing supported on six old 8-in. feeder poles from 12 ft. to 20 ft. long and connected by 2-in. x 8-in. cross pieces. The firebox was equipped with a 10-in. tile smokepipe, and culls from the tie yard were used as fuel.

The cost of the tank was about $135, exclusive of labor, and the first cost of the entire installation was about $200. In its operation two men removed the ties from the flat car and they were lowered into the tank with the aid of a foreman holding a pike. "Letteney" preservative was used. The tests showed that the ties absorbed virtually as much oil in a five-minute dipping as in an immersion of forty-eight hours. The capacity of the tank was five ties, and the plant sometimes treated from 1500 to 1800 ties per week, although its full capacity was about 500 ties per eight-hour day. The ties were removed by two men with tongs, and after drying for forty-eight hours were ready for service. When dry they were of a reddish-brown or mahogany color. A daily record of the work was kept on a form like that illustrated herewith, which showed that, on an average, each tie consumed 1 qt. of oil, with the temperature ranging from about 98 deg. to 110 deg. Cent. The foreman, who also acted as fireman, was paid $2 a day; tie handlers were paid $1.75





TREATING 30,000 TIES ON THE BOSTON & WORCESTER STREET RAILWAY a day, and the general foreman in charge of the yard was paid $2.25 a day. Five men were at work constantly and two helpers put in part time.

At present two methods of timber treatment are used. Both are applications of coal-tar distillates, the one being applied by high pressure in hermetically sealed cylinders, and the other an "open tank" process. The pressure process requires expensive apparatus, and a large outlay for labor and freight. As the installation cost of the equipment is too great to admit of transportation to individual localities, it must be permanently located at the point most convenient for the supply of material and the delivery of the finished product. This treatment uses a cheap grade of oil known as creosote which, if heated to 315 deg. Cent., will leave a residue of less than 25 per cent. The open-tank treatment, on the other hand, uses a distillate known as anthracine oil, which, if heated to the same temperature, leaves a residue of about 80 per cent.

Anthracine oil is the last fraction of coal tar to distill over, beginning at 270 deg. Cent. and continuing to the end of distillation. Its use in America has been mainly in proprietary articles such as carbolineum and various wood preservers of high quality. In the application of anthracine oil, steaming of the tie with subsequent forcing in of the oil at excessive pressures is not required. The average absorption of air dried timber is ample for preservation. This oil has been used extensively for more than twenty years by railroads entering New York and other coast cities on their floating equipment, wharves, station platforms, bridges, fence posts, poles, etc. Specifications for it have been issued by the American Railway Engineering Association.

When the Natick Junction plant was first put in service the railway had examined a number of untreated oak ties in the ground at Southboro. After about eight months' service these untreated ties were so far decayed that the ends could be taken off. Some 600 were on hand when the plant was started, and in June, 1913, a number of these were treated with "Letteney" preservative, and are now in virtually as good condition as then. It has been found that the treatment at least doubles and probably triples the life of the tie.

The preservative was supplied by the Northeastern Company, Boston, Mass., and the plant was designed by E. H. Howard, civil engineer, Framingham, Mass. The Northeastern Company has recently made a contract with the Portsmouth Street Railway & Light Company, Portsmouth, Ohio, for the open-tank treatment of 55,000 ties and has contracted with the Lexington Traction & Terminal Company, Lexington, Ky., for a year's supply. The cost is about 50 cents per gallon, with reductions according to quantity. The Denver City Tramway, Public Service Corporation of New Jersey, Utah Railway, Light & Power Company, Galveston Electric Company, Houston Electric Company, Union Street Railway Company, New Bedford, Mass., and others have recently used the open-tank treatment.

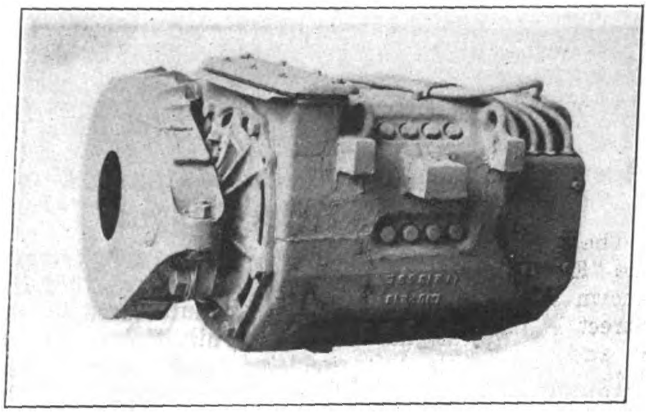
BOSTON & WORCESTER STREET RAILWAY COMPANY SPECIAL TREATED-TIE REPORT

Date.................. Weather.................. Temperature..........
Location of plant..
Number of ties treated..
Number of ties prepared..
Approximate number oak ties treated.... Chestnut ties treated....
Depth of oil center of tank at 7:00 a.m..........................
Depth of oil center of tank at 5:30 p.m..........................
Temperature of oil in tank, morning..........................
Temperature of oil in tank, afternoon..........................
Labor foreman..
Labor fireman..
Labor hauling ties to and from tank..........................
Labor dipping ties..
Labor shaving ties..
Labor stripping off bark..
Length of time ties have been cut before treating..........
Remarks:

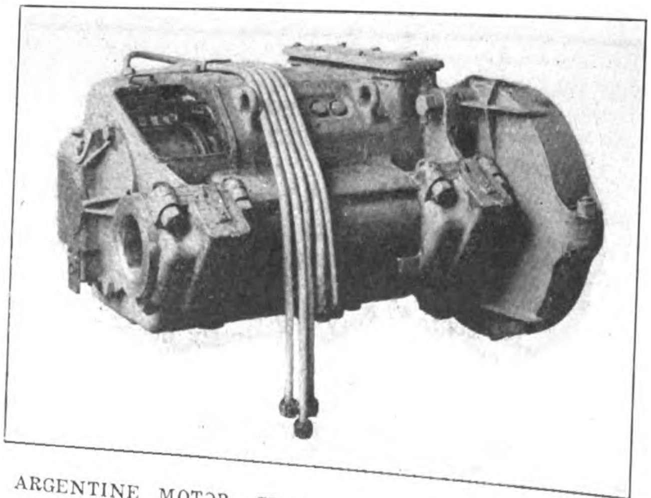
Signed..

High-Tension D.C. Tap-Field Motors for the Central Argentine Railway

The contract for the Central Argentine Railway of South America, which the British Thomson-Houston Company, Ltd., Rugby, England, has nearly completed, comprises two-motor, four-motor and trailer equipments, the coaches for which will have a motorman's cab at each end. The equipment consists of railway motors, master controllers, contractors, and auxiliary parts for automatic control, switch panels, etc., also all electrical details in connection with vacuum brakes, ventilating and lighting systems.


ARGENTINE MOTOR—SEEN FROM PINION END

These motors are for use on an 850-volt continuous-current system, and are rated at 250-hp each. In view of the high speeds which are required for operating express trains, these motors are arranged for tap-field control, enabling speeds up to 65 m.p.h. to be obtained. Efficient ventilation is provided by a fan attached to the armature, which draws air through a screened inlet over the armature and back through longitudinal ducts in the core, insuring uniform radiation of heat and the elimination of hot spots. In this way the radial ducts, which are used in the ordinary type of armature, are eliminated, making it possible to build a much tighter core and to protect completely the armature coils on the under side. The armature coils are insulated with mica, this material being used wherever possible throughout the motor. The field windings consist of copper strip insulated with asbestos and impregnated, any movement or chafing being effectually prevented by spring flanges which hold the coils in position. All external leads from the motors are incased in flexible metallic tubing, thus effectively


ARGENTINE MOTOR—SEEN FROM COMMUTATOR END

protecting the insulation from injury. The axle bearings are fitted with heavy gun-metal linings, while the armature bearing linings are of gun-metal lined with babbitt. That part of the axle between the bearings is inclosed by a dust guard, a dust cap being also fitted to the armature shaft bearing at the commutator end. The gear case is of strongly-ribbed, malleable iron, arranged for three-point suspension.

The pinion is cut from a solid forging of high-grade steel and subsequently oil-tempered. It is shrunk on the shaft and retained in position by a nut fitted with a lock washer which engages with a slot on the pinion face. The gear wheel consists of a rim of high-grade oil-tempered steel shrunk on to a cast steel center.

Electric Service Supplies Company Controls the "Reliable" Signal

The Electric Service Supplies Company now controls the "Electric Service" automatic block signal, formerly known as the "Reliable" signal, manufactured by the Street Railway Signal Company, Philadelphia, Pa. It is announced that this exclusive control was entered into only after very searching investigations into the reliability and dependability of this signal. It was found that installations that had been in service for some time showed records of performance approached by no other contactor type of signal; that operation with speeds of from 40 to 60 m.p.h. was an entire success; that the contactors, which are mechanical and directional in operation, were absolutely dependable and worked equally well with cars running at high or low speed.

The signals, as is well known, were the first to conform to the official A. E. R. A. aspects, giving indications thus:

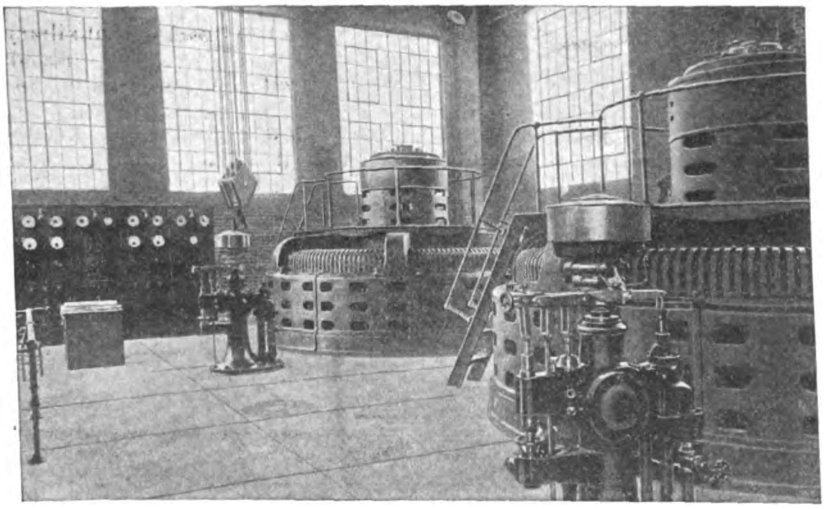
A green light—allowing car to proceed.

A red light—bringing car to stop because of occupied block.

A red and yellow light—permissive signal allowing car to proceed if green light changes to these colors when car passes contactor.

A red and green light—showing the following car that the block is occupied by a car running in same direction and allowing the following car to proceed if the yellow light changes to the opposite side of red when the car passes the contactor.

Their construction and operation are so arranged that any unusual car or train movements will be taken care of perfectly. H. R. Stadelman, formerly secretary of the Street Railway Signal Company, has been retained as signal engineer by the Electric Service Supplies Company, to which all correspondence relative to signaling work should now be addressed.



TWO 1875 KVA, VERTICAL WATERWHEEL-DRIVEN UNITS WITH DIRECT-CONNECTED EXCITERS, NORTH CAROLINA POWER COMPANY, ASHEVILLE, N. C.

Direct-Connected Exciters

The present tendency in power plant design is to lay out the station as a number of independent units, so that trouble on part of the system will not cause a shut-down of feeders and apparatus other than those directly affected. This trend is especially noticeable in hydro-electric plants where the energy is used over a wide territory via long transmission lines which are particularly liable to trouble. To render each generator unit independent, many engineers favor the use of individual exciters, each connected to its own generator.

The Westinghouse Electric & Manufacturing Company has perfected a line of exciters especially adapted for such service. The chief point urged against direct connection is that trouble in the exciter necessitates shutting down the generating unit unless leads are provided for exciting the generator from some other exciter unit. Hence reliability is the primary requirement in exciters designed for direct connection. It is stated that the company's designers have fully recognized this fact, the exciters being characterized by rugged construction and great overload capacity. While the exciters generally are built especially for the particular generator to which they are to be attached, their details of design and construction are similar to this company's standard engine and belt-driven d.c. generators.

Several methods of mounting the exciter are employed. In the case of a vertical generator the exciter is carried by the thrust-bearing bracket. With a horizontal generator, the exciter frame may be mounted on an extension of the generator bed plate, on a bracket attached to the bearing pedestal, or on a separate base.

The use of the direct-connected exciter has the following advantages: Each generator is dependent only upon its individual exciter, the number of plant auxiliaries is reduced, rheostat losses tend to be less, belt troubles are eliminated and a compact appearance is secured.

In addition to the advantages of greater freedom from trouble, etc., it is frequently true that an outfit of direct-connected exciters will be cheaper than any other arrangement. This is particularly the case in hydro-electric plants where other arrangements, affording equal independence, entail a much greater first cost.

Interurban Zone Fare Register

In the article published on page 593 of the issue of March 20 describing a double fare register adapted for city and zone operation, made by the New Haven Trolley Supply Company, the view published showed the company's double register for city service alone. The general external appearance of the two registers, in fact, is exactly the same except that the direction indicator of the city register shows only "in" and "out" signs, whereas in the interurban register these indications are replaced by the numbers of the successive zones.

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Maryland.—Crossing Other Railroads—Determination of Right—Power of Public Service Commission.

The statute creating the Public Service Commission and the amendments thereto have not taken away the right of a railroad company to condemn a crossing over another road. (City & Suburban R. Co. v. Washington, W. & G. R. Co., 87 Atlantic Rep., 834.)

Michigan.—Street Railway Franchise—Revocability.

A street railway permit or franchise which was revocable at the pleasure of the city, as required by Const. Art. 8, Sec. 25, but which fixed no definite term for its expiration if not revoked, did not conflict with Const. Art. 8, Sec. 29, prohibiting the granting of a franchise for a longer period than thirty years, since, in the absence of a limitation in the grant, it must be assumed that it cannot extend beyond the term fixed by the constitution.

A provision in a street railway permit that, in case the city should engage in municipal ownership and operation of street railroads, it should purchase the tracks and equipment at a price to be fixed by agreement or arbitration is not a limitation upon the power retained by the city in the permit to revoke the permit, and therefore the provision is not contrary to Const. Art. 8, Sec. 25, prohibiting the granting of franchises which are not revocable by the municipality. (Peck et al. v. Detroit United Ry. et al., 146 Northwestern Rep., 978.)

New York.—Refund of Money Paid for Instruction by Discharged Employee.

An application for the employment of a street car conductor provided that, in the event of his leaving the services for any reason whatever within six months, the money paid him for work under instruction while on trial should be deducted from such moneys as should be due from the company on the date of his "leaving." Held, that the word "leaving" meant to quit or depart, implying volition on the part of the person leaving, and limited the forfeiture of the instruction wages to a case where plaintiff left defendant's employ of his own volition, nor was such instruction affected by the words, "for any reason whatsoever." (Muesling v. International Ry. Co., 147 New York Sup., 177.)

Oregon.—Eminent Domain—Remedy of Owner—Punitive Damages.

One who goes without the owner's consent upon another's land and appropriates a part thereof and changes its physical features, as by making a railroad cut contrary to the owner's wish, may be held liable in punitive damages. (Kingsley v. United Rys. Co., 133 Pacific Rep., 786.)

Tennessee.—No Contempt for Injunction on Speed of Cars.

Where a temporary injunction issued to restrain a railroad company from condemning a right-of-way immediately in front of complainant's residence was dismissed on stipulation, which provided that both parties should apply for a dismissal, and that the road should be constructed in a certain manner and the trains operated at less than a certain rate of speed, the officers of the railroad company cannot be proceeded against as for contempt for violation of the injunction because they operated the trains at a greater rate of speed. (Caldwell v. Nashville Interurban Ry. Co. et al., 164 Southwestern Rep. 774.)

Washington.—Power of Regulation by Municipality Disappears After Appointment of State Public Service Commission.

Public Service Commission law (law 1911, Chap. 117) declares that the term "common carrier" shall include street railroads; that the term "transportation of persons" includes any service in connection with the carriage of persons, the term "service" being used in its broadest sense; that whenever the Public Service Commission shall find that the rules of any common carrier as to transportation are unjust or insufficient, it shall determine reasonable and just rules, and that a complaint may be made by any individuals or body politic, or municipal corporation. Const. Art. 11, Secs. 10 and 11, authorize municipalities of a certain size to form their own charter and to exercise police power, not in conflict with the general laws. Held, that as the statute expressly applies to street railways, and authorizes action by the Public Service Commission on the petition of municipalities, a municipality is, since its enactment, precluded from further regulation of a street railroad in its borders, even though the commission has not acted. (Seattle Electric Co. v. City of Seattle et al., 138 Pacific Rep., 892.)

LIABILITY FOR NEGLIGENCE

Alabama.—Collision with Unregistered Automobile.

In an action for injuries to an automobile in collision with a street car, whether the machine was or was not registered in compliance with the criminal laws of the state was immaterial. (Birmingham Ry., Light & Power Co. v. Ætna Accident & Liability Co., 64 Southern Rep., 44.)

Illinois.—Crossing Accident—Care Required.

While a traveler approaching a railroad crossing is required to use ordinary care to avoid being struck by a train, and this usually demands the use of the faculties of sight and hearing, a failure to look and listen does not bar a recovery as a matter of law, but is usually a question of fact which the jury may consider in determining whether ordinary care has been exercised. (Gibbons v. Aurora, E. & C. R. Co., 104 Northeastern Rep., 1064.)

Louisiana.—Abuse of Street Car Passenger—Right of Action.

Where a conductor charges such passenger in the following language, "You want to beat somebody out of a nickel; you want to cheat me out of a nickel," he humiliates and mortifies him in his own eyes, and damages will be allowed therefor. (Carter v. New Orleans Ry. & Light Co., 65 Southern Rep., 16.)

Louisiana.—Right-of-Way in Center of Street Liable for Paving Assessment.

Land held in private ownership, running through the middle of a street, with a roadway on either side, in a city having a population exceeding 10,000 (New Orleans excepted) is subject to local assessments for paving as "abutting" property, under Act No. 10 of 1896. (City of Shreveport v. Shreveport Traction Co., 64 Southern Rep., 414.)

Massachusetts.—Garnishment of Goods in Transit—Carrier Not Liable.

A carrier, having property in its possession in actual transit, may be charged as trustee or garnishee, and the property reached thereby by the creditors of the owner of consignee.

A carrier, surrendering in good faith and without negligence goods taken under a valid legal process issued against the owner, is excused from further liability. (Clifford v. Brockton Transp. Co., 101 Northeastern Rep., 1093.)

Massachusetts.—Passenger Walking Along Running Board of Open Car Not Negligent.

When plaintiff boarded a street car, it seemed to be full. He stood for a few seconds on the running board at about the middle of the right side, and then walked slowly and carefully along the running board while the car was in motion toward a vacant place which he saw in the second seat from the front, and with one hand on one stanchion and the other hand on another was in the act of stepping into the car to take the seat when he was thrown therefrom. Held, that he was not negligent as a matter of law in walking along the running board under such circumstances. (Holliday v. Boston Elevated Ry. Co., 101 Northeastern Rep., 1074.)

Massachusetts.—Liability for Cause of Death in Case of Person with Incurable Disease.

Under St. 1907, Chap. 392, a street railway corporation which negligently causes the death of a passenger, shall be punished by a fine recoverable by indictment, to be paid to the executor or administrator, and it shall also be liable in damages assessed with reference to the degree of its culpability, recoverable in an action of tort by the executor or administrator. Held, that damages are recoverable for the death of a person afflicted with Bright's disease, which continued from the time of the accident and was a contributing cause to the death, occurring about seven months thereafter, where the death was hastened or caused sooner than it would otherwise have occurred by an accident caused by negligence, since such was the rule at common law on an indictment, and the act for which the action of tort lies is the same as that for which an indictment will lie. (Wiemert v. Boston Elevated Ry., 104 Northeastern Rep., 360.)

Massachusetts.—Injuries to Passenger—Negligence.

Where a street car passenger standing on the rear platform fell off the car while running at 7 or 8 m.p.h. along a straight track and there was no evidence of any jolt or jar, or of negligent starting or stopping of the car, there was no actionable negligence of the street railway company. (Slotofski v. Boston Elevated Ry. Co., 102 N. E. Rep., 418.)

Massachusetts.—Starting Bell Rung by Unauthorized Person.

Where a street car was started in response to a signal while plaintiffs were preparing to alight, the fact of the ringing of the bell warranted an inference that it was sounded by or by the authority of the servants in charge. The conductor admitted that while the signal to stop was sounded by an unauthorized person, he took no precaution to prevent the ringing of the starting bell by an intermeddler. (Sholsberg v. Boston & N. St. Ry. Co., 103 N. E. Rep., 634.)

Massachusetts.—Contributory Negligence of Plaintiff Not Bar to Recovery in Some Cases.

Where the motorman of a street car negligently drove the car rapidly so close to a team carrying a projecting pole that any movement of the team out of a straight line would cause the pole to strike passengers, as it did, the fact that the driver of the team was also negligent did not relieve the railway company of liability. (Anderson v. Old Colony St. Ry. Co., 101 Northeastern Rep., 1072.)

Michigan.—Care Required as to Defects in Street.

Where a public street, because of repairs, was badly torn up, so that it was difficult for vehicles to cross the car tracks, both the driver of a vehicle and the motorman were bound to use additional care to avoid an accident. (Rahaley v. Detroit United Ry., 142 Northwestern Rep., 1100.)

Missouri.—Master and Servant—Liability for Injuries to Pit Man.

An employee in a carhouse, who had been working in a pit under a track, and who knew that the operator of a car on such track knew that he was in the pit, was not negligent, as a matter of law, in failing to keep a constant watch for the car as he gathered his tools and left the pit by a ladder or stairway, as he could rely in some degree on the car not coming back without warning. (Stockton v. Metropolitan St. Ry. Co., 164 Southwestern Rep., 177.)

Missouri.—Damages Not Reduced Because Poor Health Increased Injuries.

The fact that the physical condition or health of one street railway passenger, injured in a derailment, is such that she received a more serious injury than she would have received had she been in better health, or than another passenger in better health would have received, is not a defense to an action for such damages, or a ground for reducing the damages recoverable. (Patterson v. Springfield Traction Co., 163 Southwestern Rep., 956.)

Oregon.—Damages Under Employers' Liability Act.

Under employers' liability act (laws of 1911, page 16), Sec. 1, requiring persons or corporations engaged in the manufacture, transmission, or use of electricity to use every precaution practicable for the safety of employees, and Sec. 4, providing that, if there shall be any loss of life by reason of the neglect of provisions of the act by any person liable thereunder, the heirs shall have a right of action, without any limit as to the amount of damages, while the beneficiary may recover any money loss, including the value of services during minority and the benefits reasonably to be expected therefrom, there can be no recovery for loss of comfort, society, and protection of the decedent. (McFarland v. Oregon Electric Ry. Co., 138 Pacific Rep., 458.)

Pennsylvania.—Violent Ringing of Gong Sometimes Negligence.

While it is a motorman's duty to ring his gong with emphasis on proper occasions, it may be negligence to ring it violently and unnecessarily in proximity to a frightened horse, whose condition is manifest. (Lapsley v. Pittsburgh Rys. Co., 89 Atlantic Rep., 874.)

Pennsylvania.—Torts of Servant—Scope of Employment.

Where a motorman was riding on a trolley car as a passenger during a strike, and was doing no act on behalf of the company, and shot plaintiff from the rear platform, and there was no evidence that in firing the shot he was acting for the company, it was not liable for the resulting injuries. (Drexler v. Philadelphia Rapid Transit Co., 90 Atlantic Rep., 452.)

Washington.—Injuries to Animals—Measure of Damages.

In case of an injury to an animal, the measure of damages is the difference in value before and after the injury, and expenses incurred, provided the total damages do not exceed the original value, but if an animal is injured and expenses of treatment are reasonably incurred under the belief that the animal may be cured, such expenses in case of its death, together with the actual value of the animal, may be recovered. (Douglass v. Seattle Electric Co., 132 Pacific Rep., 230.)

Washington.—Care Required in Removing Automobile from Track.

A street railroad, in an attempt to remove an automobile partly overturned on its track and obstructing traffic, with the consent of the owner's agent, owed the owner no duty further than to exercise due care. (Augerson v. Seattle Electric Co., 132 Pacific Rep., 223.)

Washington.—Termination of Relation of Passenger and Carrier—Injury to Pedestrian from Overhanging Platform on Curve.

Plaintiffs and others alighted from a street car on a planked roadway running parallel with the street car track and passed to the rear of the car, crossed the tracks, and stepped upon a platform erected in the street by the street car company, and were walking along the platform, when the street car, as it rounded a curve in passing them, swung some 3 ft. over the platform and struck plaintiff. Held, that plaintiffs were not passengers when the accident happened, so that the company owed them no greater duty to look out for their safety than it owed to other pedestrians.

A street car company is not bound to warn pedestrians on the streets to prevent injury from the overhanging of the car in rounding a curve, since that is a matter of common knowledge of which everyone must take notice. (Gannaway et ux. v. Puget Sound Traction, Light & Power Co., 138 Pacific Rep., 268.)

West Virginia.—Dangers of Linemen—Actionable Negligence.

A lineman employed to reset poles, who has to climb among live wires for the purpose of attaching to the old poles a pulley used in hoisting the new ones assumes the risk of all ordinary dangers incident to so hazardous an employment but not the risk of unknown and abnormal dangers due to the master's negligence.

It is negligence for which the master is liable to a servant who is injured or killed while so employed to permit a joint or connection to be made in a highly charged electric wire and remain uninsulated and so close to one of the metal braces supporting a cross-arm on the pole as to charge it. (Perry v. Ohio Valley Electric Ry. Co., 78 Southeastern Rep., 692, 693.)

Wisconsin.—Contributory Negligence by Man Stationed to Watch Broken Wire.

Where a fireman was stationed by his superior officers to keep passers-by away from a pole from which hung a live wire occasionally emitting sparks, the fireman was guilty of contributory negligence in attempting to break the wire with his bare hand, and no recovery can be had for his death, it appearing that he was a man of mature years and had passed a civil service examination. (Glander v. Milwaukee Electric Ry. & Light Co., 144 Northwestern Rep., 972.)

Wisconsin.—Parent and Child—Imputed Negligence.

Where the parents of a minor child allowed him to go driving with his grandfather, the contributory negligence of the grandfather in attempting to drive in front of a rapidly approaching car, which struck the vehicle and killed the child, must, in an action by the parents for the wrongful death, be imputed to them. (Kuchler v. Milwaukee Electric Ry. & Light Co., 146 Northwestern Rep., 1133.)

LONDON LETTER

Considerable New Work Going On in England Despite the War—London Underground Earnings Affected

(From Our Regular Correspondent)

The council of the Incorporated Municipal Electrical Association has decided that instead of the proposed convention in 1915, in Dundee, business meetings shall be held in London for the transaction of routine business necessitated by the articles of association and for the discussion of matters of general interest to the members. A meeting will be held at the Institution of Electrical Engineers on June 17 to receive and discuss a report prepared by A. S. Blackman, chief electrical engineer, Sunderland, and T. Roles, chief electrical engineer, Bradford, on behalf of the "Point Five" Association, on "The Practical Result of the Point Five Tariff"; and to receive and discuss a report prepared by Frank Ayton, chief electrical engineer, Ipswich, secretary of the electric vehicle committee of the Incorporated Municipal Electrical Association, on "The Use of Electric Vehicles in Municipal Service." On June 18 the annual general meeting will be held.

In March of last year, J. S. D. Moffet, manager of the West Ham Corporation Tramways, advised his committee that "a clean sweep" of the existing electrical equipments of the rolling stock would be in the interests of the undertaking. The experience he has gained in the interval has convinced him that it would undoubtedly pay the corporation to replace the equipments by motors of higher power and greater efficiency, and that the matter ought to be taken in hand at once, so that the tramways may be in a high state of efficiency to meet the motor-bus competition which exists to-day, and which is likely to be keener after the war. In a report which he has prepared for the electric lighting and tramways committee on the subject, Mr. Moffet points out that one of the chief factors in the transportation of passengers to-day is speed. The board of trade, as recently as December, 1913, increased the maximum speed allowance to 16 m.p.h on practically every route in the borough, and, in Mr. Moffet's opinion, even speeds up to 20 m.p.h. and over are practicable under certain conditions with perfect safety to the traveling public. Mr. Moffet estimates that the saving that could be effected, after completing the change-over of the equipments, would be in the neighborhood of £4,000 per annum, making no allowance for the benefits that are bound to accrue from fewer breaks in the service and a more satisfied public.

A new scheme for dealing with extraordinary traffic is under consideration by the Leeds Corporation. Leeds suffers from the regular transit of heavy goods through its streets. Recently, when reconstructing one side of a roadway over which this traffic passes, the engineers found that the setts had been fractured to the point of crumbling. The new proposal is to convey the heavy loads by tramway. For this purpose, it is proposed to construct hopper wagons to be drawn over the tramway lines by electric locomotives. The wagons are to have a capacity of 10 tons each, and a charge of 4d. per ton-mile is to be made.

The controversy with regard to the advisability of the Bristol Corporation purchasing the Bristol Tramways & Carriage Company's undertaking continues to excite interest in Bristol. The corporation experts have estimated that the undertaking is worth £670,000, but Sir George White, the chairman of the company, says that the claim will be something like £2,000,000. The special committee of the corporation which is dealing with the matter has invited the directors of the company to a conference with a view to arriving at an amicable arrangement.

The Glasgow Corporation decided some time ago to extend its electricity-producing facilities by the erection of large works at Dalmarnock, which, when completed, will form the chief source of supply for both lighting and power purposes. The excavation operations for the new buildings are under way. It is hoped that the first part of the works will be ready to deliver energy at the beginning of the winter of 1916-1917. The site covers more than thirteen acres, and was purchased for £27.112. The ultimate capacity of the works will be at least 140,000 kw, or 200,000 hp. It is intended to transmit electricity at 20,000 volts.

Exception is taken by the highways committee of the London County Council to the proposal of the finance committee to charge the war service allowances to officers and employees of the Council who have joined His Majesty's forces to the account of the particular service concerned. During the South African war, allowances to tramways employees were charged to the general county account, and the suggestion of the highways committee is that this precedent should be followed. The effect on the tramways undertaking of the adoption of the finance committee's proposal would be serious; it is estimated that the working of the tramways during the current financial year, despite the abnormal circumstances and the increased costs under many heads, will show a surplus, whereas if this surplus be charged with this additional expenditure it will be turned into a deficit. The tramways general reserve fund stood at March 31, 1914, at £190,597, after a large sum had been withdrawn to meet the deficiency on the previous year's working, and a deficit through the proposed policy respecting war allowances will further deplete it. Were it exhausted it would be necessary for the Council to levy a general rate to make good the deficiencies. The decreased competition of motor omnibuses owing to the war is benefiting the Council tramways, which now have an increased revenue of £5,000 weekly as compared with the previous year.

The Leeds Corporation has completed the extension of its tramways from the old terminus at Guiseley to the White Cross Hotel in the same township. In regard to the trackless system which it is intended to carry forward to Burley and Otley, in Wharfedale, good progress has been made with the erection of the standards, and, according to a statement made recently by J. B. Hamilton, the general manager, it is hoped to install service at the end of May or early in June.

The directors of the Edinburgh & District Tramways have decided that for the present it will be unnecessary to introduce women conductors on the system. The tramwaymen objected, and after holding meetings on the subject decided to act on the suggestion from the tramways manager that if they were willing to co-operate by working overtime when required the necessity for introducing women conductors would be overcome. It is stated that there was a good response to the tramway company's advertisement for women conductors, and that had it been necessary to employ women there would have been no scarcity of such labor.

A sub-committee of the tramway committee of the Edinburgh Town Council has decided that experiments with self-propelled cars, with a view to the possible introduction either of electrically or petrol-driven vehicles, should be made. The lack of elasticity of the cable system in Edinburgh is now being keenly felt.

The Underground Electric Railways, which controls most of the tubes in the London district, complains that the passenger earnings of some of the concerns in which it is interested have been adversely affected by the war. The commencement of work on the enlargement of the City & South London tunnels is postponed. Interesting details are given from which it can be gathered that the total passengers carried (omitting the District Railway in each case, the line being now under government control in connection with the war) for 1914 was 730,968,970, against 740,698,370 in 1913. The falling off was practically all in the London General Omnibus traffic, the numbers carried being 569,343,223, against 580,205,335. Doubtless this is largely attributable to the fact that so many of the omnibuses were taken over by the government for service in France at the outbreak of hostilities.

Dealing with the suggested new tram terminals, the committee considers that the terminals proposed by the tramways committee will form a great relief from the present congestion by enabling the tramways committee to return cars from these points north and south respectively, instead of running them through the congested central portion of the city. The committee strongly recommends the principle of terminals, or limits to the through route system, to the favorable consideration of the City Council.

A. C. S.

News of Electric Railways

BRITISH RAILWAY ELECTRIFICATIONS

The reports of the annual meetings of the various main railways in Great Britain are chiefly interesting on account of references made to the various electrification schemes. The Lancashire & Yorkshire Railway refers to the electrification of the Manchester and Bury line as having progressed so far that it was not considered desirable to stop work when the war broke out. It is progressing satisfactorily, but will not be completed quite so early as originally anticipated, as on account of the war it has been decided to extend the time necessary for completion.

The London & North-Western Railway states that its electrification scheme from Queen's Park to Watford is approaching completion. Practically all the work of widening the main railway and constructing the necessary new bridges and tunnels for the junctions between the new electric lines and the existing lines to Euston and Broad Street is well under way, and preparations are now being made to begin the new tunnels under Primrose Hill. The new electric power station and repair shed at Stonebridge Park are well advanced, and the six electric substation buildings are practically completed. The North London Railway also refers to the electrification scheme which it is carrying out in conjunction with the London & North-Western Railway, and explains that construction would have been completed this spring had it not been for delay in carrying out the contracts, which have been much affected by the war. It is still hoped, however, that before the end of the year there will be a through service of electric trains between Broad Street and Kew and Richmond over the Hampstead Junction line.

On the other hand the London, Brighton & South Coast Railway Company has practically stopped all work on capital account since the outbreak of the war, but has been obliged to proceed with the equipment of the suburban lines for electrical working, not only because contracts were made and certain orders given, but because a considerable quantity of material had been delivered which would seriously deteriorate if not used. It is further stated, however, that the electrical services which have been in operation now for some years continue to show marked expansion. Referring to the electrification scheme of the London & South Western Railway, it is stated that the declaration of war completely upset all the company's calculations and it had seriously to reconsider its position. It was committed to a sum of more than £650,000, and, in the circumstances, concluded it prudent to suspend all operations for the time. Later, however, the company reconsidered the position, and raised the necessary capital.

PRELIMINARY RAPID TRANSIT WORK

The preliminary work that is necessary to the plan for the extension of rapid transit improvements in Philadelphia was begun on March 20, attended by a fitting ceremonial in which Mayor Blankenburg, Director of Transit A. Merritt Taylor; Frank R. Ford, of Ford, Bacon & Davis; H. H. Quimby, chief engineer of the transit department of the city, and Assistant Director Atkinson participated. That part of the work officially begun is under contract with the construction firm of Peoples Brothers. It calls for the reconstruction of sewers in Walnut Street from Third to Sixth Street. Thirty-five weeks is the time allotted for the completion of the sewer work, according to the contracts. Before the expiration of this period work on the Broad Street subway will begin, providing the $6,000,000 transit loan is authorized April 29.

The Mayor in his remarks told those who witnessed the ceremony that upon the exercise of their independent privilege as voters depended the future of the rapid transit program. The Mayor said:

"Fellow citizens, I must warn you that it is for you to decide whether or not we shall have rapid transit. If you neglect to go to the polls on April 29 and vote for the $6,000,000 transit loan, rapid transit will be a thing of the future, how many years no man can say. And remember that every vote counts. Your vote is important."

STRIKE IN SPRINGFIELD

A strike was declared on the Springfield (Mass.) Street Railway on March 31 by the local branch of the Amalgamated Association. The disagreement arose from the company's refusal to retain men discharged for irregularities in connection with fares pending the installation of transfer registers. J. T. Harmer, president, addressed the following statement to motormen and conductors:

"At a conference with the committee of your association held in my office on Friday afternoon, March 26, three requests were made of the company:

"1—That additional registers be installed on the cars so that transfers could be rung up.

"2—That until the registers were installed no more men should be discharged for irregularity in handling fares.

"3—That three men who had recently been discharged for that cause should be reinstated.

"I made the reply at that time that the Springfield Street Railway had about the same practice as in other places of the same size—transfers were not rung up on registers, and when men were checked up and found irregular they were discharged; but the argument of the committee that additional registers were a protection to the character of the men appealed to me and I agreed to take the matter under consideration. With regard to the second request, I declined to accede to it. With the third request, that the three men be reinstated, I declined to do comply, but stated to the committee that under the contract all grievances had to be arbitrated, and that I would agree to arbitrate the discharge of the three men.

"At the meeting a demand was made that transfer registers be installed on the cars and that the three men discharged should be reinstated, in accordance with a vote of the employees taken on March 29, and that unless I granted this demand the cars would not be run out of the barns on Wednesday morning. I again offered to arbitrate the cases of the three men, and further, at the close of the meeting, agreed to install transfer registers, it being understood, however, that if the cars were not run out of the barns Wednesday morning I should not be held to this agreement.

"As the company has done exactly what the contract demands, it does not consider itself responsible if work should be suspended on the cars, and it also feels that it is its duty to the men and public to make the above facts known, so that the men will have a full understanding of them before they take the responsibility of stopping service."

In a statement to the public on behalf of the union, J. H. Reardon condemned secret inspection and attacked the company for not installing transfer registers in the past. The statement entirely failed to meet the willingness expressed by the company to arbitrate the cases of the three conductors in question or to acknowledge the company's willingness, after conference, to install transfer registers.

On March 31 the company made no attempt to operate any but mail cars.

On April 1 the men voted to accept the proposition of the State Board of Conciliation to return to work. In a statement which he issued, Mr. Harmer said that the company of its own volition is to install transfer registers on the cars and that the other questions would be taken up by the board for investigation next week.

REPORT OF INDIANA COMMISSION

According to the annual report of the Public Service Commission of Indiana for the fiscal year ended Sept. 30, 1914, the total mileage of electric interurban railway in operation in that State is 2,798.4 miles, of which 2,732.49 miles are single track. On June 30, 1913, the companies had outstanding $109,217,286 of capital stock and $93,010,047 of funded debt. The companies have an average stock issue of approximately $40,000 per mile of single track and an average bond issue of $34,000 per mile of single track. The commission states that it would not be a violent assumption to estimate the average cost of reproduction on this basis.

For the year ended June 30, 1913, the companies paid in dividends $924,286, or less than 1.2 per cent on the par value of the stock outstanding. Many of the stock issues are paying 5 per cent dividends, but the commission says that in other instances the bonds and stock have dropped far below the par value. What has been lost to individual investors, however, has been made up to separate communities through the increase in the value of real estate.

The total revenues derived from the interurban railways in 1913 were $15,090,417. The total operating expenses, including taxes, were $8,972,020, leaving a balance of $6,118,397. The companies received $2,040,759 from sources other than passenger revenue, as follows: Baggage revenue, $53,749; parlor and special car revenue, $38,029; mail revenue, $10,106; express revenue, $344,944; milk revenue, $110,646; freight revenue, $1,127,961; switching revenue, $10,805; miscellaneous transportation revenue, $3,250, and operations other than transportation, $342,359. For the year ended May 1, 1914, the total deaths by interurban railways was 74 and the total number of injuries 167, as compared to 371 and 2279 on steam railroads.

LEGISLATION IN OHIO

The bill making it legal to file suits during receivership in any county through which an electric railway passes was passed by the House on March 25 and is before the Governor.

The public utilities committee of the House has reported favorably the Reighard bill, which is intended to remove the mandatory feature of the law requiring the physical valuation of all public service companies by the Public Utilities Commission. It gives the commission discretionary power, even where city councils demand a valuation for the purpose for fixing rates. It may not affect the valuations that are now being made, if enacted into a law.

The bill relating to bonds issued for municipal ownership purposes has been recommended for passage by the Senate committee on public utilities. It provides that such bonds shall be a lien on the property only in so far as the bonds issued exceed the limitations provided by the Longworth bond act.

The Smith bill, requiring inclosed cabs for motormen, has been amended in such a way as to give the Public Utilities Commission discretion in its application.

Representative Hyle has introduced a bill providing that eight hours shall constitute a day's work for all railroad and electric railway employees, from switch engine and switch car hands to trackmen, who are employed in the yards.

The bill regulating the hours of employment of street and electric railway motormen and conductors has been recommitted to the House committee on labor, because of an amendment that is not clear.

The House committee on public utilities has recommended for passage the Myers bill, which will allow steam and electric roads to join in the construction of union depots.

MONTANA EARNINGS AND ACCIDENTS

The Board of Railroad Commissioners and ex-officio Public Service Commission of Montana has issued its seventh annual report for the year ended Nov. 13, 1914. According to this report, the operating revenues and expenses of the electric railways in the State for the year ended June 30, 1914, were as follows: Anaconda Copper Mining Company, operating revenue, $81,732, and operating expenses, $50,788; Billings Traction Company, operating revenue, $26,395, and operating expenses, $25,256; Butte Electric Street Railway, operating revenue, $546,213, and operating expenses, $536,711; Gallatin Valley Railway, reports not available; Helena Light & Railway Company, operating revenue, $97,763, and operating expenses, $83,353; Missoula Street Railway, operating revenue, $79,426, and operating expenses, $75,002, and Montana Power Company, operating revenue, $2,130,041, non-operating revenue $800,765, and operating expenses, $755,981.

A summary of the accidents during the year ended Sept. 30, 1914, shows that two employees were killed by the railways and three injured as compared to three and sixteen for electric utilities and six and twenty-nine for all utilities. For persons other than employees the railways had two killed and sixteen injured, out of a total of two killed and twenty-four injured.

LEGISLATION IN PENNSYLVANIA

The Senate has passed the House bill to allow municipalities to regulate motor conveyances, etc. The House bill taxing switches, turnouts, etc., in cities of the second class has been passed by the Senate on first reading. The House has passed the bill taxing wires, poles, etc., in cities of the second class. The House has also passed on second reading the bill taxing the real estate of public service companies in cities, boroughs and townships. The House bill limiting the hours of labor of motormen, etc., has been returned with a negative recommendation. The House has passed on second reading the bill authorizing street railways to operate motor buses. It has also passed on second reading the bill providing for a municipal tax on motor vehicles. The bill introduced in the Senate relative to the employment of labor and advertising during strikes, etc., has been referred to the judiciary general committee. The House has referred to the committee on corporations the bill providing for the formation and regulation of stock companies and authorizing the issue of stock without par value on reorganization, etc. The House has referred to the judiciary general committee the supplement to the Public Service Company law empowering the commission to order connections between street railways and lines owned, leased and operated by municipalities, etc.

ARTICULATION OF BOSTON LINES

On April 4 train service will be extended from Harvard Square, Cambridge, through Park Street, Boston, to the Washington station of the Dorchester tunnel, now under construction. The operation of trains through to Washington Street, 0.5 mile, will tie together the Tremont Street subway, Washington Street tunnel and the Cambridge subway. The new facilities will be centered at the Washington station, which is expected to become the most important downtown transfer point in Boston on the rapid transit lines.

The new station differs from all others on the Boston Elevated Railway in arrangement. It extends under Summer Street from Washington to Chauncy Street, and is built in two levels. The lower level contains two platforms about 350 feet long each, which will be used as the berths of Harvard Square trains until the next section of the Dorchester tunnel is opened. The upper level is a 500-ft. promenade or lobby with exits to the surface and to the winter and summer stations of the Washington Street tunnel. An escalator will also be in service between the lower level and the street. Free bodily transfer will be given between tunnel and subway trains, and between trains and surface cars, as previously outlined in this paper.

COMMISSION INQUIRY COMPLETED

It was announced on March 30 that the legislative committee which has been conducting the investigation into the affairs of the Public Service Commissions of the First and the Second Districts of New York had completed its work and that the findings with regard to the commission for the second district would probably be returned within ten days. It is said that the committee will recommend that one commission of seven members replace the present commissions, three members of this single commission to be appointed from New York City, three from the up-State districts and a chairman appointed at large. It is also said that the report of the legislative committee will advocate a reduction in the salary of the commissioners from $15,000 to $10,000 a year, with $2,000 additional for the chairman. Senator Thompson, chairman of the committee, was quoted as stating that the report regarding the commission for the second district would make no recommendation as to the personnel of the commission, unless recommendations were especially requested by Governor Whitman in a formal letter.

STOCKHOLDERS AUTHORIZE DETROIT SALE

The stockholders of the Detroit (Mich.) United Railway on March 31 authorized the directors to sell the property of the company in the one-fare zone to the city at the price offered by the city railway commission plus betterments and extensions made after April 1. The offer was made public on April 2 by the railway commission.

IMPROVEMENTS IN CINCINNATI

Replying to a letter from Director of Public Safety Fosdick of Cincinnati, Walter Draper, vice-president of the Cincinnati Traction Company, sent a communication on March 25, in which he outlined the improvements the company is ready to make and added a number of suggestions as to how the work should be done in order to avoid inconveniencing the public. Mr. Draper suggests that the work be done in sections and that some sections be allowed to remain over to another season. He advised the committee that the company could make improvements only to the extent of its finances. The double-tracking of Central Avenue will cost about $150,000, and the addition of the Sixth Street extension would make the expense very heavy. The improvements are to be paid for largely out of income. The following day the street railway committee decided to formulate an ordinance requiring the company to give transfers at a number of additional points.

MASSACHUSETTS LEGISLATURE

Governor Walsh has signed the bill eliminating the 1-cent toll charge levied in the East Boston tunnel upon passengers carried by the Boston Elevated Railway. If the bill is accepted by Mayor Curley and the City Council by Dec. 31, 1915, a 5-cent fare will be established in the tunnel as on all other parts of the system. About 80,000 people in the East Boston district of the city will be benefited. The tolls have been collected by the railway and turned over to the city; but if the act is accepted the city will make annual appropriations until 1922 from the tax levy, and these, with the rental received from the company for the use of the tunnel, will meet the interest and sinking fund requirements on the bonds issued to pay the cost of construction of the tunnel. The Governor has also signed a bill authorizing the Boston Transit Commission to contract for the temporary use of portions of the Dorchester tunnel. The bill providing for the electrification of railroads in the Boston district has been referred to the next Legislature. Leave to withdraw has been reported upon the bills for the state ownership of street railways. The bill authorizing the ownership of pleasure resorts by street railways has been engrossed.

"ELECTRICAL PROSPERITY WEEK"

"Electrical Prosperity Week" has officially been set for the first week in December this year. The executive committee, which is to guide the campaign for this event is composed of the following men: Chairman, A. W. Burchard, vice-president General Electric Company; alternate, F. H. Gale, advertising manager General Electric Company; Gerard Swope, vice-president Western Electric Company; alternate, E. W. Rockafellow, sales department Western Electric Company; J. R. Strong, president Tucker Electrical Construction Company; alternate, George Weiderman, George Weiderman Electric Company, Inc.; Frank W. Smith, vice-president United Electric Light & Power Company, New York; alternate, George Williams, Henry L. Doherty & Company; Hugh M. Wilson, vice-president *Electrical World;* alternate, Frank B. Rae, Jr., *Electrical Merchandise.*

General charge of the affair will be in the hands of J. M. Wakeman, general manager of the Society for Electrical Development. H. W. Alexander, manager of the department of publicity of the society, will have charge of the publicity work. At the next meeting of the executive committee on April 7 it is proposed to appoint fifty local committeemen to handle the campaign in different geographical centers. The most prominent men in these centers will be named. A national advertising campaign will be carried in magazines, while local newspaper advertising will be done to emphasize the campaign in each locality. Motion pictures, poster stamps, billboards, electric signs and car cards will also be used to awaken enthusiasm.

Indeterminate Franchises in New Jersey.—The Senate of the State of New Jersey has passed the Pierce indeterminate franchise bill and it is now up for passage in the Assembly. At two previous sessions the Senate approved the bill, but both times it failed in the House.

Texas Commission Bill Fails.—It was stated at Austin, Tex., on March 13 that Senator Robbins had abandoned all hope of passing his bill providing for the creation of a public service commission at the present session of the Legislature, but that he might make an effort to have the question submitted by Governor Ferguson at the coming special session, which will be held this month.

Railway's Right to Purchase Light Company Affirmed.—An opinion has been rendered by the attorney general of Pennsylvania in the matter of the York Railways' application for approval of the Public Service Commission, to purchase the property of the Merchants' Electric Light Company in which the right of a street railway to purchase and operate an electric light company is affirmed.

New Trolley Line to Philadelphia.—A new rapid transit electric railway route to Philadelphia will develop as the result of plans of the Reading (Pa.) Transit Company to build a connecting link between Boyertown and Pottstown, Pa. This would also mean a direct electric railway route to Philadelphia from Lancaster by way of Reading. Engineers are now making a survey of the proposed line and work is expected to start shortly.

Lehigh Valley Transit Power For Reading Line.—The Allentown & Reading Traction Company, operating between Allentown and Reading, Pa., has abandoned its power plant at Griesemersville and in the future will be supplied with power from the lines of the Lehigh Valley Transit Company. The generating plant at Kutztown will be continued in operation to supply the district between that town and Reading. Dorney Park, which is owned by the same company, will also be supplied with lighting current during the summer season.

Decision in Ohio Extension Case.—The City Council of Cincinnati endeavored recently to compel the Cincinnati (Ohio) Traction Company to extend the Warsaw Avenue line. The company objected and carried the matter to the Public Utilities Commission. The decision being favorable to the company, the city appealed to the Supreme Court. That court holds that if the route would entail unusual and unwarranted dangers and jeopardize the lives of passengers the commission is authorized to relieve the company of the obligations sought to be imposed by the ordinance.

Railroad Service Exhibition.—A national railroad supply and service exhibition will be held at the Grand Central Palace, New York City, from May 17 to May 22, 1915, inclusive, under the direction, management and supervision of the Order of Railroad Telegraphers, Dispatchers, Agents and Signal Men of America. It will be the aim to show the progress made by inventors and makers of safety appliances to protect and to safeguard the traveling public and the railroad servants. Applications for space may be made to the order at its offices in the Temple Court Building, New York.

New Haven Minority Suit.—Arguments in the suit of minority stockholders of the New York, New Haven & Hartford Railroad to recover for the company approximately $102,000,000 alleged to have been wrongfully spent, and, in addition, double that amount in penalties, were made before the full bench in the Supreme Judicial Court on March 19 For street railways it is claimed $46,000,000 was thus improperly expended. The principal contention of the defendants is as to the right of minority stockholders to bring a bill of this nature, their claim being that such a bill could not be maintained even if brought in the name of the corporation itself.

Hearings on Alleged Chicago Violations.—Hearings have been held by the Illinois Public Utilities Commission as a result of the complaints filed by J. B. Hogarth, formerly general superintendent of the Chicago Railways, as noted in the ELECTRIC RAILWAY JOURNAL of March 20. Evidence was taken as to whether or not the association of individuals forming the collateral trust was a public utility. Gilbert E. Porter, counsel for the trustees, described in detail how the trustees purchased the controlling interest in the three elevated railways through a contemporaneous issue of notes, and stated that the three members forming the association were not amenable to the commission, although the function of the trust was to borrow the money needed by the railways. Hearings were continued.

Toronto Bills Rejected.—The city of Toronto, Ont., had its bill affecting the Toronto Railway thrown out by the private bills committee of the Ontario Legislature on March 23. The city asked that the word "tracks" be defined as meaning roadbed and rails instead of just rails. The city also asked that it be allowed to expropriate the Toronto Suburban Railway in Ward Seven. Another request was that the agreement of 1891 be interpreted to mean that the city had the right to say on what streets the Toronto Railway should lay tracks. This was rejected, as was also the request that the company be forced to put 180 new cars on the system. As the result of the city's request it is likely that an amendment to the general act will be moved so that the Ontario Railway Board will have the supreme right to deal with all railway questions.

Assisting the Small Borrower.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, and Arthur Williams, of the New York Edison Company, are among the directors of the Morris Plan Company, New York, which started business on Dec. 31, 1914, with a capital stock of $100,000 to make loans to small borrowers. The plan of making loans is simple, but is in no way a charity. It does, however, relieve the borrower from the machinations of the loan sharks. Applicants for loans must furnish references as to their character and must give information as to their income. They must have at least two indorsers or co-workers of situation and income at least as good as their own. Interest on loans is deducted in advance.

The Flood of Legislation—Elihu Root, the president of the Constitutional Convention which will meet in April to review and remold the organic law of the State of New York, was the principal speaker at the meeting of the members' council of the Merchants' Association of New York on March 25. Speaking of the flood of legislation recently Mr. Root said: "We are seeing now in the newspapers remarks that this Legislature has not done much. I had a count made not long ago in the library of Congress of the number of laws that had been passed in the five preceding years. That was made last year, and in the five years ended Dec. 1, 1913, I found that more than 62,000 laws had been passed by Congress and the State legislatures in this country in that five years, and I found that there had been reported during that five years and published in 630 volumes of reports of the courts more than 65,000 decisions of courts of last resort in this country. How can you possibly know them? How can you conduct your business and keep out of jail? So, give credit to the convention for what it does not do."

Hydro-Radial Hearing.—In reply to the deputation from the Hydro-Electric Association of the province of Ontario, Canada, on March 26, Premier Hearst stated that the resources of the province were at present taxed to the limit by present obligations as a result of the war, and in order to grant the subsidy of $3,500 a mile to the hydro-radial system it would be necessary to tap new sources of revenue. Once the government's hands were free, after the present crisis was passed, the matter would be taken up and some decision reached. Shortly after the deputation had made its appeal for the subsidy the government had introduced in the Legislature a bill which provides for the creation of radial "zones" in townships. The legislation will authorize township councils to define a radial zone in the township and in that defined section only will the vote be taken. If the proposition is carried, the costs will be borne entirely by the ratepayers in the zone benefited. The bill also provides for validating the contracts and agreements of the Toronto-Markham-Port Perry Radial Line, but its provisions will not be operative except by proclamation.

Financial and Corporate

ANNUAL REPORTS

San Francisco Municipal Railways

According to a preliminary report made to the finance committee of the Board of Supervisors of San Francisco, the net profit on operation of the San Francisco (Cal.) Municipal Railways for the year ended Dec. 31, 1914, was $185,546. After deducting the comparison charges for services rendered by other departments of the municipal government and for taxes, the net profit was $81,790. These comparison charges included $97,737 for federal, state and municipal taxes and $6,018 for the estimated value of other departmental services, although these amounts are not actually paid.

The statement of income, profit and loss for 1914 follows:

Operating revenues:	
Passenger revenues	$1,150,236
Miscellaneous revenues	9,202
Total	$1,159,438
Operating expenses:	
Way and structures	$27,633
Equipment	48,091
Power	137,839
Traffic	356
Conducting transportation	354,332
General and miscellaneous	45,904
Comparison charges required by charter	6,018
Depreciation—18 per cent of gross revenue	208,699
Total	$828,872
Net operating revenue	$330,566
Add miscellaneous income—income from municipal bonds owned	1,318
Gross income less operating expenses	$331,884
Deductions from income:	
Taxes—comparison charges required by charter:	
State franchise—5¼ per cent on gross revenue	$60,870
Municipal franchise—3 per cent on passenger revenue	34,507
Municipal car license	1,534
Federal income—1 per cent on net income	826
Total taxes	$97,737
Interest on funded debt	148,617
Other interest	3,740
Total deductions	$250,094
Net profit for the year 1914	$81,790

Winnipeg Electric Railway

The statement of income, profit and loss of the Winnipeg (Man.) Electric Railway for the year ended Dec. 31, 1914, follows:

Gross earnings	$4,101,302
Operating expenditure	2,416,209
Operating surplus	$1,685,093
Fixed charges:	
Debenture and bond interest	$449,732
City percentage and car license	122,487
Taxes, insurance, etc	118,263
Total	$690,482
Net surplus for year	$994,611
Balance from last year	901,698
Total	$1,896,309
Quarterly dividends for 1914	1,080,000
Balance carried to balance sheet	$816,309

The gross earnings for 1914 increased $22,608, or 0.55 per cent, while the expenses of operation, including maintenance, repairs and renewals, increased $163,602, or 7.26 per cent. The increase in the operating expenses, which occurred principally in the railway department, is attributable partly to expenditure introduced in conformity with the requirements of the Public Utility Commissioner, and partly to the annual increase in the graduated scale of wages applicable to senior service employees. The operating ratio for 1914 was 58.91 as compared to 55.23 in 1913. The net earnings in 1914 decreased $140,994, or 7.72 per cent. The total of passengers carried decreased from 59,563,757 in 1913 to 58,489,987 in 1914, or 1,073,770, while the transfers increased from 15,039,016 to 20,277,197.

New construction and improvements entailing an expenditure of $1,308,545 were made during the year. These included the laying of about 7½ miles of track in Winnipeg, the construction of an 18-mile branch line from Middlechurch to Stonewall and the establishment of a fast electric service between Winnipeg and Stonewall. Twenty large double-track closed motor cars were constructed in the company's Winnipeg shops. Practically all of the company's double-truck closed single-end cars have been converted to comply with operating conditions under the "pay-as-you-enter" system, the rear vestibules being equipped with safety doors. To provide for the foregoing capital expenditures, the directors arranged the sale of additional 4½ per cent consolidated debenture stock, the proceeds of which amounted to $879,468. The proceeds of treasury notes were $500,000, making in all $1,379,468.

Ottawa Traction Company, Ltd.

The first annual report of the Ottawa (Ont.) Traction Company, Ltd., for the year ended Dec. 31, 1914, contains the following statement, which includes the operations of the Ottawa Electric Railway:

Gross earnings of Ottawa Electric Railway	$1,096,459
Operating expenses and maintenance	665,227
Net earnings	$431,232
Disposition of net earnings:	
Four quarterly dividends of 3 per cent and a bonus of 3 per cent	$281,535
Interest on bonds and loans	39,109
Mileage payments	15,751
Taxes	16,722
Contingent account for reduction of track renewals, car equipment and other accounts	55,000
Total	$408,117
Balance transferred to profit and loss	$23,115

The gross earnings for 1914 were $1,096,459, as compared to $1,041,282 in 1913, an increase of $55,177. The total expenses, including mileage payments, taxes and interest, increased from $675,853 in 1913 to $736,809 in 1914, or $60,956. The net income, therefore, showed a reduction from $365,428 in 1913 to $359,649 in 1914, or $5,779. The total of passengers carried was 25,321,547 in 1914 as compared to 23,987,883 in 1913, an increase of 1,333,664.

The report states that notwithstanding the business stringency throughout the country for the first seven months of the year, which was added to by the outbreak of the war, every month showed an increase in the gross receipts. The directors are confident as to the future. During the year nine double-truck cars were added to the rolling stock, and a new bridge costing $15,000 was built at New Edinburgh. This spring the company intends to put heavier rails on Bank Street from Wellington Street to Gladstone Avenue, which will complete the track renewals throughout the system.

Toronto Railway

The statement of income, profit and loss of the Toronto (Ont.) Railway for the year ended Dec. 31, 1914, follows:

Gross earnings	$6,127,096
Operating and maintenance expenses	3,529,546
Net earnings	$2,597,550
Less:	
Interest on bonds	$182,499
Percentage on earnings	955,740
Pavement charges and taxes	191,651
Total	$1,329,790
Surplus earnings	$1,267,660
Balance last year	4,448,611
	$5,716,271
Dividends—four at 2 per cent	923,901
Surplus carried forward	$4,792,370

The gross earnings for 1914 were $6,127,096, or $78,077 more than in 1913. The passenger earnings were $6,043,512, an increase of $62,816. The various charges against the earnings for operation, maintenance, etc., amounted to $3,529,546, an increase of $406,237 for 1914. The operating ratio was 58.4 per cent. The payments made to the City of Toronto, including the percentage on earnings, pavement charges and general taxes, totaled $1,122,914, an increase of $33,206 over 1913. The net earnings decreased $328,159 during 1914. Passengers carried totaled 152,966,153, an increase of 1,729,228, and transfers totaled 65,778,022, an increase of 2,694,904. The company reports that $790,220 of its currency and sterling bonds have been drawn for redemption, and that during 1914 it disposed of $480,000 of its currency bonds and also issued and offered $1,000,000 of capital stock to present stockholders.

Dominion Power & Transmission Company, Ltd.

The statement of income, profit and loss of the Dominion Power & Transmission Company, Ltd., Hamilton, Ont., for the year ended Dec. 31, 1914, follows:

Gross earnings	$2,395,967
Operating expenses	1,390,847
Net earnings	$1,005,120
Transferal to maintenance and renewal account	101,023
Balance	$904,097
Bond interest and interest	377,106
Surplus earnings	$526,991
Balance from 1913	995,862
Total	$1,482,853
Dividends declared	461,392
Bad debts—written off	1,056
Surplus for 1914	$1,020,405

The report states that the closing down of factories considerably reduced the power receipts during the year, and the street railway traffic fell off to a marked extent. In view of the widespread and general derangement of business, however, the position of the company is regarded with satisfaction. During the year the company made bond and sinking fund payments of $134,390, besides setting apart 20 per cent of the gross for renewals and maintenance. After the outbreak of the war the work on the new steam power station was discontinued, but the report states that it will probably be advisable to complete the building and install the plant during the coming summer so that at least one or two units may be ready for operation before winter.

Butte (Mont.) Electric Railway.—The Butte Electric Railway has defaulted the March 1 interest payment on its $700,000 of first mortgage 5 per cent bonds. This is the first time the company has been unable to pay the interest on its bonded indebtedness. In spite of strict economies the company has not been able to overcome the monthly deficit caused by the falling off of its business in the present depression. Last year the company borrowed $150,000 to buy new cars, change old cars into modern ones and install other new equipment. This sum is carried as a floating debt, so that the liabilities of the company at present may be considered to be $850,000.

Central California Traction Company, San Francisco, Cal.—The California Railroad Commission has authorized the Central California Traction Company to lease its lines in Stockton to the Stockton Electric Railroad for $12,500 per annum for the first three years and $15,000 per annum for the remaining period of the lease, which is to run from Jan. 1, 1915, to Jan. 1, 1953. At the hearing in this case it developed that the interurban line of the company between Stockton and Sacramento has been placed under the general manager of the Stockton Electric Railroad, who acts in a similar capacity with reference to the Fresno Traction Company and the Visalia Electric Railway, all of which corporations are subsidiaries of the Southern Pacific Company. Witnesses for the Central California Traction Company, who are also its principal stockholders, vigorously denied that it was the intention to sell their line to the Southern Pacific Company, or that any negotiations were pending, and stated that the supervision of the main-line operations exercised by the general manager of the Stockton Electric Railroad was simply in the interest of economy. In this regard the commission comments as follows: "We have no reason to doubt the sworn testimony of these witnesses. At the same time, we have here a most remarkable situation of a supposedly competing line being managed by an official of certain subsidiaries of its competitor. The competition may be either actual or fictitious, but it has nothing to do with the merits of this particular application. It may be well, however, to call attention to the fact that the commission does not look with favor upon any act which might be employed to evade the utilities act."

Chicago (Ill.) Elevated Railways. — The National City Bank, Lee, Higginson & Company and N. W. Halsey & Company, New York, are offering at 91 and interest, to yield about 5.65 per cent, the unsold portion (less than $500,000) of the present issue of $12,500,000 of first mortgage 5 per cent gold bonds of the Northwestern Elevated Railroad, dated 1911. These bonds are due in 1941, but are callable as a whole although not in part, except for the sinking fund, at 102 and interest at any interest date upon thirty days' published notice.

Chicago, Harvard & Geneva Lake Railway, Walworth, Wis.—The Wisconsin Railroad Commission has authorized the Chicago, Harvard & Geneva Lake Railway to issue $78,500 of 5 per cent refunding bonds and to reduce its capital stock from $150,000 to $75,000.

Cities Service Company, New York, N. Y.—The comparative figures of the Cities Service Company for 1914 and 1913 are as follows: Gross earnings—1914, $3,934,453; 1913, $2,172,411. Expenses—1914, $116,908; 1913, $85,348. Net earnings—1914, $3,817,545; 1913, $2,087,063. Net interest—1914, $420.000; 1913, $123,062. Net to stock—1914, $3,397,545; 1913, $1,964,001. Net to surplus—1914, $1,290,504; 1913, $588,797. H. L. Doherty, president, states that the earnings were satisfactory in view of existing conditions.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—On March 23 the Ohio Supreme Court affirmed the decision of the lower courts in awarding a judgment to Eli M. West, receiver Columbus, Delaware & Marion Railway, for a balance, reported to be $1,023,253, due from John G. Webb.

Duluth-Superior Traction Company, Duluth, Minn.—According to a recent letter to stockholders from C. G. Goodrich, president Duluth-Superior Traction Company, it was decided at a recent meeting of the board of directors that it would be unwise to continue the common stock on a 4 per cent basis, and that the payment of dividends should be made semi-annually instead of quarterly. Under this policy a semi-annual dividend of 1 per cent was declared for the six months ended June 30, 1915, payable on July 1. It is stated that since the strike of the company's employees in 1912 the cash position of the company has not been so strong as it should have been for the comfortable operation of the property. It was hoped that the increased growth of business would gradually overtake the deficit in liquid assets as compared with current liabilities, but this has not been the case.

Fairmount Park Transportation Company, Philadelphia, Pa.—Announcement has been made that on March 22 Frank Silliman, of E. W. Clark & Company, Philadelphia, was appointed co-receiver of the Fairmount Park Transportation Company with Samuel M. Clements, Jr. The receivers have been authorized to issue the necessary certificates as security for a loan of $20,000 to be advanced by the reorganization committee for the purpose of meeting bond interest due on April 1. It is reported that two-thirds of the money raised by assessment on the assenting stock has been paid in, and definite arrangements for putting the reorganization plan into effect will soon be completed. Details of this plan were noted in the ELECTRIC RAILWAY JOURNAL of Jan. 16, Feb. 27 and March 6.

Hartford & Springfield Street Railway, Warehouse Point, Conn.—It is reported that negotiations are under way for the sale of the Hartford & Springfield Street Railway, which operates suburban lines between these two cities, with branches to Suffield and Rockville, to the Northern Connecticut Light & Power Company. The latter company is now before the General Assembly for permission to increase its capitalization to $2,000,000.

Interborough Rapid Transit Company, New York, N. Y.—As compared to the passenger traffic in January and February, 1914, the Interborough Rapid Transit Company during these two months this year carried 2,800,000 less passengers on its subway and elevated lines. The January decrease was largely caused by the temporary falling off of traffic on account of the accidents in the subway, but the February decrease was brought about by the fact that in 1914 the traffic was abnormally large on account of the heavy storms that paralyzed the surface lines. In spite of this decrease in traffic, during the eight months ended Feb. 28 the company earned 14.3 per cent on its stock, as compared to 13.5 per cent last year. At the end of February the surplus available for dividends was $297,198 ahead of last year, and it is expected that the increase for the year ending June 30 will be about $500,000.

Jersey Central Traction Company, Keyport, N. J. — The Jersey Central Traction Company, which operates a line in Middlesex and Monmouth Counties, New Jersey, has been purchased by Laird Brothers, Wilmington, Del. The price paid is said to have been about $1,000,000. Laird Brothers are reported to represent the DuPont powder interests. Morris Brothers & Company, Philadelphia, have been the controlling factors in the company.

Montreal Tramways & Power Company, Ltd., Montreal, Que.—Potter, Choate & Prentice, New York, are offering at 99¼ and interest, to yield 6.4 per cent, the remaining portion (less than $700,000) of the issue of $7,000,000 of two-year 6 per cent collateral trust gold notes of the Montreal Tramways & Power Company. Previous reference to this note issue was made in the ELECTRIC RAILWAY JOURNAL of Feb. 27.

New York (N. Y.) Railways.—The arbitration committee appointed to fix the rate of interest on the 5 per cent adjustment income bonds of the New York Railways for the six months ended Dec. 31, 1914, has decided that the payment shall be 1.769 per cent, payable on April 1. The rate paid for the first six months of 1914 was 1.288 per cent, making a total for the year of 3.057 per cent. This compares with payments of 3.981 per cent for 1913 and 3.021 per cent for 1912. Previous references to the 1914 payment were made in the ELECTRIC RAILWAY JOURNAL of March 6 and March 13.

North American Company, New York, N. Y.—The North American Company, under whose petition the St. Louis & San Francisco Railroad was placed in receivership three years ago, has been restrained by order of Federal Judge Sanborn from attempting to collect until Feb. 10, 1916, a note for $625,000 held against the railroad company. The court also forbade the sale of the $5,000,000 of first mortgage bonds held as security for this note. The order, however, which follows a mutual agreement between the receivers of the railroad and the officers of the North American Company, designates the dates on which interest is to be paid on the note.

Pacific Electric Railway, Los Angeles, Cal.—The California Railroad Commission on March 17 authorized the Pacific Electric Railway to sell its heating and lighting system at Playa del Rey to the Southern California Edison Company for $1,544.

Pacific Gas & Electric Company, San Francisco, Cal.—In regard to the non-inclusion of sinking fund deductions in the annual income statement of the Pacific Gas & Electric Company, A. F. Hockenbeamer, vice-president and treasurer, says: "We have not at any time advanced the claim before either the California Railroad Commission or other rate-making body that our rates should be high enough to permit us to earn sufficient revenue to retire our bonded debt. To do so would ultimately result in the company securing the entire title to its property from its rates, provided it allowed in addition a proper depreciation charge. What we asked the commission to do some months ago and what it has granted us is this—when we pay off a $1,000 bond through the operation of some sinking fund, to replace this retired capital with an equivalent amount of our common stock, a most conservative procedure. As the commission allows depreciation to be included in operating expenses and the rate of return is computed only after depreciation has been provided for, there is no reason why an additional allowance should be made for sinking funds."

Philadelphia Company, Pittsburgh, Pa.—According to Mason B. Starring, president United Railways Investment Company, which through stock ownership controls the Philadelphia Company, the estimated earnings of the Philadelphia Company for the fiscal year ended March 31, 1915, show a decrease in gross of less than 4 per cent as compared with the previous year. Mr. Starring states that in all departments rigid economies have been put into effect, and there is no valid reason to question the ability of the company not only to meet all its fixed charges but to provide for cash dividends on all its stock. It is said to be reasonably certain, therefore, that the forthcoming dividend upon the common stock will be paid in cash. The payment of the second scrip dividend of the company was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9.

Riverside, Rialto & Pacific Railroad, Riverside, Cal.—The Riverside, Rialto & Pacific Railroad has been taken over by the Pacific Electric Railway, which will run interurban trolley cars from the terminus of the new branch direct to the depot in Los Angeles. An operating schedule was put into effect on March 15 whereby seven trains each day will run between Riverside and Los Angeles, the rail distance on the new line being 63.8 miles and the running time two hours and fifteen minutes. Previous references to recent corporate changes in this company were made in the ELECTRIC RAILWAY JOURNAL of Jan. 30 and Feb. 20.

United Gas & Electric Corporation, New York, N. Y.—It is announced that Drexel & Company, Philadelphia, has sold or exchanged more than $4,000,000 of the $5,500,000 of three-year 6 per cent gold notes of the United Gas & Electric Corporation, dated April 1, 1915, and due on April 1, 1918. The sale of the notes to the bankers was mentioned in the ELECTRIC RAILWAY JOURNAL of March 6. The bankers were offering the remaining notes for sale or exchange if, when and as issued, at 98½ and interest for delivery on April 1. The notes are secured by $7,650,000 of thirty-year 6 per cent collateral trust bonds, dated April 1, 1915.

Washington Railway & Electric Company, Washington, D. C.—The Public Utilities Commission of the District of Columbia on March 23 authorized the Washington Railway & Electric Company to issue $353,000 of general improvement 6 per cent debenture bonds, dated Jan. 2, 1915, and due on Jan. 1, 1925, to be sold for the highest price obtainable. The proceeds of this issue are to be used to cover the cost of certain betterments and improvements. The commission states that certain information which it will consider in acting upon the application to issue the remaining $487,000 of the bonds will not be in its hands before the completion of the valuation of the company now in progress. Previous reference to this matter was made in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

Winnipeg (Man.) Electric Railway.—The directors of the Winnipeg Electric Railway on March 20 declared a quarterly dividend of 2½ per cent on the company's $9,000,000 of stock, payable on April 1. This compares with 3 per cent quarterly from July, 1911, to January, 1915, inclusive. The reduction to a 10 per cent basis was expected in view of the steady decrease in earnings reported. One cause of the falling off in the revenue is said to be the departure of so many young men from Winnipeg for foreign service. The jitney competition is also said to have been harmful.

DIVIDENDS DECLARED

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred.

Boston Suburban Electric Companies, Newtonville, Mass., quarterly, $1, preferred.

Citizen's Traction Company, Oil City, Pa., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Cincinnati, Ohio, quarterly, 1½ per cent, preferred.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 2 per cent.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent. preferred.

Philadelphia Company, Pittsburgh, Pa., 3 per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

South Carolina Light, Power & Railways Company, Spartanburg, S. C., quarterly, 1½ per cent, preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-quarters of 1 per cent.

Tidewater Power Company, Wilmington, Del., 3½ per cent, common.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Winnipeg (Man.) Electric Railway, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '15	$15,634	*$10,198	$5,436	$2,180	$3,256
1 " " '14	15,020	*10,230	4,791	2,105	2,686
12 " " '15	179,438	*114,246	65,192	25,099	40,093
12 " " '14	164,722	*104,140	60,582	25,147	35,435

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Jan., '15	$7,462	*$7,478	$17	$1,145	†$1,162
1 " " '14	7,333	*7,261	72	1,066	†994
12 " " '15	121,885	*101,967	19,919	13,220	6,699
12 " " '14	123,864	*98,799	25,065	13,019	12,046

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, CLEVELAND, OHIO

1m., Jan., '15	$27,713	*$17,019	$10,693	$10,961	†$268
1 " " '14	28,814	*16,795	12,020	10,789	1,231

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Jan., '15	$60,767	*$26,872	$33,896	$28,792	$5,104
1 " " '14	55,986	*24,205	31,780	25,282	6,499
12 " " '15	686,388	*301,000	385,387	328,148	57,239
12 " " '14	614,099	*291,343	322,755	278,042	‡73,487

EL PASO (TEX.) ELECTRIC COMPANY

1m., Jan., '15	$92,402	*$43,995	$48,607	$4,186	$44,221
1 " " '14	92,713	*49,548	43,166	4,284	38,881
12 " " '15	1,041,482	*569,919	471,562	51,258	‡420,305
12 " " '14	898,671	*486,064	412,708	59,563	‡371,514

DALLAS (TEX.) ELECTRIC COMPANY

1m., Jan., '15	$179,354	*$105,019	$74,335	$33,417	$40,918
1 " " '14	201,071	*128,399	72,672	26,779	45,893
12 " " '15	2,187,162	*1,264,280	922,882	377,600	545,283
12 " " '14	2,223,756	*1,302,363	921,393	305,113	616,280

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Jan., '15	$53,527	*$30,286	$23,241	$8,770	$14,471
1 " " '14	55,014	*36,589	18,425	8,242	10,181
12 " " '15	671,608	*395,629	275,979	102,164	173,815
12 " " '14	466,062	*291,814	174,248	112,980	137,510

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Jan., '15	$161,999	*$102,011	$59,988	$36,209	$23,779
1 " " '14	197,277	*120,147	77,130	36,485	40,645
12 " " '15	2,388,842	*1,292,723	1,096,119	440,850	655,269
12 " " '14	2,400,726	*1,367,396	1,033,331	324,037	609,294

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Jan., '15	$20,016	*$16,026	$3,990	$5,605	†$1,615
1 " " '14	22,137	*15,198	6,939	5,610	1,329
12 " " '15	274,512	*179,686	94,826	67,059	27,767
12 " " '14	294,611	*179,682	114,929	67,450	47,479

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Jan., '15	$54,761	*$37,502	$17,258	$13,449	$3,810
1 " " '14	62,546	*38,152	24,394	12,868	11,526
12 " " '15	707,470	*467,406	240,064	153,223	86,842
12 " " '14	692,344	*443,174	249,170	145,546	103,624

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Jan., '15	$98,337	*$71,812	$26,525	$35,925	†$9,401
1 " " '14	105,489	*60,480	37,009	35,058	1,951

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEXAS

1m., Jan., '15	$144,672	*$87,270	$57,402	$27,265	$30,137
1 " " '14	173,094	*106,248	66,846	24,227	42,618
12 " " '15	2,042,677	*1,132,260	910,418	320,541	589,877
12 " " '14	2,148,247	*1,192,216	956,031	286,310	669,721

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., Jan., '15	$26,073	*$16,724	$9,349	$7,796	$1,554
1 " " '14	25,670	*18,157	7,513	7,679	†166
12 " " '15	303,918	*192,651	111,267	91,547	19,720
12 " " '14	295,570	*195,022	100,548	90,308	10,240

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Jan., '15	$20,232	*$13,236	$6,996	$7,382	†$386
1 " " '14	23,701	*14,937	8,764	7.268	1,490
12 " " '15	261,371	*168,091	93,280	86,943	6,437
12 " " '14	283,141	*181,196	101,945	82,068	19,877

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Jan., '15	$670,886	*$421,650	$249,235	$178,139	$71,096
1 " " '14	754,035	*434,635	319,400	173,899	145,501
12 " " '15	8,367,824	*4,994,023	3,373,801	2,123,096	1,250,705
12 " " '14	8,665,995	*5,005,097	3,660,899	2,071,120	1,589,779

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Jan., '15	$70,590	*$46,744	$23,847	$23,410	$437
1 " " '14	72,461	*49,038	23,423	23,015	408
12 " " '15	840,768	*550,693	290,076	275,727	14,349
12 " " '14	832,449	*556,883	275,566	267,570	7,996

TAMPA (FLA.) ELECTRIC COMPANY

1m., Jan., '15	$85,360	*$40,971	$44,389	$4,425	$39,964
1 " " '14	80,158	*43,855	36,303	5,062	31,241
12 " " '15	986,202	*517,194	469,008	53,852	415,156
12 " " '14	856,941	*475,616	381,326	56,016	325,310

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*Includes Taxes †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

Progress of Legislation—State and City Measures Pending—Summary From Texas

The measure introduced in the Legislature of New York by Senator Thompson to regulate the jitneys was passed on third reading in the Senate on March 29. The measure provides that buses shall obtain permission to run from local authorities rather than from the Public Service Commissions. Other provisions are that the buses must repair all pavements damaged and must not run in competition with street railway lines. The measure amends Section 25 of Chapter 219 of the laws of 1909 entitled "An act in relation to transportation corporations, excepting railroads, constituting Chapter 63 of the consolidated laws," as added by Chapter 495 of the laws of 1913. The measure is to go into effect immediately.

In the City of New York several applications for permission to operate buses are pending. One of the companies, the New York Central Transportation Company, Inc., has asked the Board of Estimate to permit it to operate 5-cent vehicles between the Pennsylvania Railroad station and the Grand Central Station.

On March 24 the franchise committee of the Board of Estimate and Apportionment met to decide upon routes for motor bus lines to conform somewhat to the applications of the five different companies that desire franchises. In explaining the scope of the work of the franchise committee, Mayor Mitchel said:

"The committee has decided upon a map of the city which traverses the streets in which it is desirable that there be omnibus service. Now the committee will determine the conditions as to payments to the city, fares, restrictions as to operation, responsibility of applicants for franchises, etc. The committee will then report to the Board of Estimate. As far as I am concerned the whole matter is a traffic question. I do not intend to go into the jitney matter until it is actually before me."

Harry P. Nichols, chief of the bureau of franchises of the Board of Estimate and Apportionment of New York, has reported to the Mayor on the application of the Far Rockaway Transportation Company, Inc., for a franchise to operate three stage or omnibus routes for public use in the conveyance of passengers and property in Far Rockaway and Rockaway Beach. Mr. Nichols says that the data on hand with respect to the cost of operation of omnibuses show that a company could not profitably carry passengers the distance proposed by the applicant for a fare of 5 cents. Omnibuses are to be run at intervals of not more than thirty minutes between 6 a. m. and 12 o'clock midnight. The company is to be required to pay to the city during the time of the original grant 5 per cent of its gross receipts, such payments to be the first year not less than $500, but during the succeeding four years not less than $1,500 and during the remaining time not less than $2,000 per annum.

Several of the smaller towns in Texas, such as San Angelo, Sherman and Denton, have passed ordinances which have regulated the jitney so effectively that they have been compelled to cease operation. In Fort Worth the ordinance is being held in abeyance by the authorities pending a decision from the Texas appellate courts. One arrest was made by agreement for violation of the provision requiring a bond of $5,000 to protect persons riding in jitney cars against loss by accident. The case was rushed through the city and district courts and then appealed to the court of criminal appeals on a writ of habeas corpus. The case was set by the Appellate Court for submission on March 31. A decision is expected within ten days from that time.

The proposed Dallas ordinance would require a bond, either with an indemnity company or with personal security, of $2,500 to protect the city and property owners against damage to property. It would not require any bond for protection of passengers, the city commission taking the position that any person riding a jitney must do so at his own risk. Dallas is in the throes of a city municipal campaign now and action on the ordinance will likely be deferred until after the election on April 6.

Houston jitney owners are urging the city commission there to defer action on the proposed ordinance. The ordinance there is similar to that proposed in other cities, the chief feature being a provision requiring liability insurance for protecton of passengers and pedestrians who might be hurt by such cars. The Houston jitney men say so far there is but one company in Texas that will write this kind of insurance and the rates charged are prohibitive; that if the proposed ordinance should become effective, it would have the effect of putting the jitneys out of business.

The City Council of Beaumont, Tex., on March 16 adopted a jitney ordinance which will become effective in twenty days. The ordinance requires that a license shall be secured by jitney operators. The application must contain information in regard to the car, make, number, seating capacity, and horse-power, etc. The proposed route must be designated together with the terminals and the schedule which the applicant desires to observe. Cars seating five people must pay $20 a year each, those seating seven people $30 and for every passenger over seven the operator must pay $5 extra per person. Operators are not to be permitted to carry more than the stated seating capacity of their cars. The word "bus" must be printed in large letters on the car. Operators must file indemnity bonds with the city in the sum of $5,000.

At the hearing in El Paso, Tex., on March 15, the ordinance pending in that city was declared to be unduly burdensome by the operators of the jitneys. The law requires the driver in applying for a license to indicate over what streets he intends to operate and between what terminals, and requires the driver to operate only upon these streets. It fixed a bond of $5,000 to cover liability for any accidents that occur.

The jitney ordinance passed in San Antonio was to go into effect on April 1. A bond not to exceed $5,000 is demanded to secure the payment of damages to all persons injured by carelessness or negligence on the part of jitney operators. Each car is to be held to a regular schedule and operate on certain streets. All automobiles engaged in general transportation are to be assessed $25 for each seven-passenger car and $3.50 for each additional seat, the license to run for one year. The schedule, which must be filed with the city clerk before a license is issued to an operator, must give the terminal of the route, the time to be consumed in making the trip, the number of cars and when each car will leave terminals and arrive at other terminals.

The bill to regulate jitney buses introduced into the Legislature of New Jersey has been passed by the Assembly on fifth reading. An amendment adopted provides that no special franchise taxes such as are required now of street transportation companies shall be paid by jitney corporations if their earnings are less than $5,000 a year. The bill is intended to prevent the operation of jitneys except by corporations under the utilities law and requires that these corporations must obtain a franchise before doing business.

A joint Senate and Assembly committee hearing on the jitney was held at Sacramento, Cal., on March 22. Chairman Cogswell of the committee said: "The proposition must be plain to all parties that the State must see that there is fair competition and that neither the jitney nor the railway be given an advantage. The jitneys must pay the same rate on the gross income as the electric railways and we must take into consideration the fact that the electric railways are required to pave and keep in repair the center of the street." Among those who appeared at the hearing to present the case of the railways were Charles N. Black, vice-president of the United Railroads of San Francisco, and E. L. Lewis, superintendent of the Los Angeles Railway.

In the course of the campaign being carried on at the California State Capitol for legislation that will regulate the jitney bus, it was stated that the gross earnings of the United Railroads of San Francisco have decreased 11 per cent since March 1 as a result of jitney competition. Brokers who canvassed the situation in San Francisco stated that there were more than 500 jitney buses in operation on Market Street, exclusive of those that ply between the Ferries and the Exposition at 10 cents per passenger. Assuming that each jitney bus takes in $5 a day, this makes a total of $2,500 a day deflected from the receipts of the

United Railroads. The Municipal Railway System has not, it was stated, suffered to any great extent.

An act has been introduced into the Rhode Island House by Representative Boswell to regulate the jitney and Councilman Harden of Providence, R. I., has presented to the Common Council of that city a resolution providing for a report upon the need of regulating the jitneys.

The federal trustees of the Rhode Island Company, Providence, have sent a letter to the City Council committee on ordinances pointing out that unless the local jitney bus service is regulated under conditions analagous to those faced by the railway, or unless the latter is relieved of some of its obligations to the city, the company will be unable to continue business. The trustees call attention to the fact that in 1914 there was insufficient revenue to pay a dividend on the company's stock, and that this year the dividends earned will be cut in two, if not wiped out altogether, by the competition of unregulated jitneys. The trustees offer to consider regulative ordinances.

An ordinance governing the operation of jitneys in Cedar Rapids, Ia., has been prepared by Commissioner Lazell and referred to F. S. Dawley, city solicitor, for an opinion as to its legality. The ordinance is modeled after the measure now in effect in the city of Boise, Idaho, which was published in full in the ELECTRIC RAILWAY JOURNAL Feb. 20, 1915, page 397.

At a meeting of the City Council of Toronto, Ont., on March 22, Alderman Walton asked the city solicitor if the jitney bus service could be legally operated on the streets of the city without interference with the franchise rights of the Toronto Railway. The solicitor said that he thought so. The Mayor is reported to have said: "I am glad to see the jitneys on the street, I am sorry that the Council turned down my proposals in the last two years for motor buses. The city should take hold of this scheme itself. We must, however, have the jitneys under reasonable control. They have come to stay, and the city should have a fleet of them. The city should get a reasonable percentage of the receipts of the jitneys. They have proved to be popular, and they are going to depreciate the receipts of the street railway and the city's share of those receipts. The jitneys will act as an educator to motor buses. I am going to take up the matter of their proper regulation with the Toronto members of the Legislature."

After a three-hour session on March 25 Chairman Lee of the joint committee on street and electric railways of the Council of Atlanta, Ga., named a sub-committee to look into the jitney bus ordinances passed by other cities and into the information furnished by the Georgia Railway & Power Company preparatory to drawing up a new ordinance for Atlanta.

A jitney ordinance drafted by the Board of Public Service of the city of St. Louis has been introduced in the Council by Dr. Randall providing rules and regulations for the operation of buses. The bill follows closely the tentative regulations prepared recently by Mr. Talbert, the director of streets and sewers.

The city attorney of Salt Lake City, Utah, has completed the draft of a regulatory ordinance there and turned the measure over to the City Commission. Included within the scope of the ordinance are all motor-driven vehicles operated for transportation of the public in competition with the street cars, except ordinary "for rent" cars such as hotel buses and sight-seeing cars.

The Memphis (Tenn.) Street Railway has just mailed out to a large number of citizens of Memphis pamphlets in which it makes a frank plea for such regulation of "jitney" bus lines as will place them on a fairly competitive basis with the street railway. The statement is given over to a plain discussion of the relations between the city railway and the city and it is stated that each month the railway company pays out in money for street paving more than 675 "jitneys" would pay into the city treasury in a year, under the present licensing law. One of the paragraphs in the pamphlet reads as follows:

"With the increase of investment and the growth of its business, direct taxes of the street railway have steadily increased until $140,000 is the sum which this company is now required to pay annually to the city, county and state and federal governments. It is interesting to present this direct tax burden in another way. The company operated in 1914 an average of 165 cars for an average of fifteen hours each day. These cars average thirty-eight seats each. More than half of the time each day in 1914 half of these seats were hauled empty. For each of the thirty-eight seats in each of the 165 cars the company paid over $22 direct tax and, including the paving tax, the annual tax for each seat was $41.79, or $1,588 per car." There are said to be more than 300 jitneys in operation under license on the streets of Memphis.

According to figures taken from the records at police headquarters in the city of Seattle there were 314 jitney bus accidents between Dec. 28 and March 17. In these accidents eighty-five pedestrians were struck down, thirty-four passengers were injured at the time the autos in which they were riding were damaged, and 195 buses were damaged without injury to passengers or pedestrians.

The Portland Railway, Light & Power Company has contracted with an auto bus company for the interchange of business on the East Side District in Portland, Ore., so as to serve a residence district now without street railway service.

Under an opinion rendered by Attorney-General W. B. Tanner of the State of Washington, Secretary of State I. M. Howell will refuse to accept the filing of any referendum petition against the bill requiring the filing of $2,500 surety bonds by jitney bus and taxicab operators. Mr. Tanner holds that the emergency clause making the act effective on April 10 is valid on the grounds that the act is necessary for the public safety, under exercise of the police power of the State.

NEW COMPANY PUBLICATION

The Virginia Railway & Power Company, Richmond, Va., has begun the publication of *Public Service News*. The first issue was dated March 18. The paper is 6 in. wide by 8¾ in. high. It emphasizes in its title safety first and efficient service. The announcement by the company to its patrons regarding the purposes of the publication follows:

"The Virginia Railway & Power Company is operating in five cities and six counties of this State. It is carrying more than 200,000 passengers and serving more than 20,000 customers with electric light and power every day in the year.

"Its service is an essential element in the daily life of these people, and upon the quality of that service depends not only the convenience, but the growth and prosperity of the communities served.

"To keep the varied and complicated machinery required for this service always ready for immediate demand, to direct the efforts of over 2000 employees, of varying dispositions and fitness, to reasonably satisfy the tastes and ideas of 250,000 people every day, is a difficult task.

"We want to make the street railway and light and power service in the communities served by this company the best in the world. You would like to have it so. Neither the company nor the public can accomplish this alone. They must work together. As partners in a common enterprise—the making of a prosperous and progressive city—there must be mutual understanding and co-operation to attain success.

"The company has long felt the need for some closer and more direct means of communication with its patrons. We want to 'talk it over' with you; to tell you something of the problems which confront us; some of the difficulties encountered by our employees; and some of the ways in which you can help us to give you a good service.

"As a means to this end *Public Service News* will be published and distributed to our patrons on the cars. It is not an advertising scheme. It will not invade the fields of newspapers, but will be used as a medium for talking directly to our patrons, for improving relations with our employees and helping them in the discharge of their difficult duties to the public, for creating a better understanding and closer co-operation between the company and its patrons, and for any other purpose which has as its end and object the improvement and perfection of the public service.

"Intelligent criticism is helpful, but the mere 'knocker' never did and never will do any good. He is a common nuisance. The people who 'reason together' for the solution of their problems and promotion of their common good make community progress and prosperity possible."

INCREASE IN FARES ASKED

As announced briefly in the ELECTRIC RAILWAY JOURNAL of March 27, page 651, Clinton Q. Richmond, general manager of the Berkshire Street Railway, Pittsfield, Mass., has sent a petition to the Massachusetts Public Service Commission asking for authority to establish a new schedule of fares on the road. The petition says in part:

"Your honorable commission in an order dated July 13, 1914, made on petitions of the selectmen and residents of Lanesboro relative to fares and service on the Berkshire Street Railway, Numbered P. S. C. 20 and P. S. C. 479, has said, speaking of your petitioner, as follows:

"'From an investigation of the present financial condition of the Berkshire Street Railway it appears that the company has been unable to meet its operating expenses and fixed charges. This company reported a deficit for the year ending June 30, 1913, of $92,320.43 and no dividend was paid to the stockholders.'

"That for the year ending June 30, 1914, the petitioner was unable to meet its operating expenses and fixed charges, and incurred a deficit of $72,507.17 and no dividend was paid to the stockholders. That owing to the increased cost of labor, the rise in prices and the general increase in the cost of doing all kinds of business, it is necessary that your petitioner should increase its rates of fare, in order, if possible, to meet the cost of providing safe, convenient, adequate and comfortable transportation service for its patrons, and in order to provide an adequate return upon the investment in its property."

Attached to the petition is a schedule providing for the increase of fares by the establishment of zones in which 5, 6 and 7-cent fare units shall apply. Local rates in Pittsfield and North Adams are not increased by the proposed tariff.

LIMITING CAR CAPACITY

The order of the commissioner of health of New York, limiting the carrying capacity of cars, now applies to the cars of the following lines: Eighty-sixth Street, Fifty-ninth Street, Sixth Avenue, Eighth Avenue, Lexington Avenue and Madison Avenue surface lines and the Second Avenue elevated line in Manhattan; Graham Avenue, Flatbush-Seventh Avenue and Third Avenue surface lines in Brooklyn, and the lines of the Staten Island Midland Railroad in Staten Island. The Brooklyn Rapid Transit Company says that persons excluded from the cars of the lines of its system affected by the order crowd cars operating over the same or near-by streets and increase the congestion on these lines.

On March 30 Health Commissioner Goldwater announced that he had received a letter from Theodore P. Shonts, president of the New York Railways, in which he agreed to comply with the orders concerning the Sixth and Eighth Avenue lines after April 5. In his letter to Dr. Goldwater President Shonts said: "We accept this order, reserving the right to raise the question of your jurisdiction in the premises at the proper time." Mr. Shonts said further that his company would not permit inspectors to put passengers off the cars, but would instruct its employees to refuse to move cars when passengers boarded them in excess of the limits prescribed by the health board. Dr. Goldwater further announced on the same day that the Richmond Light & Railroad Company and the Staten Island Midland Railroad had agreed that the order should be adopted permanently on April 12. On March 30 an arrest was made in Brooklyn for overcrowding.

The order limiting the carrying capacity of cars to one and one-half times their seating capacity was extended to the Third Avenue Railway on April 1.

Sunday Operation in Toronto.—The Toronto Suburban Railway obtained permission from the railway committee of the Ontario Legislature on March 26 to run cars on Sunday on the lines through Ward Seven (West Toronto) to Lambton and to Weston, Woodbridge and also Guelph. At present the operation of cars on Sunday is prohibited by the railway act under a penalty of $400 fine.

Reduction in Fare Refused.—The Public Utilities Commission of Maine has issued its decision in the case of the Androscoggin Electric Company on petition of residents of Androscoggin and Cumberland Counties asking that a local service be furnished on the interurban railroad of the company between Portland and Lewiston and that certain rates of fare be changed. The local service is ordered to begin on July 1, 1915, but the reduction in fare is refused.

Public Safety Calendar.—The Sheboygan Railway & Electric Company, Sheboygan, Wis., has just issued a calendar which is attracting considerable attention locally as an effective safety-first medium. The calendar begins with the month of April, 1915, and runs to and through the month of May, 1916. It is 11½ in. high by 8½ in. wide. The upper half is given over to illustrations in the interest of safety methods and the lower half to the calendar proper. It is printed in two colors.

Freight Business Appeal.—The Empire United Railways, Inc., Syracuse, N. Y., is distributing to shippers with the suggestion that they tack it up in their shipping rooms a poster, 24 in. wide by 20 in. high, giving details of its "fast freight service at slow freight rates." In addition to the time-tables the poster contains a table of less than carload class freight rates in cents per hundred pounds from Rochester to other points on the system. In the center there is a half-tone engraving showing one of the new fast three-car electric freight trains.

Retaliatory Measures.—Notice has been served on the Puget Sound Traction, Light & Power Company by the Public Service Commission that unless it continues its present arrangement of carrying passengers on the West Seattle Port Ferry and the stub line in the suburbs for a 5-cent fare the commission will require it to furnish enough cars on the Alki and Fauntleroy lines to provide every passenger with a seat. The announcement by the commission was made on the eve of the company's advertised discontinuance of the Ferry Street car plan.

"Transit Problems in Brooklyn."—The Brooklyn (N. Y.) Rapid Transit Company has reprinted the article "Transit Problems in Brooklyn" contributed by W. C. Jenkins to the *National Magazine*, and is distributing the article in the form of a pamphlet 4¼ in. wide by 7¼ in high. The account of the development of the company is very interesting, but it is not altogether free from the tendency of the magazinist to exaggeration. The article is illustrated with a portrait of T. S. Williams, president of the company, and with halftone reproductions of photographs of cars, equipment and men connected with the company.

"The Man with a Job."—H. S. Newton, general manager of the Ohio Valley Electric Railway, Huntington, W. Va., is distributing to the employees of the company a pamphlet entitled, "The Man with a Job." It is written by Wightman D. Roberts and gives the reflections of the man with a family and a job, when urged by socialists to join their ranks. He admits that there are some dark corners in life—in his own life, in the lives of others, and even of the "boss." At the same time he wonders whether his lot will be any better under a socialistic "commonwealth" where he will probably be a "minority stockholder." His conclusion is that he is not going to kick the ladder out from under his feet.

Welfare Work in St. Louis.—The recent annual pamphlet report of the United Railways, St. Louis, Mo., contained the following reference to the welfare work of the company: "The Employees' Mutual Benefit Association, which was started in February, 1914, has proved a great success. On Dec. 31, 1914, the association had 3247 members, and during the eleven months of its existence paid out in sick benefits $19,212, and in death benefits $5,100. Nothing which the company has even done has been of so much benefit and nothing has brought about such close relations between our employees and the company as the institution of this association. We propose to put into effect in the year 1915 a pension system for aged and incapacitated employees, and also a savings and loan association for the benefit of those employees who wish to save their money, or build or purchase homes of their own."

Demurrage Information for Transportation Men and Farmers.—The United States Department of Agriculture has prepared Bulletin No. 191, a twenty-seven-page digest of the demurrage laws in effect in each of the states for both intrastate and interstate traffic. While intended primarily for farmers and shippers of foreign products, this bulletin should be of interest to shippers of all commodities and to transportation men generally. As indicating how the agricultural industry is affected by existing regulations and practices in the matter of car supply and the marketing of farm products, the salient points of each state code are compared, and the state codes are also compared with the uniform code or national car demurrage rules. The principal provisions of the various codes are listed in tabular form in an appendix. This bulletin can be procured from the superintendent of public documents, Government Printing Office, Washington, D. C., at 5 cents a copy.

The Motorman as an Example.—The Stark Electric Railroad, Alliance, Ohio, has recently posted in its cars a card reading as follows: "Observe the Motorman. Safety first is a good sign to display conspicuously on the front of a trolley car; it is an admonition well to keep always in the eyes of people while they are using the streets. But there would be very few street accidents if everybody were as careful as the motorman. The man at the controller has the right of way and he knows it. In case of a collision he stands a better chance of escaping uninjured than the driver of a wagon or automobile. Yet he is unabating in his constant watchfulness and carefulness. There isn't a day during which somebody does not owe his life to one of the seemingly stolid but really alert fellows in the front vestibules of the cars. Time and experience have given them a charitable feeling toward the surprisingly large number of people who thrust themselves into danger on the streets needlessly and when they really know better. The motormen have trained themselves to look out for the careless persons. Be as careful as a motorman."

Change in Fare at Lexington, Ky.—Return to the old system by which residents of the country districts adjacent to Frankfort, Lexington, Georgetown, Versailles and Paris, Ky., ride on a 5-cent fare is announced by the Kentucky Traction & Terminal Company, to take effect about April 1. The change was made early last year when the act of the Legislature, fixing a rate of 2½ cents a mile, became effective and the company recast its schedule of fares on that basis, believing the law was mandatory, a minimum fare of 10 cents resulting. Since then the law has been held invalid by the courts, and through the unofficial efforts of William F. Klair, member of the State Railroad Commission, the company has decided to reduce rates. In announcing the decision to revise the rates of fare, F. W. Bacon, vice-president, wrote to Mr. Klair in part as follows: "Although the company would not reconsider a recast of its entire fare system, we have decided to re-establish the 5-cent fare minimum zone on the basis of 2½ cents a mile and to re-establish adjacent to the various towns the old 5-cent fare zones, as they originally existed." The Kentucky Traction & Terminal Company was the only electric line in the State affected, as no other lines measure 50 miles in length.

Maine Freight Service Increases.—The freight-by-trolley service between Portland and Lewiston, Maine, has been established by the Cumberland County Power & Light Company. A large business in the carrying of cream to the Auburn creamery, also a good milk-carrying business from the small towns to Portland, has already been worked up by the company, as well as a daily order for transporting several tons of grain from the city wholesale houses to way stations. On account of the decision of the Eastern Steamship Company to make Gardiner its northern terminus on the Kenebec River and to discontinue its service between Augusta and Gardiner, the Lewiston, Augusta & Waterville Street Railway, controlled by the Cumberland County Power & Light Company is considering the establishment of an electric freight service between Gardiner and Augusta and between Gardiner and Waterville. Under the proposed plan freight from Boston will be taken from the steamers at Gardiner and dispatched to Hallowell and Augusta and points between to Waterville. The company has seven freight cars in course of construction at the Laconia Car Works, five flat cars and two motor cars. The company also plans to build a connection to the steamboat wharf at Gardiner and to erect a freight shed there.

Personal Mention

Mr. James O. Marcum, claim agent of the Ohio Valley Electric Railway, Huntington, W. Va., has again been elected Mayor of Ceredo after having served two terms.

Mr. L. B. Wickersham has resigned as assistant engineer of the Spokane, Portland & Seattle Railway and as vice-president of the United Railways, Portland, Ore., which is controlled by the Spokane, Portland & Seattle Railway through the Oregon Electric Railway. He will engage in general engineering work.

Colonel William Hayward, legal adviser to Governor Whitman of New York, nominated by the Governor for appointment as a member of the Public Service Commission for the First District of New York, has been confirmed by the Senate. He succeeds Mr. Milo R. Maltbie, whose terms of office expired on Feb. 1. Colonel Hayward is counsel for the Thompson legislative committee, which has been investigating the conduct of the Public Service Commissions. The new commissioner gained his military title in the Spanish war. He was graduated from the University of Nebraska and went to the front as captain of the Second Nebraska Infantry, and before hostilities closed had been appointed to the command of his regiment. He was three times Republican State chairman of Nebraska and was secretary of the Republican national committee and western manager of the Presidential campaign of Mr. Taft with headquarters in Chicago. Colonel Hayward was an assistant district attorney under Governor Whitman when the latter was district attorney of New York.

Mr. Milo R. Maltbie, who retires from the Public Service Commission of the First District of New York in favor of Colonel William Hayward, is the last of the original commissioners appointed by Governor Hughes. He took office on July 1, 1907, and his first term expired on Feb. 1, 1910. He was reappointed and since Feb. 1, 1915, has been a hold-over. Mr. Maltbie was born at Hinckley, Ill., in 1871. He was graduated from Upper Iowa University in 1892 with a degree of Ph.B., and has the degree of Ph.M. from Northwestern University and Ph.D. from Columbia University. He was professor of economics and mathematics at Mount Morris College from 1893 to 1895, a fellow in administrative law at Columbia University in 1895, secretary of the Reform Club committee on city affairs from 1897 to 1902, and editor of *Municipal Affairs* from 1897 to 1903. He was prize lecturer on municipal government at Columbia University in 1900 and was secretary of the Art Commission of the city of New York from 1902 to 1907. He investigated municipal conditions in Europe for the Reform Club in 1899, was a delegate to the International Congress on Housing in 1902, a member of the committee on municipal ownership and operation of the National Civic Federation and conducted an investigation in Great Britain into the relative merits of municipal and private operations of public utilities for the National Civic Federation in 1906.

OBITUARY

William Borchers, who became associated with Mr. W. B. Strang, president of the Strang Line from Kansas City to Olathe, Kan., nineteen years ago in New York and who came to Kansas City with Mr. Strang as his personal assistant, died on March 15. Mr. Borchers was about forty years old. He was unmarried.

Benjamin Ellery Chase, banker, manufacturer and a director of many corporations, died in New York on March 27 at the age of seventy-two years. Mr. Chase was born at Floyd, Oneida County, N. Y., and was educated at Vernon Academy. He entered the clothing business and later became a manufacturer. He was president of the Central Bank of Rochester, of the East Side Savings Bank of Rochester and of the Ludlow & Southern Railroad of California and was a director of the General Railway Signal Company.

George F. McCulloch, one of the pioneers in the promotion of interurban lines in Indiana, died at his home in Summit, N. J., on March 27. Mr. McCulloch was born in Lancaster, Ohio, on Sept. 25, 1855. His parents removed to Muncie when he was quite young, and he attended the public schools of Muncie, and was graduated from the high school there. In 1872 he was apointed deputy county clerk. During the six years of his service in that office he studied law, and was admitted to the bar in 1881. In 1899 Mr. McCulloch founded the Muncie *Moring Star*, and later became one of the principal promoters of the syndicate which established the Indianapolis *Star* and Terre Haute *Star*. He promoted the first electric street railway in Muncie, Ind., and a few years later, in connection with Mr. Charles L. Henry, Indianapolis, and Mr. Randal Morgan, Philadelphia, he promoted and constructed the interurban lines from Muncie to Indianapolis. Mr. McCulloch was president and treasurer of the original Union Traction Company of Indiana, and for some years acted as general manager of the property. When Mr. McCulloch retired from active management and was succeeded as president of the company by Mr. Arthur W. Brady, he became chairman of the board of directors. During the last few years Mr. McCulloch lived in the East, having withdrawn from the newspaper field and activities in the electric railway business. The funeral was held on Wednesday, March 31, at Muncie, Ind. The body of Mr. McCulloch was brought from the East by Mr. Arthur W. Brady, who is a brother-in-law of Mr. McCulloch. From Fort Wayne the remains were conveyed to Muncie on the Union Traction Company private car, "Martha," which was built for Mr. McCulloch when president of the company and named after his daughter. The private car of Mr. Robert I. Todd, president of the Terre Haute, Indianapolis & Eastern Traction Company, carried as Mr. Todd's guests many former associates of Mr. McCulloch from Indianapolis to Muncie for the funeral. Many glowing tributes were paid to Mr. McCulloch's memory. One of his gifts to Muncie was a finely wooded tract of eighty-five acres, which is now known as McCulloch Park.

OHIO SERVICE CASE

On March 23 the Ohio Supreme Court passed upon questions of law in the case of the Hocking Valley Railroad against the Public Utilities Commission, wherein the commission had ordered the company to resume the operation of electric cars between Hamden and Wellston, a service which had been abandoned on the ground of unprofitableness. The substitution of steam cars was not satisfactory to the patrons of the road, and appeal was taken to the commission. The court says that the fact that some loss would result from compliance with the service order is an important element, but does not of itself conclusively establish the unreasonableness of the order. When a transportation company proposes to abandon a service which it has maintained and for which it received a franchise, the court says the burden of the proof is on it. The court will examine the entire record in connection with the proceeding to determine whether or not the finding of facts by the commission is so much involved with and dependent upon questions of law as to be in reality a decision of law.

FEBRUARY CLEVELAND REPORT

The operating report of the Cleveland Railway made to the directors on March 27 showed a total revenue for the month of $602,772, an increase over the same month in 1914 of $58,821. The revenue from transfers amounted to $53,559. The actual surplus for the month was $45,848, while the net ordinance surplus was $19,307. This increased the interest fund to $318,157. It is the first report in the last four months to show an increase in revenue over the same month last year.

A resolution was introduced in the Council of Cleveland, Ohio, on March 29, providing for the extension of the Warner Road line of the Cleveland Railway into Garfield Park. Action was postponed on Councilman Wood's ordinance to extend the Payne Avenue line to the East 105th Street line. The extension is opposed by Peter Witt, street railway commissioner. At the meeting the company was authorized to contribute $3,000 to the Employees' Mutual Benefit Association.

The directors of the Cleveland Railway have accepted the grant for the section of Euclid Avenue between East Twenty-second and East Fortieth Streets, known as Millionaires' Row.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***East Georgia Railway, Savannah, Ga.**—Application for a charter has been made by this company to build an interurban electric or steam railway from Glennville to Adabelle, with a branch line from Hagan to Claxton. Capital stock, $212,500. Incorporators: Henry P. Talmadge, William B. Stillwell, J. K. McIver, George J. Baldwin, J. F. Minis, T. M. Cunningham, Jr., W. W. Mackall, Leopold Adler and Edwin Leffler, all of Savannah.

***Savannah, Piedmont & Western Railway, Columbia, S. C.**—Incorporated in South Carolina to build an interurban railway from Greenwood to North Augusta, 60 miles, with a minimum capital stock of $30,000 and a maximum capital stock of $3,000,000. Incorporators: J. Peyton Clark, New York City, and S. H. McGhee and Kenneth Baker, Greenwood.

FRANCHISES

Fresno, Cal.—The Fresno Interurban Railway has received a twenty-five-year franchise from the Council to extend its lines in Fresno.

Riverside, Cal.—The Pacific Electric Railway has received a franchise from the Council to operate its new line on Market Street from the north end of Magnolia Avenue to the connection on North Market Street with the Riverside, Rialto & Pacific Railway lines in Riverside.

Ayer, Mass.—The Lowell & Fitchburg Street Railway has asked the Council for permission to extend its tracks in Main Street in Ayer across the railroad tracks to connect with the Ayer terminus of the Shirley-Ayer line of the Fitchburg & Leominster Street Railway.

Louisville, Ky.—The Louisville Railway has received a franchise from the Board of Works to extend the West Chestnut Street line from Twenty-seventh Street and Chestnut Street to Shawnee Park via Madison Avenue in Louisville.

Lancaster, N. Y.—The Buffalo & Depew Railway has received permission from the Council to extend its line from Burlington Avenue along Ellicott road to Central Avenue in Lancaster. Permission also was granted to extend its lines along Transit Road to Bowmansville.

Syracuse, N. Y.—The New York State Railways has asked the Council for a franchise for a double track on Euclid Avenue, in Syracuse.

East Linden, Ohio.—Councilman Lamneck introduced an ordinance in Council at Columbus, Ohio, on March 8, giving the East Linden Electric Railway a franchise for a line extending from the Leonard Avenue viaduct north on Joyce Avenue to the corporation line. This line is to be extended to Shepard. It is in addition to the line to East Linden, for which the company already has a franchise.

Toronto, Ont.—The Toronto & York Radial Railway has received from the Ontario Legislature a two years' extension of time on its franchise to begin the construction of certain lines outside the city limits of Toronto.

Toronto, Ont.—The Humber Valley Electric Railway has received from the Ontario Legislature a two years' extension of time on its franchise in which to begin work on its line through the Humber Valley from Lambton to the mouth of the Humber River and along the shore to Sunnyside. [Feb. 20, '15.]

Pawtucket, R. I.—The Pawtucket Street Railway has asked the Council for a franchise to lay rails on Broad Street over the abandoned roadbed of the New Haven Railroad and relocate rails in Dexter Street and Broad Street and to build new track on Barton Street, between Baxter Street and Broad Street in Pawtucket.

Corpus Christi, Tex.—The Corpus Christi Street & Interurban Railway has received a franchise from the Council to remove its tracks from Buford Avenue, to discontinue the operation of the belt line and instead operate two lines to South Bluff.

TRACK AND ROADWAY

Birmingham & Chattanooga Railroad, Birmingham, Ala.—Surveys have been completed by this company between Birmingham and Chattanooga, 145 miles, grading has been completed from Boaz northeast for about 3 miles, and construction will be resumed as soon as financial conditions are improved. J. M. Spradin, Boaz, president. [April 11, '14.]

Fresno (Cal.) Interurban Railway.—Plans are being made by this company for an extension east from the Fresno extension to Las Palmas where the road would cross the Southern Pacific Railway tracks and go east ½ mile, and then north through the Lynch and Tarpey properties to the Melvin road, where it will continue north toward the eastern border of Clovis. The company will soon ask the Clovis City Council to grant a franchise on Fifth Street, from the eastern to the western city limits, from which point it is hoped to extend to the Glorietta vineyard.

Vallejo-Benicia Electric Railway, Vallejo, Cal.—This company reports that the proposition to build an electric railway between Vallejo and Benicia has been abandoned for the time being on account of financial conditions. No construction work has been begun. Joseph J. Henry, president. [Jan. 30, '15.]

Danbury & Bethel Street Railway, Danbury, Conn.—Work will be begun at once by this company to extend its electric lines from the Stearns Lime Company near the Danbury line through Brookfield Junction to Brookfield Center, a distance of 4 miles.

Jacksonville (Fla.) Traction Company.—This company is double tracking its line on Hogan Street and Forsythe Street in Jacksonville.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—During the next few weeks this company will award contracts to build about 2 miles of new track with two turnouts in Lewiston. H. C. Hartung, Lewiston, general manager. [March 20, '15.]

Centralia (Ill.) Traction Company.—This company is extending its line about 1 mile south to the Illinois Central Railroad shops in Centralia.

Galena, Ill.—F. J. Meller, secretary of the Galena Commercial Club, has received word from promoters of the proposed electric railway from Galena to Freeport that they will begin surveying for the line about April 10. Headquarters will be in Galena.

Kewanee & Eastern Electric Railway, Kewanee, Ill.—Surveys are being made and right-of-way is being obtained by this company on its line in Kewanee. C. G. Lampman is interested.

Illinois Traction System, Peoria, Ill.—This company has given up the plan, at least temporarily, to build the branch line from Martin Stop to Wapella.

Kankakee & Urbana Traction Company, Urbana, Ill.—Plans are being made by this company to extend its line in a northerly direction from Kankakee.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Arrangements are being made by this company to extend its Lewis Street line to the eastern city limits of Fort Wayne.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Board of Public Works has directed that this company pave between the tracks; that the work of rebuilding the lines be done on Senate Avenue from Tenth Street to Twenty-first Street; on Kentucky Avenue from West Street to Sand Street; on Oliver Avenue from Birch Street to Division Street, and on Brookside Avenue from Massachusetts Avenue to Eighteenth Street in Indianapolis.

Lafayette & Northwestern Railway, Lafayette, Ind.—Preliminary arrangements are being made by this company to begin work soon on its proposed electric railway to connect Lafayette and Chicago, via Rensselaer, Hammond, Princeton, Round Grove and West Point. O. L. Brown, general manager. [March 6, '15.]

Tri-City Railway & Light Company, Davenport, Ia.—During the next few months this company reports that it plans to relay some of its tracks, using in all about 250 tons of new rails.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—This company awarded contracts on March 19 to S. Dolman Sons, Topeka, at $100,000, for grading the roadbed between Bonner Springs and Lawrence, Kan., a distance of 20 miles. Four bridges from 60 ft. to 160 ft. in length and six or eight smaller ones over culverts will be contracted for very shortly. Contract for the grading calls for work to start April 1 and it is expected that track laying will begin Aug. 1.

United Railways & Electric Company, Baltimore, Md.—This company is asked to consider plans to extend the Columbia Avenue line to Lansdowne and the adjacent section.

Minneapolis, Minn.—Frederick W. Cappelen, city engineer, states that the project to build a municipal electric railway in Minneapolis has been abandoned for the present. [Nov. 29, '13.]

Electric Short Line Railroad, Minneapolis, Minn.—An extension from Minneapolis to Faribault via Shakopee is being planned by this company.

Minnesota Northwestern Electric Railway, Minneapolis, Minn.—This company reports that it has placed in operation the 20-mile section of its line between Thief River Falls, Silverton and Goodridge. The company's repair shop is located at Thief River and it operates one car. Capital stock, authorized, $50,000. Capital stock, issued, $50,000. Bonds, authorized, $150,000. Bonds, issued, $150,000. Daniel Shaw, Thief River, president. [Aug. 8, '14.]

Southern Minnesota Traction Company, St. Paul, Minn.—Plans are being considered by this company to begin work soon on its proposed line between Faribault and Waseca. H. C. Theopold, Faribault, is interested. [Oct. 3, '14.]

Caldwell County & Southern Railway, Kingston, Mo.—This company reports that work will not be begun on this proposed 9-mile electric railway between Kingston and Hamilton until financial backing has been secured. David Miller, Kansas City, president. [April 18, '14.]

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—The work of grading the right-of-way for this railway will be resumed as soon as weather conditions will permit. Equipment and provisions are now being assembled, in charge of C. H. Dameron, the promoter, and the active work will be in charge of John Dameron. Most of the grading yet to be done is in the corporate limits of Huntsville, the remainder of the line having been graded and concrete culverts installed during the summer of 1913. [March 27, '15.]

Nevada Water, Light & Traction Company, Nevada, Mo.—Work has been begun by this company on the extension on South College Street in Nevada.

Ismay, Ekalaka & Southern Electric Railway & Power Company, Ismay, Mont.—This company reports that the construction of this proposed railway from Ismay to Ekalaka has been indefinitely postponed for want of funds. William Fulton, Ismay, president. [April 25, '14.]

Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B.—A 4-mile extension from Moncton to Fox Creek is being considered by this company.

Jersey Central Traction Company, Keyport, N. J.—During the next few weeks this company expects to build about 1 mile of new track.

Albany Southern Railroad, Albany, N. Y.—Contracts have been filed with the Public Service Commission for the Second District, by this company and the United Traction Company, providing for a double-track loop around the Plaza at the foot of State Street, which the Albany Southern Railroad wanted for its cars. The new plans have been approved by Inspector Barnes of the commission, and by the city authorities.

Brooklyn (N. Y.) Rapid Transit Company.—This company has filed with the Public Service Commission for the First District a form of contract and plans for widening the elevated structure on Fulton Street, from Nostrand Avenue to Adams Street, so as to provide for a third track. The plans provide also for a number of changes in stations west of Franklin Avenue. Two stations are eliminated, one at Boerum Place and the other at Cumberland Street. Changes are also made at Duffield Street, where the entrances are removed from Duffield Street to a point west of Bridge Street and a point east of Elm Street, in Brooklyn.

New York, N. Y.—On Friday, April 9, the Public Service Commission, First District, will receive bids for the construction of Section No. 4 of Routes Nos. 4 and 36, that part of the Broadway-Seventh Avenue subway in Manhattan lying between Fifty-first Street and Fifty-ninth Street, for operation under the dual system agreements by the New York Municipal Railway. This line is now entirely under contract save for the stretch in Broadway and Seventh Avenue between Thirty-eighth Street and Fifty-ninth Street. It is expected that the contract for the section extending from Thirty-eighth Street to Fifty-first Street will be advertised for bids within the next few weeks.

Syracuse & Suburban Railroad, Syracuse, N. Y.—Improvements to cost more than $10,000 will be made to this company's line between Jamesville and Orville shortly after April 1. The engineers of the company have completed the plans for the work. It is planned to start the improvements as soon as the weather will permit. The roadbed will be reinforced with gravel and new steel rails will be laid.

Cleveland (Ohio) Electric Railway.—An extension of the Payne Avenue line through Hough Avenue to East 105th Street in Cleveland is being contemplated by this company.

Defiance (Ohio) Interurban Railway.—This company reports that no definite plans have been made when work will be begun on this proposed railway to connect Defiance, Ohio, and Fort Wayne, Ind., via Ashland, Emmett, Paulding, Cecil, Antwerp and New Haven. K. V. Haymaker, Defiance, president. [March 9, '12.]

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—Plans are being made by this company for the completion of its line between Waynesburg and Blacksville, W. Va. A meeting of the stockholders is announced to be held at Waynesburg on April 5. The object of the meeting is stated as being for the election of directors, the authorization of the sale of securities and the approving of the contract for the completion of the railway.

Port Arthur (Tex.) Traction Company.—This company has begun work on the construction of the line over the pleasure pier causeway.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Directors of this company, following a meeting in the office of Vorles P. Brown here, announced that plans were about made whereby the project would be financed. Prediction was made that work of construction would begin in a few weeks. [Aug. 8, '14.]

Monongahela Valley Traction Company, Fairmont, W. Va.—This company is rebuilding with heavier rails about 3½ miles of its lines in Fairmont, which includes repaving along improved lines with adequate foundation.

SHOPS AND BUILDINGS

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—This company has made arrangements to purchase land with a 50-ft. front on Lincoln Street and extending 200 ft. through to the river, for a freight terminal in Lewiston.

St. Louis Water Works Railway, St. Louis, Mo.—This company has completed its new passenger station at Baden, the southern terminus of the waterworks line. The structure is of Roman brick and red Roman tile, and is 225 ft. long.

Atlantic Coast Electric Railway, Asbury Park, N. J.—This company is erecting a new office building and storehouse at Allenhurst, N. J.

POWER HOUSES AND SUBSTATIONS

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—During the next few weeks this company expects to purchase one 125-motor generator set for its power house in Lewiston. H. C. Hartung, Lewiston, general manager.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has decided to install an electric lighting and power plant at Burrton.

Toledo Railways & Light Company, Toledo, Ohio.—This company has placed a contract with the Westinghouse Electric & Manufacturing Company for a 20,000-kw turbo-generator, with all electrical equipment.

Manufactures and Supplies

ROLLING STOCK

Port Arthur (Tex.) Traction Company is reported as having ordered four double-truck trailer cars.

Lehigh Valley Transit Company, Allentown, Pa., is converting four open cars to closed cars in its Allentown shops.

Southern Illinois & St. Louis Traction Company, Harrisburg, Ill., through W. H. Schott & Company, Chicago, has ordered eighteen interurban cars from the American Car Company.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., advises that it is about to let a contract for four new passenger cars which will be larger and capable of higher speed than those already in operation.

Toronto (Ont.) Civic Railway received till March 30, 1915, through the Department of Works, Toronto, tenders on one sweeper body and equipment for the St. Clair Avenue Division and four car bodies, including mechanical and electrical equipment for the Lansdowne Avenue extension.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., has ordered forty-five box cars, nine passenger trail cars, two combination mail and express cars and one baggage car from The J. G. Brill Company, and two gas-electric motor cars and three gas-electric locomotives from the General Electric Company.

Chicago Automobile Transportation Company, Chicago, Ill., is the name of the company which was noted anonymously in the ELECTRIC RAILWAY JOURNAL of March 6, as having ordered forty auto buses from The J. G. Brill Company. S. E. Lyon is president. The chasses have not been selected as yet, but two types are now up for final decision. Information regarding details of equipment will be forthcoming shortly. This is a 10-cent-fare line.

TRADE NOTES

Algoma Steel Company, Sault Ste. Marie, Ont., has received an order from the Northern Ohio Traction Company for 500 tons of rails.

Federal Signal Company, Albany, N. Y., announces that its New York office is now located in the Vanderbilt Concourse Building, 52 Vanderbilt Avenue, with direct underground connection with the Grand Central station and Interborough subway.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order to equip with No. 323-A four-motor equipments the first lot of twenty cars which were recently ordered by the Binghamton (N. Y.) Railway from the Cincinnati Car Company.

The J. G. Brill Company, Philadelphia, Pa., is reported as having received orders to ship through L. Rubelli's Sons, Philadelphia, fourteen cars to South America, including three cars already shipped for Venezuela, and eleven cars to be shipped later this month for use in Sao Paulo, Brazil; Bogotá, Colombia, and Quito, Ecuador.

Pennsylvania Steel Company and Lorain Steel Company have received an order from the Rhode Island Company for 1600 tons of girder rails. The former company also received an order from the New York Municipal Railway for 800 tons of rails, while the latter company received from the same railway an order for 1600 tons of girder rails.

A. G. Shaver has opened an office as consulting engineer at 1640 Transportation Building, Chicago. He will give particular attention to work in railway signaling and telephone and electric power plant construction. Mr. Shaver recently resigned as secretary of the Hallet Iron Works, manufacturers of line material and tools, Harvey, Ill. He was formerly signal engineer for the Chicago, Rock Island & Union Pacific Railroad, and for the Hall Signal Company.

American General Engineering Company, New York, N. Y., has secured the manufacturing rights and general sales agency for the Krombach centering device for the accurate boring of motor bearings. This company has recently sold to the Brooklyn Rapid Transit Company a number of A. G. E. portable telescope jacks for removing air compressors from the underframes of cars. These jacks will be installed in the twelve main repair shops and depots of the railway.

Western Electric Company, Hawthorne, Ill., in connection with the quarterly meeting of the Electrical Jobbers' Association and the Electrical Manufacturers' Association, held at Chicago during the week of March 15, invited the members of both organizations to visit its plant at Hawthorne on March 19. Many of the members of both associations accepted the invitation and made the trip to Hawthorne in a special train provided for the purpose by the company. Luncheon was served in the company's restaurant, after which the visitors were shown through such portions of the plant as time permitted.

Edwin G. Hatch has recently resigned as treasurer and manager of the Clark Electric & Manufacturing Company, New York. Mr. Hatch has also been associated with Walter G. Clark and for more than a year has had entire charge of Mr. Clark's New York office and the specification, testing and shipping of high tension electrical material. Mr. Hatch has not made definite plans for the future, but will probably open an office for consulting work in connection with the purchase, etc., of material for transmission lines and power houses. He will also probably specialize in protection systems for overhead line crossings.

Standard Woven Fabric Company, Framingham, Mass., manufacturer of friction tapes, splicings and rubber specialties for general electrical and mechanical uses, has appointed Frederick J. Gleason as director and general superintendent. Mr. Gleason was the founder of the Massachusetts Chemical Company and has had twenty-two years' experience in the manufacture and handling of rubber goods. Up to the time of joining the new company he was vice-president and general superintendent of the Walpole Tire & Rubber Company. The Standard Woven Fabric Company will open an office in New York at 1779 Broadway, which will be in charge of Charles O. Anthony.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order from the Union Traction Company of Indiana, Anderson, Ind., for twenty complete quadruple equipments of No. 333-V motors and HL control. These new equipments will replace some of this railway's high-speed passenger equipment consisting of 50-C motors and Type L hand control. Aside from the reduced maintenance, resulting from the more efficient types of motors and control, the desirability of train operation was one of the factors in making this change, and the new cars will not only run in trains with each other but also with the present equipments of Westinghouse No. 303 motors and HL control, of which the Union Traction Company of Indiana has seventeen equipments now in operation.

Edison Lamp Works of General Electric Company, Harrison, N. J., has reduced its list prices for practically all the sizes and types of Edison Mazda multiple lamps. On the regular straight side and round bulb lamps, from the 10-watt to the 250-watt sizes, also on sign lamps, stereopticon lamps, etc., the reductions range from 3 cents to 20 cents per lamp, according to the size. These reductions average about 10 per cent. The new concentrated filament vacuum lamps of 25, 40 and 60-watt sizes now list at only 5 cents per lamp more than the regular lamps of corresponding sizes. On the gas-filled, multiple lamp of 100 to 1000-watt sizes the reductions range from 50 cents to $1 per lamp, the average reductions being between 20 per cent and 25 per cent. The introduction of gas-filled lamps has been exceptionally rapid. More than a million are already in use.

ADVERTISING LITERATURE

Bridgeport Brass Company, Bridgeport, Conn., has issued a sheet on its "phono-electric" trolley wire.

Ohio Brass Company, Mansfield, Ohio, has issued a folder containing marginal illustrations of a number of the more prominent electric railway installations of its catenary materials. The folder also announces this company's order for approximately 100,000 hangers to be used on the second section of the Chicago, Milwaukee & St. Paul Railroad's new electrification. About 67,000 Type X strain insulators will be used on both sections. The transmission lines are to be equipped with O B suspension type insulators.

St. Louis Malleable Casting Company, St. Louis, Mo., has recently published a catalog which describes in detail its electrical pole and line hardware. A number of new designs which are of particular interest to electric railways have been illustrated in this catalog. Some of the products included among the new designs are malleable-iron split insulators for feed wires, in the form of insulated racks and feed-wire holders; malleable-iron pole sleeves for reinforcing steel poles, malleable-iron screw clamp ears, trolley frogs, crossings, pullovers, strain plates and hangers. Other hardware specialties described are: malleable-iron gear cases, journal boxes, cast-iron brakeshoes with hard-iron inserts, pole anchors, wooden strain insulators, pole-top pins, lightning arresters and various kinds of pins and brackets. While this catalog directs attention to the completeness of this company's line of electrical pole and line hardware, it also mentions the fact that patterns for special designs and sizes to meet the requirements of any engineer will be made free of cost if reasonable quantities are required.

Steel City Electric Company, Pittsburgh, Pa., has issued a folder describing and illustrating its Marchand clamps for stranded wire. Clamps for seven-wire strand are made in three styles—clevis clamps, twin clamps and pole clamps. Clamping is effected in a simple manner by means of a wedge. The clamp proper consists of a cone-shaped socket and conical wedge. The conical wedge is slotted to allow compression and has a hole through the center for the core or center wire to pass through. The strand is first inserted in the socket and the tapered plug is forced over the core or center wire so that the sheath wires are spread apart. The cable is then drawn back into the socket by the cable strain, the tapered plug compresses and grips the core wire or wires and the sheath wires are gripped or wedged between the tapered plug and the wall of the socket. A separate sheet which accompanies the folder reproduces fac-simile copies of reports submitted by the Pittsburgh Testing Laboratories which are evidence of the effectiveness of the clamps.

NEW PUBLICATIONS

Facts on Municipal Ownership in 268 Towns and Cities. By Glenn Marston. Public Service Publishing Company, Chicago, Ill. 32 pages. Paper, 25 cents.

This pamphlet contains an alphabetical list of cities in the United States where municipal utilities have either actually gone out of business or are dependent on the taxpayers for continued existence. It is stated that nearly 200 of the places listed were personally investigated by the author, and in other cases the information was secured from the most reliable sources, generally city and state officials and reports. The cases cited in this pamphlet are mostly those of gas, electric and water utilities.

Public Utilities Reports Annotated. Decisions of the Public Service Commissions and of State and Federal Courts. Lawyers' Co-operative Publishing Company, Rochester, N. Y. Annual subscription, $5 per volume; single advance parts, $1 each.

No. 1 and No. 2, dated respectively Feb. 18 and March 4, have appeared. No. 1 contains 128 pages, and No. 2, 254 pages. The advance sheets, published fortnightly in this form, will be followed by bound volumes on thin India paper to be published as sufficient matter accumulates in advance sheets. The purpose of this publication was set forth in the ELECTRIC RAILWAY JOURNAL of Dec. 5, 1914. The series began with cases decided after Jan. 1, 1915. Editorial preparation of the reports is in the hands of the publishers' permanent staff, in special charge of Henry C. Spurr. The publishers also acknowledge the services of A. S. Hills, formerly in charge of the bureau of commission research of the legal department of the American Telephone & Telegraph Company, and of Messrs. Smith, Knowlton and Hatch, attorneys, with offices at Colorado Springs, Col.

The wide and valuable scope of the work is shown by the fact that cases in the first numbers relate to gas, electric, telephone, water, and steam and electric railway utilities. The publication gives utility officials promptly the complete text of all leading decisions in this field of jurisprudence. A service of this kind has been needed. Accurate knowledge of all higher court and commission decisions on regulation is indispensable for all utilities.

Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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QUALIFICATIONS OF COMMISSIONERS

The editorial discussion of the proper qualifications of a public service commissioner, following the appointment of Colonel Hayward to the Public Service Commission, First District, New York, is a healthy sign. While no exception is taken to the new appointee personally, the sentiment is generally expressed that he has not had the experience or training necessary to fit him for the extremely responsible position to which he has been appointed. While both of these qualities may be acquired, it is hardly the purpose of the commission to serve as a training school in transportation matters for its members. When public service commission regulation began, we said that the success of the idea would depend entirely upon the character of the men who would be induced to accept positions of this kind. The opportunities for constructive work are so large that we believed, and still believe, that the position would appeal to a certain number of men of broad caliber and public spirit who reside in every community. But these men will not be seekers for the position. They can be induced to accept it only by an appeal to their sense of civic duty, and their services can be retained only when a well-informed public opinion insists that appointments to the commission shall not be the means of payment of political debts. We are glad to see evidences of a better general realization of the importance of the office of public service commissioner, even if the facts are not fully understood in all of the state capitols.

UTILIZING INERTIA OF MOVING TRAINS

At the last meeting of the New York Railroad Club, W. S. Murray again called attention to the flywheel effect of moving trains, mentioned editorially in this paper on page 265 of the issue for Feb. 6. According to Mr. Murray, the heavy load peaks expected at the Cos Cob power station from the starting of the 3500-ton freight trains did not materialize. The moving trains obligingly give up some of their stored kinetic energy by slowing down a little, being encouraged to do so by the slight voltage drop due to the extra draft of current by the freight train. In this issue we print a communication giving the results of some calculations of this phenomenon. The author assumes that a heavy train is operating on the d.c. section of the New Haven line (on the New York Central track in New York City), and that a 10 per cent voltage drop occurs. By a simple graphical method he calculates the current drop and the varying rate at which current and speed attain steady values again. The interesting results of the calculations are that the reduction in load is ample and its duration sufficient appreciably to relieve the power house. The assumed voltage drop caused a load reduction two-and-a-half times as great as itself. As Mr. Murray pointed out in his New York discussion this inertia effect is another illustration of the principle of regeneration. There is this difference, however, that stored kinetic energy is drawn upon in this case, whereas potential energy is drawn upon in the three-phase system.

COMPANY SECTION INITIATIVE

Although there are as yet but a handful of company sections of the American Electric Railway Association all of these are developing new ideas or applying old ones in new ways. Among the chief advantages which a national association section has over one purely local in nature is the interaction of the spirit of emulation with the resultant stimulation which is naturally fostered. Each section wants to "go the others one better," and increasingly lively competition brings out the talent for invention which often lies dormant. We see this effect already and expect to see it still more as all of the sections become familiar with what each is doing. As examples of originality and adaptiveness we note the following: The Public Service Railway section has inaugurated a course in public service economics to continue through two seasons. The new Manila section has resolved to capture the medal for the best section paper, being stimulated in this resolve by C. N. Duffy's offer to add a $100 prize if this is done. The Washington section recently conducted a competition for the best paper from trainmen and others on the trainman's duties. The Milwaukee section not only produced but wrote a play which made a decided hit, besides capturing the section medal last year. The Denver section utilizes to the full the publicity facilities afforded by the *Tramway Bulletin*, which is its official organ. These are but a few of the straws which show the way the wind blows. What's the next "stunt"?

SHOW THE SHOPMAN

Not so long ago the only repository of maintenance costs was the greasy notebook of the master mechanic. To his aides this tattered volume was as a royal arcanum, a book of seven seals. As secrecy does not beget teamwork, it is no wonder that foremen and inspectors, under chiefs of this type, showed little ambition to improve their practices. In these days this condition is rapidly giving way to a course of publicity that often transforms indifference to enthusiasm. A pioneer in this work is the Mechanical Improvement Club of the Memphis

Street Railway, which has practiced shop publicity for the past eight years, largely through the medium of quarterly meetings. The high standard of this co-operation is reflected in the account of the latest meeting of the club, chronicled elsewhere in this issue. The two papers abstracted in this account are not notable so much for new ideas as for the broad points of view manifested by men who are serving in such positions as night foreman and truck foreman. The Memphis Street Railway is not a large property, yet its Mechanical Improvement Club numbers nearly a score of men who at one time or another summarize past and present performances in open meetings. In addition to the discussions provoked at these quarterly meetings, changes from month to month as compared with preceding years are posted on a shop chart which is accessible to all. The comparative records reproduced in the article in this issue certainly are a splendid justification of a publicity that arouses the will to do better in every branch of the maintenance department.

SCIENTIFIC CAR SCHEDULES

Nothing so irritates the conscientious engineer as waste of energy, and his constant effort is to reduce it. Sometimes, to be sure, he is so absorbed in the work of saving energy that he overlooks the cost of doing so and spends as much or more on one side of the ledger as he saves on the other. But this is the exception. There is no doubt greater interest being felt in the economics of operation than ever before. The higher costs of operating cars and the diminishing income per car-mile have forced upon the railway men the consideration of energy saving as an element of operating cost reduction. This fact explains why the fundamental and familiar principles of energy consumption in train operation are receiving so much attention at present.

It is interesting to note here that these fundamentals were enunciated as far back as 1898 in an article written in that year in the STREET RAILWAY JOURNAL by A. H. Armstrong. He showed, for instance, that the energy consumption per car-mile, for a given schedule speed, considered as a function of the rate of acceleration, varies inversely with the latter, but a point is reached beyond which increase in rate of acceleration does not produce commensurate saving in energy. The inverse relation mentioned exists because the more quickly the car reaches maximum speed and the longer the coasting period, the lower will be the speed when the brakes are applied. As the kinetic energy absorbed while the car is being stopped is proportional to the square of the speed at the time of brake application, any reasonable reduction in this speed is worth while. A modern instance of this truth is cited in the paper by H. P. Fligg, on coasting, presented at the last meeting of the Denver Tramway section of the railway association and abstracted elsewhere in this issue. Of course, high accelerating rate means large commutating capacity and large heat-absorbing ability of motors, i.e., large motors, so that an economic balance must be struck between first and maintenance costs of motors, controllers, etc., on the one hand and energy cost on the other.

Closely associated with these articles in thought is that which appeared in the issue of April 3 by G. W. Remington in which another interesting comparison was made. This was between energy consumption in two runs in which the same accelerating rate was used but in one of which straight-line acceleration was continued much longer than in the other. This run required much larger motors than the other because inefficient acceleration on resistance was continued longer, requiring a higher gear ratio or its equivalent and correspondingly larger starting current. The inefficiency of the high-maximum-speed run is indicated by the high speed at the point of brake application. Here a 3 per cent schedule-speed increase was secured at 75 per cent increased energy cost and a greatly increased motor cost, obviously a most extravagant procedure. While the example presents an exaggerated comparison it shows how sensitive is energy consumption to the influence of acceleration and coasting.

MODERN EVIDENCE PRESENTATION

An editorial, published last week and entitled "Records as Evidence," directed attention to the extensive use by the Western steam railroads of the actual transportation records as evidence in an arbitration hearing on wage increases. The same thing is going on at present in Boston where the Bay State Street Railway is confronting a similar demand. Examples of the kind of evidence which the railway is presenting are printed elsewhere in this issue. The data which its experts are putting before the board are of the same nature as would interest the company's directors. The figures and diagrams are all capable of verification and form an impressive exhibit. The employees justly contend that living expenses have been increasing rapidly of late years. Everyone admits this. But at what rate have they been increasing? Generalizations and impressions are qualitative, not quantitative, and when it comes to calculating to within a fraction of a cent what wages a railway can pay, a quantitative measure is requisite. The Bay State Street Railway is wise, therefore, in first determining what the facts are and then presenting them forcibly. The result will be of great educational value, entirely aside from the outcome of the present controversy. Once a reasonable basis of agreement regarding a fair relation of profits, wages and cost of living is established, it is a mere matter of accounting to maintain this.

This tabulation of costs of living of electric railway operatives is by far the most comprehensive of any which have been made, so far as we know. The best general indications of the cost of living which are available are the "index numbers" prepared by several authorities, which are made up week by week from the costs of staples. A graph of one of these, the index number of the New York *Annalist*, is shown in one of the diagrams which accompany our report of the Bay State testimony and was selected from among several used by the company in the hearing. This number is based on the average wholesale prices of twenty-five staple foodstuffs weighted in the proportion of their use by an average family. As far as the country as a whole is concerned it should be an accurate gage of food costs, but, as the chart shows, it is not a measure of costs in the Bay State district. In spite of the much higher rate of increase of food costs in this district the wage-rate increase has more than kept pace with it.

The company's testimony showed conclusively that, while in five years the number of passengers carried per car-hour had increased slightly the number per conductor is less and the average schedule speed is less also. Evidently car crews do not have to work any harder. During this time the wages have increased more rapidly than the cost of living by 2.6 per cent of the cost, or nearly 25 per cent of the increase. At present each Bay State crew is making an annual car mileage less by 29 per cent than a Middlesex & Boston crew and less by 7 per cent than a crew on the Boston Elevated surface lines. That working conditions are satisfactory to the men is indicated by the fact that more than one-half have been with the company longer than five years and more than 40 per cent are drawing the maximum wage. Furthermore, according to Professor Richey, 21.9 per cent of the gross income is paid out in wages, compared with 21.7 per cent, the average for Massachusetts, and 20 per cent, the average in New England. In this connection, it is interesting to note that during the fiscal year ended June 30, 1914, the net income of the company was 13.7 per cent of the gross income, as compared with 15.3 per cent during the previous year, showing a loss of 10.4 per cent, although the company did a larger business. Thus, while the demands of the wage earners and the public have increased, the income to the stockholders has decreased by a large percentage.

DIVIDENDS AND RATE MAKING

It has often happened that the declaration of large dividends on the capital stock of public service corporations has been immediately followed by insistence on the part of its patrons that the rates of the company are too high. This question recently came up before the Board of Public Utility Commissioners of New Jersey in the Acquackanonk Water Company case, and the resulting decision discusses for probably the first time an official commission view of such a point.

In answer to the contention that during recent years the company had declared exceptionally high dividends and that this proved the return of the company on its existing rates to be exorbitant, the commission stated that such a contention must have as its foundation the proposition that the par value of the aggregate of the securities of a public utility is the basis upon which the company should be allowed to earn a return. The commission held, however, that the par value and the market value of outstanding securities are not controlling factors, and that the reasonableness of any rate must be determined under normal conditions by reference to the return upon the fair value of the property reasonably employed in public service when operated with reasonable economy and efficiency. The par and the market value of outstanding securities are sometimes less and more often greater than this fair value, and if it cannot be successfully contended that the par or the market value should be accepted by the public as a basis for rate making when such value exceeds the fair value, it likewise cannot be successfully contended that such value of securities when less than the fair value should be accepted by the utility as the measure of its right to earn.

Speaking more specifically of the dividend rate, the commission asserts that the size of the dividend paid by a public utility cannot control a rate-making body in determining the reasonableness of the utility's rate. Whether, after a company has provided for its operating expenses, depreciation charges and fixed charges, there is anything left for division among the stockholders, depends upon the economy and efficiency of its operation, the amount of its fixed charges and the amount of its rate. Fixed charges might be reasonable, the volume of business what might be reasonably expected in the territory supplied, the rate reasonable as judged by recognized rules, but the utility might have nothing left with which to pay dividends. Another utility operating under identical conditions might, on account of superior efficiency and economy of management, have a surplus available for dividend distribution, but the amount of its capital stock might be so great that the dividend percentage would be very small. Still another utility, working under the same conditions, might have a smaller capital stock on which to declare a dividend from a surplus equal to that accumulated in the second instance, and the dividend percentage would be very large. If the theory—that the amount of dividends declared should receive primary consideration in rate-making—should be carried to its logical conclusion, the first utility referred to above should have its rates increased because it paid no dividend; the second utility should be allowed a smaller rate increase because its dividend was very small, while the third utility should have its rates decreased because it paid a high dividend. This, as the commission states, would lead to the most palpable absurdities.

The rate-making rule of the Board of Public Utility Commissioners of New Jersey precludes the giving to the capitalization and dividend record of the company any controlling and determining force. This, however, does not mean that they do not receive consideration as elements in rate making. As for the dividends in particular, the record of such payments is naturally considered in making any allowances to the company for going value or for the development of business in the first stages of operation. To take such figures, however, as the sole evidence of what reasonable rates should be, would constitute a tax on utility management. This same idea is brought out in Wisconsin decisions, where the rates are fixed to yield utilities a minimum return, the companies being free to earn any additional amount if possible through the use of more efficient and more economical principles and devices.

Printing 1,000,000 Transfers a Day

The Third Avenue Railway System Prints Its Own Transfers at a Net Cost of 9 Cents Per 1000 This Article Is a Description of the Plant, Equipment and the Printing Practice

On Jan. 15 of the current year the Third Avenue Railway System placed a printing plant in operation in a new building at East 133d Street and Third Avenue. The printing office occupies the first floor, and the efficiency department, which was described in the ELECTRIC RAILWAY JOURNAL for March 20, the second floor of this building. At present the printing plant is devoted exclusively to the printing of transfers, which are of the double coupon type illustrated.

The equipment comprises the following machinery: Two series V, model 2, Meisel transfer presses, each driven by a 3-hp Crocker-Wheeler motor; three No. 4 Boston wire stitchers; one 35-in. Seybold "Dayton" cutter, driven by a 2-hp Diehl motor; one steel "Economy" baler; one 500-lb. capacity tiering machine from the Economy Engineering Company, Chicago, Ill.; packing tables, transfer cases, employees' metal lockers of Penn-Dar type; one 2-ton auto truck. Including the delivery service, the department staff numbers the chief, five men, two boys and four girls.

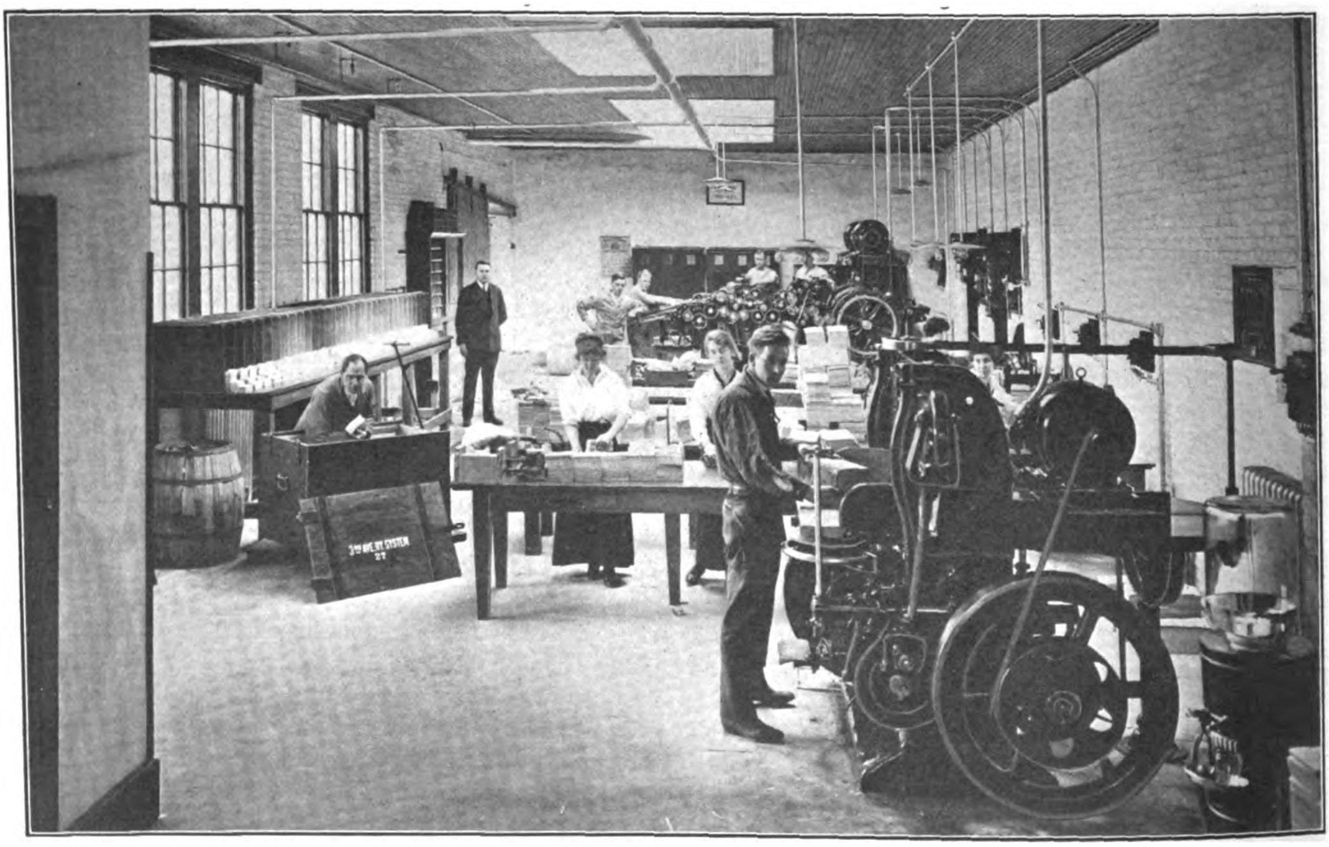
METHOD OF PRINTING AND HANDLING TRANSFERS

The capacity of each transfer press, if used on a straight run, would be 252,000 transfers an hour. However, owing to the necessity for make-ready, changing plates and rolls, etc., involved in printing 110 different styles of transfers, this maximum is not obtained in practice. The press prints a sheet 14.92 in. x 18¼ in., which gives twenty-one transfers 2 1/16-in. x 6 1/16 in. Five printings per transfer are required as follows: The back, covering "Notice to Passengers"; main text of front of transfer; serial number in red; a.m. or p.m., these letters appearing on separate transfers in order to prevent manipulation; date in red, both on the main body of the transfer and on the coupons. Then the press perforates the sheets and trims two edges to give a straight edge for the cutting which follows.

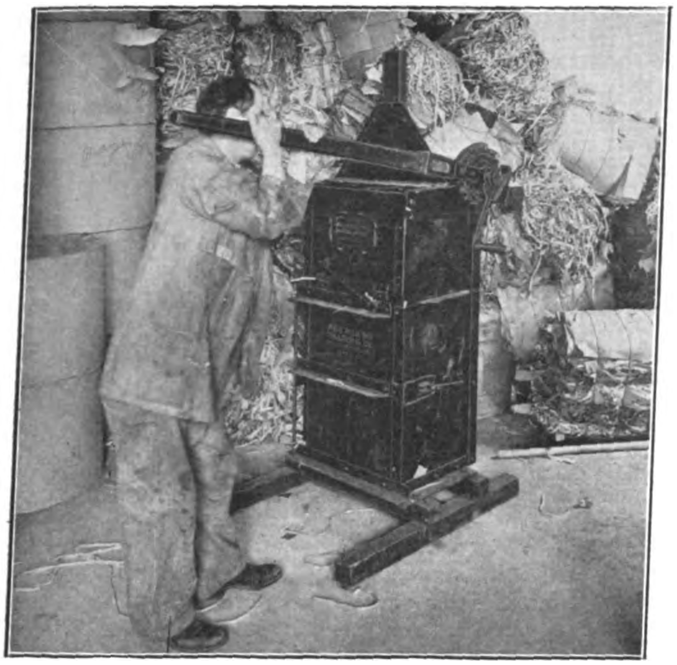
Next the sheets are taken to the cutter where they are cut into strips of seven each, after which they are removed for machine stitching and returned to the cutter to be divided into single transfers. Following this, the transfers are tied by hand into packages of 1000 each. They are then packed into wooden cases according to serial numbers and date, each case being properly identified. The cases are taken to the carhouses in the auto truck previously mentioned.

The output of the plant is 1,000,000 transfers per working day from the roll to the delivery truck. The transfers are printed thirty days ahead of date of use to make proper allowance for emergency conditions. They are delivered to the proper car stations as fast as printed.

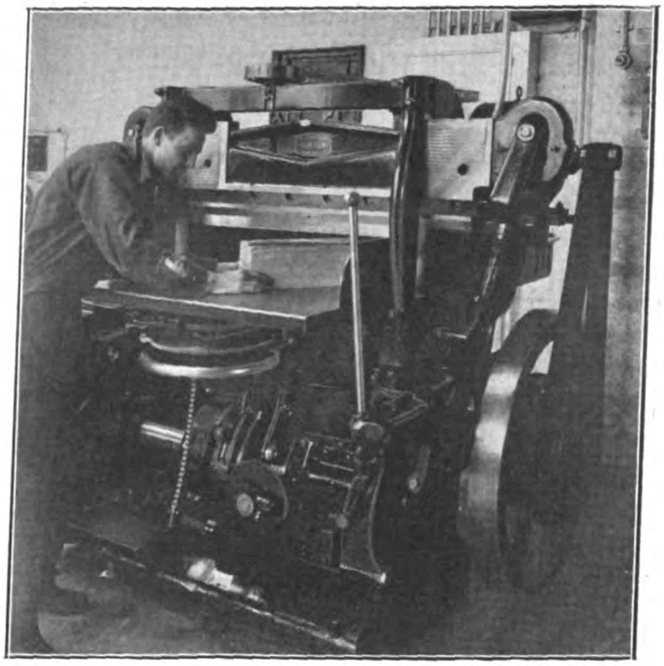
The transfer paper stock is delivered in rolls averaging 270 lb. weight, each equivalent to about 180,000 transfers. A three months' supply of these rolls is stored in quarters adjoining the pressroom. The rolls are stacked by means of the tiering machine, which is also available for loading the auto truck, as will be noted from an accompanying illustration. All trimmings are gathered and packed by machine into bales weighing



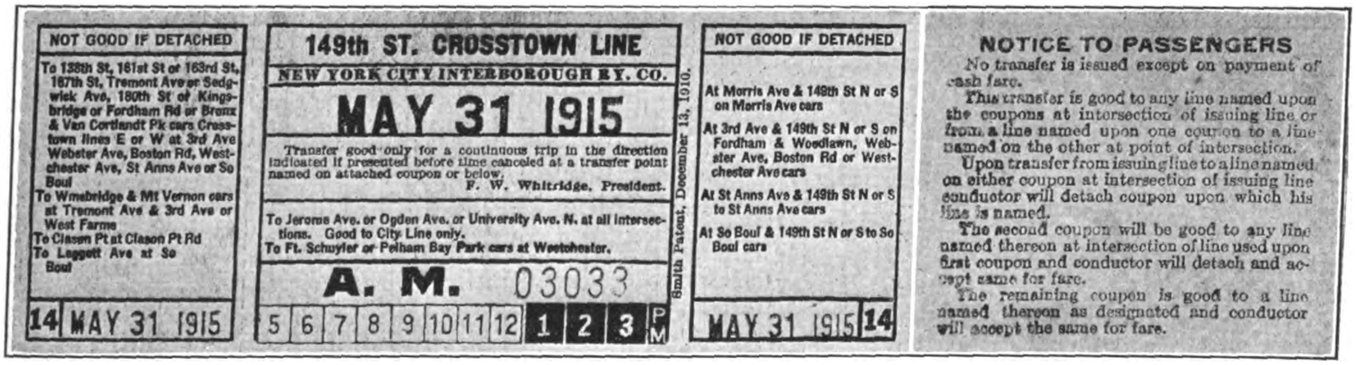
THIRD AVENUE TRANSFER PRINTING—GENERAL VIEW OF THE PRESSROOM AND BINDERY, WITH TRANSFER TRIMMING MACHINES AND SORTING TABLES IN THE FOREGROUND



THIRD AVENUE TRANSFER PRINTING—USE OF BALING MACHINE TO TAKE CARE OF TRANSFER TRIMMINGS



THIRD AVENUE TRANSFER PRINTING—CUTTING UP THE TRANSFERS INTO SINGLE LENGTHS



NOT GOOD IF DETACHED

To 138th St, 161st St or 163rd St, 167th St, Tremont Ave or Sedgwick Ave, 180th St or Kingsbridge or Fordham Rd or Bronx & Van Cortlandt Pk cars Crosstown lines E or W at 3rd Ave Webster Ave, Boston Rd, Westchester Ave, St Anns Ave or So Boul

To Wmsbridge & Mt Vernon cars at Tremont Ave & 3rd Ave or West Farms

To Clason Pt at Clason Pt Rd

To Laggett Ave at So Boul

14 MAY 31 1915

149th ST. CROSSTOWN LINE

NEW YORK CITY INTERBOROUGH RY. CO.

MAY 31 1915

Transfer good only for a continuous trip in the direction indicated if presented before time canceled at a transfer point named on attached coupon or below.

F. W. Whitridge, President.

To Jerome Ave. or Ogden Ave. or University Ave. N. at all intersections. Good to City Line only.

To Ft. Schuyler or Pelham Bay Park cars at Westchester.

A. M. 03033

5 6 7 8 9 10 11 12 1 2 3 P M

Smith Patent, December 13, 1910.

NOT GOOD IF DETACHED

At Morris Ave & 149th St N or S on Morris Ave cars

At 3rd Ave & 149th St N or S on Fordham & Woodlawn, Webster Ave, Boston Rd or Westchester Ave cars

At St Anns Ave & 149th St N or S to St Anns Ave cars

At So Boul & 149th St N or S to So Boul cars

MAY 31 1915 14

NOTICE TO PASSENGERS

No transfer is issued except on payment of cash fare.

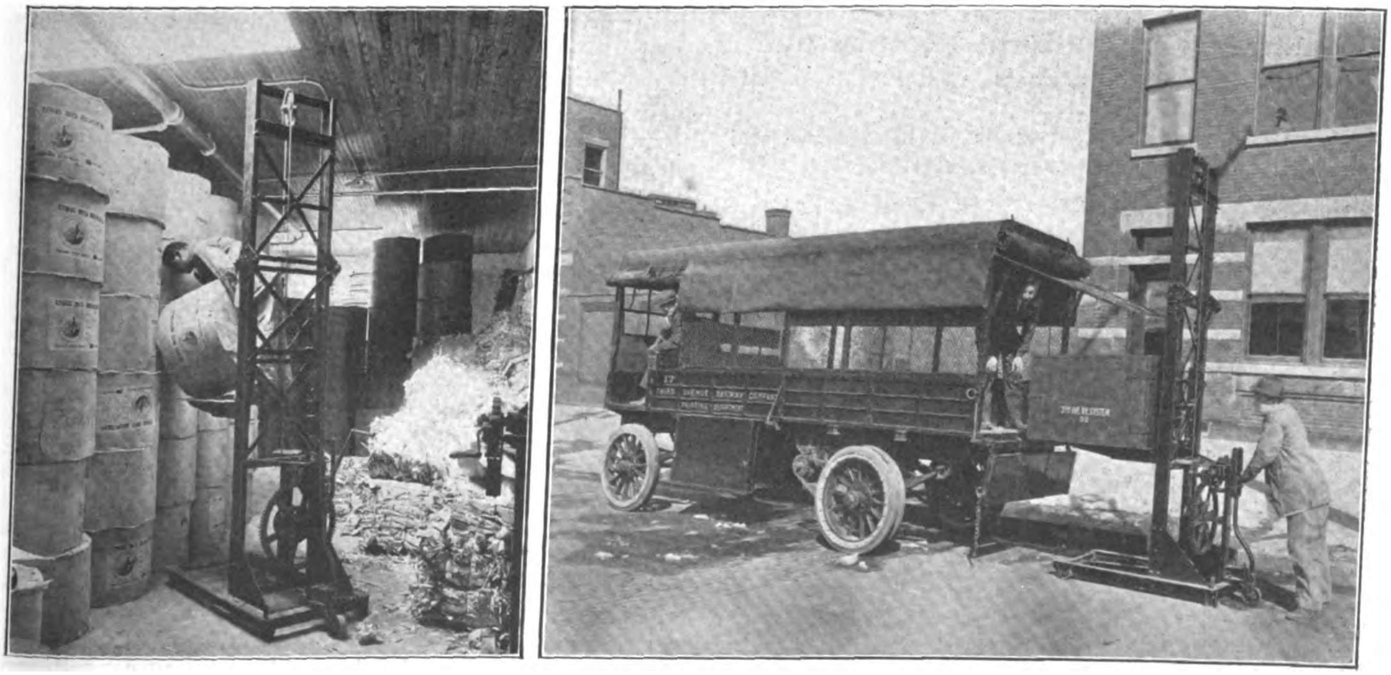
This transfer is good to any line named upon the coupons at intersection of issuing line or from a line named upon one coupon to a line named on the other at point of intersection.

Upon transfer from issuing line to a line named on either coupon at intersection of issuing line conductor will detach coupon upon which his line is named.

The second coupon will be good to any line named thereon at intersection of line used upon first coupon and conductor will detach and accept same for fare.

The remaining coupon is good to a line named thereon as designated and conductor will accept the same for fare.

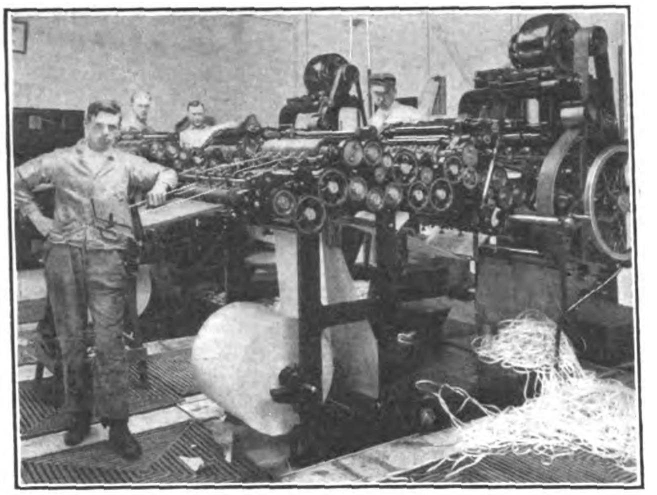
THIRD AVENUE TRANSFER PRINTING—FRONT AND BACK OF DOUBLE-COUPON TRANSFERS, REPRODUCED TO INDICATE THE NUMBER OF PRINTINGS REQUIRED



THIRD AVENUE TRANSFER PRINTING—THE DELIVERY AND STOCKING OF TRANSFER PAPER BY MEANS OF A TIERING MACHINE; SHIPMENT OF BOXES OF COMPLETED TRANSFERS IN AN AUTO TRUCK WITH THE AID OF THE SAME MACHINE about 100 lb. each. The bales are sold to a paper dealer about once a month.

COSTS

The building, which is 100 ft. deep and 22 ft. wide with a single-floor 22-ft. x 60-ft. storage "L," cost about $12,000, exclusive of land, and the printing equipment about $16,000. Since the department has been inaugurated so recently, the exact cost of its operations cannot yet be given. However, it is estimated at this time that the net cost of printing 1000 transfers is 9 cents, compared with 17 cents to 22 cents when purchased. Furthermore, the plant has proved a big convenience in printing a few hundred extra or special transfers for emergencies. The stated cost of home printing includes not only all equipment and operating expenses, but fixed charges, taxes, lighting and power, etc. In fact, in making up these figures the printing department was charged with the use of the entire building, although the second floor is occupied by the efficiency department.



THIRD AVENUE TRANSFER PRINTING—ONE OF THE TWO TRANSFER PRINTING PRESSES ON WHICH 110 STYLES ARE PRINTED

Following Up Platform Recruits at Syracuse

This System Reduces Cost of Training to the Company and Encourages Recruits to Greater Efforts

On Feb. 1, 1914, the New York State Railways—Syracuse Lines—inaugurated a follow-up system for new platform men. Previous to that time new men had been placed on the cars after completing the regular instruction period subject to the same superintendence and discipline as the experienced men. The follow-up system was devised for the twofold purpose of watching the new men to see that they did not lapse from the lessons of the schoolroom and of placing their discipline during the first six months of service in charge of the head of the instruction department for all but dischargeable offenses.

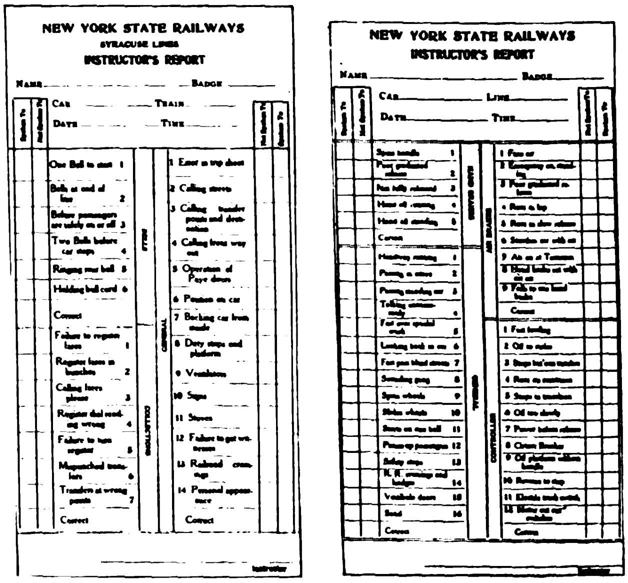
The results of the new plan are reflected in the accompanying table, which shows the number of platform candidates received in the instruction department during the year 1914 and the number who resigned at the different stages mentioned in the table. In checking these figures with previous years, the company finds that it was obliged to hire only 208 men in 1914, as compared with 250 to 300 men in earlier years. The total number of men employed on the Syracuse lines varies from 550 to 575 men.

NEW YORK STATE RAILWAYS—SYRACUSE LINES
INSTRUCTION DEPARTMENT

DATA ON PLATFORM CANDIDATES FOR TWELVE MONTHS ENDING DEC. 31, 1914.

	Conductors	Per Cent	Motormen	Per Cent
Number of men received in instruction department	116	....	92	....
Average per month	9.6	....	7.6	....
Number resigned during instruction	22	18.95	21	22.45
Number discharged during instruction	22	18.95	5	5.44
Number of men turned in	72	62.1	66	71.75
Number resigned after being turned in	10	8.62	19	20.65
Number discharged after being turned in.	13	11.2	11	11.96
Number of men who completed written examination after thirty days	52	44.8	45	49

The value of this reduction of about 20 per cent in number of men handled is indicated by the fact that the training of each new man, exclusive of accidents, costs the company about $40. John E. Duffy, general superintendent of the Syracuse lines, is greatly pleased with the new system, but thinks that part of the reduction in men handled may be credited to the fact that the maximum wage rate for beginners was increased during the year 1914 from 22½ cents to 24 cents an hour. The other rates are 26 cents an hour after six months' service, 28 cents after one year's service, and 30 cents for experienced men transferred to interurban lines.



NEW YORK STATE RAILWAYS
SYRACUSE LINES
INSTRUCTOR'S REPORT

NAME ____ BADGE ____
CAR ____ TRAIN ____
DATE ____ TIME ____

NEW YORK STATE RAILWAYS
INSTRUCTOR'S REPORT

NAME ____ BADGE ____
CAR ____ LINE ____
DATE ____ TIME ____

REPORT FORMS USED BY TRAVELING CONDUCTOR OR MOTORMAN INSTRUCTOR

The accompanying forms are reproduced to show the character of report as made by the traveling conductor or motorman instructor. These two instructors follow up the recruits on the cars with decreasing frequency as the experience of the men increases. If their reports show that a man has a special weakness the recruit is ordered back to school for further instruction in that detail. The system of separate discipline is also encouraging to the new men as evidence of the company's desire to give them a fair chance to make good.

The repeal of the "full-crew" law which imposes a needless annual expense of $1,100,000 upon the railroads of New York State, is being urged by The Merchants' Association. In a letter to Assemblyman Frank L. Seaker, chairman of the Assembly railroad committee, the association advocates the passage of two bills indorsed by Assemblyman Conkling repealing the law.

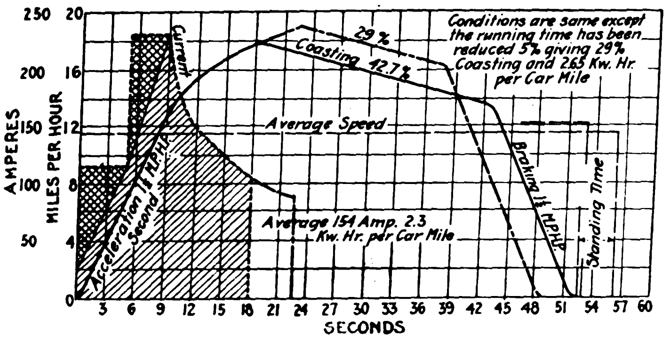
Coasting

Coasting Department Chief Denver Tramway Gave Experience with Coasting Clocks, Showing Resulting Energy Economy

At the March meeting of the Denver Tramway Company section of the American Electric Railway Association, H. P. Fligg, chief of the coasting department of the Denver Tramway, presented a paper on the results achieved by the company in economizing in energy consumption of cars. After showing how improved design has brought down the waste in equipment operation, he quoted from the ELECTRIC RAILWAY JOURNAL of 1909 as follows: "Electric railway companies are spending great sums of money in building large power plants and equipping them with efficient machinery, but after the power goes out to the line no record of it is made and motormen use it wastefully or economically, depending upon their intelligence and care." This quotation showed that there was appreciation of the need for economy in the use of energy many years ago. Mr. Fligg then proceeded to give data showing conditions in Denver which are summarized below.

REDUCTION IN ENERGY AND FUEL CONSUMPTION

The increase in energy consumption per car-mile is illustrated from the fact that in 1904 it was 2.205 and eight years later it was 3.055, an increase of 38.5 per cent. This was the power-house output divided by the total number of car-miles operated. Between 1912 and 1914 the consumption was reduced to 2.88 kw-hr. per car-mile, and from present indications 1915 will show a still greater reduction. Extensive tests made with the coasting recorders now used show that four-motor cars averaging 10.5 m.p.h. and five stops per mile, and coasting 26 per cent, consume 2.3 kw-hr. per car-mile for traction, this consumption being at the car. The average rate of coal consumption in Denver is about 4.9 lb. per kw-hr., so that, allowing 10 per cent loss in transmission, the coal consumption per car-mile is 12.4 lb. Under the same general conditions a two-motor car would have consumed about 8 lb. of coal. Theoretically, had the four-motor car been doing the same work in the same time and coasting 36 per cent, the coal burned at the carhouse would have been 11.16 lb. per car-mile. Based on energy requirements as found during the test and under present average conditions, an average motorman working a four-motor car for twelve hours per day will control the consumption of about 1400 lb. of coal for traction only, an average of 116 lb. per hour.



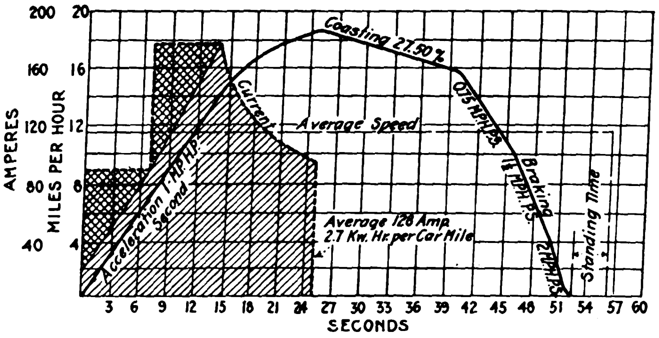
DENVER COASTING—FIG. 1—SPEED-TIME GRAPHS, FOUR-MOTOR CAR, 11.5 M.P.H., SIX STOPS PER MILE

As it is the power used for traction that is lowered by coasting, the coasting record is an indirect tally on the coal consumption demanded. Some check on energy consumption of the car is recognized as imperative to economical operation. The greatest economy results when the time rate of acceleration predetermined in the selection of the equipment is strictly adhered to, and advantage is taken of the stored-up energy. Rates of acceleration varying from 0.75 to 2.25 m.p.h.p.s. are common practice and raise no objection from passengers.

RIGHT AND WRONG CONTROLLER AND BRAKE HANDLING

There is a great difference between a high, uniform rate of acceleration and an irregular one, for during the former the current demand is nearly uniform. Some companies have installed ammeters to assist the motormen in producing a uniform acceleration. From a practical standpoint more time should be given on the first two or three controller points than on the others, as the man who has studied his coasting record has found out. After accomplishing a smooth and fairly rapid acceleration a man's efficiency as an operator is only half developed. Braking is one of the greatest variables in car operation, due to the fact that with every different speed a different amount of energy is stored in the car. Efficient braking results in a minimum dissipation of energy through brakeshoes. Under ordinary conditions this means stopping the car with one application.

Braking presents two features which must be watched very closely, the manner of taking the required amount of air and the manner of getting rid of it. From three to five seconds should be consumed in taking the air so as to get the shoe in snug contact with the wheel before the pressure is too great. Once it is in good contact air can be taken more rapidly without bad results.

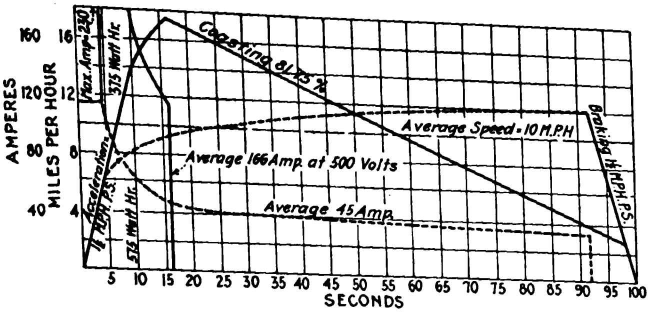


DENVER COASTING—FIG. 2—SAME AS FIG. 1, EXCEPTING VARIATION IN ACCELERATION, COASTING AND BRAKING

STUDIES IN SPEED-TIME GRAPHS

The accompanying diagrams show how energy saving is accomplished.

Fig. 1 was constructed for some of the operating conditions existing in Denver. The average speed is 11.5 m.p.h., with six stops per mile and stops averaging four seconds. Acceleration and braking are at the rate of 1.5 m.p.h.p.s. The graph shows that the run can be accomplished with 42.7 per cent coasting and an energy consumption of 2.3 kw-hr. per car-mile. It has sometimes been argued that if cars were speeded up to allow three or four minutes' additional time at the end of the line for the motors to cool, etc., the results would be the same as though secured by an increase in coasting. To test this the same conditions were assumed for the round trip with the characteristic speed-time graph shown solid in Fig. 1, except that the trip was made in fifty-seven instead of sixty minutes, giving an additional three minutes at the end of the line. The result is shown in the dot-and-dash line of the figure. In this



DENVER COASTING—FIG. 3—SPEED-TIME GRAPHS SHOWING MINIMUM AND MAXIMUM COASTING

case there is only 29 per cent of coasting, and the energy consumption is 2.65 kw-hr. per car-mile, an increase of 15 per cent.

With a given schedule to maintain, and the same number of stops per trip, the coasting can be varied by a change in the acceleration rate, a change in the braking rate, or a change in the length of stop. The length of stop, to some extent, depends upon the manner of acceleration and the manner of braking, these being less with smooth operation than with rough, choppy operation.

Fig. 2 has been constructed to show the effect of changing the rate of acceleration and braking. The former has been chosen at 1 m.p.h.p.s., and the latter graduated from 0.75 to 2 m.p.h.p.s., the other characteristics remaining as before. This shows a possible coasting of 27 per cent instead of 42.7 per cent, practically 15 per cent less, while the energy consumption is 2.7 kw-hr. per car-mile, an increase of practically 15 per cent.

A small amount of series running does not seriously affect the energy consumption, but carried to an excess it affects both energy and coasting. This is shown in Fig. 3, giving data for a four-motor car, accelerated to full series and run so as to cover the greatest possible distance in 100 seconds, accelerating and braking at the rate of 1.5 m.p.h.p.s. In this operation 575 watt-hours are consumed. If, with the same rate of acceleration and braking, the car is brought to full parallel, coasting as much as possible, to a speed of about 17 m.p.h., to cover the same distance in the same time, but 375 watt-hours are consumed, a saving of 35.5 per cent for the parallel operation.

CONCLUSIONS

The best results in operating cars are obtained through efficient acceleration and braking, and by anticipating all stops or slow-downs, whether they be for passengers, special track work, passing cars going in an opposite direction, or for other traffic conditions. The basis of all these is "mechanical feeling" and "judgment of distance and speed."

COASTING AVERAGES

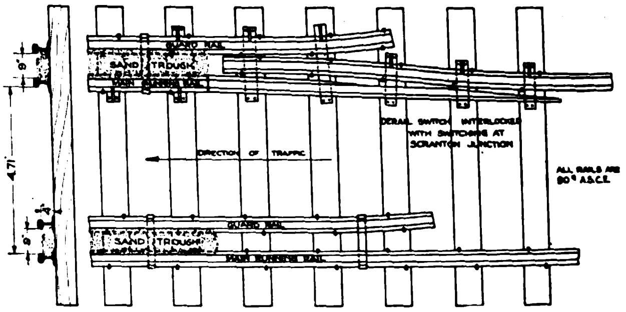
Road	Average Per Cent Coasting
Hudson & Manhattan Railroad	45.20
Long Island Railroad	37.40
Denver Tramway	35.80
San Francisco-Oakland Terminal Railways	35.10
Elmira, Corning & Waverly Railroad	34.70
Virginia Railway & Power Company (Richmond division)	34.10
Northern Texas Electric Company (Ft. Worth)	34.00
San Antonio (Tex.) Traction Company	32.80
Third Avenue Railway (New York)	32.70
Washington Railway & Electric Company (Rockington division)	29.70
British Columbia Electric Railway (Vancouver, B. C.)	28.80
Interborough Rapid Transit Company (New York) (subway division)	27.70
Boston Elevated Railway	27.30
Northern Texas Traction Company (Ft. Worth)	26.70
Empire United Railways (Syracuse, N. Y.)	24.60
Interborough Rapid Transit Company (New York) (elevated division)	23.60
Bay State Street Railway (Boston, Mass.)	23.30
Washington Railway & Electric Company (Tennalytown division)	23.20

In closing Mr. Fligg quoted a table furnished by the Railway Improvement Company showing the January coasting records of a number of roads using coasting clocks. It was explained that on this table the records of the first two roads are not comparable with the rest as they are multiple-unit systems operating over private rights-of-way.

An Effective Stop for Runaway Cars

Cars Diverted Into Gravel Trough—Elaborate Tests Show Constant Retarding Force of 12,500 Lb.

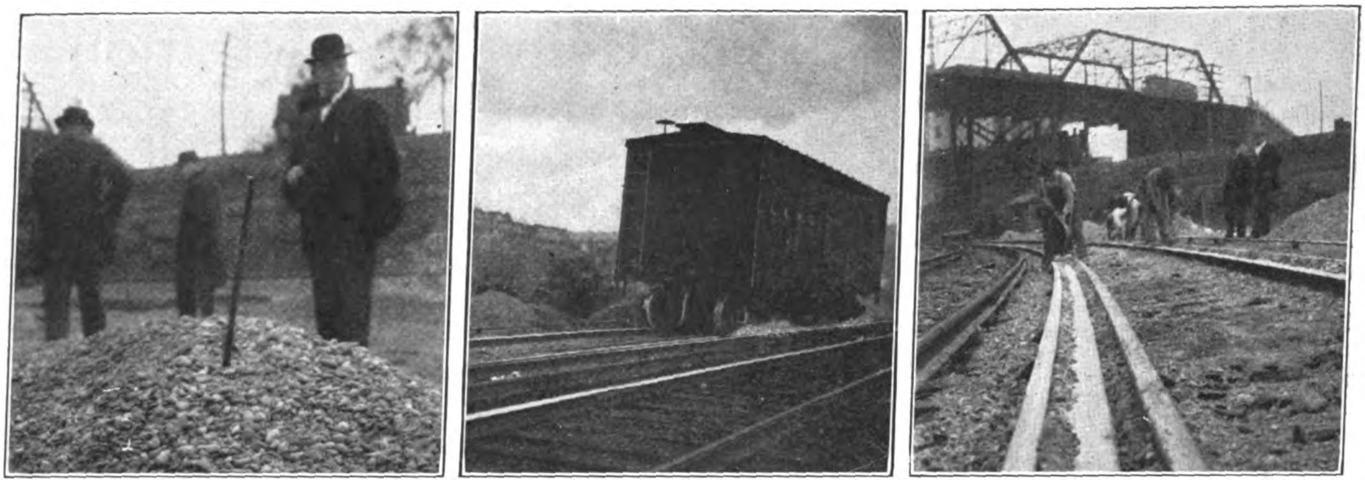
A runaway-car stop, which will be of interest to the engineering profession generally and particularly to those connected with the operation of electric railways in more or less hilly country, has recently been installed and tested on the line of the Lackawanna & Wyoming Valley Railroad in Scranton, Pa. It has been placed at the foot of the long grade approaching Scranton Junction to protect the Scranton yard and terminal from a possible runaway descending this grade. The installation is a modification of the "sand tracks" which have been in operation for some time in Europe, particularly in Germany, where they are used principally to protect against overrunning on stub-end tracks, as at steam railroad passenger terminals and freight classification yards. The only other examples of this type of protection in this country, apparently, are the sand tracks which were constructed by Ford, Bacon & Davis on the sharp grades descending the Palisades to Edgewater, on the line of the New Jersey & Hudson River Railway & Ferry Company, now operated by the Public Service Railway Company. At the time these tracks were planned a careful search failed to reveal any published tests of troughs of this kind to indicate their retarding qualities for cars of different weights and speeds. The engineers, therefore, made certain tests, the results being published in this paper (see issue for Sept. 8, 1906, page 384). Since that time other tests were made in Germany as described in the ELECTRIC RAILWAY JOURNAL for Sept. 2, 1911, page 397.



RUNAWAY CAR STOP—DETAILS OF CONSTRUCTION AT ENTRANCE TO SAND TROUGH

The runaway stop at Scranton consists, as will be seen by reference to an accompanying illustration, of two double troughs about 350 ft. long formed between the running rails and additional guard rails adjacent, the troughs being filled with gravel to a depth of approximately 4 in. At the entrance end an ordinary split-switch point is set in the running rail, the switch being normally open to divert any traffic into the troughs. Upon the approach of a regular train under control the switch is set for the main line by the operator in a near-by interlocking tower.

The stop has been elaborately tested by running cars into it at speeds ranging from 15 m.p.h. to 30 m.p.h. In all, fifteen such tests have been carried out. The first five were made with a gondola freight car which,



RUNAWAY CAR STOP—VIEWS SHOWING BEST SIZE OF GRAVEL, CAR ENTERING STOP AT 25 M.P.H., AND CRUSHED GRAVEL BETWEEN RAILS AFTER PASSAGE OF CAR

with its load, weighed 58,000 lb., and the last ten with a loaded box car weighing 76,400 lb. The test cars were drawn to various points on the grade, then cut loose and allowed to run free into the trough, observations being made as to the speed, distance and time required to make the stop, etc. The damage done during the tests was negligible and consisted principally of broken spikes and anti-creepers. Practically no damage was done to the cars or trucks, which entered and were stopped in the trough in a very satisfactory manner. It was found that the first car bumped considerably as it passed over the ties under the trough, but that the gravel was thus tamped enough so that subsequent cars ran smoothly.

Various materials were placed in the trough for the different tests, such as ¾-in. crushed stone, screened sand, small gravel and large gravel, and although hardly enough tests were made to define accurately the laws governing the behavior of cars at various speeds with the various materials, it appears that the resisting force is approximately constant for any one material, regardless of the car weight, within the range of the weights and speeds tested. The retarding force exerted by the various materials was found to be as follows: Crushed stone, 10,000 lb.; screened sand, 10,700 lb.; small gravel, 11,000 lb.; large gravel, 12,500 lb.

From this may be deduced the data shown in the following tables:

DISTANCES REQUIRED TO STOP A 50,000-LB. CAR

	Crushed Stone	Screened Sand	Small Gravel	Large Gravel
30 m.p.h.	151	141	138	121
60 m.p.h.	604	575	548	483

DISTANCES REQUIRED TO STOP AN 80,000-LB. CAR

	Crushed Stone	Screened Sand	Small Gravel	Large Gravel
30 m.p.h.	242	226	220	194
60 m.p.h.	969	922	878	775

RATE OF RETARDATION IN MILES PER HOUR PER SECOND

	Crushed Stone	Screened Sand	Small Gravel	Large Gravel
50,000-lb. car	4.4	4.7	4.8	5.5
80,000-lb. car	2.7	2.9	3.0	3.4

The behavior of the test cars while entering and traversing the trough was in every way satisfactory, there being no apparent tendency to sway, jump or leave the trough, and the retardation was apparently quite smooth and uniform.

In the light of the results of the tests described above, it appears that this device should find more or less extended application in those cases where it is desired not only to protect against possible runaway cars on grades but also to protect such possible runaways against damage to themselves and their contents. Although the rate of retardation is undoubtedly higher than that possible or advisable with ordinary car brakes, especially for the lighter cars, such a rate is not sufficiently high to be dangerous and is certainly much to be preferred to other possible developments in the case of a runaway. It is also interesting to note that the most suitable material, or large gravel, is undoubtedly the least likely of the materials tested to become ineffective during the winter because of freezing, as its self-drainage would be better than that of any of the other materials tested.

It is the opinion of the designers that, whatever the material used, tamping between the ties is necessary to insure smooth running through the stop. This may best be done by running one car of normal weight through the stop before the latter is placed in service. The passage of a car crushes and packs the gravel in the center of the trough to a considerable extent, as shown in one of the illustrations, and this packed material should be removed with a pick after each time that the stop comes into use. Logically, this packing of material indicates a greater retardation at the first axle of the car than at subsequent axles, and it also indicates that the retardation obtained with one car would not be increased in direct proportion with trains of more than one car. The retardation, however, appeared to increase somewhat with increased depth of gravel, and this might be made to take care of increased train length. The stop in question was intended only for single cars.

The information concerning this device was furnished by L. L. Odell, of the staff of Ford, Bacon & Davis, engineers, who, collaborating with W. E. Higgins, vice-president and general manager of the Lackawanna & Wyoming Valley Railroad, was principally responsible for the details of design and tests.

Public Service Commission Exhibit at Panama-Pacific Exposition

In the New York City building at the Panama-Pacific Exposition, the Public Service Commission for the First District is exhibiting, by means of pictures, two phases of its work—rapid transit and regulation. The commission booth is 14 ft. wide by 24 ft. long, with wooden partitions 9 ft. 6 in. high. The color scheme of the exhibit is dark brown and old ivory. The pictures are arranged in sequence, showing rapid transit construction on the dual system step by step, from start to finish. The exhibit on regulation is most comprehensive, covering all features of the commission's work in connection with the public utilities in its jurisdiction. An additional feature of the exhibit on construction work is a moving picture with a little romance to provide human interest.

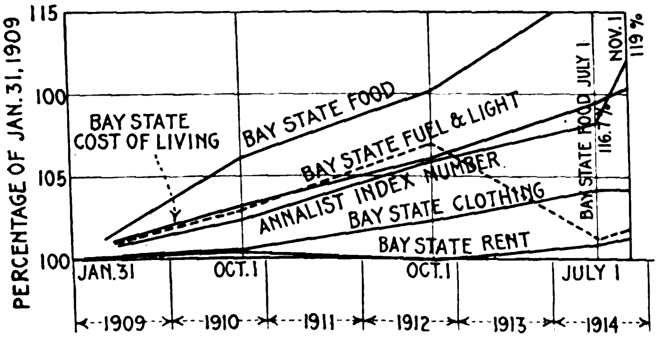
The Bay State Street Railway Arbitration

At Last Week's Hearing Hon. J. M. Swift, C. F. Bancroft, C. R. Rockwell and Prof. A. S. Richey Gave Important Testimony, That of the Last-Named Being Replete with Statistical Data

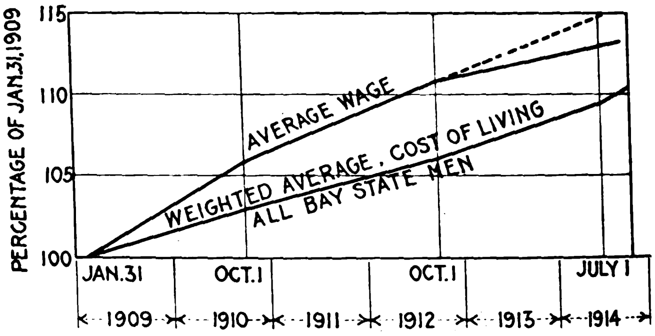
Progress on the wage arbitration case between the Bay State Street Railway of Boston, Mass., and its employees, which has been under way for several months, has been reported in the news columns of the ELECTRIC RAILWAY JOURNAL from week to week.*

On March 29, the forty-sixth day of the proceedings, the railway began its presentation of evidence, Hon. James M. Swift, attorney for the company, urging that the board should not consider evidence prior to the 1909 arbitration. The contentions of the company were that platform and other work was no more difficult and required no more skill than in 1909; that there had been no material change in the equipment nor increase in the difficulties of fare collection, and that the increase in pay had more than offset the increased cost of living.

The company paid the "going rate" and claimed that in view of the business depression the demand of the employees for an increase from the present 28-cent maximum to a 30-cent minimum rate was appalling, as was the contention that the condition of the company treasury should have no bearing upon the wage rate. "There is no more firmly-fixed principle in law," said Mr. Swift, "than that a man is entitled to a reasonable return upon his investment in the public service corporation." The company has had to practice great economies since 1910 and has not been able to furnish as good service as the public called for. Car painting and improvements have had to be postponed for lack of funds. Officials also have been moderately paid for the responsibilities they hold, while dividends have been so low as to make the investment unattractive to new capital.



BAY STATE ARBITRATION—INCREASE IN ELEMENTS OF COST OF LIVING DURING PAST FIVE YEARS



BAY STATE ARBITRATION—RELATION OF INCREASE IN WAGE RATE AND COST OF LIVING

Referring to the previous offer of the company of an increase of ½ cent per hour, Mr. Swift said that subsequent events have shown that the company could not stand even this increase, now withdrew the compromise offer, and claimed that wages should be reduced. The arbitration board was asked to restore the rate of wages in force before the 1912 agreement. To meet the situation the company will offer a co-operative plan, of which particulars will be given later.

PROF. A. S. RICHEY'S TESTIMONY

Prof. A. S. Richey of the Worcester Polytechnic Institute, superintendent of time-tables Bay State Street Railway, testified that while the cost of living on the Bay State system increased 10.41 per cent from 1909 to November 1, 1914, wages had increased 13 per cent. The increased cost of living was made up of the following increases: Food, 19.1 per cent; rent, 1.37 per cent; fuel and light, 1.91 per cent; other items, 4.15 per cent. The average wage on Jan. 31, 1909, was 23.25 cents per hour, compared with 26.33 cents on Oct. 1, 1914.

The accompanying diagrams were exhibited, among others, to show these data in graphical form. The "Analist index number" referred to shows the fluctuations in the average wholesale prices of twenty-five food commodities selected and arranged to represent a theoretical family's food budget.

Professor Richey presented Table I of operating statistics and stated that the average schedule speed of all cars on Massachusetts street railways, excluding elevated and tunnel lines, was 9.56 m.p.h. for 1914. Of 8000 notices issued by the company to the men in the last ten years 45.4 per cent called attention to existing rules or orders, cautioned regarding accidents, or were for information only and did not in the least affect the duties of car service employees. He stated further that the cost of living on the Bay State system since 1909 had been 4.75 per cent less than in Boston, the density of population on the Boston Elevated system being 11,229 per square mile, while that on the Bay State system, even in the Chelsea division, is but 6507 and in Lynn but 4000 per square mile.

TABLE I—OPERATING DATA, BAY STATE STREET RAILWAY

	Fiscal year 1909	Fiscal year 1914
Revenue passengers per car-hour	47.2	50.8
Total passengers per car-hour	53.4	57.4
Speed, miles per hour	8.46	8.35
Revenue passengers per conductor	111,926	111,381
Total passengers per conductor	126,707	125,792

TABLE II—DATA FROM THREE ELECTRIC RAILWAYS IN MASSACHUSETTS

	Bay State St. Ry.	Boston Elevated Ry.	Middlesex & B. St. Ry.
Cars per mile of track in rush hours	1.03	6.43	1.19
Population per mile of track	1,739	4,570	1,554
Receipts per mile of track	$11,920	$60,520	$8,996
Car-miles per mile of track per year	40,158	201,322	35,308
Average number of passengers per car-hour	59.6	97.3	50.2
Population per square mile	848	11,229	587
Annual car-miles per crew	17,662	19,024 (surface)	24,904
Annual receipts per conductor	$5,242	$5,720	$6,346

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*See Vol. XLIV, pages 1074 and 1402; Vol. XLV, pages 76, 150, 200, 268, 303, 346, 433 and 477.

In the fiscal year 1914 the Bay State company had a total passenger revenue of $8,969,856 and carried 215,000,000 passengers, compared with $13,820,162 and 445,000,000 passengers on the Boston Elevated system. The total population served, 1,309,120, is spread over 1544 square miles, compared with a population of 1,043,000 and a territory of 93 square miles at Boston. The Bay State system has 4.6 conductors and motormen per mile of track, compared with 21.2 on the Boston Elevated system and two on the Middlesex & Boston Street Railway. Other unit data are given in Table II.

The Bay State company has 1031 cars equipped with air brakes, or 48.8 per cent of the total, compared with 558 cars thus equipped, or 16.3 per cent of the surface cars on the Boston Elevated. Of the gross receipts, the Bay State company paid 21.9 per cent in wages, compared with 21.7 per cent on all Massachusetts electric roads, 19.98 per cent in New England, and 18.35 in the United States. The data of the Massachusetts Bureau of Statistics show that the number of industrial workers employed in factories has varied from 34 per cent to 37 per cent above the minimum in the years 1907 to 1913 inclusive. The average number of days factories or any departments of these were in operation in a year varied from 293.5 in 1907 to 289.2 in 1913. Great superiority in respect to continuity of employment was shown by Professor Richey for Massachusetts street railways compared with representative industries. (See Table III.)

TABLE III—AVERAGE UNEMPLOYMENT, IN PERCENTAGE OF TOTAL WORKERS

	Street Railways	Textile Mills	Boots and Shoes
1909	2.5	7.8	7.8
1910	2.4	10.7	7.5
1911	2.1	12.6	5.8
1912	2.5	12.4	9.0
1913	2.4	11.6	7.6
1914	2.7	11.1	17.8

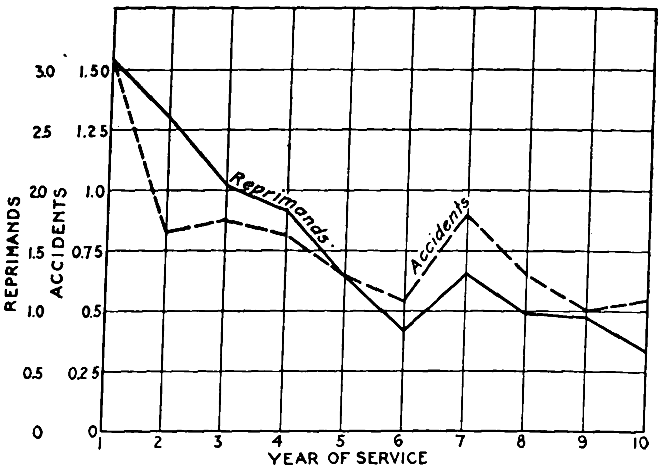
Boot and shoe workers and textile workers were selected for comparison because there are probably more employees in these two industries in the Bay State territory than in any other industry. The data were drawn from reports of the labor union secretaries to the State board.

Only 16.3 per cent of the motormen and conductors, excluding call men, are in the first year of service. Men who have worked more than two years comprise 83.7 per cent of the total; more than three years, 68.3 per cent, and in the fifth year and over, 55.2 per cent. Forty-one per cent of the total number of men, or 1313 out of 3205, are getting the maximum pay of 28 cents per hour, having reached or passed the eighth year of service. The number receiving 27 cents is 249, or 7.8 per cent; 626 men, or 19.5 per cent, receive 26 cents; 495 men, or 15.4 per cent, receive 25 cents; 522 men, or 16.3 per cent of the total, receive 24 cents. The average length of service of all conductors and motormen on Oct. 3, 1914, was 7.53 years, that for conductors being 6.46 years and that for motormen, 8.62 years. Excluding first and second-year men, the average length of service of motormen was 11.36 years; of conductors, 9.66 years, and of both classes, 10.58 years. Wages have been automatically increased 0.55 cent per hour since 1909 by the operation of the graduated scale, besides the increases granted by agreements.

A letter was introduced from the Secretary of the Navy, Hon. Josephus S. Daniels, stating that after a thorough investigation he had come to the conclusion that the labor conditions affecting wages throughout the country have not experienced any essential change during the last year, and that he had, therefore, decided to continue the same schedule in 1915 as in 1914, this applying to the Boston Navy Yard, from which men are sometimes drawn for street railway service.

An analysis of the payrolls for the year ending Oct. 3, 1914, showed that during the year an average of 2132 regular men drew $15.26 per week; 856 spare men drew $12.13 each, and 107 call men drew $3.99 each, the average of all employed being $14.01, and of all excluding call men, $14.37. The number of spare men was about 700 in winter and more than 1000 in summer. A study of the former occupations of 3504 men showed that 13.4 per cent were clerks, salesmen and agents; 12.3 per cent teamsters and drivers; 11.4 per cent shoe and leather workers; 10.4 per cent textile workers; 8 per cent from the building trades; 6.5 per cent farm workers; 5.6 per cent metal workers and foundry men; 2.4 per cent servants and attendants; 2.6 per cent tradesmen; 2.2 per cent former conductors or motormen; 1.6 per cent in steam railroad service; 1.2 per cent fishermen and seamen; 1.6 per cent from electrical trades; 1.2 per cent government and municipal employees; 0.9 per cent from printing trades; 7.7 per cent from miscellaneous indoor occupations; 0.6 per cent from miscellaneous outdoor occupations, and 2.3 per cent had unknown occupations. Of the conductors and motormen 63.5 per cent were married, and averaged 1.5 children each. For the year 1913, 65 per cent of the male employees in Massachusetts manufacturing plants earned less than $15 per week, covering nearly 500,000 employees. The average yearly wages of 28,085 male employees in Massachusetts industrial plants in 1913 was $773.89.

In the last three years 14.3 per cent of all employees resigning from the Bay State company have returned to its service. Of those who left in their first year the greater part did so during the first three or four months.



BAY STATE ARBITRATION—DIAGRAM SHOWING RELATION OF REPRIMANDS AND ACCIDENTS TO LENGTH OF SERVICE

The number of accidents to employees per 100 employees on the Bay State lines is about 2.5, compared with 6.6 per cent in cotton mills, 4.9 per cent in the shoe industry, and 18.2 per cent in foundries and metal working plants. In the last five years on the Bay State lines there were thirty-six head-on collisions and 772 rear-end collisions. Of the rear-end collisions, 449 were on double track, 247 were on single track and seventy-six were on turnouts. As the company has about 80 per cent of single track, there were fifty times as many rear-end collisions on double track as head-end collisions on single track, refuting the evidence of the union as to the greater danger of single-track operation. The witness then introduced the graph shown herewith, illustrating the relation between years of service, reprimands to conductors and motormen and accidents.

Although there were twenty-seven fare reductions or increase in free transfer facilities in the past five years, in no case has the company raised its fares. The size of the system made these changes relatively unimportant, so far as imposing additional duties upon conductors went.

As an index of the financial condition of motormen and conductors, Professor Richey showed that 425 of these employees, either in their own or their wives' names, own real estate with a total assessed valuation of $1,095,576. Evidence was also introduced from the thirteenth census to the effect that the average number of wage earners in manufacturing industries is 6,615,046, with an average yearly wage of $518.

The estimated annual cost of increases granted by the company in the agreement of Nov. 4, 1914, is $13,457; the increased yearly cost of paying motormen and conductors 30 cents per hour the first year and 35 cents per hour thereafter, as demanded by the union, would be $661,438; the extra cost of a seven-hour minimum guarantee with a minimum of two and one-half hours for morning trippers would be $245,558 per year, and other extras due to service beyond the twelfth hour, to increases in track and line departments and in power and substations bring the grand total to $1,189,113 per year as the entire extra cost of granting the union demands. The wages of motormen and conductors would be increased about 45 per cent by this policy.

A large number of extracts from the employees' magazine, the *Motorman and Conductor*, were read by counsel for the company in refutation of the testimony of numerous employees that life was a continual grind, with little pleasure and but a dreary outlook. The items quoted described the participation of members of the union in balls, field and aquatic sports, amateur theatricals, automobiling, travel, and matrimonial affairs and indicated that a large share of recreation and enjoyment falls to the lot of members of the union in the various divisions of the Bay State system.

In conclusion Professor Richey commented at length upon the testimony of Prof. Irving Fisher of Yale University relative to the cost of living, and contended that the latter's figures were of too general a character to represent local conditions. Professor Richey said that Professor Fisher's view of the index number, how it is constructed and how it represents the change in prices from year to year, and the method used by him in weighting the index, are in accord with the company's views. Contrary to Professor Fisher's assumption that price movements do not vary materially between communities, the company's investigation shows that there have been decided differences between the increases in living cost on different parts of the system. The company's index numbers are based on results of investigations in the North Atlantic section by the United States Department of Labor, correcting the index numbers used by Professor Fisher. The department will shortly issue a new bulletin with previous errors corrected. The Bay State studies show that the local increase in prices of clothing, heat and light has been very much less than the increase in food and rent, contrary to Professor Fisher's evidence.

MR. BANCROFT'S TESTIMONY

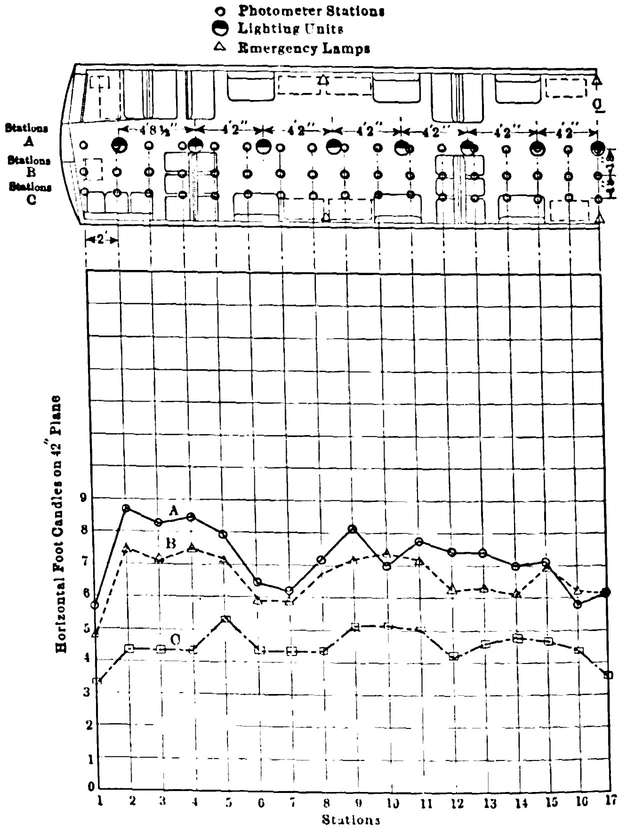
C. F. Bancroft, superintendent of motive power and machinery, testified that he had not known of a single case of heat prostration in the last fifteen years in a Bay State boiler room. He had only been able to maintain the company's equipment with regard to safety during the last two or three years, because of decreased appropriations. In the last year or two it has been necessary to discontinue car painting. On account of the damage done to equipment by motormen who attempt repairs with inadequate knowledge or tools the company prefers that all except the most minor repairs be made by the regular maintenance force.

MR. ROCKWELL'S TESTIMONY

Charles R. Rockwell, vice-president and treasurer, was the next witness. He stated that in 1911 the company's gross earnings were $8,761,847; operating expenses were $5,484,480; net income, $3,277,367; net divisible income, $1,454,307; dividends, $1,148,965, and balance, $7,617. In 1914, these items were, gross earnings, $9,695,249; operating expenses, $6,363,969; net income, $3,331,280; net divisible income, $1,324,296; dividends, $1,242,069; balance, $682. In 1911 the wages of motormen and conductors were 20.87 per cent of the revenue and in 1914 they were 21.94 per cent. The addition of 1 cent per hour to the wages of motormen and conductors in 1914 would have increased the wages by $85,430, which is more than two-thirds of the salaries of $2,500 and above in the company. The common stock pays 5¼ per cent dividends at present. The average dividend for ten years and nine months ending June 30, 1914, was 4.25 per cent.

Lighting Distribution Curves of New York Municipal Car

As noted in the ELECTRIC RAILWAY JOURNAL for March 27, the lighting of the New York Municipal Railway Corporation's car was described by Messrs. Gove and Porter before the Illuminating Engineering Association on March 11, 1915. All of the lighting distribution curves presented in the original paper were also reproduced in the ELECTRIC RAILWAY JOURNAL. Since this first publication the distribution curves of the equipment adopted have been made available. These curves, as reproduced, are for a single line of fifteen 56-watt bowl-frosted tungsten lamps placed symmetrically down the center line of the ceiling, equipped with reflectors.

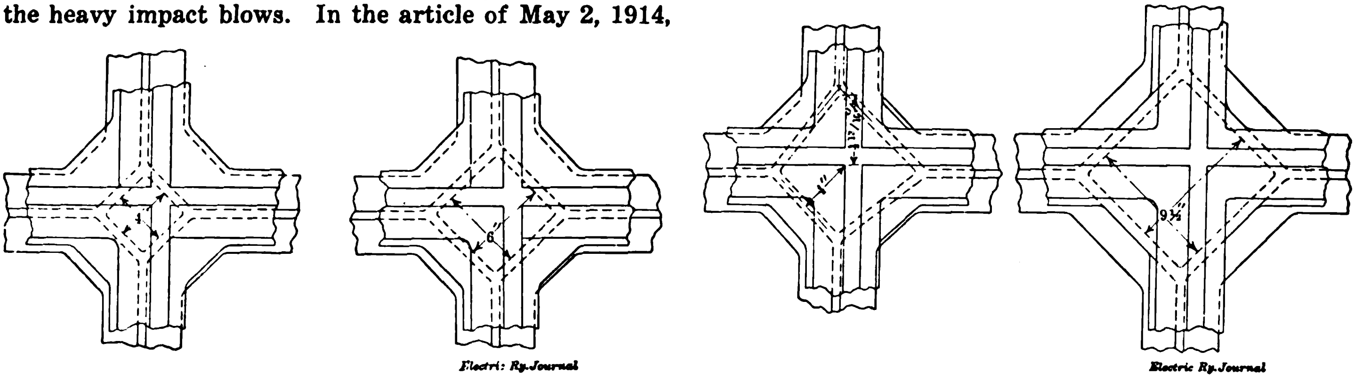


DISTRIBUTION CURVES OF EQUIPMENT FINALLY ADOPTED

Recent Solid Manganese Steel Crossings

A Study of Twenty-two Crossings Installed in Chicago During the Last Three and a Half Years Indicates that the Makers Have Succeeded in Shifting the Area of Imperfection from the Impact Points to Say 8 in. From the Gage Line

One of the chief difficulties experienced in the manufacture of solid manganese steel castings for track special work has been the elimination of segregated or unsound metal at the intersecting flangeways or at the mass points in crossing frogs. Operating experience has revealed the weak spots and has thus suggested further changes in the manufacturing process to remove these imperfections. In the past five years much testing has been carried on by different manufacturers to eliminate entirely unsound metal from track special work, or at least to remove it from the points receiving the heavy impact blows. In the article of May 2, 1914, describing Chicago's experience with solid and insert manganese steel special track work, it was stated that the principal difficulty in obtuse-angle and right-angle crossings of solid manganese steel was that after the second year they would chip at the intersecting flangeways. Manufacturers have agreed generally that this chipping or breaking of the running rail corners at intersections has been due principally to segregated or unsound metal. This belief was borne out by the fact that this type of failure did not occur in all solid manganese steel crossings. In fact, a large per cent were found in perfect condition and indicated that they would give very long life.



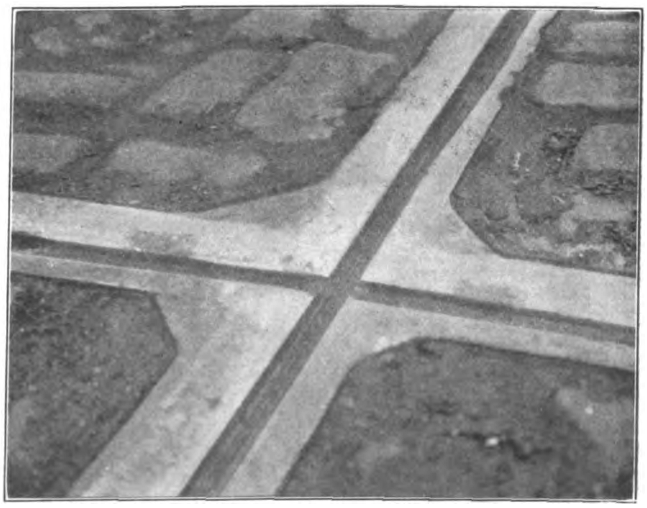
MANGANESE STEEL CROSSINGS—FIGS. 1, 2, 3 AND 4—DEVELOPMENT OF TYPES

CHANGES IN MANUFACTURE

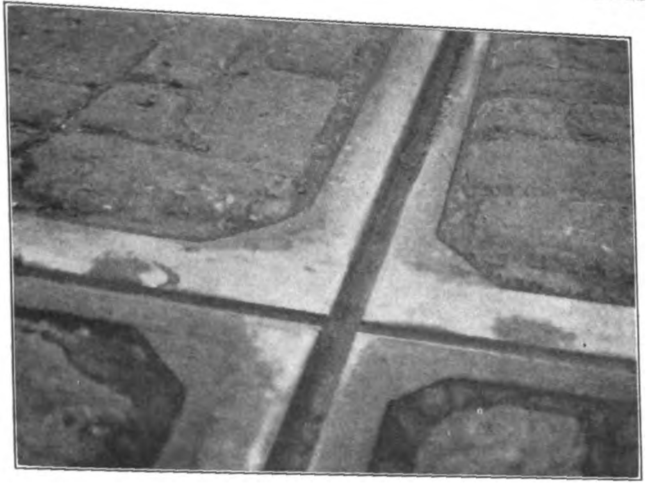
Since the unfortunate experience with solid manganese steel special work in Chicago, a number of the defective layouts have been replaced with castings which the manufacturers believed would eliminate unsound metal from the crucial points. Developments along this line included the adoption of a limiting thickness for the supporting webs, as well as the more general use of the channel instead of the T-rail sections, particularly at the points supporting the intersecting flangeways. While these changes have had a tendency to reduce segregation, internal strains and cold spots in the casting, they did not entirely remedy these defects at the mass points in solid crossings. Still other remedies included enlarging and changing the location of the gates and risers so as to feed the molds more liberally, and partial chilling in the molds. All of these have had a beneficial effect on the finished castings.

In their endeavor to remove unsound metal from the crucial points of right-angle and obtuse-angle crossings, some manufacturers rearranged the supporting webs. The successive stages through which the web distribution has passed in right-angle crossings are shown in Figs. 1, 2, 3 and 4. In the original designs of solid manganese steel crossings it was intended that the webs should intersect at right angles, which would have brought the junction exactly beneath the intersection of the running rails. This arrangement was considered impracticable, however, because of the foundry difficulties entailed, and was supplanted by the type with an intervening box 4 in. square. Service tests with this type indicated that the box was too small to introduce the necessary precautions against segregation, because the webs were too close to the crucial points. As shown in the illustrations, these box-like supporting webs have gradually been spread apart until the inside dimensions were 9½ in. square, as shown in Fig. 4. As these several stages of enlargement were made it was believed that the points of unsound metal would be further removed from the points of severest impact. Experience had shown that where the webs intersect, it was very difficult to eliminate segregation from the ball of the rail.

Early in 1911 several of these solid manganese steel crossings with the supporting webs in the form of a 9-in. box were installed at heavy traffic points in Chicago. After three and one-half years of service these crossings have demonstrated that chipped intersections



MANGANESE STEEL CROSSINGS—FIG. 5—BEGINNING OF DEPRESSION, WENTWORTH AVENUE AND FIFTY-NINTH STREET, CHICAGO

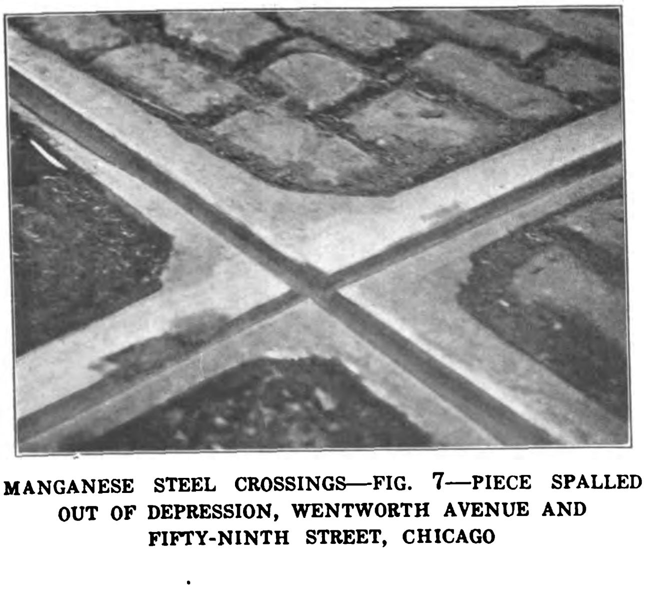


MANGANESE STEEL CROSSINGS—FIG. 6—CRACK BEGINNING IN DEPRESSION, HALSTED AND FIFTY-FIRST STREET, CHICAGO

can be eliminated, or at least up to the time of examination they gave no proof to the contrary. Other imperfections such as cupping at the joints or at the intersections, as well as cold rolling in the arms, were imperceptible, and this was considered evidence of improvement over the original installations.

EXAMINATION OF CROSSINGS THREE AND ONE-HALF YEARS OLD

In some of these more recent designs of solid manganese steel crossings, however, a peculiar phenomenon has begun to reveal itself after three and one-half years of service. A recent inspection of several of these newer layouts showed that slight depressions have begun to appear on the heavy traffic rail, about 8 in. from the intersection of the gage lines. As illustrated in the three accompanying halftones, Figs. 5 to 7, inclusive, these depressions at first appear merely as dark spots on the running rail beside the gage line. The peculiar thing about them, however, is that the depressions do not receive the passing wheel loads, but the metal seems to have shrunk away from the normal surface of the ball of the rail. In some of these depressions it was observed that a fine hair-line crack had begun to form along the edge, and in still others this crack had opened quite perceptibly, in fact that portion of the rail in the depression had begun to spall. It was also found that these depressions formed exactly over the intersection of the two webs forming sides of the square supporting box and the web in the running rail arm. Manufacturers believe that this is simply evidence that the unsound metal has been removed from the crucial points but has not been entirely eliminated. In other words, the mere shifting of the supporting webs had not removed this form of frailty. Partial chilling in the mold in conjunction with the other marked improvements in manganese steel foundry practice should exclude even this imperfection from the manganese steel crossings made to-day.

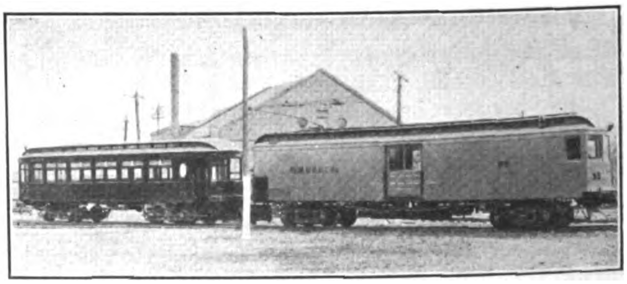


MANGANESE STEEL CROSSINGS—FIG. 7—PIECE SPALLED OUT OF DEPRESSION, WENTWORTH AVENUE AND FIFTY-NINTH STREET, CHICAGO

At first it was thought that the dark spot or depression noted was at the point where the wheels entered the narrow throatway or changed from a tread to a flange bearing. While in these installations the failure to provide gradual approaches either to the narrow throatway or to the riser in the flangeway caused a small, bright spot to appear, the locations on this bright spot and of the depression were not coincident, hence it was apparent that there was no relation between the two. Since this phenomenon could be accounted for as a mechanical difficulty, the manufacturers were satisfied that they were working along the right line. On the other hand, as the unsound metal area was so small and removed from the points of heavy impact, it was believed to be inconsequential and indicated that the presence of unsound metal in the wearing surface of solid manganese steel crossings had been practically eliminated. While only ten different layouts including twenty-two crossings of the newer design were inspected, each had been under three and one-half years' service with traffic totalling 150 wheels or 560 tons per hour. The uniform wear as well as the absence of other imperfections in all of these layouts indicated that the wearing qualities of solid manganese steel crossings had been improved and that a more uniform product had been produced.

Agricultural Extension via the Electric Way

The dairy husbandry department of agricultural extension of Purdue University, Lafayette, Ind., has arranged with the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., for a freight motor car with passenger trailer to be used in transporting an exhibit employed in connection with agricultural educational work. The freight car will contain exhibits of feeds and articles necessary to the scientific feeding of dairy cattle. In the passenger car lectures by experts on this subject will be delivered.



FORT WAYNE & NORTHERN INDIANA TRACTION—EXHIBIT AND LECTURE TRAIN

According to the present plan this two-car train will be operated over the lines of the Fort Wayne & Northern Indiana Traction Company, the Marion & Bluffton Traction Company, the Union Traction Company of Indiana, the Terre Haute, Indianapolis & Eastern Traction Company, and Indiana Railways & Light Company. The entire trip will require approximately a week, stops being made at many points en route. Posters have been distributed along the route to be taken by the train.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Signal Rules, Materials for Overhead Construction, State Laws Regarding Employment, Etc., Considered at Committee Meetings—Manufacturers' Association Officers Return from Pacific Coast

JOINT COMMITTEE ON BLOCK SIGNAL RULES

A joint sub-committee on signal rules appointed at the joint meeting of the rules and block signal committee, as reported in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, page 589, met in New York on April 7. Those in attendance were L. H. Palmer, New York, N. Y.; J. M. Waldron, New York, N. Y.; C. E. Morgan, Jackson, Mich., and J. W. Brown, Newark, N. J. This committee was appointed at the close of the discussion on block signal rules for the purpose of studying signal rules for use in connection with interlocking, block and contactor signals. After all-day and evening sessions the committee adopted a tentative report embodying a number of recommendations which will be mailed to the full committees.

COMMITTEE ON POWER DISTRIBUTION

A meeting of the sub-committee on overhead material was held in New York April 1 to 3 inclusive. Those present were Charles R. Harte, New Haven, Conn., chairman; G. W. Palmer, Jr., Boston, Mass., and C. L. Cadle, Rochester, N. Y. The general specifications were considered in detail and put into final shape, the subject of wrought iron and mild steel was completed with the exception of a few points of adjustment between the manufacturers and the standards, and the subject of wooden cross-arms was practically completed. It was decided that the subject of wrought iron and mild steel should be handled as a whole, leaving the treatment of other matters to be adjusted as they come up in turn.

MANUFACTURERS' ASSOCIATION

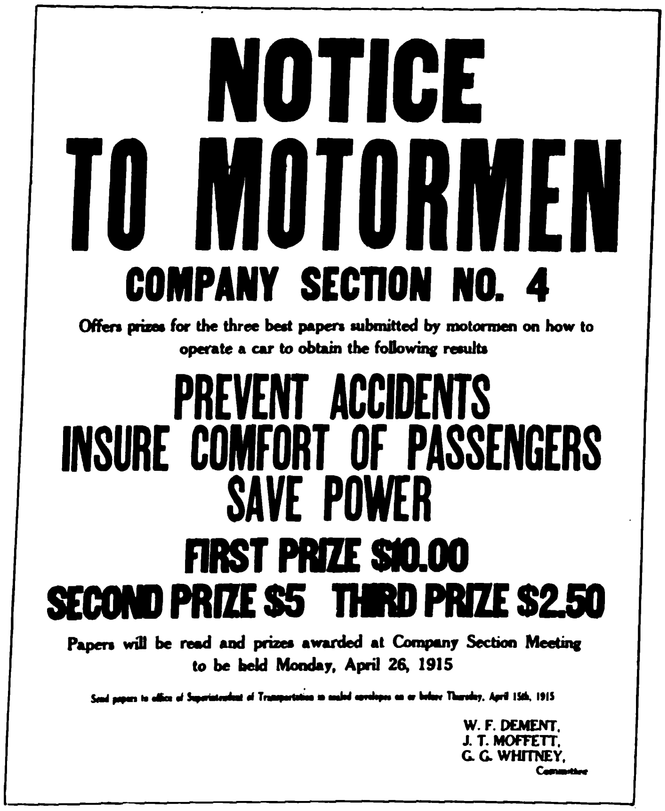
President E. H. Baker and Secretary H. G. McConnaughy of the Manufacturers' Association, who have been in San Francisco arranging for the accommodation of the convention, were last heard from at Los Angeles on their way home after a highly-successful trip. They are expected back in New York about the middle of next week. Mr. McConnaughy's office reports that the response to the sending out of bills about a week ago has been very satisfactory. This is appreciated by the executive committee because, if they can be relieved of the work of following up the collection of dues, they can devote their undivided attention to the details of transportation arrangements.

COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES

A meeting of the committee, C. S. Ching, Boston, chairman, was held in Boston on March 25 and 26. In addition to the members of the committee there were in attendance the following Boston men: Edward Dana, H. H. Hanson and R. B. Currie, Boston Elevated Railway. and H. I. Irwin, Bay State Street Railway. After a discussion of the best manner of compiling state laws relative to the employment of men on electric railways, it was decided to concentrate on the laws relating to certain subjects, as follow: hours of labor, workmen's compensation, safety appliances and comfort of employees in transportation service, intoxication among employees, and examination of employees. The committee finds that there are but eight roads which have a standard for watch inspection. The committee believes that while such a standard is desirable for city roads it is inexpedient to recommend a high standard at present, but will recommend that roads work toward such. The adoption of a standard clock for all stations is suggested as a step in the right direction. The committee considered the results of a data sheet canvass and will ask for certain additional data before completing its report.

WASHINGTON SECTION COMPETITION

At the April meeting of Company Section No. 4 three prizes will be awarded to motormen for the best papers submitted before April 15 on the subject "How to Operate a Car so as to Prevent Accidents, Insure Comfort of Passengers, and Save Power." A large poster advertising the competition is illustrated herewith.



NOTICE
TO MOTORMEN
COMPANY SECTION NO. 4
Offers prizes for the three best papers submitted by motormen on how to operate a car to obtain the following results
PREVENT ACCIDENTS
INSURE COMFORT OF PASSENGERS
SAVE POWER
FIRST PRIZE $10.00
SECOND PRIZE $5 THIRD PRIZE $2.50
Papers will be read and prizes awarded at Company Section Meeting to be held Monday, April 26, 1915
Send papers to office of Superintendent of Transportation in sealed envelopes on or before Thursday, April 15th, 1915

W. F. DEMENT,
J. T. MOFFETT,
G. G. WHITNEY,
Committee

WASHINGTON SECTION—LARGE POSTER ADVERTISING MOTORMEN'S LITERARY CONTEST

This is a continuation of the competition reported in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 27, 1915, where the awarding of prizes for papers on "The Duties of a Trainman to the Traveling Public" was reported. In the earlier conductors' competition thirty-six papers were submitted.

Secretary Burritt has announced the following scale of prices of the engineering manual and requests that members assist him in circulating it among interested persons: To members of the association the price of the manual alone is $1 and the binder $1. To nonmembers the manual is $4 and the binder $1. Sections are sold separately at prices from 10 cents to 25 cents each.

COMMUNICATIONS

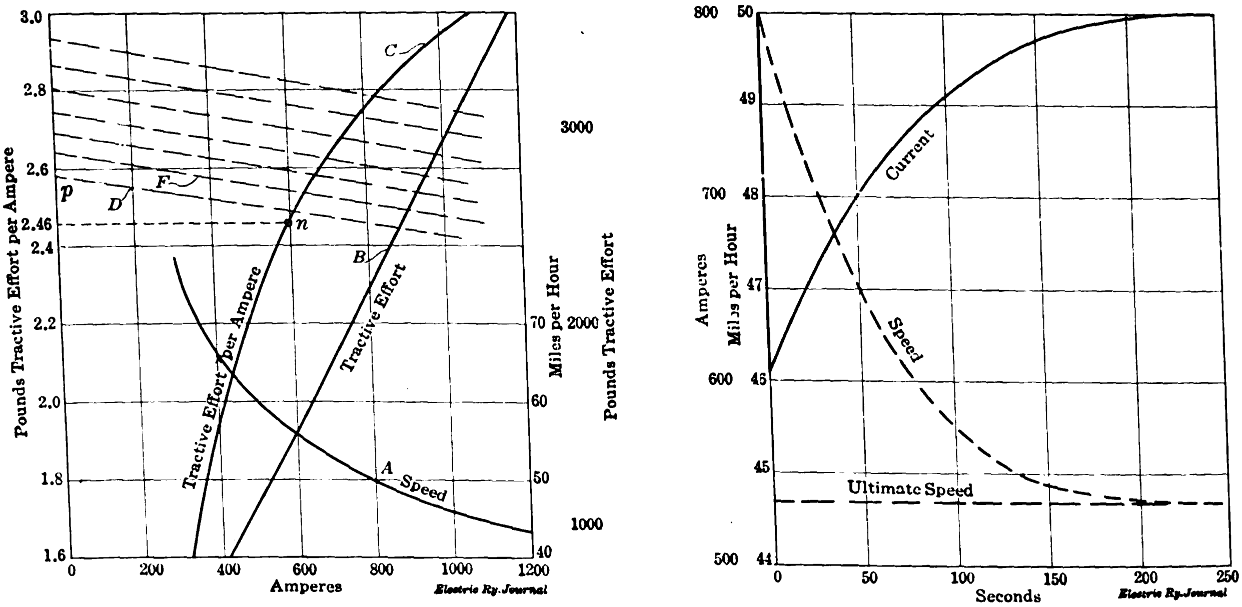
Inertia Effect of Moving Electric Trains

PHILADELPHIA, PA., March 15, 1915.

To the Editors:

In an editorial printed in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 6 you called attention to a certain "flywheel" effect noticed in starting heavy trains by means of electric locomotives on the New Haven Railroad. While this subject is not of as pressing and immediate importance as the jitney bus or the virtues of public service commissions, yet the principles involved will be acting when the jitney bus is forgotten and public service commissioners are as perfect as the characteristics of human nature will permit. It may therefore be of interest to analyze the phenomenon roughly to ascertain how important this inertia effect might be.

From physical considerations one can see at once that some such inertia effect must come into action when the voltage is lowered, because the steady speed of a series motor is practically proportional to the voltage at the same current value. The current would be practically constant at any steady speed as the train resistance is nearly constant over the range of speed involved in this case. In slowing down to the lower speed corresponding to the lower voltage the train would draw upon its stored energy and in that manner relieve the power house.



INERTIA EFFECT OF MOVING TRAINS—FIG. 1, GRAPHICAL SOLUTION OF PROBLEM; FIG. 2, CURVES SHOWING RESULTS OF CALCULATIONS

The writer was interested to obtain a quantitative idea of this phenomenon and used the following simple graphical method in doing so. The problem is this: (1) What will be the reduction in current and tractive effort due to a sudden reduction in voltage? and (2) at what rate will the current return to its original value or to one corresponding to the reduced speed, if it is desired to allow for the slight change in train resistance? The solution may be divided into the following two parts, namely: (1) Determination of instantaneous reduced current, and (2) determination of increase of current and rate of speed reduction.

Considering first the question of reduced current, when a train driven by series motors settles down to a steady speed, the current drawn is just sufficient to produce the tractive effort required to overcome train resistance. Curve *A*, Fig. 1, is the current-speed curve for the motors used on the original New Haven locomotives, when operating on direct current at 300 volts, while *B* is the corresponding current-tractive-effort curve. If we assume for illustration a train resistance of 2200 lb. per motor the current will be 800 amp and the speed 50 m.p.h. Under these conditions the 300 line volts (motors are connected in series) are balanced thus:

$$300 = E_c + IR = 287.2 + (800 \times 0.016)$$

where E_c = counter-emf, I is the current and R the motor resistance, assumed to be 0.016 ohm.

Now assume the voltage to suddenly drop 10 per cent, or to 270. The current must drop to a point at which the sum of the counter-emf and the resistance drop is 270. The counter-emf is proportional to speed and field flux. The latter, as A. M. Buck explained in his article on page 330 of your issue of Feb. 13, is proportional to the tractive effect per ampere; hence we may write:

$E_c = K \times \Phi \times$ m.p.h., where, for convenience, tractive effort per ampere is represented by Φ (to suggest flux) and where K is a constant depending upon the number of armature conductors, etc. The value of K can be obtained at once from the data given above, where $E_o = 287.2$ volts.

$$287.2 = K \times \frac{2200}{800} \times 50 = K \times 2.75 \times 50, \text{ or } K = 2.09.$$

Then if we knew what the new value of E_o was we could calculate Φ by direct proportion, and from a curve, as C, plotted between Φ and I we could read off the new current value.

An approximation to the correct value can be obtained by assuming the resistance drop the same as before; when

$$\frac{\Phi_1}{\Phi_2} = \frac{270 - 12.8}{300 - 12.8}$$

the speed remaining constant for the time being, or

$$\Phi_2 = 2.75 \times \frac{257.2}{287.2} = 2.46.$$

The corresponding current (see point n) is 590 amp, which is a considerable reduction (more than 25 per cent) due to a voltage drop of 10 per cent.

It is easy to allow for the variation of resistance drop by the following plan. From a point *p* on the line of 0 amp corresponding to 270 volts, i.e., where

$$\Phi = \frac{270}{K \times \text{m.p.h.}} = \frac{270}{2.09 \times 50} = 2.58,$$

draw a straight line, *D*, such that at any point Φ (proportional to the counter-emf) is

$$\Phi = \frac{270 - IR}{270} \times 2.58.$$

At 1000 amp, for example,

$$\Phi = \frac{300 - 1000 \times 0.016}{300} \times 2.58 = 2.43.$$

The intersection of this line with curve *C* gives the exact value of current, about 606 amp, practically the same as before.

Let us now determine the rate of increase of current and rate of speed reduction. With the reduced current there is a deficiency in tractive effort, as indicated by the tractive-effort curve, of 2200 — 1460 = 740 lb. The rate of retardation is then, as acceleration is the quotient of force and mass, if the train weight is 100 tons per motor,

$$a = 740 \div \left(\frac{100 \times 2000}{32.2} \times \frac{5280}{3600}\right) = 740 \div 9100 = 0.0814 \text{ m.p.h.p.s.}$$

It is necessary to use a step-by-step method of calculating the variation of speed, current and time. The plan often followed in plotting acceleration curves can be used for this purpose; that is, a decrement of speed, say 1 m.p.h., can be assumed, and the corresponding current, tractive effort and acceleration calculated. On the assumption that the speed falls off uniformly while undergoing this decrement the average rate of retardation will be one-half the sum of the values before and after. The duration of the decrement is then the quotient of the decrement and the negative acceleration. This can be repeated until the steady-running speed corresponding to the reduced voltage is attained.

Assume then that the speed has fallen from 50 to 49 m.p.h. As the line voltage is assumed to remain at 270,

$$270 = E_c^1 + IR.$$

As the speed is reduced the flux must increase proportionately if the resistance drop is assumed to remain the same, the correction being provided as before.

On the Φ curve, $\Phi = 2.56$ corresponded to 50 m.p.h. and no resistance drop. Then for the reduced speed, the corresponding point is,

$$2.56 \times \frac{50}{49} = 2.635.$$

Drawing the line *F* by the method outlined before we note the intersection with the curve *C*, corresponding to 635 amp and 1570 lb. tractive effort.

The retardation is,

$$(2200 - 1570) \div 9100 = 0.0692 \text{ m.p.h.p.s.}$$

Assuming that, while the speed has been falling, the average negative acceleration was

$$\frac{0.0814 + 0.0692}{2} = 0.0754 \text{ m.p.h.p.s.},$$

the time required was

$$\frac{50 - 49}{0.0754} = 13.25 \text{ seconds.}$$

This process may be repeated for, say, 48, 47, 46, 45 and 44 m.p.h., the last value being lower than the ultimate speed, as shown in Fig. 2.

The results of the calculations have been plotted in Fig. 2, from which it is seen that a reduction of voltage like that taken for granted under the assumed condition produces an appreciable relief in power-house load enduring for an appreciable length of time.

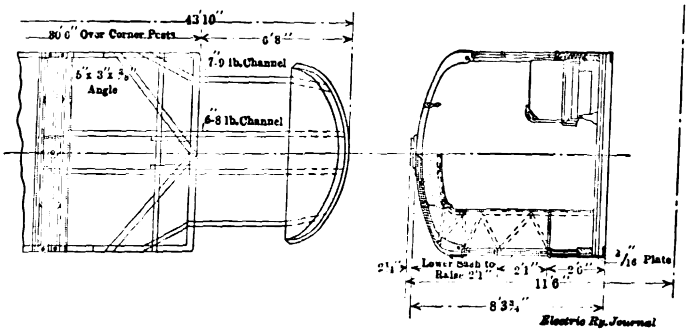
I trust that the above may contain some points of interest to your readers. J. MCANNIX.

Semi-Steel Cars in Collision

THE AMERICAN RAILWAYS COMPANY
PHILADELPHIA, PA., March 27, 1915.

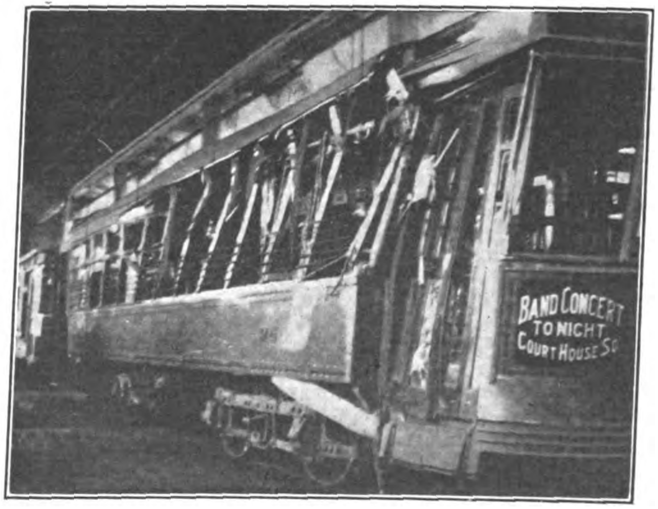
To the Editors:

We have been much interested in your article on steel car maintenance on the Long Island Railroad, as described in the issue of the ELECTRIC RAILWAY JOURNAL for March 20. On the same subject but with reference to lighter cars you may be interested in the accompanying photograph showing the condition of one of our semi-steel cars after an accident. This car received the full impact of a runaway car making a high speed on a 6 per cent grade, an impact which would practically have demolished a wooden car. The construction of the car is shown from the line drawing sent herewith. Its principal features are a steel underframe and continuous T-iron post. This car is similar to the one mentioned in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, page 556, except that it is a few feet shorter.



SCRANTON RAILWAY COLLISION—FRAMING OF PART OF CAR

The underframe is constructed as follows: The side sills are of 5-in. x 3-in. x ⅜-in. angles in one piece, bent around the corner posts and spliced in the center, forming the end sill. Crossbars are of 4-in. channels, weighing 5¼ lb. per foot., with the exception of the first crossbar back of the end sill, which is a 6-in. channel, weighing 8 lb. per foot, which takes the strain of the platform knees. The steel girder plate, 29-in. wide and 3/16 in. thick, extends from corner post to corner post, and the end plates, 33-in. wide and 3/16 in. thick, extending from the bulkhead posts and around the corner posts, connect to the side plates with 2½-in. batten plates. The top chord of the girder plate is a con-



SCRANTON RAILWAY COLLISION—APPEARANCE OF DAMAGED CAR tinuous strip 2½ in. x ½ in. Diagonal braces are 2½-in. x ⅜-in. bars.

The platform knees are of 7-in. channel, 9¼ lb. per foot. The center knees extend to the bolster, while the outside knees anchor to the bottoms of the side sills. All knees are bent accurately to shape to meet the conditions of platform level and step openings, and are securely anchored to the end sill by stirrups and bolts.

The flooring is of 13/16-in. x 3¼-in. tongued and grooved yellow pine, nailed to 1¾-in x 5-in. white oak cross-sills, which are securely bolted to the channel-iron crossbar.

The car body is framed with 2-in. x 2-in. x ¼-in. T's, running in one continuous piece from side sill to side sill, forming post and roof carline and accurately anchored to the angle side sill and to the girder plate. The bulkhead openings are of latticed construction, having 2-in. x 2-in. x ¼-in. T's bent to shape, forming the opening.

As indicated in the photograph the damage to the car consisted in the kinking of the posts near the name plate and the breaking of the glass and door on one side of the car. The other side of the car was uninjured, and there was but slight injury to passengers.

The posts were bent back into shape by the use of a blow torch and the whole car was repaired at a labor cost of $518, and a cost for materials of $67. The runaway car was of similar construction and had its vestibule and underframe damaged. It was repaired at a labor cost of $242, and a material cost of $31. If these cars had been of the old-type, wooden construction it is almost certain that one of the cars would have been totally destroyed. As it was the side sill and plate girder were not injured at all, the letterboard and the attached side of the roof being the only parts of the side injured, in addition to the windows and posts mentioned above.

C. G. KEEN,
Engineer Way and Structures.

Registration of Fares

RAILWAY AUDIT & INSPECTION COMPANY, INC.
PHILADELPHIA, PA., March 30, 1915.

To the Editors:

One of the vital questions confronting electric railways to-day and one that has in the past been condoned or treated as a joke is the theft of money by employees. The time has come, however, for a full and open discussion of this subject, and this letter is intended as an opening wedge.

No other business is so much handicapped in regard to the collection of its revenue as the street railways. Although the conductors are really the custodians for the entire revenues of the company and work under a proportionately greater trust than that imposed upon bank cashiers, they are in many cases strangers to the management and in general are placed upon a basis of optional honesty through the use of machines that tally only when the employees so choose. Hence, even with sufficient inspection constantly carried on to keep the road properly covered, some conductors are found "short." They are warned by the management, but this procedure is ineffective. In time the offense is simply repeated, and the effect upon fellow employees and young men outside the company is extremely harmful.

One reason for the present prevalence of this practice is the fact that convictions for such wrongdoing are difficult to obtain. On account of a Supreme Court ruling, it must be proved that the fares first were not registered on account of an intent to steal or embezzle, and that on the completion of the day's work the unregistered fares were held out by the conductor. The question of jurisdiction has also arisen—as, for example, in the Bucks County (Pa.) case, where four conductors were released on the ground that the fares had been held out in Pennsylvania and returns made in New Jersey. Lastly, there is the difficulty of securing a verdict for the company from the jury, either on account of badly prepared evidence or on account of the failure of the jurors to understand the conditions and to look at the matter in a properly serious light.

Electric railways, however, should now begin to take concerted action to place the stealing of nickels in the same class with other thefts. They should frame and push at any cost state laws prescribing a policy of collection and proper registration of fares collected. It should be provided that failure so to register would constitute *prima facie* evidence of theft and the offense would be a misdemeanor punishable by imprisonment. Furthermore, the courts in the county, district or city where the failure to register occurred, should have jurisdiction over such offenses. The next move on the part of the railways would be to notify labor unions that no question of theft or discipline would be considered as debatable in committees but would be treated as violations of the law.

Any method of optional registration is a continual source of temptation, and if this temptation cannot be overcome by principle it should be destroyed by the fear inculcated by proper legal punishment. It is my opinion that legislators would have much to answer for if they failed to pass such a law as suggested, if properly prepared.

V. L. EDMUNDS,
General Representative.

The Reading of a Technical Journal

THE SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
DALLAS, TEX., April 1, 1915.

To the Editors:

I have just noted with much interest the notice on your Publisher's Page in the issue of March 27 in regard to the circulation of the JOURNAL among the employees of railways. While Mr. Yungbluth's plan is an excellent one and much preferable to dumping into the waste basket or letting the papers lie in dusty heaps in corners, it seems to me that it would be better still to give to each one of such departments as these to whom copies are sent an individual subscription to the JOURNAL and, in cases where such departments contained a large number of men, several copies of the JOURNAL.

In the first place, the cost of the JOURNAL and—in fact, not to make this exclusively an individual matter with the JOURNAL—the cost of any first-class operating technical journal, is so small, compared with the valuable matter that it furnishes within the year, that I do not believe it is wise to consider the subscription costs at all, and it is especially unwise to consider them as a factor in their full distribution to the employees. Taking the ELECTRIC RAILWAY JOURNAL as an instance: it covers, within the year, valuable items of information or suggestions or advice pertaining to the details of every single department of street and interurban railways. In other words, its issues will contain more or less of good, useful information or suggestion to every single employee of a street railway, from the track greaser up, and therefore it does not seem to me that it is wise to miss the opportunity of placing the paper in the hands of every single employee or, at any rate, of giving to each one the fullest facility for reading it.

At the very reasonable price of the JOURNAL, the question of additional subscriptions sufficient for the convenient reading by all the employees would not make a large item with even the smallest street and interurban railways, and with the larger and more complex organizations of the larger companies, the information contained in the JOURNAL is even a greater necessity and their very size and complexity makes the cost of extra subscriptions to the JOURNAL a more negligible factor.

As a matter of fact, a file of the best technical journal pertaining to the particular class of public utility operated is an absolute necessity on or very close to the desk of the head of any department of that utility and should remain there, with its semi-annual index, for at least a year's issues. This means that none of these issues goes elsewhere, either as a portion of a circulation library or otherwise. To the minor subdivisions of departments there should be at least separate copies for each to circulate from the head of such minor division downward to the men in that division, and if such a division contained a large number of men there should be several copies for such general circulation.

One of the disadvantages of the circulating library method of "a few copies all down the line" is shown in the dating on Mr. Yungbluth's label. This copy reached the storekeeper on March 16, reached Manchester on March 19, with two more places, possibly, to which to send it. Outside of the extra handling which was required for this purpose, and which would not tend to improve the appearance of the magazine, there is the fact that the parties at the tail-end of the line may receive their copy four or five days or a week after its issue or after its receipt at headquarters. Such a delay in reaching the individual is not conducive to interest in the magazine, and it might very easily be possible that some suggestion contained in it would reach him after the opportunity of using such suggestion had passed. It is my idea that the quicker each current number of the technical magazine taken reaches every individual employee, the better will be the results.

There is also the further fact that a more personal interest would undoubtedly be developed in the magazine where it was the personal property of the individual or of the department or subdivision of department. To own—either as personal property or as departmental—a neat file of these magazines, instead of having them sent in as a sort of temporary "hand-me-out," would undoubtedly make the employees take a more personal interest in the magazine and would also give them a more ample opportunity thoroughly to read and digest it.

Without in any way meaning to discredit Mr. Yungbluth's idea, which is an excellent one where the supply of these magazines is limited, I would strongly suggest that the best method is to spend a little more money for sufficient separate subscriptions for the benefit of the various heads of departments, subdivisions and groups of employees. The reasons for such suggestions are fully given above. A hundred subscriptions to any one of the larger street railways is a very small item of expenditure—in fact, it should not be considered an "expenditure" but rather as a very wise investment that will return a high rate of interest. The personal experience of the writer in this matter is—not only with reference to the ELECTRIC RAILWAY JOURNAL but with reference to the lighting and other technical magazines for every class and kind of public utility—that a careful reading of the whole magazine, especially including the advertisements, notices, etc., has never failed to save him within the year many times the cost of the subscription, and he has also found that reading by the employees of the same magazines has resulted in suggestions, economies and other favorable factors that gave more return on the $3 or $4 invested than on almost any other expenditure made by the company.

H. S. COOPER, Secretary.

Making the Safety Movement Permanent

FITCHBURG & LEOMINSTER STREET RAILWAY
FITCHBURG, MASS., April 7, 1915.

To the Editors:

In your issue of April 3 I note a timely editorial on "The Brass Band in the Safety Movement." I say timely, because it has appeared to more than one who has this idea under way that sooner or later the newness would wear off, and then what?

In my opinion the only safe way to treat this important feature of our railway work is through co-operation, not of a few, but of the many, so that the movement may be so general that it cannot fail because of the diversified interests which it serves.

By co-operation I mean that in the city where a campaign of this kind is being waged all organizations should be represented in the safety association, including heads of the automobile, motorcycle, team drivers, fire, police and school departments, and the railways. With an organization of such as these working in harmony for a common cause, drawing from the varied walks of life for its membership, there cannot fail to be awakened the moral attitude, at least, of the people throughout the country.

A movement for the masses and not for the classes is one which will appeal to everybody. A movement to preserve human life and limb and conserve happiness thereby cannot fail, simply because it is a humane movement. No matter how loud the band has played, or how far or near the movement has been heralded through the press, there remains that one essential feature, and the saving grace of every movement that succeeds, thought, and this once aroused means that everybody is a safety-first practitioner, for "self-preservation is the first law of nature."

These various organizations pulling together as a unit will always be an endless chain, and when a body of men can sit down together and rationally agree that each one is for the betterment of the other's interests, then you have an organization that will accomplish something and does not need the brass band, or the press for that matter, to accomplish results. I know of one such.

The membership of such an association must be drawn from every club, religious or otherwise, and from lodges, unions, etc. They should be asked to send a delegate to represent them and act for them. With everybody joining hands in a common cause there can be no slip. It only requires continual hammering by some live wire in the organization to create fresh interest, and the rest is easy.

Then forget the band and its momentary illusion for the few, and remember only this movement which is so radically different from any other. For it is not a one-man movement, not a street railway, automobile or motorcycle proposition, but one in which everybody plays a part according to the intellect that has been given to him, and thus before we know it we have an organization free from the assailment of the press or public, because they are one with us and will not seek to destroy themselves.

You fellows who think you have exhausted your ability in this direction, just reach out and get hold of that "other fellow" who may have better ideas than either you or I of what to do, and not shut yourself up in your office and bemoan the fact that there is nothing new. For everybody you run up against has something new, and all you need do is to cull out what is practical and then apply it. Hoist that banner "First Aid to the Uninjured" a little higher and get together with everybody.

H. K. BENNETT.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Methods and Costs of Concreting for Modern Pavement

BY S. GAUSMANN, BROOKLYN, N. Y.

Too much cannot be said of the necessity for care in the concreting of modern track construction. In this article the writer will present a comparison of the different methods of mixing and state some of the causes of failures in paving where wear and settlement appear from apparently no just cause and are invariably laid to improper paving.

CHARACTER AND PLACING OF MIXTURE

While steam cinders make a good, cheap concrete with a 1:3:6 mix it is too often necessary to use more sand and cement, reducing the proportions to 1:2:4, on account of the quality of the cinders. Unless these cinders are obtained free, the cost of the concrete will be nearly as much as if gravel or stone is used and yet it will be nowhere near the quality of mixtures containing the latter elements.

A 1:3:6 mixture containing either stone or washed gravel, preferably the latter, is most desirable in modern track construction.

One of the causes of failures in paving is that when the concrete is placed in the track it is often too wet, thereby undermining the bed of the ties and causing the track to "pump." If this trouble does not develop before the track is paved it will do so soon after, and then the paving as well as the track will show the ill effects. While concrete with an excess of water might do in some construction it will not serve in track work. It should be avoided, especially where operation is resumed over track immediately after the concreting is finished and before it has had time to set.

Another condition to be avoided is the failure to compact the concrete thoroughly under the rail. While with an exceedingly wet concrete this space will be filled at first, the concrete will soon shrink away from the rail, leaving a void which is not large in extent, but large enough to do damage. On the other hand, when the concrete is of the proper consistency a large pocket will be left unless extreme care is used. To avoid this trouble the concrete should be thoroughly placed by shovel tamping, followed, after it has set slightly, by tamping with tamping bars from both sides of rail. Unless this is done sand from below the paving will work into the pockets and cause the pavement to settle, especially along the rail.

When the concrete is placed in the track it should be well rammed and the surface kept to a uniform height. While a templet can be used for this purpose, it is unnecessary except in the case of brick or wood block paving, as men accustomed to the work can keep the concrete to the desired height.

When track is concreted from the bottom of the ties to 3 in. or more above the ties it is advisable to do so in two sections, bringing the first section to the top of the ties and placing on this a very thin layer of sand, followed by the rest of the concrete. While this separation may seem to be added work it can be done at no greater expense than if the concrete was placed all at once; it will not injure the quality of the foundation, and although the "other fellow" possibly is not considered, the two-section practice means much good to the road when reconstruction is undertaken.

In mixing concrete the hand process should be avoided as it is very unsatisfactory, both from a cost as well as a quality standpoint, for no matter how well it may be followed the ordinary workman will get careless. Even if the proper proportions are in the batch they will not be mixed properly, and especially so if the men are expected to do a certain amount as a day's work.

A batch mixer is, of course, preferable. While the cost of production and placing varies little from that of a continuous mixer much more can be done in a given time. Still, for many roads the initial cost of this machine is practically prohibitive and for such construction the continuous mixer is the ideal machine.

COST OF CONCRETING

The following costs are based on doing work with no car interference. These costs will be somewhat increased under car operation, with machines outside the tracks, or decreased with machines of larger capacity.

The freight rates for hauling machines to and from work are in accordance with rates approved by the Public Service Commission of the State of New York, First District, and include the total cost of maintenance of the car equipment, cost of trackage and overhead line rights and office expenses of the freight department. These rates vary according to the length of haul, the figures given being for an average haul. This haulage cost would be considerably reduced where the track department does its own handling of material, etc., and where only the wages of crews are charged against it instead of having the freight department make a general charge per car-mile.

The batch mixer, for which the following costs for operation are given, is of 0.5 cu. yd. capacity. It can be bought for $1,300, mounted on a car, and is electrically operated as to mixing only, so that it must be hauled to and from the work daily.

The number of men employed and their rates per hour in operating a machine of this character are: One assistant foreman, 25 cents; one operator, 25 cents; four laborers, 20 cents; six laborers, 18 cents; fourteen laborers, 16 cents; one checker of time and material, 15 cents, or a total cost of $47.70 for one day of ten hours. This cost is distributed to the various operations as follows:

Operation of the machine	$2.50
Watching mix and dumping	4.25
Handling material to the machine	13.50
Removing and placing the track	22.10
Ramming and tamping under the rail	3.85
Checking	1.50
	$47.70
Add other charges:	
Overtime for cleaning	$0.90
Interest on investment	.58
Freight to and from work	6.25
Lubricants, repairs and incidentals	2.33
	$10.06
Total	$57.76

A gang of this size will average in a ten-hour day approximately 675 ft. of single track with concrete 7 in.

deep. The volume, with 6-in. x 8-in. x 8-ft. ties spaced 2 ft. center to center, is equal to 94.22 cu. yd., making the unit cost $0.613 per cubic yard, exclusive of material.

A good continuous mixer of a standard make can be purchased for $560. Although such mixers are supplied on wheels for use at the side of the track, a good car with old pony wheels and a wooden frame can be made for approximately $30, thus bringing the total cost to less than $590. This cost is for a gasoline-operated machine, but an electrically operated one is preferable. Provided an old motor is obtainable, the first cost will vary but little from gasoline, whereas the cost of operation will be less.

As a machine of this kind is easily derailed it need not be removed from the street daily, and can be left on the work continuously ready for use at any time, with no outlay for freight charges until it is required at other points.

The number of men employed, and their rates per hour, in operating one of these machines are: One assistant foreman, 25 cents; one operator, 25 cents; two laborers, 20 cents; three laborers, 18 cents; eight laborers, 16 cents; one checker of time and material, 15 cents, or a total cost of $28.70 for a ten-hour day. This cost is distributed to the various operations as follows:

Operation of machine	$2.50
Handling material to machine	10.20
Distributing in track	12.10
Ramming and tamping under rail	2.40
Checking	1.50
	$28.70
Add other charges:	
Overtime for cleaning	$0.50
Interest on investment	.26
Freight to and from work	1.25
Gasoline, oil and repairs	2.25
	$4.26
Total	$32.96

This gang will average 430 ft. of single track per ten-hour day, with concrete 7 in. deep. This length, with 6-in. x 8-in. x 8-ft. ties spaced 2 ft. center to center, is equivalent to 60.054 cu. yd., making the unit cost $0.5488 per cubic yard, exclusive of material.

Of course, in mixing by hand the number of men employed may vary, but for an illustration we may assume that as many are employed as on the continuous mixer, exclusive of the operator. The cost then would be distributed to the various operations as follows:

Distributing material and mixing	$10.50
Distributing in the track	11.80
Ramming and tamping under the rail	2.40
Checking	1.50
	$26.20

This number of men in a ten-hour day will average 225 ft. of single track with concrete 7 in. deep which, with 6-in. x 8-in. x 8-ft. ties spaced 2 ft. center to center, amounts to 32.77 cu. yd., equivalent to a unit cost of 80 cents per cubic yard.

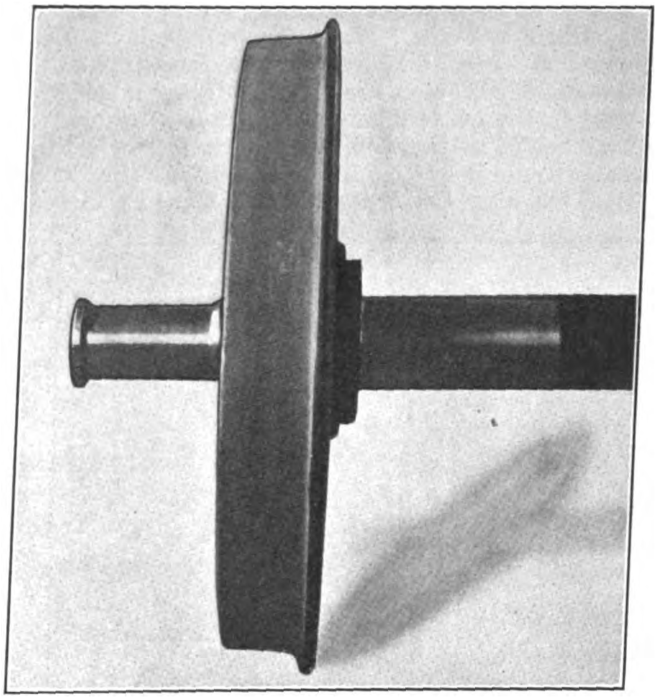
The foregoing figures were obtained from many years' experience in this line and from carefully collected data. While they may not apply to all locations, the costs can be easily adjusted to meet any conditions from the information given.

During the recent cold weather in Louisville, Ky., when the Louisville & Portland Canal was frozen over, small fish swarmed into the intake waterways of the Louisville Railway Company's High Street power plant and were drawn through the screens and circulating pumps. They entered the intake waterways in search of air, but made much work for the men in charge of the condensers, as the fish had to be removed. The record catch for one day was 112 lb.

Restoring Steel Wheel Flanges with a Welder

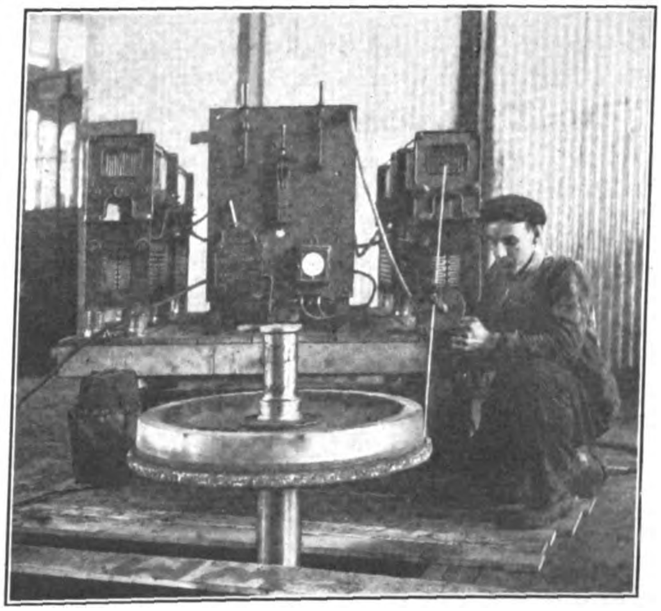
BY F. A. MURPHY, ELECTRICAL ENGINEER AND MASTER MECHANIC CHICAGO, OTTAWA & PEORIA RAILWAY, OTTAWA, ILL.

With the advent of the electric welder came the serious consideration of adapting this outfit to deposit metal to replace that worn away on various parts of car equipment. It is one application along this line, namely, the restoration of flanges on steel car wheels that is described in the present article. The danger that sharp-flanged wheels will split switches, shear rails, etc., is recognized, and need not be dwelt upon here.



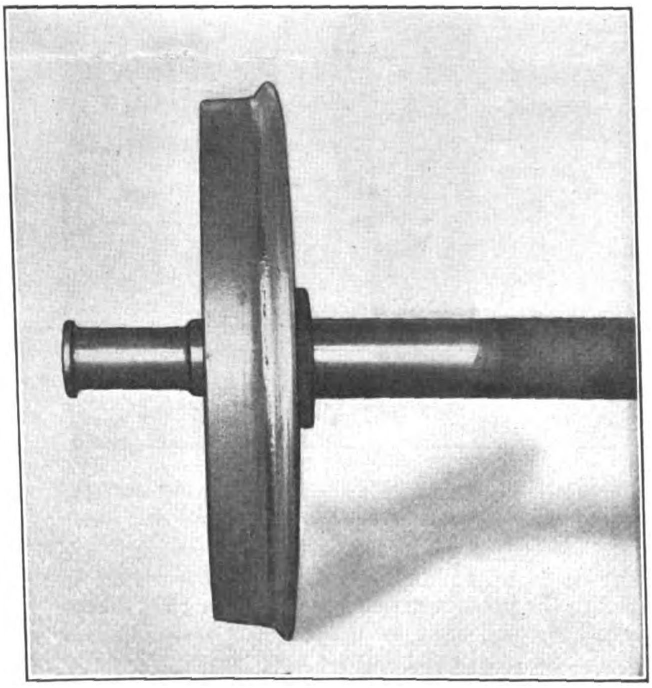
WELDING ON WHEEL FLANGES—FIG. 1—WHEEL WITH SHARP FLANGE

Fig. 1 shows one wheel of a pair removed from a 50-ton car on account of a sharp flange. To give this



WELDING ON WHEEL FLANGES—FIG. 2—WELDING OPERATION AND EQUIPMENT wheel the proper flange contour it was necessary either to take enough material off of the wheel face by turning, or to deposit enough steel on the worn portion of the wheel flange to bring about the same result. If the first method, namely, that of turning, had been used, at least 5/8 in. of metal would have been removed from the tread of each wheel, thereby causing about 33 1/3 per cent reduction in the wear life of the wheel. But, by restoring the flange with an electric welder, the 5/8 in. of metal usually wasted in turning is saved and the life of the wheel is thus prolonged accordingly.

Fig. 2 shows an operator building up a flange on the wheel illustrated in Fig. 1. The metal electrode is 1/4-in. cold-rolled steel. Fig. 3 shows the finished wheel, which, after the flange had been over-built with the welder, was placed in the wheel lathe and finished. The total cost of removing, welding, finishing and replacing this particular wheel was $3.37. This amount approximates the cost of handling wheels for each turning. In addition the metal usually wasted in turning is saved. The latter is estimated to be worth about $9.50 per pair of wheels.



WELDING ON WHEEL FLANGES—FIG. 3—THE WELDED FLANGE RESTORED TO NORMAL CONTOUR

From data collected, wheels with welded flanges are found to have made an average of 40,000 miles. This mileage might be greatly increased by developing some means of hardening the metal which is used in building up these flanges. The addition of carbon by using a carbon electrode and chilling the metal are being investigated. While this method of restoring worn steel wheel flanges is considered experimental, the results obtained indicate its possibilities. The writer intends to continue his experiments and would appreciate the experience of others working along the same line. In addition to the work outlined, successful results have also been obtained from electrically-welded flat spots. These, like the wheel flanges, were over-built and then ground to a true contour.

The influence of the New York, Westchester & Boston Railway, the new high-speed third-rail line out of New York, is lending to the growth and development of Westchester County was shown in an article printed in the New York *Evening Post* of April 3.

Sleeving Shrunk on Worn Armature Shafts—Rethreading Pinion-End Threads

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

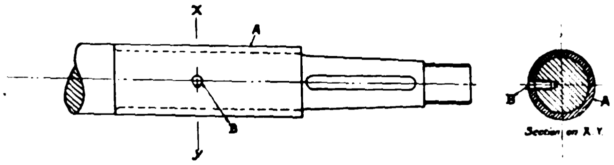
The following is a description of the methods adopted by the writer in dealing with worn or damaged armature shafts on a large British street railway:

The armature bearings were of the ordinary anti-friction metal-lined type, both split and solid. The operating conditions were normal, but as the system was one of the earliest to commence running it is only to be expected that a large number of the older armature shafts had worn to a small size. The diameters, of course, varied in dimensions, but each was made true and parallel every time the armature passed through the winding shop.

Apart from the occasions when they were under repair the shafts were put into the turning lathe at least once annually when the car came in for its general overhaul.

To keep the number of bearings for issue to the depots within reasonable limits, the shafts were finished to the nearest 1/32 in. A fixed minimum diameter was decided upon and when a shaft reached this size, instead of removing it and pressing in a new one, as is very commonly done, the shaft was brought back to the maximum diameter in the following manner:

A steel sleeve, *A* (see sketch), was bored out to a size which gave a tight shrink fit to the shaft, the latter being skimmed and filed in the lathe but not polished. The sleeve was then heated to a dull red, passed over the shaft and allowed to cool slowly.



KEYED SLEEVING SHRUNK ON A WORN ARMATURE SHAFT

As an extra safeguard to prevent any movement, a 3/8-in. peg, *B*, was screwed through the sleeve into the shaft; and to prevent the possible working loose of this peg a small notch was cut in the side of the peg hole with a chisel, so that a small projection was formed on the peg when it was expanded by hammering after being tightly screwed up. The armature was then put back into the lathe and the sleeve turned to the top standard diameter. This method proved to be much cheaper than installing new shafts and was quite satisfactory in every way.

Recently a shaft or two has been built up to the original diameter with added metal by the oxy-acetylene process. The cost of this is greater than one would at first think, chiefly because of the quantity of oxygen used. A good final surface can be obtained by machining, but it is not certain that it can be made uniformly hard all over. In the absence of a sufficiently long experience of the wear under running conditions, a true comparison cannot yet be made with the method previously described.

RETHREADING PINION-END THREADS

It is a very common thing to find the pinion-end threads either stripped or otherwise badly damaged. The writer's common practice in dealing with these cases has been to cut off the threaded portion and bore an axial hole in the end of the shafts; this is then tapped to suit a plug threaded like the original extension. After tightly screwing the plug into position a cross pin is fitted through the shaft and plugged to prevent the latter from screwing back. Many shafts have been repaired in this way and have invariably proved satisfactory.

A newer process which has now been adopted with perfect success is to build up the old threaded portion with the oxygen blow pipe and afterwards re-turn and thread it. Where the necessary apparatus for carrying out the latter process is in use, this method of reinstating damaged threads will be found both economical and entirely suitable.

Memphis Maintenance Co-operation

A feature in the organization of the Memphis (Tenn.) Street Railway for the past eight years has been the Mechanical Improvement Club, which is composed of the foremen, inspectors and others in the car maintenance department, with A. D. McWhorter, master mechanic, as chairman. This organization meets quarterly to discuss equipment maintenance, and once a year an additional touch of good-fellowship is given to the gatherings by a banquet. These meetings have done a great deal toward improving operating conditions.

On the occasion of the latest banquet, held on Jan. 28, several instructive papers were presented by members of the staff. Abstracts of two, "How to Reduce Car Changes," by C. B. Tutwiler, night foreman, and "Motor and Truck Maintenance," by E. L. Berger, foreman motor and truck department, are presented herewith.

HOW TO REDUCE CAR CHANGES

Mr. Tutwiler said that reports on defective cars cannot always be depended on because they are sometimes incomplete and sometimes they are misleading. Again, a defective car report may be prepared with attention to each defect, but its value may be greatly lessened if a careless workman fails to realize the importance of faithful performance of duty.

Efficient inspection should begin with the car placer, who is in a position to see several of the defects that may be overlooked by the crew or by the inspector.

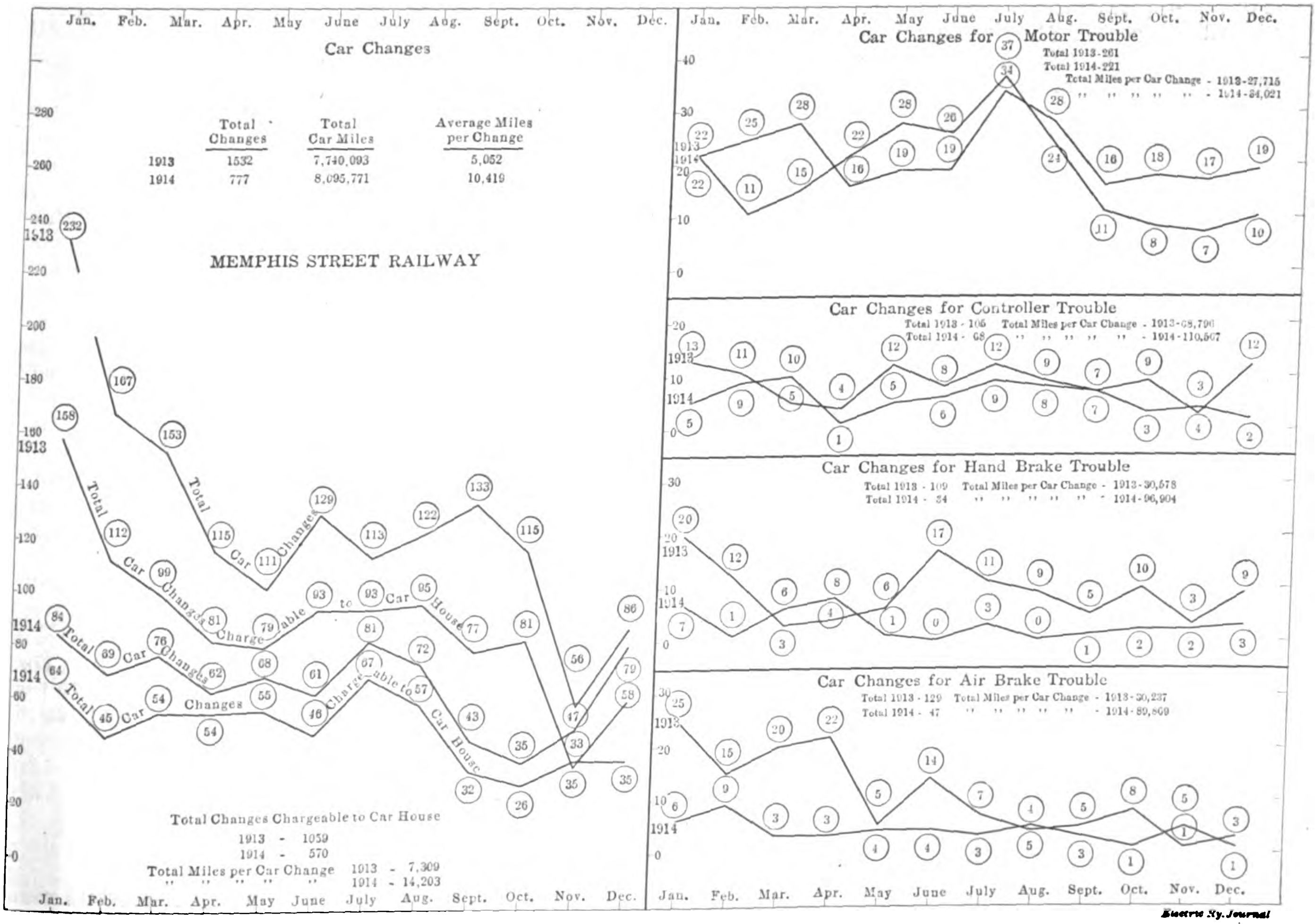
Before returning a repaired car to service, it should be thoroughly inspected from the trolley to the rail. When it comes in from its first day's run, the shopmen should notice how each part stood the first day's service. Any part that shows a weakness or defect should be watched closely until that weakness or defect is overcome.

Not only should every job be treated as conscientiously as the biggest, but each man ought to do a little more than the work assigned to him. If a man notices a defect that has been overlooked by a fellow workman, he should in the spirit of co-operation call the other man's attention to the defect. Of course he should be just as willing to receive suggestions relating to his own work. Vigilance should never be relaxed, but the same careful inspection should be maintained as if the car had been giving trouble every day. The motorman with a defective car is like a mechanic with a defective tool or a barber with a dull razor.

In concluding, the speaker said that car changes could be reduced by thorough inspection, co-operation, recognition of responsibility, vigilance and enthusiasm.

MOTOR AND TRUCK MAINTENANCE

Mr. Berger said that motor failures in 1913 were 261; in 1914, 221. The record for 1914, while showing fewer troubles, was not a satisfactory one and was not in any way an index to the true condition of the motors.



EQUIPMENT MAINTENANCE GRAPHS OF THE MEMPHIS (TENN.) STREET RAILWAY COVERING THE YEARS 1913 AND 1914

During the first half of the year the interurban equipment set a new high mark for breakdowns, and later the continued excessive heat baked out and destroyed a number of No. 800 fields entirely out of proportion to the mileage made with them. After these conditions had passed only thirty-six failures were recorded in four months, against 185 in the previous eight months.

Other avoidable troubles had, no doubt, added to this list, but in every case steps had been taken to prevent a recurrence, if possible. The 1913 record in reduction of motor failures, namely, from 679 to 261, was one that would probably stand.

But the reduction of trouble, while of vital importance, is only an incident. There were other problems of equal importance. Time-saving methods had been and were being devised and applied as rapidly as practicable. Three years ago the renewal of eighteen pairs of wheels was conceded a good week's output for three men. In one week of the preceding month four men had renewed thirty-six pairs, and the week before the same crew had renewed forty-one pairs, in addition to taking care of the regular motor maintenance.

At the last annual meeting the working force had been reduced from nine men to five. This number has since been reduced to three.

Many and varied practices had been evolved and tried for the prevention of cruelty to the purchasing department. The discovery that a tin cap was superior to the oil disk was one. The disk, owing to its unmechanical construction, was destructive to bearing liners and impossible to retain permanently. The tin cap, purchased at a cost of $1.09 per hundred against the cost of the disk at $5 per hundred, saved the more costly liners. The purchasing department promptly extended the idea to sign top caps, buying for 63 cents per hundred an article that had previously cost $5 per hundred. In some cases, notably No. 57 and No. 800 bronze axle bearings, journal bearings and babbitt metal, formerly a continuous nightmare to the storeroom purchases, had been decreased almost to the discontinuance of purchasing. As for truck maintenance, with the exception of the wheels the trucks were operating steadily without attracting attention, and that is invariably a safe guide to the condition of the trucks.

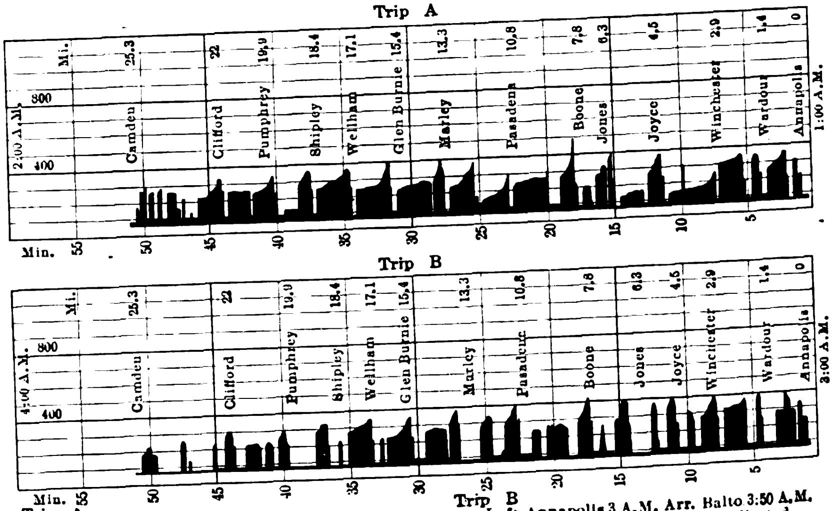
Concluding with some statistics, the speaker said that in 1911 the armature bearings made a mileage of 14,200. In the last six months of 1914 the mileage was 39,042, an increase of 24,842, or 275 per cent. Axle bearings in 1911 made 24,800 miles; in the last half of 1913 they made 84,195, and in the last six months of 1914 they made 190,919, or 227 per cent over the same period of 1913 and 770 per cent over 1911.

COMPARATIVE RECORDS OF CAR CHANGES

In connection with this data, Mr. McWhorter furnished the graphic record shown on page 721 of car changes in the years 1913 and 1914. The original of this chart is posted in a prominent part of the shop where it is accessible to all employees. At the beginning of 1914 the records for the preceding year were posted in black lines. Then red lines were extended on the same chart as the figures for each month of 1914 became available. On the new chart, prepared to compare the years 1914 and 1915, a dotted line shows the figures for 1914 while a solid line is being extended from month to month of 1915. So far the new year also shows a decrease over its predecessor.

Ampere-Hour Meters on the Annapolis Short Line

The management of the Annapolis Short Line, following a careful study of energy consumption data, was convinced that a great improvement was possible if the motormen were taught how to take better advantage of coasting. To secure a basis for comparison, a coasting test run was made on April 23, 1914, between Annapolis and Baltimore under exactly the same stop and line conditions but with practically no coasting on the first trip and maximum possible coasting on the second trip within the same schedule conditions. The difference in energy used was found to be practically 19 per cent. Energy consumption graphs from this test were then plotted, one below the other on the same sheet, as reproduced, as an object lesson to the men. The lower graph shows the time that coasting was possible between the stations named.



Trip A
Left Annapolis 1:00 A.M. Arr. Balto 1:50 A.M.
Made 12 Stops at Stations Indicated
Energy Consumed - 110 K.W.H. at D.C. Bus

Trip B
Left Annapolis 3 A.M. Arr. Balto 3:50 A.M.
Made 12 Stops at Stations Indicated
Energy Consumed - 90 K.W.H. at D.C. Bus

Saving, in Energy Consumption, of Run B over A
19%

ANNAPOLIS SHORT LINE—COASTING TEST RUN

At first the men were simply instructed to be more careful in the use of energy, no meters being employed. It was found, however, that while some improvement followed at first backsliding was almost immediate because there was no procedure to sustain the interest of the men. Therefore, on Jan. 1, 1915, the company equipped the thirteen motor cars with Sangamo ampere-hour meters, this type being chosen in preference to watt-hour meters because of more reliable operation, lower cost and ease of installation. In fact, to install an ampere-hour meter it is necessary only to open up the ground lead and connect it in circuit without incurring any danger of insulation breakdown. The meters also are read very easily, for in addition to the usual integrating dial they have a larger dial which indicates amperes up to 300, that limit representing somewhat more than the amperes that would be used on a round trip between Baltimore and Annapolis. This large dial is easily read by the motorman, thus removing any distrust which the more mysterious integrating dial might inspire.

During the entire month of January the meters were run blind, and in the meantime one of the most capable men was trained as an instructor in the art of coasting. This man then spent about two days in turn with each motorman.

The "runs" record for meter records, as reproduced, has space for the train and car numbers, the motorman's name, the reading of the integrating dial at the beginning and end of a round trip, the energy consumption per trip, the stops per trip (as obtained from the conductor's report), and the "overs" per trip. The expression "overs" refers to the number of amperes a motorman shows in excess of the minimum for a trip with the same number of stops. The "average overs" of a motorman, as summarized by days or months, is obtained by adding the "overs" for either period and dividing the sum by the number of trips made by him. An "x" opposite a man's run indicates absence, and an "o" that he has made a perfect record.

MOTORMAN'S RECORD OF POWER CONSUMPTION, STOPS, ETC.

RUNS.................................... DATE......................................

Train No.	Leaving Time.	Car No.	Motorman.	Meter Reading		Power Consumed in A. H.	Stops.	Overs.	Remarks.
				Start.	Finish.				

ANNAPOLIS SHORT LINE—RECORD DEVISED TO MAKE AMPERE-HOUR COMPARISONS OF MOTORMEN

In addition to making allowance for the number of stops, the men are also classified according to morning and evening runs. The reason is that the evening men are on an hourly instead of half-hourly schedule after 6 p. m., so that they have less meets to make and are also less likely to suffer from low voltage. The records of the men are posted on the bulletin board, and keen competition exists between them.

The record for the month of February shows an average energy consumption of 3.6 kw-hr. per car-mile. This in comparison with January's average kilowatt-hours per car-mile (4.2) shows a saving of 15 per cent; or compared with the figure for February, 1914, 4.7 kw-hr. per car-mile, a reduction of 23 per cent.

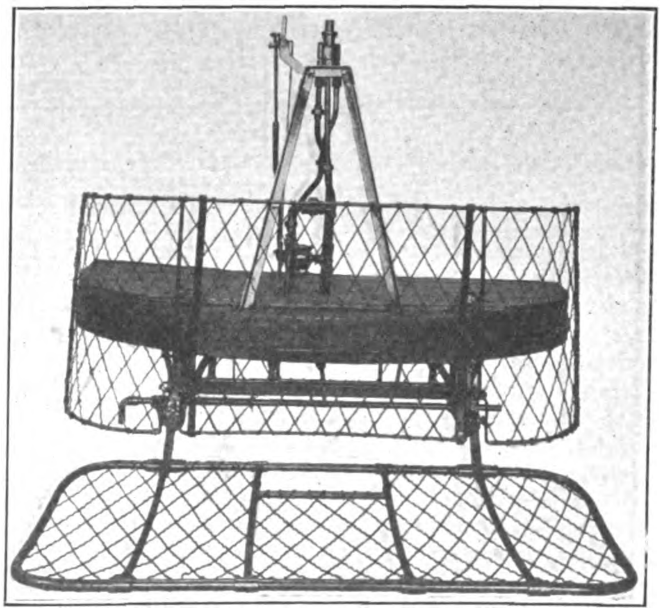
In the month of March the energy consumption was 3.4 kw-hr. per car-mile. This is a saving of 19 per cent over January, 1915, and 24 per cent over March, 1914. The energy consumption for March, 1914, was 4.5 kw-hr. per car-mile. The brakeshoe saving in February and March, 1915, will be from 25 per cent to 30 per cent.

A Novelty in Fenders

The recent indorsement of the redesigned fender made by the American Automatic Fender Company, Seattle, Wash., by a committee appointed for its examination by the Public Service Commission of New York, First District, has called attention to the remarkable results that can be readily attained by pneumatic operation. This fender is operated either automatically by striking a light blow upon the outboard edge of the apron or else manually by moving a small valve handle in the vestibule. The motion is not only downward but backward as well and it is so rapid that the eye cannot follow it.

The movement diagonally downward to the rails is calculated to take one-eightieth part of a second, the actual speed at which the fender travels being twice that of a street car moving at full speed. In consequence, the apron, when it is dropped automatically, must actually withdraw from contact with the opposing object while the downward movement is being made, thus prohibiting the possibility of any projecting member being caught and forced under the fender.

The new device is a development from the original Nelson fender, and this fact is recognized in the report of the New York Public Service Commission's committee, which stated that the fender as examined on March 8, 1915, bore no resemblance to the fender submitted in the tests of 1908, except in name and in the fact that it is operated by air. Unlike the original fender, it can be compactly folded up to permit the coupling of cars, besides which it is notable for lightness, shortness of projection, automatic operation upon contact with any object, a backward movement as the fender drops, and provision so that operation of the fender, whether automatic or by the motorman, simultaneously drops the fender and sets the brakes. The fender also permits the installation and operation of a wheelguard, and is adjustable to any height above the rails. Continuing the committee reported that no opportunity had been presented for testing the fender in actual service, but that the objectionable features, which had caused it to say in its report of Dec. 29, 1908, that this fender was not applicable to New York City service conditions, had been eliminated in the present construction.

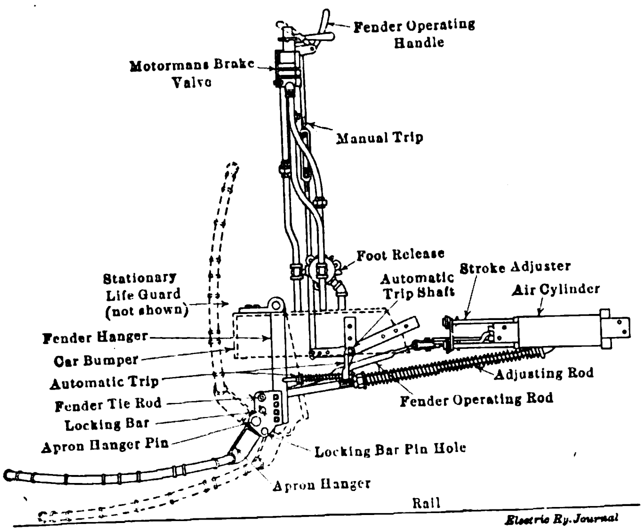


AIR-OPERATED FENDER—FRONT VIEW, SHOWING OPERATING VALVE CONNECTED TO AIR-BRAKE PIPING

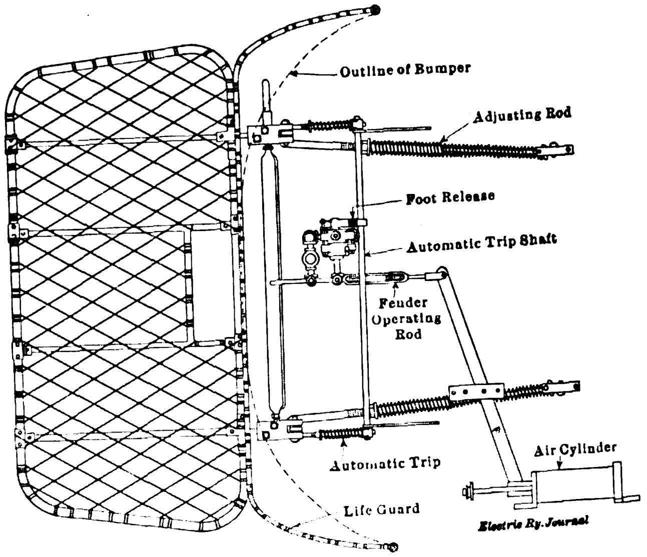
The new design differs from the original mainly because the apron swings downward and backward instead of being pressed straight down by direct-acting air cylinders. The principle of pneumatic control, however, is the same as in the early type of Nelson fender which has been attracting much attention on the Pacific

Coast during the past three years. This fender first became prominent four years ago, when exhaustive fender and wheelguard tests in Portland, Ore., were conducted jointly by the city and the street railway officials. The tests lasted more than a year, and over forty different devices were tried out. As a result the air fender has replaced wheelguards on all the air-equipped cars in Portland, where the narrow streets and congested traffic make severe conditions for a projecting apron. The officials of the Portland Railway, Light & Power Company, however, have recently gone on record in a letter to the New York Public Service Commission, with the statement that they regard the air fender as entirely successful. Thirty-six persons were picked up by it on the streets of Portland during 1914.

During the year 1913, fender and wheelguard tests similar to those in Portland were conducted by the street railway officials and the Canadian government authorities in Vancouver, B. C. These were described in the ELECTRIC RAILWAY JOURNAL for Nov. 1, 1913. The air fender again showed the best record and it is now being installed on the cars of the British Columbia Electric Railway Company in Vancouver and Victoria. It is also in use in Boise, Idaho, and on the municipal cars in Seattle, being highly indorsed by the users in both cities.



AIR-OPERATED FENDER—DIAGRAM OF ELEVATION, SHOWING THE OPERATING MECHANISM



AIR-OPERATED FENDER—PLAN VIEW, SHOWING LOCATIONS OF LIFE GUARD AND OUTLINE OF APRON

In the previously-mentioned fender and wheelguard tests conducted by the New York Public Service Commission in 1908 the air fender in its original form received a rating of 80.3 per cent efficiency, only two devices being higher out of a total of sixty-seven tested. In the Vancouver tests, however, which followed the rules laid down by the New York Commission, the improved air fender received a rating of 91.8 per cent efficiency.

The latest model is so constructed that it is hung from behind the bumper instead of in front, reducing maintenance to a minimum because all the castings and the trip mechanism are placed where they are not exposed to breakage. The projection is also reduced by this construction, the fender extending only 30 in. outboard. From the diagrams shown above it will be seen that the apron is attached rigidly to apron-hanger castings, which are hung from jaw castings by the so-called apron-hanger pins. These pins serve as pivots when the apron is folded up. The apron is locked in either folded or operating position by castings which are attached to the locking bar and which have projections fitting into the locking pinholes and preventing movement of the apron-hanging castings. The jaw castings in turn are bolted to the fender hangers which swing from the bumper beam.

The operation of dropping the fender is effected by pulling the whole arrangement back against the long springs on the adjusting rods, the change in angularity of the fender hanger causing the outboard edge of the apron to strike the rails. The power for this operation is obtained from an air cylinder which is controlled by a semi-automatic, wide-opening three-way valve that is cut in on the air-brake exhaust piping on the car. It is supplied with air direct from the main reservoir, and when the valve is opened air goes to the fender-operating cylinder and also to the brake cylinder, a check valve permitting operation of the brakes without affecting the fender but involving a brake application whenever the fender is dropped.

The three-way valve is operated automatically by an arm extending from the automatic-trip shaft. The shaft is caused to rotate by a slight movement of the fender hanger, the latter being connected by adjustable springs to arms at each end of the shaft. By tightening these springs the movement of the fender hanger necessary to operate the valve is reduced and the action is thereby made more delicate to any desired degree, but normally the adjustment is made so that a 15-lb. pressure at the edge of the apron causes the valve to open. The valve also may be operated directly by moving a valve handle located beside the regular brake valve and by a reset pedal near the floor, which provides for release of the air and the return of the fender to normal position.

An important feature is that the air-brake exhaust is carried through the three-way valve so that if the valve ports are stopped up the air brakes cannot be released. In addition, the ready return of the fender to operating position makes daily testing an easy matter. For running during heavy snow which might exert enough pressure against the apron to operate the fender automatically a latch (not shown on the illustration) is provided to prevent the rotation of the automatic trip shaft. This does not, however, prevent operation by means of the fender-operating handle, as this opens the three-way valve direct.

News of Electric Railways

DETROIT PURCHASE NEGOTIATIONS

Review of Steps in Connection with Negotiations for Sale of Urban Lines to the City

Negotiations for the municipalization of the lines of the Detroit (Mich.) United Railway within the one-fare zone have reached the stage where the City Street Railway Commission has made an offer to the company, and the stockholders, after holding a special meeting to consider the proposition, have replied to the offer. The commission's offer, made on Feb. 23, 1915, in brief was as follows: For all the property, real, personal, and mixed, including franchises and franchise rights, except cash, accounts receivable and securities, within the one-fare zone, so called, of Detroit, the city, to the extent of its power, will assume the payment of the mortgage debt of the Detroit United Railway not exceeding $24,900,000; a clear title subject to the mortgage to be furnished to the city, and immediate possession by the commissioners following upon the ratification of the proposal by three-fifths of the electors to be assured. To this proposal the stockholders replied with an authorization to the board of directors to sell the property as described to the city at a price of $24,900,000 plus any amount expended for additions, extensions and betterments after April 1, 1915, on terms of payment satisfactory to the directors and determined by counsel to be valid.

The existing laws of Michigan governing the power of cities to acquire public utilities have been held by counsel for the city to be not broad enough to cover the proposition submitted by the Street Railway Commission and consequently at the instance of the commission bills have been introduced in both branches of the Legislature to confer this power. The bills have not as yet been reported out of committee, but the city expects they will be passed at the present session.

The Street Railway Commission, which was created by a charter amendment for the express purpose of bringing about municipal ownership of the Detroit city lines, engaged Prof. E. W. Bemis several months ago to make an appraisal of the property within the one-fare zone. This appraisal stated the value of the property, excluding items of material on hand and some other features, to be approximately $21,000,000. The company asserted that $35,000,000 had been invested in the property and that its value, after an allowance for depreciation, would be in excess of $30,000,000. After consideration the commission made an offer, subject to the will of the voters, to assume the bonded indebtedness of the company not to exceed $24,900,000, but did not make any statement as to what it would pay for the lines on the basis of a cash price. Announcements in the newspapers by members of the commission set forth that it had been estimated that the receipts of the street railway would be sufficient to meet operating expenses, interest on bonds and amortize the funded debt, and these announcements were taken to mean that the commission had decided the assumption of the bonded debt of the company was more likely to bring early municipalization than any other plan.

The one-fare zone includes all the territory within the city of Detroit and connecting villages in which the company operates at a flat seven-for-a-quarter rate of fare. Inasmuch as these lines, involving 220 miles of single track. are always regarded as the Detroit city unit, all negotiations have been on the basis of the city acquiring the entire system on which one rate of fare exists.

The commission engaged an expert accountant to go over the bonded debt of the company and make a report, but the statement of the accountant, if completed, has not yet been made public. The funded debt of the company includes some $4,100,000 of bonds outstanding against properties of the Detroit United Railway which are not a part of the city system but a part of the Flint, Pontiac and Orchard Lake interurban divisions.

A question has been raised as to the construction to be placed upon the commission's offer of assuming the bonded debt, it being contended in news articles and editorials in some newspapers that the commission did not intend to pledge the credit of the city in taking over the funded debt. Another question raised is whether the commission proposes to assume the bonds of $4,100,000 outstanding against interurban properties of the Detroit United Railway. On neither of these points has the commission made a public statement as to its meaning. J. C. Hutchins, president of the Detroit United Railway, at the meeting of the board of directors on March 1, announced that these matters were the subject of negotiation. No announcement has been made as to any negotiations covering the entrance of interurban cars into the city, this being regarded as a matter of detail.

At the present time an additional appraisal of all the properties included in the Detroit United Railway and its subsidiary interurban companies is being made by Dean M. E. Cooley of the University of Michigan for the State Railroad Commission. This appraisal is likely to be made public some time in May.

It is unlikely that the Street Railway Commission's final and entire proposal for the consideration of the electors will be made public until after the necessary State legislation has been enacted. Just what the final proposition will be remains to be developed out of the negotiations proceeding between the commission and the company, and the course that these negotiations will take will of course depend upon how closely the views of the company and the commissioners coincide on the different questions involved.

KANSAS CITY INTERURBAN STATION

A joint Council committee named to consider proposed locations for an interurban railway station in Kansas City, Mo., is hearing the arguments of the supporters of various sites. In the cases of three sites franchises are being asked of the Council by men who agree to erect a suitable station. Detail plans for a building and for track arrangement have been filed with the committee. The three sites which are the subjects of franchise requests are at Fourteenth and Main Streets, Tenth and Wyandotte Streets, and Eleventh and McGee Streets. Wholesale and jobbing interests who wish to promote the convenience of traveling men and the development of Kansas City as a jobbing center unite with a considerable proportion of retail merchants in favor of Tenth and Wyandotte Streets. Other retail merchants and property owners strongly favor Eleventh and McGee Streets, while the Fourteenth and Main Street location has its backing of business interests. It is at present not considered likely that a decision will be immediately reached by the Council committee; nor that even if an ordinance is prepared for establishing an interurban station the necessary steps can be taken for a year or so.

MISSOURI PUBLIC SERVICE COMMISSION

According to the second annual report of the Missouri Public Service Commission for the year ended Dec. 31, 1914, 345 formal complaints and applications were filed during the year, of which 243 were concluded. During the same period 651 informal complaints were filed, of which 563 were adjusted either by correspondence or by informal conferences with the complaining parties and the utilities affected. The report gives detailed accounts of the activities of the legal, rate, engineering, accounting and other departments of the commission during the year. The commission states that the money stringency and the falling off in the market for securities of all classes of corporations since the beginning of the European war was very noticeable to the commission in the small number of applications for authority to issue stocks and bonds. During the year the commission completed a valuation of the Kansas City, Clay County & St. Joseph Railway and the Cassville & Western Railroad. The commission notes that few complaints were made during the year, as to any unfair treatment of the public by utility agents and employees, and complimented the agents and the employees for their courteous demeanor.

STRIKE IN WILKES-BARRE

Inability to Choose Third Arbitrator Precipitates Strike—Statement by Company

A strike was declared on the lines of the Wilkes-Barre (Pa.) Railway on April 1 through the overbearing attitude of the representatives of the trainmen with respect to wages. The case is an unusual one in that the company had agreed with the men to working conditions for the next three years, the question of wages being the only one that remained open. This subject the company agreed to arbitrate.

The committee representing the men proposed that one arbitrator be chosen by the company, one by the men and the third arbitrator by the two previously chosen within ten days. As this method did not provide a definite way of arbitration in case of a disagreement between the two arbitrators as to the third arbitrator, the company proposed that the third arbitrator be chosen by the presiding judge of the Court of Common Pleas of Luzerne County, and in case of his failure to act within five days the presiding judge of the Circuit Court of Appeals for the Eastern District of Pennsylvania make the appointment. This plan was rejected by the committee of the men, and the company agreed to accept the committee's method. T. D. Shea was appointed to represent the men and S. D. Warriner the company. E. C. Jones, who was proposed by Mr. Shea, representing the men, was accepted by Mr. Warriner, representing the company. Although both Mr. Warriner and Mr. Shea requested Mr. Jones to serve he declined.

Conferences were then held by the two arbitrators, but they failed to agree, and following the expiration of the time allotted to them, set for Feb. 12, a meeting was held at the office of the company, at which the two arbitrators, committee, management and counsel of both parties were present. The management again suggested that the appointment of the third arbitrator be left to the five judges of the Court of Common Pleas of Luzerne County. This was declined. After this failure to agree it was suggested that the two arbitrators discuss the amount of wages to be paid trainmen, with the hope that perhaps they could agree without the need of an umpire. On March 30 Mr. Shea and Mr. Warriner reported that they could not agree on the wage terms. T. A. Wright, manager of the company, issued a statement at once reviewing the entire proceedings. This statement he concluded as follows:

"To sum up the situation: We have mutually agreed upon working conditions for the next three years, wherein we made certain concessions; we have agreed to arbitrate wages; this we are still willing to do by any reasonable method and that the umpire be a disinterested person, who, through social, business, political or religious life, could not be influenced by either party. And, finally, we have offered an increase of 8⅓ per cent to be accepted in five days, or the offer to be withdrawn."

On April 8 federal and State mediators succeeded in inducing the men and Mr. Wright to accept John Price Jackson, State Commissioner of Labor, as umpire.

STRIKE ON SYRACUSE SUBURBAN LINES

Late on April 7 a general strike order affecting the Empire United Railways was issued at Syracuse, N. Y., by international officers of the Amalgamated Association. The total number of employees of the company is 426 and the number of trainmen 319. Ernest Gonzenbach, general manager of the Empire United Railways and associated lines, issued the statement published below in regard to the position of the company in the controversy. The Brotherhood of Electric Trainmen announced its intention to stand by its agreement with the Empire United Railways and to back up the brotherhood men employed on the system, and that it did not intend to have the Amalgamated interfere with it. The statement of the brotherhood said that a principle was at stake which the brotherhood would see through to the end. A member of the executive committee of the Amalgamated Association said that that association was fighting for "recognition of the union, whose members are recognized as the men best fitted to operate electric cars."

Mr. Gonzenbach's statement follows:

"No one regrets more than I the crisis growing out of the controversy between the two labor organizations. I am very sorry to be put in a position in which I do not desire to be placed—between the upper and nether stones, being made a victim of something over which the company I represent had no control and was not responsible.

"We had an agreement with the Amalgamated Association on the Auburn & Syracuse line, which worked out finely, being satisfactory to the employees and satisfactory to the company.

"If we had not been bound by another contract—that with the brotherhood—we would have been glad to have entered into an agreement with the Amalgamated Association covering the Empire United Railways.

"Under existing conditions we could not in honor do this. If we had broken faith with the brotherhood, which has carried out its part of the agreement to the letter, we would have sacrificed our business honor and thrown suspicion on future contracts in which we might enter.

"There is no prejudice on my part or any of the other officials of the company against the Amalgamated Association and no reason why we should not have done business with its representatives along the lines they desire except the existence of another contract which could not be broken.

"We have men enough to keep cars running regularly on all the lines provided we have proper protection."

The strike at Syracuse went into effect on the morning of April 8. The trouble seems to be centered around the Auburn & Syracuse line, and it was said that not a car was moved in Auburn on April 8. The situation is complicated by the fact that the local railway lines in Syracuse and Rochester, into both of which cities the Empire United Railways operates, are organized under the Amalgamated Association and threats were made to call strikes in these cities if the cars of the Empire United Railways were permitted to operate into them over the city lines proper. To forestall any attempt to keep its cars out of Rochester, the Empire United Railways on April 8 obtained a temporary injunction restraining the New York State Railways from preventing cars of the Empire United being run over New York State Railway tracks in Rochester. This order of the court was made returnable on April 10. The Lake Shore and the Oswego division cars of the Empire United Railways run into Syracuse over the company's own tracks, but the cars of the South Bay line enter the city over the New York State Railway's tracks.

WHAT LABOR EARNS

Statistics taken by the chairman of the executive committee of the Associated Railroads of Pennsylvania and New Jersey from the report of the secretary of internal affairs of Pennsylvania for 1911 make the following comparative exhibit as to the number of wage earners, the character of industries employing them, and their average yearly income:

Character of Industries	Number Wage Earners	Average Annual Income
Anthracite coal	169,629	$573
Bituminous coal	173,116	584
Iron and steel	111,563	696
Pig iron	13,038	632
Cars and car wheels	11,418	676
Engines and boilers	5,162	612
Electrical supplies	9,981	597
Furniture	8,463	534
Hats	8,585	541
Iron and steel forgings	2,086	608
Machinery	15,751	574
Paints, white lead, etc	1,826	550
Railroad supplies	4,935	719
School teachers (male)	8,044	547

INTIMIDATING SEATTLE EMPLOYEES

An unsuccessful attempt was made on March 31 to stampede the conductors and motormen of the Seattle lines of the Puget Sound Traction, Light & Power Company and intimidate them into joining the union fostered by the Amalgamated Association. Late in the evening several hundred men interrupted the service of the company by smashing windows, confiscating controller handles and fare boxes and cutting trolley ropes. The company, in order to avoid trouble points, changed the routing of some of the cars. A. L. Kempster, manager of the company in Seattle, in speaking of the affair, said:

"I do not believe there is a more loyal force of employees in the country. The men do not want to strike and have no grievance against the company which they have made known. The mob was assembled for the purpose of stampeding the men into joining a union. During the last few weeks our men have been pestered to join the union. They have been swamped with circulars and have been importuned at their homes and on the cars."

Sam Atkinson and W. B. Fitzgerald, national officers of the union, state the matter will be dropped until the employees of the company desire to join the union.

IMPORTANT CINCINNATI MATTERS

At a special meeting of the Rapid Transit Commission at Cincinnati, Ohio, on March 29, Archibald S. White and John E. Bleekman, with their engineers, presented a complete plan for bringing the various interurban railways into the business section of the city. They appeared at the invitation of the commission to explain a proposition that was made in February. This included the construction of a rapid transit entrance and the rehabilitation of a number of interurban lines.

Mr. White's suggestion is a modification of plan No. 4, which was described in the ELECTRIC RAILWAY JOURNAL of Jan. 9, page 108. Suggested by both J. G. Schmidlapp and Bion J. Arnold, it was finally worked out by Assistant City Engineer Edwards. It contemplates a terminal station near the post-office and an elevated road through Third Street and a private right-of-way touching Mt. Adams near the Marine Hospital. Another branch would pass through Norwood, Bond Hill and Ivorydale to Winton Place. An extension from Torrence road to Carrel Street would afford service to the east end and connect with three interurban lines.

Mr. White suggested that he would undertake to build the road and then turn it over to the city at cost, taking bonds in payment. He further said he would organize a company to operate it, paying as rental the interest on the bonds and a certain amount to a sinking fund, together with operating expenses, taxes and incidentals. Any remaining profit would be divided between the company and the city. He has obtained options on three of the interurban lines and is negotiating with two others. If his proposal is accepted the roads will be purchased, rehabilitated and extended to Hamilton, Dayton, Springfield, Xenia and Columbus.

The law to empower the city of Cincinnati to finance and build a rapid transit loop was approved by the board of park commissioners and the Rapid Transit Commission on April 3. It provides in the first place for the appointment by the Mayor of a board of rapid transit commissioners consisting of five members after the City Council takes action to that end. The commission members are to serve without compensation.

Sections 2 and 3 provide for the election of officers of the board and the appointment of a superintendent and engineers. Section 4 places the management of construction with the board and gives it the right to build under, on or over canal lands, streets, alleys and public highways, whether within or without the limits of the corporate boundaries. Control of operation of the road is also vested in the board. Under Section 5 the board has power to expend money appropriated or received from the sale of bonds for transit purposes but no liability is to be incurred unless the funds are in the city treasury to the credit of the board. Section 6 provides for the assessment of 50 per cent of the cost of boulevards or parkways built in connection with the road upon the owners of abutting property. Section 7 deals with the manner of issuing bonds and levying taxes. The board must submit its wants to Council, and if it fails to act within sixty days then the matter may be taken directly to the electors. Section 8 limits the amount of bonds or the total indebtedness contracted for this purpose to 2 per cent on the total value of all property listed and assessed for taxation. Under section 9 the board is authorized to build the road proper, together with all tracks, switches, depots, terminals and everything else in connection with it. Section 10 provides for the purchase or appropriation of lands needed for the road, within or without the corporation boundaries. Section 11 describes the manner in which all rentals and moneys received from the lease of the road or any of the property shall be kept and handled. A sinking fund is to be provided for the payment of accruing interest and the principal of the bonds. Section 12 authorizes the board to lease the road for operation.

LEGISLATION IN OHIO

The Ott bill limiting the hours of labor of street and interurban railway motormen and conductors was passed by the House of Representatives by a bare majority on March 30. As amended, the measure provides that the men shall not work more than ten in any consecutive thirteen hours and shall have eleven hours of rest in each twenty-four, and that by agreement between the men and their employer they may work longer when occasion requires. The provision requiring that new men shall work fifteen days under a trained man before being allowed to operate a car was dropped. The bill will now go to the Senate.

The Smith bill, requiring that motormen be protected from dust the year around by screens, has passed the Senate. On March 30 the Meyers bill, permitting steam and electric roads to unite in building union depots, was passed by the Senate.

VALUATION OF SPOKANE PROPERTIES

The valuation of the property of the Washington Water Power Company, Spokane, Wash., was begun recently by officials of the Public Service Commissions of Washington and Idaho. After the figures are secured it is expected that the commissions will establish a valuation on which rates for all services will be based. Though joining in the work Idaho will pay only about one-fifth of the cost, because the street railroads, the larger power plants and the more extensive power distribution systems are in Washington. When the final figuring is completed on the valuation rates will be made to cover the company's business not only in Spokane, but in the small towns in Washington and Idaho and in the mining districts which the company serves.

SPRINGFIELD ARBITRATION HEARING

The hearing in connection with the differences between the management of the Springfield (Mass.) Street Railway and the representatives of its employees was convened at two o'clock on April 7 and adjourned at 4.30 o'clock by agreement of both sides to meet again at 9 a. m. on April 8. The company's case will be outlined as soon as the men have brought their side to the attention of the State Board of Arbitration. The conference on April 7 was an executive one, but it was stated before the meeting opened that the only matter at issue involved the reinstating of three conductors discharged for alleged irregularities in fare accounting. It is stated that the principal contention of the representatives of the men will be that it is impossible under the present system of registration and accounting of fares to secure convicting evidence against a conductor who might be suspected of irregular accounting, and that the company should have provided transfer registers so as to allow the men to make a proper accounting by registration of all fares that are collected, whether in cash, complimentary tickets or transfers.

Maine Labor Bill Postponed.—The bill to limit the hours of work of the street railway employees to nine a day has been indefinitely postponed by the Senate of Maine.

Tennessee Compensation Measure.—The workmen's compensation act before the Tennessee General Assembly has been recommended for rejection by the Senate judiciary committee.

Chicago Election Without Traction Issue.—William Hale Thompson was elected Mayor of Chicago on April 6. The utility issue, which has carried mayors into office in the past, did not attain any importance in the contest.

Workmen's Compensation.—On April 1 Governor Whitman of New York signed the bill amending the workmen's compensation law by providing for direct settlement of claims between employers and employees and for advance payments to injured employees.

New Jersey "Seven Sisters" Law Amended.—Governor Fielder of New Jersey has signed an amendment to the "seven sisters" act of 1913 permitting corporations to purchase stock of other corporations.

solely for the purpose of investment, not using the same for voting purposes of bringing about the substantial lessening of competition.

Storm in the East.—New York and practically the entire Atlantic seaboard were in the grip of a severe storm on April 3. Snow, driven by a northeast gale, which at times obtained a velocity of 60 m.p.h., held up trans-Atlantic sailings, damaged telephone and telegraph wires, delayed interurban cars and suburban trains, and crippled transportation on the surface and elevated lines.

Newport Franchise.—A committee of the Business Men's Club of Newport, Ky., met Mayor Hembold and the City Commissioners on April 1 and the franchise which is soon to be offered for sale was discussed. It is said that officials of the Cincinnati, Newport & Covington Street Railway, which is expected to be the only bidder, are very much opposed to certain conditions of the franchise.

Another Seattle Purchase Proposal.—A new proposal for the purchase of the Seattle, Renton & Southern Railway by the city of Seattle, Wash., was presented to the City Council recently by a committee representing property owners in the Rainier Valley who according to report are willing to bear part of the expense of the purchase in order that the controversy between the city and the receivers of the line may be settled.

Writ of Error In Contempt Case.—Federal Judge Killits, sitting at Toledo, Ohio, has granted Negley D. Cochran and the Toledo Newspaper Company a writ of error and they have appealed the cases against them to the United States Circuit Court of Appeals at Cincinnati. They were convicted of contempt of court in connection with certain news items and editorials alleged to have reflected on the acts of the court in the Toledo Railways & Light Company cases.

Wyoming Commission Organized.—The Public Utility Commission, created by the last Legislature of Wyoming, was formally organized on April 1. The commission consists of Governor John B. Kendrick, Robert B. Forsyth, state auditor, and Herman B. Gates, state treasurer. Governor Kendrick appointed H. Allen Floyd, Sheridan, Wyo., secretary of the commission. The board will have power over all public utilities in the State not in conflict with the Interstate Commerce Commission.

Brooklyn Fender Hearing.—The Brooklyn (N. Y.) Rapid Transit Company fender order was brought up again before the Public Service Commission on April 1 at a rehearing before Commissioner Cram. The railroad objects to that part of the order compelling it to place projecting fenders and wheel guards on all its cars outside of the heart of the city. It contends that there is no fender which in its present form is suitable to the local conditions obtaining in Brooklyn. The question is still open before the commission.

The Toledo Franchise.—Mayor Keller, of Toledo, Ohio, has received a letter from H. L. Doherty, of H. L. Doherty & Company, operating the property of the Toledo Railways & Light Company, saying that he is anxious to reach an agreement with the city on the franchise matter at an early date, but that no company can operate under the franchise prepared by the special committee of the City Council some time ago. Mr. Doherty said he would return to Toledo soon ready to take up the franchise question at the convenience of the city officials.

Special Public Utilities Number.—The New York *Evening Post* published a special sixteen-page supplement to its regular edition for March 31 dealing with public utilities. The principal articles were "Utility Earnings" and "Law and Regulation." The other articles dealt largely with utility prospects in various sections of the country and the utilities of South and Central America. A page was devoted to portraits and biographical sketches of Theodore N. Vail, Thomas A. Edison, Wilbur C. Fisk, H. L. Doherty and Alexander C. Humphreys, "men who have helped to make public utilities servants of the public."

Renton Suit Abandoned.—The City Council of Seattle, Wash., has passed the bill for the abandonment of the suit brought to condemn the private right-of-way of the Seattle, Renton & Southern Railway in Rainier Valley. The suit was brought about three years ago. The case went to the State Supreme Court and was remanded to the Superior Court for retrial. The case was set for retrial, but Corporation Counsel Bradford advised the Council to abandon the litigation, declaring that since the courts have ruled the company has a legal franchise, the company may be compelled to raise its tracks to street grade without resorting to condemnation proceedings.

Commission to Examine Books of Chicago Trust.—The Illinois Public Utilities Commission has ruled that its accountants shall examine the books of the Chicago Elevated Railways collateral trust. Commissioner Thompson holds that a declaration of the power of trustees was insufficient and that evidence of their acts was necessary to prove that the trust was not a public utility. G. E. Porter, counsel for the trustees, admitted that they exercised power over the roads but stated that they did not go beyond the rights of stockholders. Hearings have been postponed until the commission's accountants report.

New York Franchise Tax Reduction.—Comptroller Prendergast of New York City said recently: "The franchise taxes charged against the Metropolitan Street Railway for 1910 and 1911 amounted to $1,865,165. The company contested the valuations placed upon its properties by the State Board of Tax Commissioners. It has carried its protest to the Court of Appeals, and that court has just rendered a decision reducing the tax from the figure just given to $878,121. The city will not be able to collect this full amount because the company is entitled to deduct what it has paid for the privilege of doing business under Section 48 of the franchise tax law."

Chicago Questions Commission's Authority.—The corporation counsel for Chicago holds that the Illinois Public Utilities Commission is authorized to subpœna the officers and employees of the city as individuals, but not as representatives of the city. He has further expressed the opinion that while the city employees were serving on the witness stand as individuals their testimony was not binding on the city nor an admission by the city that it recognized the authority of the commission. Acting upon this advice the local transportation committee decided that in the future any attempt on the part of the commission to interfere with traction matters in Chicago would not be tolerated.

The New York Commission Inquiry.—On April 5 Governor Whitman of New York notified the Public Service Commissioners for the First District of New York, who appeared before him two weeks ago in answer to charges growing out of the legislative investigation of the commission, that they need not appear before him on April 6. When the Governor adjourned the hearing it was for two weeks, in order that he might ask the commissioners under charges to reappear if there were any points in the record upon which he wanted more light. Many contradictory statements have been made in regard to the probable course of action by the Governor with respect to removals from office.

New Subway Ventilating Systems.—The Public Service Commission for the First District of New York has adopted a resolution in favor of employing J. G. White & Company as consulting engineers, to work with the engineering department of the commission in perfecting some new system of ventilation for the subways now under construction in New York City. The present system consists of gratings in the sidewalks. The commission and the consulting engineers will investigate the merits of a proposed system, consisting of chimneys of ornamental design placed either in private property or in public squares. The chief engineer of the commission has been directed to confer with J. G. White & Company.

New Viaduct Line in Kansas City.—The first street cars were operated over the Twelfth Street viaduct on March 18, the Twelfth Street cars of the Metropolitan Street Railway being routed to the stock yards over the structure. For more than a year the Twelfth Street cars have been looping back at the top of the bluffs overlooking the West Bottoms, and the traffic from the stock yards and wholesale district has been cared for by the circuitous "stock yards" line, winding southward, and the elevated and surface lines along the north edge of the district. Until October, 1913, the stock yards district was served chiefly by a cable railroad, the last survivor of its era in Kansas City. The Twelfth Street line traverses a hotel district.

Bill of Particulars Asked.—George W. Wickersham, in behalf of his clients, Lewis Cass Ledyard and other officers and directors of the New York, New Haven & Hartford Railroad, asked Judge William H. Hunt in the Federal District Court at New York on April 5 to require the government to furnish the defendants with bills of particulars, to enable them to prepare a defence to the indictment charging them with conspiracy to violate the Sherman law. Mr. Wickersham also complained of the vague and general description of the commerce, which the indictment charges the New Haven men monopolized. Frank M. Swacker, assistant United States attorney-general, and Robert Stephenson, assistant United States district attorney, for the government, asserted that the indictment was specific enough.

Against Pierce Bill.—The New Jersey Utilities League, the formation of which was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20, page 390, has protested through its president, John A. Riggins, against statements made in an editorial published in the Newark *News* commenting on the Pierce indeterminate franchise bill, the passage of which by the Senate of New Jersey was noted in this paper on April 3, page 686. In concluding his letter to the *News* Mr. Riggins said: "We have mentioned only two provisions of the bill: compulsory sale at cost, and amortization of capital account. The former mulcts the company, the latter mulcts both the company and the public. No such confiscatory provisions are on the statute books of any other state. There are numerous other radical provisions to which reference might be made. These will suffice to show how harmful is the bill. Wisconsin, whose radical policies have lately been repudiated at the polls, becomes a most conservative state when viewed in the glare of the Pierce bill."

Precautionary Subway Measures.—As a result of the investigation into the Times Square subway accident of Jan. 6 the Public Service Commission for the First District of New York has adopted a resolution, proposed by Commissioner Milo R. Maltbie, that counsel to the commission be directed to prepare an order with reference to various improvements, embracing the following requirements: install a complete and separate telephone system, with telephone stations at frequent intervals along the roadway between stations; install an improved lighting system throughout the subway, so arranged that in case of failure of one source of supply another automatically will take its place; install an additional independent source of power supply for operating the ventilating fans; rearrange power, signal and light cables in manholes so as to guard against a breakdown in one class of cables being communicated to another class; install ventilating outlets for existing subway manholes where required; and install additional ladders and stairways from the subway to the street through existing ventilating chambers, to be used as emergency exits.

PROGRAM OF ASSOCIATION MEETING

Iowa Street & Interurban Railway Association

The convention of the Iowa Street & Interurban Railway Association, as previously announced in the ELECTRIC RAILWAY JOURNAL, will be held at Keokuk, Ia., on April 22 and 23. A program, including the following papers, has been announced:

"Measures for the Welfare of Employees," by Morris A. Welsh, chief special agent of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.

"The Jitney Bus," by C. I. Palm, of the Omaha & Council Bluffs Street Railway, Omaha, Neb.

"The Investigation and Care of Railway Circuits," by F. V. Skelley, assistant general superintendent of the Tri-City Railway, Davenport, Ia.

"Safety First," by F. K. George, director of safety of the United Light & Railways Company, Grand Rapids, Mich.

"Arrangement of Schedules with a View to Providing Service During the Evening Peak," by L. L. Sloss, superintendent of transportation of the Des Moines (Ia.) City Railway.

Financial and Corporate

BUSINESS IN WASHINGTON

A. W. Leonard of Stone & Webster Reviews Conditions in the State of Washington

A. W. Leonard, president Puget Sound Traction, Light & Power Company, Seattle, Wash., has written to the New York *Evening Post* in part as follows:

"The recent Legislature showed a tendency to enact legislation that from a general business standpoint is safe and sane. The result should be increased confidence in the country at large, and should be additional proof that this State has eliminated to a great extent much of the freak legislation so prevalent in other states.

"Among the measures enacted, which, from our standpoint, are important, were the bill to compel cities to use money voted for bond purposes for that particular purpose, and not allow diversion to other projects; the bill to require municipalities to submit budgets, and under penalty to comply with the estimates contained therein; the bill regulating jitney buses, and requiring them to furnish a surety bond of $2,500; and the public utility bill requiring a certificate of necessity and convenience, which will prevent duplicate investment in the public utility field. The jitney bill will perhaps have the most important effect on our business. Since the advent of the jitney the receipts of this company have been reduced thousands of dollars per month.

"One very important bill which failed of passage was the one to allow public utilities to operate under an indeterminate franchise. This measure would have placed the companies on a firmer basis. It will undoubtedly come up again.

"Another bill which is badly needed is one that will place the municipal light and power plants in this State under the same regulation as the privately-owned plants. At present the municipal plants have an undue advantage in that they can quote lower rates or offer special inducements in the way of fixtures, free lamps, etc., to secure customers."

BERLIN WAR RIDING

War Cuts Traffic 15.1 Per Cent on Surface Lines and 27.2 Per Cent on Rapid Transit Lines

Statistics just available covering all electric railway surface traffic in Berlin for the years 1913 and 1914 show that the traffic in 1914 was 578,611,030 as compared with 623,212,835 in 1913, a reduction for the year of 7.2 per cent. The losses caused by the war, however, were actually 15.1 per cent, as the loss resulting from industrial depression alone in the first six months amounted to only 1.3 per cent. The Grosse Berliner Strassenbahn alone (exclusive of its suburban lines) carried 425,419,478 pasengers during the year, a loss of 8.6 per cent. The loss for the first half of 1914 was 3.5 per cent, but for the second half it was 15.6 per cent.

These losses in surface railway traffic are all the more striking because a large number of horse and motor buses were withdrawn for military purposes. Thus the bus business for the first six months of 1914 consisted of 101,547,372 passengers, an increase of 6.3 per cent compared with 1913. During the second six months of 1914, however, only 48,951,946 passengers were carried, a decrease of 32.8 per cent compared with the second six months of 1913.

On the elevated-subway system (Berlin Hoch- und Untergrundbahn) 52,736,030 passengers or 45.1 per cent more were carried in the first half of 1914 than for the same part of 1913, this extraordinary increase being largely caused by the opening of the Wilmersdorf line. Yet the war made such inroads on this system that the second six months of 1914 showed a decrease of 27.2 per cent compared with 1913, despite the new mileage. The fact that the rapid transit system suffered so severely would indicate that most of the bus travel went to the surface lines. The latter have a uniform fare of 2½ cents, except in a few suburbs, where the fare is 3¾ cents, whereas a rather costly zone system is in vogue on the subway-elevated routes.

The total number of passengers for the last six months of 1913 and 1914 respectively was 372,303,257 and 298,731,155—a loss in 1914 of more than 24 per cent.

ANNUAL REPORTS

Hudson & Manhattan Railroad

The comparative statement of income, profit and loss of the Hudson & Manhattan Railroad, New York, N. Y., for the years ended Dec. 31, 1913 and 1914, follows:

		1914	1913
Gross revenue—passenger fares		$3,490,880	$3,478,084
Miscellaneous revenue from railroad operations:			
Advertising		$150,689	$162,732
Other car and station privileges		66,804	65,334
Sale of power		3,619	7,632
Miscellaneous transportation revenue		10,950	2,197
Other miscellaneous revenue		28,008	27,734
Total miscellaneous railroad revenue		$260,070	$265,629
Total railroad revenue		$3,750,950	$3,743,713
Operating expenses of railroad:			
Maintenance of way-structures	Actual	$216,849	$224,751
	Reserve	61,745	56,599
Maintenance of equipment	Actual	159,797	149,088
	Reserve	63,272	57,999
Traffic expenses		1,625	1,973
Transportation expenses		786,358	797,139
General expenses		157,693	167,477
Total operating expenses of railroad		$1,447,339	$1,455,026
Net operating revenue from railroad		$2,303,611	$2,288,687
Taxes on railroad operating properties		251,205	261,306
Net income from railroad operation		$2,052,406	$2,027,381
Net income from Hudson Terminal Buildings		$957,079	$920,755
Net income from other real estate properties		40,191	16,235
Total net income from outside operations		$997,270	$936,990
Total net income from all operating sources		$3,049,676	$2,964,371
Non-operating income		28,628	32,754
Gross income		$3,078,304	$2,997,125
Income deductions other than bond interest:			
Interest on car purchase agreements		$54,267	$63,467
Interest on real estate mortgages		52,199	38,399
Interest on loans payable		......	55,729
Rental tracks, yards and terminals		73,187	55,083
Amortization of debt discount and expense		37,531	36,895
Miscellaneous deductions		19,606	11,862
Deductions prior to bond interest		$236,790	$261,435
Net income applicable to bond interest		$2,841,514	$2,735,690
Deduct bond interest on N. Y. & J. 5's, first mortgage 4½'s and first lien refunding 5's		2,121,007	*2,020,264
Balance of net income, for the period, available for interest on adjustment income bonds		$720,507	$715,426

*For the purpose of comparison, the interest deductions for the month of January, 1913, are included as if the first lien and refunding mortgage and the adjustment income mortgage (both dated Feb. 1, 1913), had been effective during that month.

During 1914 the total railroad revenue of the company increased $7,237 or 0.19 per cent, the passenger revenue increasing $12,796 or 0.37 per cent and the miscellaneous revenue decreasing $5,559 or 2.09 per cent. The items of miscellaneous revenue showed the following percentages: Advertising, decrease of 7.4 per cent; other car and station privileges, increase of 2.2 per cent; sale of power, decrease of 52.6 per cent; miscellaneous revenue other than transportation, increase of 1 per cent, and miscellaneous transportation revenue, increase of 398.6 per cent. The report states that during the first seven months of 1914 the company's passenger traffic showed a consistent and satisfactory normal increase of 2.6 per cent over the same period for 1913. Owing to the depressed business conditions incident to the war, however, the last five months showed a decrease of 1.8 per cent. The principal loss in traffic was in that which under normal conditions flows to and from Hoboken, where since Aug. 1 there was a condition of almost complete stagnation because of the internment of the North German Lloyd and the Hamburg-American steamships.

By the exercise of great care in expenditures, the net income of the company was not adversely affected by the loss in traffic in the latter part of the year. The operating expenses decreased $7,687 or 0.53 per cent, so that the net railroad operating revenue increased 0.65 per cent. The decrease in operating expenses was secured by cuts of 1 per cent in maintenance of way, 17.6 per cent in traffic expenses, 1.3 per cent in transportation expenses and 5.8 per cent in general expenses, these being more than sufficient to overcome an increase of 7.7 per cent in maintenance of equipment. The ratio of operating expenses to total operating revenues was 38.58 per cent, as compared to 38.86 per cent in 1913. Taxes decreased $10,101 or 3.8 per cent, and income deductions other than bond interest decreased $24,645 or 9.4 per cent. As a result the net income applicable to bond interest increased $105,824 or 3.8 per cent.

During 1914 the company carried 59,900,257 passengers as compared to 59,434,152 in 1913, an increase of 0.8 per cent. The number of passengers per revenue car mile was 7.54 in 1914 and 7.44 in 1913. Following are other comparative traffic statistics: Passenger revenue per revenue car mile, 1914, $0.4393, 1913, $0.4352; gross railway operating revenue per revenue car mile, 1914, $0.4720, 1913, $0.4684; operating expenses (excluding taxes) per revenue car mile, 1914, $0.1821, 1913, $0.1820; net railway operating revenue per revenue car mile, 1914, $0.2899, 1913, $0.2864; passenger revenue per passenger, 1914, $0.0583, 1913, $0.0585. The company now has 18.757 miles of track and 226 steel passenger motor cars.

Capital Traction Company

The statement of income, profit and loss of the Capital Traction Company, Washington, D. C., for the year ended Dec. 31, 1914, follows:

Revenue from transportation:	
Passenger revenue	$2,242,205
Mail revenue	297
Total revenue from transportation	$2,242,502
Revenue from operation, other than transportation	13,490
Total operating revenue	$2,255,992
Operating expenses	1,150,192
Net operating revenue	$1,105,800
Miscellaneous income	17,146
Gross income, less operating expenses	$1,122,946
Deductions from income:	
Taxes	$120,581
Tax, special police	21,527
Interest	283,711
Total deductions	$425,819
Net income	$697,127
Dividends	660,000
Surplus for year	$37,126
Surplus at beginning of year	82,023
	$119,150
Credit:	
Unredeemed tickets of old issues charged off	$29,244
Net material and supplies adjustments	3,096
Total	$32,340
Surplus at close of year	$151,490

The passenger receipts during 1914 decreased $53,751, as compared to 1913, on account of the general business depression. By a decrease in operating expenses this amount was reduced to a net loss of $25,877. The operating ratio for 1914 was 50.98 per cent. During the year $56,723 was added to the depreciation reserve, $21,699 was paid in bonuses to motormen and conductors under the merit system and $37,127 was added to surplus after the payment of a 5½-per cent dividend.

During 1914 the company made capital expenditures of $11,404. Air-brake equipments were installed on fourteen double-truck open cars. It is stated that the saving in operation expected from the adoption of the prepayment type of car and the installation of air brakes is now being realized in the material reduction in the number of accidents and in the amount paid out in settlement of claims. During the year such an amount showed a total reduction of $7,555 over 1913.

The company now owns and operates 44.943 miles of single track and operates 2.112 miles under trackage agreements, conduit construction, and also owns 10.924 miles of surface construction, a total of 57.979 miles for operating tracks. It has 705 cars, all passenger cars for actual service, except fifty service cars and twelve obsolete cars. A valuation of the company is being made by The J. G. White Engineering Corporation.

London Street Railway

The gross earnings of the London (Ont.) Street Railway for the year ended Dec. 31, 1914, were $375,895, an increase of $43,928 over 1913. Of this increase $43,839 came from passenger traffic. This unusual increase was mostly caused by the first year's operation of Sunday service, although the gross earnings made a satisfactory gain even without Sunday earnings. The outbreak of the European war caused some inconvenience in the way of financing but did not otherwise seriously affect the company's business. This is ascribed to the fact that the manufacturing industries of London are more of a domestic nature than those in many other cities.

The total operating expenses for 1914 amounted to $267,901, an increase of $32,984. Cost of power for transporation showed a decrease of $3,701 for the year, but the remaining expense items showed increases, as follows: way and structures, $5,193; equipment, $4,363; car service, $23,979, and general $3,150. The net earnings increased by $10,944 to $107,994, while interest deductions increased $2,835, giving net income of $76,045, an increase of $8,109.

During 1914 the company expended $47,912 in construction and equipment. The total revenue passengers carried in 1914 were 10,286,448, as compared to 9,078,489 in 1913, and the transfers in the two years were 1,697,963 and 1,462,562. The net earnings per car mile decreased from 6.13 cents in 1913 to 5.66 cents in 1914.

Atlantic Gas & Electric Company, New York, N. Y.—The securities deposited by the Atlantic Gas & Electric Company and its subsidiary, the Pennsylvania Utilities Company, to secure the first collateral mortgage bonds, dated 1912, were sold at auction on March 27 for $283,388 to the bondholders' protective committee. It is understood that these will soon be taken over by the General Gas & Electric Company under the plan noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23. This latter company controls the Northwestern Ohio Railway & Power Company and the Rutland Railway, Light & Power Company.

Connecticut Valley Street Railway, Greenfield, Mass.—An application has been made to the Massachusetts Legislature for authority to consolidate the Connecticut Valley Street Railway and the Northern Massachusetts Street Railway. At present the eastern terminus of the Connecticut Valley Street Railway is at Miller's Falls and the western terminus of the Northern Massachusetts Street Railway is at Orange, twelve miles distant. It is reported that a physical connection will be made by the construction of a line to cost $400,000.

Hanover & McSherrystown Street Railway, Hanover, Pa.—The Hanover & McSherrystown Street Railway was sold on April 1 by J. W. Stacy, president York Trust Company, and associates to interests connected with Brooks & Company, Scranton, Pa. Negotiations had been in progress for the last year but were delayed by the adverse effect of the European war. On the new board of directors Mr. Stacy was succeeded by James A. Linen, Jr., Scranton, and the other new directors follow: C. R. Bedford, Scranton; Edward L. Allen, Hanover; J. E. Weisenfluh and F. B. Atherton, Scranton. Ellis S. Lewis, York, and Benjamin W. Frazier, Philadelphia, members of the old board, remain on the new one. The new board organized by electing the following officers: President, James A. Linen, Jr., Scranton; vice-president, J. E. Weisenfluh, Scranton, and secretary and treasurer, F. B. Atherton, Scranton. The sale of the street railway company carries with it the Hanover Light, Heat & Power Company. The capitalization of the companies is $135,000 of stock and $400,000 of bonds.

Interstate Railways, Camden, N. J.—It is announced by John A. Rigg, president Interstate Railways, that the response of holders of the preferred stock of the company to the proposition offered by the directors for an exchange of that stock for other preferred shares, without the retirement clause and thus a permanent investment, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23, has been very favorable. The directors have selected the Real Estate Title Insurance & Trust Company, Philadelphia, as the depositary for the present preferred issue, temporary certificates being issued in exchange for the existing shares until the permanent certificates are ready for delivery. A stockholders' meeting has been called for April 23 to amend the company's certificate of incorporation to conform with the provisions of the new preferred stock.

Joliet & Eastern Traction Company, Joliet, Ill.—It is announced that the certificates of stock in the new Joliet & Eastern Traction Company, the corporation formed of bondholders of the old Joliet & Southern Traction Company, will be ready for distribution to the bondholders within thirty days. The amount of stock of the new company will be $350,000, the value fixed by the Illinois Public Utilities Commission, and this stock will take the place of the $800,000 of bonds. Very few of the bondholders accepted the proposition made to them some time ago to accept 10 per cent of their bonds in cash in lieu of stock in the new company.

Joliet, Plainfield & Aurora Railroad, Joliet, Ill.—The bondholders of the old Joliet, Plainfield & Aurora Electric Railroad have been notified that a second dividend has been declared by the receiver in bankruptcy proceedings. This new dividend makes a total of 36.80 per cent on the outstanding bond issue of $400,000, or $147,280 that have been distributed to the creditors out of the amount paid at the sale of the road. The company which succeeded this old corporation is the present Aurora, Plainfield & Joliet Railway.

Kansas City Railway & Light Company, Kansas City, Mo.—The protective committee for the first lien 5 per cent bonds of the Kansas City Railway & Light Company has issued a circular to holders urging that the bonds be deposited with the committee by May 15. The committee reviews the steps toward the reorganization of the Kansas City properties and states that to reach an acceptable agreement it may be necessary to foreclose the various mortgages.

Long Island Railroad, New York, N. Y.—A formal complaint in a suit in equity has been filed by Dick Brothers & Company, New York, against the Pennsylvania Railroad, the Long Island Railroad, the Pennsylvania Tunnel & Terminal Railroad, and the present thirteen directors of the Long Island Railroad. The complaint contains five counts and alleges a misuse of the property and the money of the Long Island Railroad for the specific advantage of the Pennsylvania Railroad and the tunnel company which it controls. The plaintiffs ask for a receiver for the Long Island Railroad and also demand two separate injunctions, one to restrain the present directors from continuing practices complained against and the other to restrain them from advancing money for further expenditures of the Long Island Railroad for the benefit or purposes of the Pennsylvania Railroad, or from paying any principal or interest on account of advances made by the Pennsylvania Railroad.

Los Angeles (Cal.) Railway Corporation.—The Los Angeles Railway Corporation has filed an application with the California Railroad Commission requesting authority to sell $250,000 of its first and refunding mortgage gold bonds for the purpose of refunding $250,000 of first mortgage 6 per cent bonds of the Los Angeles Traction Company, falling due on May 1.

Nashville Railway & Light Company, Nashville, Tenn.—A dividend of 1 per cent has been declared on the $4,000,000 of common stock of the Nashville Railway & Light Company, payable on April 1. This compares with dividend payments of 3 per cent in 1910, 3½ per cent in 1911, 5½ per cent in 1912, 7¼ per cent in 1913 and none in 1914.

Omaha & Lincoln Railway & Light Company, Ralston, Neb.—The Nebraska State Railway Commission has authorized the Omaha & Lincoln Railway & Light Company to issue securities amounting to $130,000, divided as follows: $97,500 of 5 per cent bonds, $22,000 of 6 per cent preferred stock and $10,500 of common stock. This makes the total capitalization of the company $330,000, upon which amount the commission requires an allowance of 7 per cent to be set up for maintenance and depreciation. The new issue covers property recently constructed, largely transmission lines, a very small portion of this amount having been expended on the railway properties. The order of the commission requires that separate accounts be kept of the railway and the lighting properties.

Pacific Gas & Electric Company, San Francisco, Cal.—It is officially announced that the Pacific Gas & Electric Company has completed arrangements for the redemption on April 22, 1915, at 100¼ plus accrued interest, of an additional $1,500,000 of its one-year 5 per cent notes, maturing on Dec. 15, 1915. The redemption of these notes eight months before they are payable will result in a large saving of interest to the company. The company is reported to have cash balances of approximately $3,000,000, which accounts for its ability to get these notes out of the way. After this redemption there will be only $1,500,000 of these notes left, as compared with $7,000,000 outstanding a year ago. It is anticipated that this balance will also be called in very shortly.

Porto Rico Railways, Ltd., Toronto, Ont.—The gross earnings of the Porto Rico Railways, Ltd., which controls the Porto Rico Railway, Light & Power Company, San Juan, Porto Rico, for the year ended Dec. 31, 1914, amounted to $772,905, a decrease of $77,216 over 1913. The operating expenses decreased $45,782 to $404,071, and other revenue decreased $38,960 to $8,146, giving a net income of $376,000, a decrease of $70,395. This falling off is attributed chiefly to the general financial depression aggravated by the low price of sugar when last year's crop was marketed. An amount of $361,529 was charged to capital accounts during the year. The freight traffic decreased from 165,958 tons to 101,524 tons and the number of passengers carried from 7,283,479 to 6,632,460. Passenger earnings per car-mile dropped from $0.3013 to $0.268.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—The sale of the property of the Tri-State Railway & Electric Company at the county courthouse in Cleveland on March 30, as announced in the ELECTRIC RAILWAY JOURNAL of March 27, was postponed until April 7 on account of the presence of only one bidder.

Washington & Maryland Railway, Washington, D. C.—The Public Utilities Commission of the District of Columbia has found the following values, as of Aug. 15, 1914, for the Washington & Maryland Railway: amount of money expended in the construction and equipment of the utility as shown by the utility's and the contractors' records, $119,558; reproduction cost of physical property, $60,403, and reproduction cost of physical property less depreciation, $55,298. In determining the total reproduction cost, however, the commission decided that the following percentages should be added: 5 per cent for engineering and superintendence, 3 per cent for interest during construction and 3 per cent for legal and organization expense, insurance, omissions and contingencies. This total of 11 per cent added to the foregoing figures gave a reproduction cost of $67,047 and a reproduction cost less depreciation of $61,381. The commission determined the proper rates of depreciation to be 3.34 per cent for way and structures and 4.25 per cent for power plant equipment.

West End Street Railway, Boston, Mass.—The 8700 new shares of common stock of the West End Street Railway, which, as noted in the ELECTRIC RAILWAY JOURNAL of March 27, were authorized by the Massachusetts Public Service Commission to provide for additions, were sold at auction on April 1 at prices ranging from 63¼ to 64½. The shares were disposed of in twenty-eight different lots and among fifteen purchasers, the largest purchasers being R. L. Day & Company with 3790 shares, Moors & Cabot with 1035 shares, and Kidder, Peabody & Company with 1000 shares. The sales price compares with 66⅛ to 68 in April, 1914, and 71⅛ to 78¼ in February, 1913.

West India Electric Company, Ltd.—According to the annual report of the West India Electric Company, Ltd., Kingston, Jamaica, the gross receipts for 1914 increased 1.43 per cent over 1913 to $288,924, while the operating expenses increased 5.06 per cent to $155,228. The net earnings, therefore, decreased 2.48 per cent to $133,696. The total of passengers carried decreased 3.39 per cent to 5,030,391, and the railway department receipts decreased $5,287. The receipts of the lighting department increased $7,698 for the year. The payment to the government of the 4 per cent tax on the railway receipts amounted to $8,326, a decrease of $190. The company announces its intention to add to its contingent fund until it reaches $100,000.

DIVIDENDS DECLARED

American Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred; quarterly, 2½ per cent, common, also 2½ per cent in stock.

Brooklyn (N. Y.) City Railroad, 2 per cent.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.

Dallas (Tex.) Electric Company, 3 per cent, first preferred; 2½ per cent, second preferred.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; one-half of 1 per cent, common.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

Virginia Railway & Power Company, Richmond, Va., 1½ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$391,191	......	......	......	......
1 "	"	'14	383,248	......	......	......	......
2 "	"	'15	834,477	......	......	......	......
2 "	"	'14	824,885	......	......	......	......

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$130,652	*$127,705	$2,947	$2,989	†$42
1 "	"	'14	133,794	*132,572	1,222	346	876
8 "	"	'15	1,372,173	*1,188,451	183,722	27,659	156,063
8 "	"	'14	1,423,742	*1,190,610	233,131	2,775	230,356

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$62,068	$56,004	$6,064	$17,285	†‡$11,097
1 "	"	'14	67,870	63,623	4,247	15,976	†‡11,681
8 "	"	'15	656,455	591,099	65,356	137,931	†‡71,395
8 "	"	'14	684,776	598,367	86,409	122,331	†‡34,845

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$388,164	$13,047	$375,118	$40,833	$334,285
1 "	"	'14	391,259	9,031	382,228	29,167	353,061
12 "	"	'15	3,942,499	130,266	3,812,234	443,333	3,368,900
12 "	"	'14	2,657,931	86,690	2,571,241	181,396	2,389,845

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$83,791	$54,978	$28,813	$32,153	†$3,340
1 "	"	'14	82,929	55,425	27,504	31,588	†4,084
2 "	"	'15	177,105	114,136	62,970	64,207	†1,237
2 "	"	'14	176,981	115,567	61,415	63,483	†2,068

CONNECTICUT COMPANY, NEW HAVEN, CONN.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$556,153	$380,180	$175,973	$98,258	‡$99,135
1 "	"	'14	535,364	458,789	76,575	88,366	‡9,379
8 "	"	'15	5,353,002	3,927,701	1,425,301	786,235	‡812,277
8 "	"	'14	5,409,522	4,032,557	1,376,965	713,893	‡837,595

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$21,129	$22,229	†$1,099	$7,979	†‡$9,052
1 "	"	'14	19,731	22,235	†2,504	7,800	†‡10,275
8 "	"	'15	259,009	208,788	50,221	63,109	†‡12,567
8 "	"	'14	252,451	201,958	50,494	61,694	†‡10,858

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$32,206	$41,767	†$9,561	$6,237	†‡$15,638
1 "	"	'14	25,708	45,180	†19,471	7,124	†‡26,160
8 "	"	'15	292,817	347,352	†54,534	51,358	†‡104,371
8 "	"	'14	260,199	391,052	†130,852	43,901	†‡170,751

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$358,756	$290,972	$67,783	$117,299	†‡$48,527
1 "	"	'14	358,331	321,679	36,651	110,314	†‡72,854
8 "	"	'15	3,541,838	2,666,266	875,582	944,638	†‡2,851
8 "	"	'14	3,596,063	2,693,767	902,295	858,171	‡130,646

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$714,878	$493,881	$220,997	$47,575	$173,422
1 "	"	'14	678,838	465,476	213,362	44,909	168,453
2 "	"	'15	1,484,170	1,025,421	458,749	100,575	358,174
2 "	"	'14	1,424,844	959,085	465,760	94,525	371,235

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

Houston and Salt Lake City Regulatory Ordinances Passed —San Francisco Ordinance Introduced—Additional City Reports

The ordinance intended to regulate the jitney in Houston, Tex., has been adopted by the City Council, and automobile owners who desire to comply with the terms of the ordinance have thirty days in which to make their arrangements. The ordinance provides that jitney operators shall furnish liability insurance in the sum of $10,000 or give a personal bond for that amount for the protection of the public. It also carries the usual wheel tax of $12 a year for each car, and in addition a provision fixing the tax for ordinary touring cars for jitney service at $1 a month and the tax for the buses carrying ten or more passengers at $50 a year. Under the ordinance the Public Service Commissioner of the city is vested with authority to grant licenses and permits, regulate schedules and designate terminals of each line, subject to appeal to the City Council. Each application for a permit must show the names of each and all who are to drive the car, the type of car, horsepower of the machine, factory number, county license number, seating capacity, terminals of the line, streets to be used and the schedule of departure and arrivals. Before receiving the permit to operate the drivers are to be examined by a board composed of the superintendent of police, the city attorney and the person in charge of the city automobile repair shop. No passengers will be allowed to ride on the running boards, fender or door and only one passenger will be allowed to ride in front with the driver. One conviction of a driver suspends his license for ten days and the third conviction will revoke the license permanently. Any person who violates any provision of the ordinance is subject to a fine of not less than $5 or not more than $25. Representatives of the Houston Jitney Association have served notice on the city officials that they will ask for a referendum election to determine whether the voters of the city approve the ordinance. The members of the association claim that it will be impossible for jitney owners and operators to comply with the provisions of the ordinance. Under the city charter if 10 per cent of the voters ask for a referendum the City Council is obliged to order an election to be held.

On March 31 the City Commission of Salt Lake City, Utah, passed an ordinance regulating the operation of motor buses for hire over the streets of Salt Lake, effective on April 1. The measure does not relate to street cars, interurban cars or motor vehicles used exclusively as hotel buses, or sightseeing cars, or to autos rented from a stand in the streets, or from any public or private garage, where the destination or route of such cars is under the direction of the passenger. It is aimed solely at the regulation and control of the jitneys operating in competition with the street railways. It provides for the licensing of such cars at the discretion of the City Commission, such license to be limited to certain routes and terminals designated in the application for license. Regular schedules must be maintained by all such cars from six o'clock in the morning until midnight every day, including Sundays and holidays. The application for license must contain information as to the name, age and residence of the owner and operator, type of car, power and seating capacity, license number, factory number, route, terminals and schedule to be maintained. Cars with a seating capacity of four pasengers or less are to pay the city $75 a year license, cars with more than four or less than ten passenger capacity are to pay $100, and cars of more than ten passenger capacity are to pay $125. After dark every car is to be artificially illuminated on the inside and also on the outside to show the route and terminals. The ordinance makes it unlawful to run on any streets other than those designated in the route. It is unlawful to run past or within 25 ft. of any other motor bus or any street car for the purpose of reaching a prospective passenger first. Policemen, firemen and employees of the city health department when wearing uniforms must be carried free. Drivers are forbidden to charge or receive any amount in addition to the regular passenger fare for the transportation of hand baggage. It is unlawful to cross any railway track without first bringing the car to a full stop. A bond of $5,000 is required for the protection of passengers against damage from injury to themselves or property. The license of any owner or operator may be revoked by the city at any time if it appears that the owner or operator is a careless or reckless driver. Any violation of the ordinance is deemed a misdemeanor and is punishable by a fine not exceeding $50 or thirty days in jail, or both. On second conviction the license may be cancelled.

The public utilities committee of the San Francisco Board of Supervisors tentatively adopted a proposed jitney bus ordinance on March 31. The outstanding features of the proposed ordinance provide for insurance of the jitney patrons against accident and the payment of an annual license by the jitney owners, graduated according to seating capacity. The insurance feature is designed to provide a policy which shall yield a maximum of $5,000 in case of accident causing injury or death, and $10,000 if two are hurt or killed. In addition to this the policy must provide for payment of $1,000 in case of property damage. It is provided that jitney owners shall pay the premiums on these policies, but in event of recovery in court for damages it is to be provided that the injured party or his heirs, in case of death, may receive their insurance from the insurance company itself. The license feature of the proposed ordinance provides that owners of jitneys shall pay a license fee to the city of from $40 to $100 per annum, according to the seating capacity of their vehicles. Other provisions prescribe the duties of the police relative to routing the traffic.

In addition to the general rules governing the operation of the jitney promulgated under the police power, Director Talbert of the department of streets and sewers of St. Louis has had introduced in the Municipal Assembly an ordinance to require the jitneys to be inspected by the city as to their safe running condition, but no regulation as to charges or service is provided. Richard McCulloch, president of the United Railways, is quoted in part as follows:

"So far the city has not seen fit to order any regulation of the jitney as to the service and any irresponsible person is permitted to operate a jitney. I believe that the powers of the State Public Service Commission are such as would allow it to set aside any city ordinance. That matter, however, has never been tested, but the United Railways will urge that it be treated fairly in any regulation as to transportation service in St. Louis."

John M. Atkinson, chairman of the Public Service Commission of Missouri, is reported to have said that the regulation of the jitneys would lie with the city of St. Louis and that the jitneys were not under the jurisdiction of the commission.

The bill which has been introduced into the Legislature of Iowa authorizing cities and towns of that State to regulate the jitney follows in full:

"Cities and towns, including cities acting under the commission form of government, and cities acting under special charter, shall have power to regulate, tax and license so-called jitney buses, and all motor vehicles operating upon the streets and avenues of such cities and towns and engaged in carrying passengers for hire, on a plan similar to that followed by street railway companies; to fix and determine the streets and avenues upon which they shall be permitted to operate; to require such vehicles to be operated over reasonable routes, and upon reasonable schedules; to require the owners or operators thereof to file with such city or town a proper indemnity bond for the protection of the city or public against damages resulting from negligence in the operation of such vehicles; and to impose penalties within the limits of section 680 of the code, for the violation of any ordinance enacted hereunder."

The special joint committee of the City Council of Little Rock, Ark., has agreed upon the terms of the ordinance to be passed by that city to regulate the jitney. The surety bond is fixed in the sum of $5,000 for each automobile let for hire. Other provisions include the definition of streets on which public automobiles may be operated, limitation of the number of passengers the cars may carry and requirements for licenses. The seating capacity specified by the manufacturers of the cars is to be the maximum number of passengers which may be carried. Licenses are fixed at $3 a month for drivers of five-passenger cars, $4 a month for seven-passenger cars, $6 a month for eight to twelve-passenger cars and $8 a month for larger cars. These licenses are to be payable quarterly and are in addition to the regular vehicle licenses. The inspection of public automobiles is provided for through the creation of an automobile inspector, who will pass upon the fitness of automobiles for public service and the qualifications of chauffeurs. The penalty for violation of any provision of the ordinance is fixed at not less than $5 or more than $25.

The bill to regulate the jitneys and to require owners to file bonds to cover possible damages and to pay 10 per cent of their gross earnings as a tax has been negatively reported by the committee on roads of the House of Pennsylvania.

Operators of jitneys in Memphis are required by a ruling of R. A. Utley, fire and police commissioner, to turn in their State license numbers to the department, where they are supplied with special license plates, red letters on a green plate, the words "Public Service" appearing perpendicularly at either side. The old numbers will be carried on the records of the department and the plates must still be kept by the owners of the car. Owners of buses may not change the plates at will but when they enter "public service" must remain in it until they go on record at the department as having relinquished the jitney plates which indicate the character of their machines. These plates, it is stated, will give the public and the police definite information as to the character of any automobile they may see on the street. The new plates are supplied without cost to the jitney owners.

In the ELECTRIC RAILWAY JOURNAL for March 27 the jitney situation in various cities was outlined by publishing data on the number of buses in operation, the character of service, the possibility of regulation and the like. The following list which appears in the Erie *Daily Times* supplements this, the data having been obtained by the Buffalo police from the police chiefs of the cities named:

Seattle—800 cars. Ninety-two people injured on streets. Ten extra officers detailed to traffic duty. Stolen autos found in jitney service. Traffic congested. $2,500 bond required.

Fresno, Cal.—Fifteen cars. Can use only routes not covered by street cars. $10,000 bond required.

Los Angeles—700 cars. Twenty-five per cent increase in accidents. Schedule over definite route.

Birmingham—100 cars. Traffic congested and several accidents occasioned. Regulatory ordinance now being considered.

Spokane—Ninety cars. Traffic slightly congested. No accidents. $2,500 bond required.

San Antonio—120 cars. Traffic heavily congested. Great increase in number of accidents. Two killed. Ordinance requiring bond and other regulations now being printed.

Oakland—300 cars. Forty accidents in January. One hundred and twenty-eight jitneys gone out of business. Traffic is congested. One hundred and twenty-five arrests for violations of ordinance. $10,000 bond required.

Tacoma—Seventy-five cars. No special ordinance as yet. Hindrance to traffic.

Baltimore—Twenty-five cars. New venture here. Regulation not as yet prepared. Several accidents since operation.

Salt Lake—Fifty cars. Ordinance just passed. Had few accidents, but nothing serious.

New Orleans—250 cars. Regulations being drawn. Have added much to street congestion. Had several accidents, one fatality.

Vancouver—350 cars. Regulations now being prepared. Traffic much congested in principal streets. Number of minor accidents.

Nashville—Twelve cars. Lengthy ordinance now in press. No traffic trouble.

After a trial of several months all of the jitney bus operators in San Angelo, Tex., have suspended service.

A peculiar turn has been given to the question of liability in connection with jitney bus accidents in a suit filed at Seattle on March 29. Victor Clements, a laborer, has asked for damages in the sum of $20,500 against the city. He contends that the city, in permitting its streets to be put to an unlawful use by the operation of automobiles as common carriers without regulation and without franchise, was responsible for injuries which he sustained when he was struck by a jitney.

The federal trustees of the Rhode Island Company and officials of the Rhode Island Jitney Bus Association appeared before the committee on ordinances of the City Council of Providence on April 6 and discussed regulations for jitney bus service. The meeting lasted four hours. The jitney men proposed a license fee of $10 per bus per year in place of the present $3 charge. About 650 jitneys, mainly Ford cars, are now being run. The bus representatives also favored requiring each jitney owner to take out a bond of $1,000 for each car operated, to serve as a guarantee of damages in case of injury to persons through the fault of jitney operators. Stringent rules to insure competent operators, a 5-cent fare and regular routes throughout the city were also recommended. A minimum age limit of twenty years was suggested for jitney operators. The railway company's representatives advocated a $100 license fee per bus, urged a higher bond value, and recommended the enforcement of existing ordinances relative to hacks and carriages in connection with jitneys, particularly in relation to the avoidance of congestion and the restriction of standing places.

On April 2 the ordinance committee of the City Council of Portland, Maine, held a hearing on jitney buses. A. H. Ford, general manager of the Cumberland County Power & Light Company, said that the local street railway service is in danger of curtailment, with resulting discharge of employees. Other speakers urged the importance of regulation.

COPPER ZONE SYSTEM EXTENDED

The Public Service Commission of Indiana on March 29 granted the petition of the Terre Haute, Indianapolis & Eastern Traction Company for a new local and interdivision passenger tariff, based on the copper zone instead of the nickel zone system. As shown in the order of the commission, the fares to be charged and collected by the company on and after May 1, 1915, are to be computed on the following basis: at the rate of 2 cents a mile for the distance actually traveled, as nearly as practicable, one-half mile at 1 cent each to be taken as the unit, 5 cents, however, to be the minimum fare. In the case of fractional miles, from 0.75 (regarded as 0.8) of any mile to 0.24 (regarded as 0.2) of the next mile, both inclusive, fractions are to be disregarded, and the intervening whole mile regarded as the distance. In the case of fractional miles, from 0.25 (regarded as 0.3) of any mile to 0.74 (regarded as 0.7) of the same mile, both inclusive, the fractional distance is to be regarded as one-half mile and the total distance taken as the number of whole miles and one-half. For instance, any distance from 5.3 miles to 5.7 miles, both inclusive, is to be regarded as 5.5 miles, and any distance from 5.8 miles to 6.2 miles, both inclusive, is to be regarded as 6 miles.

The minimum fare is to be 5 cents, and due consideration is to be given to competitive mileage of other steam or electric railroads. The fares for children between five and twelve years of age are to be at the rate of 1 cent a mile, computed in the method outlined above.

Each passenger riding to or from points outside the corporate limits of any municipality to or from points within the corporate limits of such municipality upon a car making a continuous trip between such points, is to be regarded as a continuous passenger between such points, and is to be charged and pay a continuous passage fare computed upon the mileage basis, from the point outside the municipality to the station maintained or designated by the company in the municipality.

Petitions for establishing the copper zone system of fares have also been filed with the Public Service Commission by the Indianapolis & Cincinnati Traction Company and the Fort Wayne & Northern Indiana Traction Company, but no hearings have yet been held by the commission on these petitions.

EXPERIENCE MEETINGS IN SCRANTON

Paul Adrian, writing in the Elmira (N. Y.) *Telegram* of April 4, said in part:

"W. E. Boileau, general manager of the Scranton (Pa.) Railway, has started an educational school that is bringing results. Every Monday afternoon, Mr. Boileau calls together two or three hundred of his employees. All the bosses are represented. Stenographers are there. All complaints are heard and placed on record. The employees talk freely. Their suggestions are taken seriously. They report where there is a weak spot. The bosses come forward with their suggestions. Mr. Boileau then gives a talk—a practical one. He tells the men what the company wants for the wages paid. He tells the conductors they are the servants of the passengers, while on the car, and that they are paid for civility and not talking back. He shows them it is their business to make car riding as popular as possible, for the more fares collected the more conductors and motormen will be employed. He has a heart to heart talk with his men. He interests them in air, electricity, machinery, clean cars, well ventilated cars and the comfortable temperature of cars. The result of the talks—the getting together—is made manifest in many ways. The employees and the bosses are learning to understand each other, and all work for the interests of the company, and help add to its business. With Mr. Boileau safety is first, and he talks interestingly on the subject and tells his audience it is the careful and not the venturesome man who is profitable to the company. In all industries, in all trades, in all business there should be more heart to heart talks between employers and employees."

POLITENESS

An exceedingly practical discussion of the value of politeness is being placed before the employees of the Louisville (Ky.) Railway under the signature of J. T. Funk, superintendent of the company. It is brief and to the point. It reads:

"Politeness is a gift that all persons do not possess, but it is something that can be acquired by practice. The operative of a car who is polite and courteous to his passengers is in possession of an asset of great value to the individual; such an employee is soon discovered by the riding public and is appreciated by every passenger with whom he comes in contact. In many cases when such a one has an accident and is desirous of having witnesses, he can secure them without difficulty. In many instances passengers will volunteer their statements in his behalf. On the other hand, when it is known that an employee is not polite and is cross, it becomes difficult to secure information exonerating him, even though he may not be at fault for the accident. Certain it is that the general public appreciates a polite man on either end of the car. Conductors and motormen can add greatly to their own comfort as well as to that of passengers by being polite under all circumstances."

BENEFIT ASSOCIATION AT ROCKFORD

The Rockford (Ill.) City Traction Company has organized a mutual benefit association among its employees, having previously built a fine clubroom for them. The clubroom provides a library, a poolroom, card tables, private steel lockers, shower baths and a floor that is being used monthly for dances. A male chorus and an orchestra have been organized and rehearsals are being held. There are social gatherings every month. Besides the entertainment and clubroom privileges the employees are united in a mutual benefit association that provides for the employee during accident or sickness disability and insures against the death of an employee, his wife or any child under fifteen years of age. Of the 200 employees 180 are members of the association. An employee by paying $1 a month into the association receives $1 a day in accident benefits from the first day, and $1 a day for sickness after the fifth day. If the employee is sick longer than ten days he is paid at the same rate from the first day of sickness. If a member dies his beneficiary receives $100, while if the wife or a child under fifteen years of age dies the employee is paid $50 in death benefits.

Two death benefit claims have been allowed for the wives of two employees. One employee has died since July 1, 1914, the date of organization. About $600 has been paid in one form or another as benefits since the association was organized, and there is more than $600 in the treasury. At the last entertainment an oyster supper was served from 4 p. m. to 8 p. m., after which a musical program was rendered and dancing enjoyed. The company arranges for a picnic for the employees each year, and this also brings the employees and their families in closer and more congenial relations. With an orchestra organized and rehearsing and the male chorus perfected it is hoped to give a minstrel show or some entertainment of like nature next winter. A new schedule of runs has been worked out by which a day of ten to ten and one-half hours has been put into effect. Under this plan the "swing" run has been practically eliminated so that there are more men than formerly off duty during the evening.

SAFETY ZONES IN LOUISVILLE

Extension of the safety-first zone plan of the Board of Public Safety of Louisville to the wide streets of the city is projected along the lines of an experiment the traffic department is making at the intersection of Fourth Street and Broadway. The zones have been marked for some time at the intersections of the narrow streets, posts with flags at the tops having been in use for several months to indicate where traffic must stop as street cars do at the intersections. On the wide streets, such as Broadway, Jefferson and Market Streets, the board did not believe it necessary to mark off a space where pedestrians could feel safe, for the reason that there is plenty of room at the sides of the railway tracks. Confusion has resulted, however, and now the Board of Public Safety is putting into use a series of posts connected with chains, to mark off the safety zones at such intersections. The two end posts are topped with flags and are connected with the two remaining posts by chains, the four posts and the chains serving to enclose a space adjacent to the car tracks and with the open side toward the tracks. It is probable that, after a somewhat longer trial, the system will be extended to other broad thoroughfares in the central part of the city.

Limiting Car Capacity.—Health Commissioner Goldwater of New York put into effect on April 5 his order limiting the carrying capacity of the Eighth and Sixth Avenue car lines of the New York Railways. Both the health board and the company had men on hand to check the service.

Increase in Wages.—Platform men of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, received an advance of 1 cent an hour in wages on April 1. The advance was made in accordance with the terms of a contract signed with the motormen and conductors on April 1, 1914, and affects several hundred men.

Safety Campaign in Toledo. — The Columbus Railway, Power & Light Company, Columbus, Ohio, is preparing to resume vigorously the safety-first campaign begun some time ago. Poster advertising will be used extensively in the campaign. F. M. Babbitt is in charge of the safety department. H. W. Clapp, superintendent, said that the accidents during February showed a decrease of 35 per cent over those of the same month a year ago. He attributes this largely to the safety-first campaign.

San Francisco "Transit Tidings."—The United Railroads, San Francisco, Cal., has revived *Transit Tidings*. The company says: "*Transit Tidings* again steps into the field of San Francisco publicity. Its mission is educational, to acquaint the people of this city and visitors, in a concise way and by means of maps, with the interesting points of our city and with the best and cheapest means of reaching them. It will serve as a guide of ready reference for exposition travel. Put it in your pocket; you will find use for it many times each day."

Side Destination Signs in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., is installing side destination signs on such cars as were not already so equipped. All cars bought or reconstructed in the past five years have had the side signs. Some of the older cars had signs only on the front and rear ends. A type of sign that can be installed with small change in the cars is being used for the present purposes. They are being put next to the rear entrances as being most convenient for observation of the passengers waiting for or boarding cars.

Accidents in New York.—Twenty-one persons were killed by automobiles on the streets of New York City during March, according to the report of the National Highways Protective Society. Trolleys caused the death of four, and wagons caused the death of five. During the corresponding month of 1914 the total number of persons killed was twenty-seven. The number of persons killed on the streets and highways of New York State outside of New York City during the past month was thirteen. Of this number, nine were deaths from automobiles, two by trolleys, and two by wagons.

Colonel Hayward's First Case.—Colonel William Hayward of the Public Service Commission of the First District of New York, the successor on the commisison to Milo R. Maltbie, held his first public hearing on April 5. It was on the application for a rehearing on the order of the commission of Nov. 20 that the New York & Queens County Railway improve its service. Commissioner Cram's conduct of the same matter had been such that Colonel Hayward, as counsel for the legislative investigating committee, had founded one of his charges against that commissioner upon it. The company contested the order on the ground that it involved the purchase of equipment, which it claimed it could not afford. In concluding the hearing Colonel Hayward said that he saw no reason for changing the original order of the commission.

Safety-First Campaign in Fitchburg.—The first meeting in Massachusetts of men representing all kinds of traffic for the purpose of formulating plans for a safety-first campaign and the prevention of accidents was held on March 26 in Fitchburg, Mass. On the suggestion of A. Q. Thayer, chief of the police department, it was voted to petition the city government to place signs of the "silent policeman" style at dangerous places. Stereopticon views were thrown on a screen by Harrah K. Bennett, claim agent of the Fitchburg & Leominster Street Railway, who called the meeting. He said that he did not wish it to appear that it was a railway idea entirely. The co-operation of the railway companies, motorists, motorcyclists and all who used the streets was needed. Commenting editorially on the meeting the Fitchburg *Daily News* said in part: "As was rather neatly set forth in a letter by Mr. Bennett, first aid to the uninjured is the object in view. Through the hearty co-operation which the campaign will receive from the Fitchburg Automobile Club the local motorcycle club and civic organizations, the safety-first slogan is bound to grow in importance in this city until we shall see the elimination of preventable accidents. This work should have the hearty indorsement of every citizen."

Hauling Gravel and Sand.—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., announces that it has just closed a contract to furnish and haul all of the gravel and sand to be used in paving a 15-mile section of the Lincoln Highway which parallels its line. This section of the Lincoln Highway, which is being constructed from coast to coast, is to be paved with an 8-in. concrete slab, 18 ft. wide, and with a 3-ft. gravel border on each side, the same depth or thickness as the concrete pavement. This will require approximately 1600 carloads of gravel and sand and about 250 carloads of cement. The gravel and sand will be furnished by the railway company from a gravel pit on its line near South Bend, Ind., and the cement will be delivered to it at Michigan City for distribution to points most convenient for highway construction forces. In connection with this contract the railway also announces that it has approximately 500,000 yd. of very fine gravel and torpedo sand in its pit and in the gravel land adjoining. The company has just undertaken the erection of a modern gravel washing and screening plant, at an estimated cost of $15,000, with which it proposes to supply the territory served by its line with washed gravel and sand. The screening plant will have a capacity of approximately 600 yd. per day, and with it the company hopes to develop a freight business of 3000 carloads a year.

Personal Mention

Mr. S. C. Dows has been appointed purchasing agent of the Iowa Railway & Light Company, Cedar Rapids, Ia.

Mr. J. E. Weisenfluh has been elected vice-president of the Hanover & McSherrystown Street Railway to succeed Mr. William D. Hinds.

Mr. T. H. Rabe has resigned as treasurer of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to go into business for himself.

Mr. F. B. Atherton has been elected secretary and treasurer of the Hanover & McSherrystown Street Railway, Hanover, Pa., to succeed Mr. Ellis S. Lewis.

Mr. R. S. Cook, purchasing agent of the Iowa Railway & Light Company, Cedar Rapids, Ia., has been appointed assistant general manager of the company.

Mr. N. H. Hawkins, formerly credit manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been elected assistant secretary and assistant treasurer of the company.

Mr. John W. Stacy has resigned as president of the Hanover & McSherrystown Street Railway, Hanover, Pa., following the sale of this company by himself and associates to Brooks & Company, Scranton, Pa., as noted elsewhere in this issue.

Mr. James A. Linen, Jr., Scranton, Pa., has been elected president of the Hanover & McSherrystown Street Railway, Hanover, Pa., to succeed Mr. John W. Stacy, following the sale of the company by Mr. Stacy and his associates to Brooks & Company, Scranton, Pa.

Mr. J. P. Ross, formerly secretary of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been elected secretary and treasurer of the company, succeeding in the latter capacity Mr. T. H. Rabe, whose resignation is noted elsewhere in this column.

Mr. William O'Connell, county treasurer of Cook County, Ill., has been appointed a member of the Illinois Public Utilities Commission to succeed Mr. James E. Quan, resigned. Mr. Quan was appointed chairman of the commission to serve temporarily, his resignation coming voluntarily after a little more than a year's service.

Mr. Allan Purvis, recently manager of the interurban lines of the British Columbia Electric Railway, Vancouver, B. C., has been appointed superintendent of the Canadian Pacific Railway lines west of Toronto to Windsor. Mr. Purvis was in the employ of the Canadian Pacific Railway previous to his association with the British Columbia Electric Railway.

Mr. H. H. Sanborn, rate expert, and Arthur B. Roehl, assistant rate expert of the California Railroad Commission, have tendered their resignations to take effect the latter part of April. Mr. Sanborn and Mr. Roehl have been with the Railroad Commission for more than four years, during which time they have assisted in all important railroad rate hearings and investigations. Mr. Sanborn and Mr. Roehl propose to form a partnership for the practice of law in San Francisco.

Mr. J. G. Herrin, assistant superintendent of the Kansas City-Western Railway, Kansas City, Kan., has been appointed general superintendent of the company, and Mr. John M. Sheehan, claim agent of the road seven years ago, returns as assistant superintendent and general claim agent. Mr. Herrin succeeds J. W. Richardson, who died two months ago. All three men were in train service on the cable lines of Kansas City more than twenty years ago when the present management of the Leavenworth line had charge of that property. Mr. Richardson and Mr. Herrin were gripmen on cable trains, and had risen together in the service of the interurban.

OBITUARY

J. A. Gaboury, who is said to have been largely responsible for the successful promotion of the first electric railway in Columbus, Ga., is dead.

John Englis, Brooklyn, N. Y., is dead. Mr. Englis was well known throughout the East in coastwise and inland shipping circles and as one of the promoters of the Brooklyn Union Elevated Railroad and other subsidiaries of the Brooklyn Rapid Transit Company.

Walter Spooner Allen, formerly statistician of the American Telephone & Telegraph Company, died at San Diego, Cal., on March 31. Mr. Allen was born in New Bedford, Mass., and was graduated from the Massachusetts Institute of Technology. He studied at the university of Leipzig and taught for three years at the Massachusetts Institute. He was the first secretary of the Massachusetts Board of Gas & Electric Light Commissioners and acted as secretary of the special committee appointed by the Massachusetts Legislature on the relations of street railways and municipalities. He was also secretary and executive officer of the board of Paris exposition managers of Massachusetts, and represented Massachusetts at the Paris exposition of 1900. He was also one of the United States delegates to the tramway congress at Paris.

John D. Murphy, roadmaster of the New York & Long Island Traction Company, Hempstead, N. Y., and the Long Island Electric Railway, died suddenly of heart failure at his home in Hempstead on April 2. Mr. Murphy entered the employ of the New York & Long Island Traction Company about nine years ago in charge of construction of overhead on the Jerico turnpike division. Four years ago he was placed in charge of the track and line of the company with the title of roadmaster. Before becoming connected with the New York & Long Island Traction Company Mr. Murphy was in the employ of the New York & Queens County Railway and before that he was with the Union Traction Company, Philadelphia, now included in the system of the Philadelphia Rapid Transit Company. He was forty-nine years old and is survived by a widow and four sisters.

Lee Massengale, who was interested in the promotion of the jitney in St. Louis, committed suicide at his home in East St. Louis on April 1 in a fit of melancholia, said to have been induced by failures which he sustained in the jitney business. Mr. Massengale was formerly vice-president, secretary and general manager of the Iola (Kan.) Railroad. He was born at Denton, Tex., on July 5, 1865. In 1885 Mr. Massengale entered the employ of the Lindell Railroad, St. Louis, Mo. From 1887 to 1889 he was connected with steam railroads. In the latter year, however, he returned to the Lindell Railroad in connection with the installation of the Sprague system and subsequently became master mechanic of the company. In 1900 Mr. Massengale was appointed master mechanic of the United Railways, St. Louis. In 1894 he accepted the position of master mechanic of the East St. Louis & Suburban Railway, but resigned from the company in 1906, to become general manager of the Iola Railroad. He was also at one time connected with the Lake View Traction Company, Memphis, Tenn.

BUSES IN KANSAS CITY

The jitney service in Kansas City has grown to the use of nearly forty buses of a capacity of ten to eighteen passengers each, but the number of small passenger cars is declining. It has been estimated by the jitney association that nearly 50,000 persons have been carried by the jitneys, at 5 cents and 10 cents a trip, on a single pleasant spring day. This is about 10 per cent of the number normally carried on the street cars in a day. A special service for Swope Park, the 1300-acre playground through which there is no street railway service, is now being planned by the jitney opertors.

Director of Public Safety Porter of Philadelphia, who has just returned from a visit to the West, considers the jitney a nuisance. He is quoted by the Philadelphia *Record* of April 3 as having said:

"In some cities the jitney has developed into an ideal aid to pickpockets and women flirts. Pickpockets work with the driver. They get a victim in the seat between them and then as the car bounces along and the victom's mind is concentrated on keeping his hat from blowing off, they go through his pockets and trim him well. No such complaints have been received in this city, thus far, but with the rapid growth of the jitney in popularity the complaints will undoubtedly come."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Willimantic & Manchester Street Railway, Willimantic, Conn.**—Application for a charter has been made by this company in Connecticut to build an electric railway from Willimantic south of the tracks of the Central Vermont Railroad where connection may be made with the tracks of the Connecticut Company, thence through Pleasant Street and connecting streets to Columbia, thence extending through to the towns of Andover, Coventry, Bolton, and Manchester to a point in Manchester near Manchester Green where connection can be made with the tracks of the Connecticut Company. Among those interested are: T. J. Spellacy and Joseph I. Kopelman of Hartford, and Edward M. Yeomans of Andover.

***Fort Myers, Marco Bay & Miami Railway, Miami, Fla.**—Application for a charter has been made by this company to build an interurban railway from Fort Myers to Miami, via Naples and Marco Bay, a distance of 150 miles. W. B. Clay, Arcadia, engineer in charge of the survey.

FRANCHISES

Redwood City, Cal.—The Council has approved the ordinance granting a sale and transfer by Edward F. Fitzpatrick to the Redwood City Harbor Company all the right-of-way, title and interest heretofore granted by the town of Redwood City to E. F. Fitzpatrick, and authorizing the construction of an electric railway on Chestnut Street in Redwood City. [March 13, '15.]

Washington, D. C.—The Washington & Maryland Railway has asked the Public Utilities Commission of the District of Columbia for permission to build lines on Kansas Avenue and other thoroughfares in Washington, D. C.

Alton, Ill.—The Alton & Eastern Electric Railway has asked the Council for a one-year extension of time on its franchise in which to build an extension of the Alton Street line from Alton to the new hospital east of Alton. T. W. Gregory, East St. Louis, secretary. [Dec. 19, '14.]

Aurora, Ill.—The Aurora & Mendota Electric Railway has asked the Council for a fifty-year franchise in Aurora. This proposed line will extend along the Burlington route through Bristol, Plano, Sandwich, Somonauk, Leland, Earlville, Mendota to Princeton, where it will connect with the Illinois Traction System of interurban lines. [Nov. 21, '14.]

Brandon, Man.—The City Council has decided to connect up the two main dead-ends of the Brandon Municipal Railway system, with Twenty-second Street as the basis of the west end, at a cost of approximately $16,500.

***Kalispell, Mont.**—The Flathead Development Company has asked the Council for a franchise to build an electric line in Kalispell.

Camden, N. J.—The Public Service Railway has obtained from the State Board of Public Utility Commissioners the approval of an ordinance passed by the city of Camden for the construction of its new electric line from Camden to Haddonfield. The ordinance provides for a new line in Starr Avenue, crossing Border Street, and the necessary connections; also a new line in Border Street. In addition the ordinance provides for a double track line on the White Horse pike from Ferry Avenue to Haddon Avenue. The Utility Commission having approved the ordinance, it is now in full effect, and the Public Service Railway may begin the work at any time.

Buffalo, N. Y.—The International Railway has received a franchise from the Council for a double-track line on West Ferry Street between Hampshire Street and Niagara Street in Buffalo.

Cleveland, Ohio.—The Cleveland Railway has received a franchise from the Council for the Payne Avenue line extension to East 105th Street in Cleveland.

Lorain, Ohio.—The Lorain Street Railway has asked the Council for a franchise in Lorain.

Hull, Que.—The City Council has asked the Hull Electric Railway to extend the Chelsea Road tracks to the Mountain Road in Hull.

TRACK AND ROADWAY

***Hot Springs, Ark.**—The Mountain Valley Water Company, which is owned and controlled by St. Louis interests, contemplates the construction of an electric line from Hot Springs to the company's headquarters in Mountain Valley.

Pacific Electric Railway, Los Angeles, Cal.—An extension south of Los Angeles to Ingledale, Lawndale and Hawthorne Acres is being contemplated by this company.

San Francisco (Cal.) Municipal Railway.—The California Street municipal railway line has been completed and will be operated to the terminus at Thirty-third Avenue in San Francisco. Heretofore it has stopped at Thirteenth Avenue.

San Francisco-Oakland Terminal Railways, San Francisco, Cal.—This company is asked to extend its line along Broadway to Rockridge.

Connecticut Company, New Britain, Conn.—An extension through the northwest section of New Britain will be built by this company within the next few months.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—This company reports that work has been begun on its 60-mile line to connect Harrisburg, Marion, Pittsburg, Johnston City, West Frankfort and Herrin. The company has purchased rails, ties, cement, bridge steel and rolling stock for the line and will purchase power from the Southern Illinois Railway & Power Company. The repair shops will be located at Johnston City. Capital stock, authorized and issued, $3,500,000; bonds, authorized and issued, $2,500,000. Officers: W. H. Schott, 111 West Monroe Street, Chicago, president and general manager; Charles Schott, secretary, and Frank Payne, Johnston City, superintendent and chief engineer. [March 6, '15.]

Peoria (Ill.) Railway.—This company has begun work double-tracking Main Street in Peoria.

Public Utilities Company, Evansville, Ind.—Work on the extension of the Bell Street line will begin at once in Evansville. All materials for the construction of the line have been purchased.

Gary (Ind.) & Interurban Railway.—An extension from Chesterton to Porter is being planned by this company.

Louisville & Southern Indiana Traction Company, New Albany, Ind.—By an agreement reached between this company and the city of New Albany, the city will make extensive repairs in the streets, restoring those portions for which the railway company is responsible and dividing the charges accordingly. The asphalt streets will be repaired with crushed rock and saro, the brick streets with brick. If the saro and rock does not prove satisfactory, granitoid will be used for the asphalt repair work hereafter.

Columbus, Kan.—A party of surveyors and engineers is working on the second survey of the proposed electric line from Columbus to Miami. When this work is completed, it is said that a survey will also be made to Galena.

Hutchinson (Kan.) Interurban Railway.—An extension on Avenue F east in Hutchinson is being planned by this company.

Joplin & Pittsburg Railway, Kansas City, Kan.—This company has awarded a contract for grading the 33-mile line between Bonner Springs and Lawrence to S. S. Dolman & Son, Topeka.

Arkansas Valley Interurban Railroad, Wichita, Kan.—The extension from Halstead to Hutchinson will be built in the near future.

Bay State Street Railway, Boston, Mass.—An extension of the Highland Circuit line over what is known as the Highland loop will soon be built by this company.

Duluth (Minn.) Street Railway.—An extension from Tenth Street to Sixteenth Street in Duluth is being contemplated by this company.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has completed the installation of 20 miles of aluminum cable, additional to its copper equipment, being the first aluminum lines in this section.

United Railways, St. Louis, Mo.—Arrangements are being made by this company to extend the north end of the Taylor line from its present terminus at Florisant Avenue to Broadway via Bircher Street in St. Louis.

Brooklyn, N. Y.—The Degnon Contracting Company, which has the contract for the extension of the Fourth Avenue, Brooklyn, subway from Forty-third Street to Eighty-sixth Street, during the week informed the Public Service Commission, First District, that its work is sufficiently advanced to allow track-laying work to begin. Tracks will be laid immediately as far south as Sixty-fifth Street, to a connection with the Sea Beach railroad, which is to be operated in conjunction with the Fourth Avenue line. It is expected that operation of the line will be possible by June 1 of this year.

Republic Railway & Light Company, New York, N. Y.—It is stated that plans are being worked out by the corporate interests of this company for a bond issue of possibly $25,000,000. If the matter is satisfactorily arranged it means that important improvements will be made on the traction lines and power plants in Youngstown, Sharon, New Castle and Warren, Ohio.

New York, N. Y.—Bids are desired until April 15 by F. J. G. Kracke, commissioner of bridges, Municipal Building, New York, for the equipment of the westerly tracks of the upper deck of Manhattan Bridge. Security, $40,000.

Niagara River & Eastern Railroad, Niagara Falls, N. Y.—This company has asked the Public Service Commission for permission to build a line to connect with the Buffalo, Lockport & Rochester Railway, between Lockport and Niagara Falls. [Dec. 12, '14.]

Yonkers (N. Y.) Railroad.—The Thomas Crimmins Contracting Company, with offices at 444 East Sixty-ninth Street, New York City, is expected to resume work on the double-tracking of the Park Avenue line in Yonkers at once. The double tracks, which now end at Ashburton Avenue, will be extended to the terminal of the line at Roberts Avenue. That portion of the line up to Ashburton Avenue is now double-tracked, the work having been done last year by the same company. Negotiations are pending with a contractor for the double-tracking of Yonkers Avenue, on which the city is now laying a permanent pavement.

Ohio Valley Traction Company, Portsmouth, Ohio.—O. S. Hord, Maysville, Ky., and A. Keithly, Huntington, W. Va., were awarded the contract for building the extension of this company's line between Sciotoville and Ironton, on March 27, on their joint bid. The figures were not made public. The work is to begin within twenty days from the date of the award and be completed by Dec. 1, 1915.

Hamilton (Ont.) Street Railway.—A sub-committee of the Hamilton City Council and this company are considering plans for an extension to the southwestern section of Hamilton, and the renewal of the tracks on York Street in Hamilton.

Forest Hill Electric Railway, Toronto, Ont.—The railway committee of the Ontario Legislature has refused to grant any further extension of time on the franchise in which to begin work on this proposed line on the northern boundary of Toronto, and the charter will accordingly become useless and the project to build an electric railway along the Forest Hill road will be abandoned. [March 20, '15.]

Lehigh Valley Transit Company, Allentown, Pa.—This company contemplates the reconstruction of its tracks with new rails and ties on the following streets in Allentown, Pa.: Hamilton Street, Second to Sixth Street (including new brick work); North Fourth Street from Greenleaf to Sumner Avenue; St. John Street from Sixth to Fifth Street (including new brick work).

Schuylkill Traction Company, Norristown, Pa.—Work has been begun by this company at Frackville for the proposed extension to Pottsville.

Phoenixville, Valley Forge & Stafford Electric Railway, Phoenixville, Pa.—This company has placed in operation its line into the center of Phoenixville over its own tracks.

Shippensburg, Newburg & Western Railway, Shippensburg, Pa.—Engineers have gone over the route of this railway as far west as Roxbury by way of Lurgan and Orrstown. Some of the ties on the route to Newburg were laid some time ago. This was a projected 13-mile line to connect Shippensburg, Middlespring, Newburg, McKenney and Roxbury. [Jan. 10, '13.]

Dallas (Tex.) Southwestern Traction Company.—This company, recently organized with the object of constructing an electric interurban line from Dallas southwestward through Cleburne, Irving, Glen Rose, Comanche, Ballinger, Brownwood, thence to San Angelo, has been given indorsement by a committee appointed by the Merchants and Manufacturers' Association of Dallas. The committee is composed of George W. Riddle and William G. Breg.

***Houston, Tex.**—A movement for organization of a company to construct an interurban line from Houston (Tex.) to Richmond, a distance of about 30 miles, was launched at a meeting in Houston this week. Committees were appointed to organize the business interests of Houston, Richmond and Sugarland in behalf of the proposed line. It is planned to raise $50,000 in cash, and $38,000 was pledged at the Houston meeting, Houston business men pledging $28,000 and Richmond $10,000. Houston interests also promised to procure right-of-way. A committee on organization was appointed as follows: T. B. Wessendorff, Mayor of Richmond; R. F. Ransome, Richmond; J. R. Farmer, Richmond; E. P. Eastburn and E. Kennedy, Houston.

Guadalupe Valley Traction Company, Seguin, Tex.—This company reports that it has obtained a charter for the proposed electric railway to connect Austin, Lockhart, Seguin and San Antonio and that some of the right-of-way and a franchise from the city of Austin and the County of Travis has been obtained, with the right to cross the bridge across the Colorado River. The incorporators of this electric railway are the owners of the Guadalupe Water Power Company and have spent several hundred thousand dollars acquiring water rights and riparian rights in and to the waters of the Guadalupe River from Seguin, in Guadalupe County, north through Guadalupe County and Comal, Kerr and Kendall Counties. This project is progressing and it is expected when work begins on the power plants arrangements will also be made to begin the construction of the electric line. W. B. Dunlap. [Ang. 2, '13.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—Work has been begun by this company on the extension to Huntsville. The Utah Construction Company has the contract. [Oct. 5, '14.]

Roanoke Railway & Electric Company, Roanoke, Va.—Construction of a cut-off from Jamison Avenue southward on Eighth Street to Highland Avenue to Seventh Street to Murray Avenue in Roanoke will soon be built by this company.

Virginia Railway & Power Company, Richmond, Va.—An extension of its Grove Avenue line from its present terminus at the intersection of Canal Street up to High Street, in Petersburg, provided that the city will pave Canal Street in Petersburg is being planned by this company.

***Big Bend Transit Electric Railway, Spokane, Wash.**—This company, which plans to build an electric railway from Spokane along the Spokane River to its junction with the Columbia River, has filed with C. O. Upchurch, agent for former Spokane Indian reservation, maps and plans for a line from Spokane to Miles and has asked for further grants and concessions from the Interior Department on the reservation and the Fort Spokane military reserve.

SHOPS AND BUILDINGS

Fort Smith Light & Traction Company, Fort Smith, Ark.—Arrangements have been concluded by this company for removing its headquarters from North Sixth Street to the Ben Wolf Building at the corner of North Third Street and Garrison Street in Fort Smith.

POWER HOUSES AND SUBSTATIONS

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has increased its battery equipment near Olathe, and has installed a 300-kw generator at Overland, replacing a 200-kw generator, which is held temporarily in reserve; this and other excess capacity may ultimately be installed elsewhere for the company.

Ottawa (Ont.) Electric Railway.—This company has installed a 2150-hp generator set in its new steam auxiliary power plant on Middle Street in Ottawa.

Manufactures and Supplies

ROLLING STOCK

Manhattan & Queens Traction Corporation, New York, N. Y., is considering the purchase of ten new cars.

Androscoggin Electric Company, Lewiston, Maine, has ordered two interurban closed car bodies from the Laconia Car Company.

Miami (Fla.) Traction Company, B. B. Tatum, president, is reported as having ordered four storage-battery cars from The J. G. Brill Company.

Valencia (Venezuela) Tramways has ordered four cross-bench open cars from The J. G. Brill Company. The order was placed through the J. G. White Engineering Corporation.

Quito (Ecuador) Tramways has ordered two closed double-truck cars from The J. G. Brill Company. The order was placed through the J. G. White Engineering Corporation. The construction of these cars has been completed.

New York, Westchester & Boston Railway, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1915, as having issued requests for bids on fifteen new steel cars, has ordered this equipment from the Pressed Steel Car Company.

New York Municipal Railway, Brooklyn, N. Y., has issued requests for bids on 100 new cars for the dual subway system. This equipment will make a total of 300 cars ordered for the system, with 300 more cars contemplated at later dates. Bids for the new equipment are to be submitted by April 15.

Southern Illinois & St. Louis Traction Company, Harrisburg, Ill., will operate twenty passenger cars and twenty freight cars on its new line. Eighteen passenger cars already have been ordered, as noted in the ELECTRIC RAILWAY JOURNAL of April 3, 1915.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., which was reported as having ordered rolling stock in the issue of the ELECTRIC RAILWAY JOURNAL for April 3, 1915, will purchase twelve instead of nine passenger trail cars. Three of these trail cars are designed for handling mail and express and the third for handling baggage.

TRADE NOTES

Standard Paint Company, New York, N. Y., has removed its offices from its former location at 100 William Street to the Woolworth Building.

J. P. Rapp, steel wheel specialist, has resigned from the Forged Steel Wheel Company and allied companies, and has been appointed vice-president of the Gulick-Henderson Company, inspecting, consulting and chemical engineers.

Chicago Pneumatic Tool Company, Chicago, Ill., has removed its branch offices to new quarters, as follows: New York office, from 50 Church Street to 52 Vanderbilt Avenue; Boston office, from 191 High Street to 185 Pleasant Street.

Walter N. Albertson, Milwaukee, Wis., public utility engineer, has moved his office from the Railway Exchange Building to larger quarters at 527 First National Bank Building. Mr. Albertson is president of W. N. Albertson & Company of Milwaukee.

Walpole Tire & Rubber Company, Walpole, Mass., has appointed Joel Mann Martin, for the past five or six years connected with the Atlanta office of the General Electric Company, to a position with the rubber company. Mr. Martin will handle Walpole tapes and insulating varnishes in the South.

Lindsley Brothers Company, Minneapolis, Minn., has changed its general sales offices from the First National Soo Line Building to the McKnight Building, Minneapolis. Its general offices are in Spokane, Wash. The company is establishing in Minneapolis a large yard which will contain a complete stock of sizes of Western red cedar poles.

Street Railway Signal Company, Philadelphia, Pa., writes that in order to devote more time to the engineering and manufacturing branches of its rapidly growing business, it has assigned the exclusive selling agency for its signal apparatus to the Electric Service Supplies Company, Philadelphia, New York and Chicago.

Vacuum Impregnating Works, Chicago, Ill., has taken over the plant and business of the Federal Electrical Manufacturing Company. The combined companies are serving more than seventy electric railways in the capacity of winding, rejuvenating and impregnating all kinds of coils. This company has a large impregnating plant located in Chicago.

W. B. Huey and **A. H. Huey** announce the formation of a new company, under the name of the Huey Company, with offices and plant at 59 East Adams Street, Chicago, for the production of high-grade blueprints, direct blue line prints, negative prints, black line prints, litho reproductions, hectograph copies and photostat reproductions. A complete line of sensitized papers and drawing materials of all kinds will be carried in stock.

Aleck M. MacCutcheon, previously with the Crocker-Wheeler Company, Ampere, N. J., has recently removed to Cleveland to take charge of the design work of the Reliance Electric & Engineering Company of that city. At the time of leaving the Crocker-Wheeler Company Mr. MacCutcheon was engaged in the design of special motor generator sets for use in connection with wireless installations.

Society for Electrical Development, New York, N. Y., announces the appointment of George W. Hill to its staff. Mr. Hill will devote his time to the work of the field cooperative section under George B. Muldaur. Mr. Hill was connected for six years in the storage-battery sales and engineering work, including two and a half years in charge of the Canadian territory of the Canadian General Electric Company, and five years with the Westinghouse interests, part of which time he was in charge of the retail supply department at Boston and the remainder with the Westinghouse Lamp Company.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has received an order for its interurban type headlights from the North Holland Electric Tramway, Haarlem, Holland. These headlights are being equipped with standard 94-watt bulbs. This company reports shipment of headlight equipment during March to the following electric railways: Topeka (Kan.) Railway; Fort Smith (Ark.) Traction Company; Ogden (Utah) Rapid Transit Company; Mahoning Valley Railway, Youngstown, Ohio; The J. G. Brill Company for new cars of the Bridgeton & Millville Traction Company; Portland Railway, Light & Power Company, Portland, Ore.; Mobile Light & Railroad Company, Mobile, Ala.; Des Moines (Ia.) City Railway; Ogden, Logan & Idaho Railway, Ogden, Utah; United States Lighthouse Service, Detroit, Mich.; St. Joseph Railway, Light & Power Company, St. Joseph, Mo.; Shreveport (La.) Railways; St. Louis Car Company for new cars of the Empire United Railways; Wason Manufacturing Company for new cars of the Shore Line Electric Railway; Niles Car & Manufacturing Company for Self-Propelled Car Company's new oil-electric cars; Boston & Maine Railroad, Boston, Mass.; Los Angeles (Cal.) Railway; Idaho Traction Company, Boise, Idaho; Toronto (Ont.) Suburban Railway; Manila Electric Railroad & Light Company, Manila, P. I.; Virginia Railway & Power Company, Norfolk, Va.; Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; Eastern Electric Company, Ltd., St. John, N. B.; Long Island (N. Y.) Railroad; Everett Railway, Light & Water Company, Everett, Wash.; Iowa Railway & Light Company, Cedar Rapids, Ia.; Rounds Line, Owensboro, Ky.; Carbon Transit Company, Mauch Chunk, Pa.; San Antonio (Tex.) Traction Company; West India Electric Company, Kingston, Jamaica; Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.

ADVERTISING LITERATURE

Union Electric Company, Pittsburgh, Pa., has issued a catalog describing its lightning arresters for the protection of pole transformers and railway circuits.

Kellogg Switchboard & Supply Company, Chicago, Ill., has issued Bulletin No. 67, which contains a thorough discussion of its system of railway telephone operation.

National Carbon Company, Cleveland, Ohio, has issued a circular which outlines in an interesting way the reason of the company for choosing three pyramids as a trademark for the sale of its carbon brushes.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a blotter advertising its electric railway, light and power materials and a separate folder describing and illustrating its motorman's safety mirrors for open and closed cars.

Bridgeport Brass Company, Bridgeport, Conn., has issued a bulletin which contains a report, accompanied by tables, on the qualities of its conductor wire "Phono-Electric." The tests were conducted by Leonard Paget, civil engineer, and comparisons were made with hard drawn copper wire of previously standardized quality. One table shows the high breaking strength of this wire for various sizes. The bulletin also explains that this wire, unlike hard drawn wire, is of homogeneous tenacity throughout and shows by another set of tables its greater tensile strength compared with hard drawn wire when the outer "skin" of both kinds of wires of similar sizes has been removed. Other tests show the greater elastic and torsional strength of the "Phono-Electric" wire.

Ohmer Fare Register Company, Dayton, Ohio, has issued in pamphlet form a guide to the electric railway systems in the West. The pamphlet is entitled, "Sunset Land by Trolley," and the preface says that the pamphlet has been compiled for the use and convenience of electric railway officials or their friends who are planning to visit the expositions this year at San Francisco and San Diego. The book contains fifty-two pages and is an electric railway Baedeker to the sights of electric railway interest, not only in the Pacific Coast states but also in Colorado. Each electric railway system is mentioned by name and there is a short description of it with an account of the principal points of interest which the visitor would like to see in each city. The pamphlet includes an index of the electric railway companies mentioned in the text, some forty-five in number, and a statement is made that all of these companies are users of Ohmer fare registers.

Robert W. Hunt & Company, Chicago, Ill., engineers, have issued a bulletin of standard specifications for steel rails in connection with their bureau of inspection which includes tests, consultation, and inspecton of all rails and structural materials. As stated in the bulletin, 3,374,475 tons of rails have been examined under their special inspection. "Special inspection" orders require experienced and competent inspectors to be located in each department of the mill at all times, while the orders are being filled. Thus there are inspectors night and day in the steel mill, in the blooming mill, in the rail mill and at the drop testing machine, in addition to the regular final rail inspectors. These inspectors record all important data pertaining to each heat, and by transmitting pertinent conditions to each other prevent the effect of careless workmanship by subjecting the work to special scrutiny prior to the acceptance of the rails. The circular contains specifications for carbon steel rails as adopted by the American Railway Association and the American Society for Testing Materials, manufacturers' standard specifications for open hearth and Bessemer steel rails and specifications of the Colorado Fuel & Iron Company for open-hearth steel rails.

NEW PUBLICATION

Catalog of Books on Railway Economics. By Bureau of Railway Economics. University of Chicago Press. 446 pages. Cloth.

This book is a record of the works relating to the economics of railway transportation which are cataloged in thirteen of the principal libraries of the country and in the collection of the bureau. The book is not a complete bibliography, for literature in periodicals, miscellaneous papers and ordinary state and federal documents is omitted. The main divisions of the index are according to general works on special topics, administration, construction and operation, traffic, railways of the various countries, and railway periodicals and proceedings. The topics of most interest to electric railway officials are those of such general application as taxes, valuation, government ownership, capitalization, regulation and the like. A few references are given to books on electrification.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLV NEW YORK, SATURDAY, APRIL 17, 1915 No. 16

WIDENING OF THE STOCK MARKET

Although in the last two weeks the bond market has continued to broaden and develop increasing strength, the tendency is just now overshadowed by the rapidly advancing activities and prices of the stock market. "War specialties," or the stocks of companies that have already benefited from the war, seem to be the controlling and leading factors in the market, and concentrated buying is being carried on in the stocks of large structural steel, railroad equipment and other similarly constructive enterprises. The chief cause for satisfaction, however, is not that certain stock issues have advanced in price with unusual rapidity, but that the whole undertone of the market appears to have strengthened to such a degree that a reversal of sentiment in the more speculative issues would probably be insufficient to create a serious general setback. Advices are to the effect that during the last few days the investing public has shown a greater interest in public utilities securities than for months, and that there are other indications that business is entering upon a period of recuperation. While mere expressions of optimism are still more numerous than acts based on optimism, and while we do not look for an unrestricted business rejuvenation in this country until the end of the European struggle is in sight and the mania for adverse business legislation has worn itself out, yet we believe that the turning point has been reached and that progress, while undoubtedly slow, may henceforth be confidently expected.

STANDARD SAFETY RULES

Now is the time for electric railways to have their "say" in regard to the code of safety rules which the United States bureau of standards has in preparation. To be sure the contents of the code are not yet generally known, but they will be very shortly, and there will be a general conference of all interests held in Washington early in July to approve the tentative draft for preliminary publication. The American Electric Railway Association has received due consideration in the conferences held so far and will be officially a participant in the Washington conference. It is urgent that the association delegates be prepared adequately to represent the views of their constituents. While it is true that the rules to be published early in the summer are to be considered preliminary, they will have great weight with public service commissions and other regulatory bodies. These semi-transient boards will, and should, hold in great respect the recommendations of a permanent scientific-industrial bureau like the bureau of standards, especially if the recommendations are backed by official representatives of many national organizations. Hence we urge active and intelligent co-operation. Intelligent criticism now will do more good than denunciation hereafter, and, as the bureau has gone out of its way to request suggestions, there should be no lack of them from the electric railways, which have assumed a place of leadership in the safety movement.

MAIL VERSUS EXPRESS PAY

Still the controversy regarding railway mail pay—or, as might be more fittingly said, still Postmaster-General Burleson—rages. This official now publicly accuses the carriers of being insincere in asserting that they are under-paid for carrying mail, because they receive for this service much more than they have long willingly accepted for carrying express. Such a statement is irrelevant. What the railways receive for express traffic has no limiting relation upon what they should receive for mail carriage. Even if Mr. Burleson does not know this as a matter of common sense and common law, as a government official he can hardly be complimented for his non-recognition of the recent United States Supreme Court decisions in the North Dakota and the West Virginia rate cases, in which it was held that each class of railroad traffic must bear its own direct costs and its proportionate share of the overhead expenses, and that carriers cannot be compelled to do a certain class of business at non-compensatory rates. These authoritative decisions show the irremediable weakness of Mr. Burleson's argument. It is worthy of notice, however, that his statement is as incorrect as it is irrelevant. The joint congressional committee on railroad mail pay which reported last August spent two years investigating this subject and concluded emphatically that it was "compelled to reject the (postal) department's attempt to show higher relative earnings from mail as reckless and misleading."

UNITED STATES DEPARTMENT OF TRANSPORTATION

Howard Elliott, president New York, New Haven & Hartford Railroad, last week before the Norwich Chamber of Commerce made a recommendation which should have the widest publicity. In short, it was to the effect that the transportation business, by means of a federal department and representation in the President's cabinet, should receive the same recognition that has heretofore been accorded to the financial, agricultural, industrial and labor interests. No one will deny that in importance, in volume and in effect upon national welfare, the transportation industry compares favorably with any of these other forms of activity. A department representing such an industry would serve as an accredited clearing house for all matters relating to the rights and privileges of common carriers. It would have a stabilizing effect upon the demands of the public and the commissions on the one hand and the policies and the acts of carriers on the other; in other words, it would be of inestimable worth in fostering better public relations from a point of vantage secured by governmental power and prestige. It would also be of service in helping to bring about a unification of state and national laws on the subject of transportation. It would enable the railways to have an advocate in the councils of the nation, as we presume the Secretary of Railroads, like the Secretary of Agriculture, the Secretary of the Navy and the Secretary of War, would direct his efforts toward improving the condition of his particular field. If so, the benefit of his services would be enormous, and while it would be confined directly to the interstate carriers, the intrastate electric railroads should receive indirectly a great deal of assistance through the influence of such a department on the public mind.

OBSOLESCENCE ON A LARGE SCALE

The changes now under way in the Seventy-fourth Street power house of the Interborough Rapid Transit Company in New York form an epitome of fifteen years' progress in electric power generating apparatus. The eight great engines installed during 1900 are now relegated to the scrap heap or to the job of occasional helper over extra high load peaks. Those still retained are like aged veterans who are given sinecures to enable them to keep their self-respect. These prime movers, when built, were the last word in reciprocating engine design. They were in good physical condition when retired. Those displaced were broken up because no one wanted them as engines. In the boiler house the tubes and settings were retained, to be sure, but only because they were adaptable to the new conditions of forced firing and superheat. The boilers are like the old jacknife with two new blades and a new handle. The ubiquitous turbine displaces not only the big engines on the main floor, but also, in smaller sizes, the motors which formerly drove one auxiliary or another. And as for the reciprocating pump, a few samples are preserved but only for a highly specialized duty. The secret of it all is speed; high speed of the turbine and the centrifugal pump, high velocity of air and fuel through the furnaces, rapid circulation of water in the boiler and high steam speed in the pipes. High velocity means light weight, small floor space, low cost, small radiation loss and all of the incidentals which go with these desiderata, without serious compensating disadvantages. The slow-moving power station is obsolescent because expensive to operate, the new apparatus being able to generate energy more cheaply even if required to earn interest on the difference between the first cost and scrap value of its predecessors.

SCHEDULE SPEED—A NEGLECTED FACTOR

It is significant that whenever an expert study of electric railway service is made in a large city, suggestions leading towards a more rapid movement of cars are almost invariably included. This is true of the traffic reports published in this paper during the past two years on Detroit, Fall River, Pittsburgh, Philadelphia, Providence and other places.

The increase in schedule speed thus sought is not obtained by increasing the maximum speed of the cars, a course to which there are a number of obvious objections. On the contrary, higher average speed is obtained by reducing the waste time of a run, and the result is beneficial not only to the public in more rapid transit but also to the company, as it means fewer platform men, fewer cars and fewer kilowatt-hours to perform the same service. The possibilities of this plan seem hardly to have been generally realized, but with the competition of the jitney, whose only claim for merit lies in its "non-stop" service, the question assumes possibly a new and an added importance.

Various methods are available for accomplishing this increase in schedule speed. They can logically be divided into two classes, i. e., (1) those designed to reduce the time lost in stops to receive and discharge passengers, and (2) those designed to reduce the delays not connected directly with the operation of the cars but caused by street congestion. The latter class includes methods of rerouting to reduce track crowding or to eliminate congested crossings, methods of dispatching cars across congested crossings, regulation of vehicular traffic, etc. It is not the intention here to consider particularly this latter class of delays, but rather the first class. To this, perhaps, less attention has been directed, although, on most railways, the time spent by a car outside of the congested district is usually very much greater than that spent within the congested district, hence the opportunity for time saving would seem to be considerable. That this is so is indicated by the recently published records of a thirty-four-minute city run in which the stops for passengers took twelve minutes and the free running time only twenty-two minutes, a result which may be more typical than is generally believed.

Delays to cars outside the congested district are divisible into two sections, namely, (1) the time lost by slowing down to make a stop and accelerating after a stop, and (2) the time taken by the passengers to board and leave the car. The first section is directly proportional to the number of stops that are made. The second section varies with the number of passengers who board or leave the car, in other words, with the total number of passengers per trip although the ratio is not absolutely proportional because the time of passenger interchange depends somewhat upon the number of passengers boarding or leaving at each stop, decreasing as the number of passengers increases. It is evident, then, that the problem can be attacked in two ways, by reducing the number of stops and by reducing the time of passenger interchange.

The skip-stop plan undoubtedly is the best known of the various methods which have been introduced for reducing the number of stops, and considerable stress is laid upon its advantages in the recently-published Detroit report, it being recommended for four of the main city lines. The estimated saving in Detroit is a reduction in the number of stops per mile from twelve to eight. This reduction is estimated to give an increase in the schedule speed of 10 per cent, notwithstanding the proposed use of trailers after the skip-stop has been inaugurated. Obviously this increase in schedule speed means that each unit will be 10 per cent more effective and that its capacity for transporting passengers will be increased by that amount. As evidence of the effectiveness of the plan the Detroit report cites the practice on the Superior Avenue line in Cleveland, where, in spite of the introduction of two-car units, the number of stops was reduced from fifteen to nine per mile. Forty per cent more passengers are now being carried, with the capacity of the line still well under the limit, and, in Detroit it is estimated that equally good results will be obtained. Still another suggestion for reducing the number of stops in the Detroit report is the establishment of a certain number of non-stop cars through the factory loading districts at certain times of the day to take care of the general travel at points beyond the factories.

The possibilities thus intimated in the Detroit report and shown in the Cleveland practice are too great to be ignored. The number of cities where the skip-stop has been introduced can be counted on the fingers of two hands, and possibly on the fingers of one hand, but any method which means an increase of 50 per cent in the carrying capacity of existing tracks, as well as better transit facilities and lower operating expenses, is certainly worth investigation.

But the possibilities of increasing the schedule speed without increasing the maximum speed for sections of the run outside of the congested district are not confined entirely to reducing the number of stops. The rate of passenger interchange, or the second division mentioned above, also has appreciable effects. In this there are three factors. The first is the number of passengers boarding or alighting. As the rate per passenger on a single car decreases slightly with the number of passengers per stop, a reduction in the number of stops will add a further increment to the schedule speed by increasing the average number of passengers boarding or leaving the car per stop. The second factor in the schedule speed is the habit of the people in different communities, as it has been found that the rate of passenger interchange varies in different cities. Hence the schedule speed will be increased if the railway companies can induce the passengers to move more quickly. The third factor relates to the arrangements at the stopping points and on the car for receiving and discharging passengers rapidly. This is affected by the size, number and location of exits and entrances, by the extent of the reservoir capacity for boarding passengers on the car and for waiting passengers outside of the car, by whether stopping points are distinctly marked, by the use of extra front-end collectors at crowded terminals, etc.

These methods of increasing the carrying capacity of a crowded electric railway line differ radically from the usual popular remedy, which is to add more cars, a plan which on most city lines which are near their capacity would be a detriment rather than an advantage. In fact, the Detroit report already mentioned brings out this point very clearly by its apt statement that "increasing the number of cars to reduce crowding only tends to make conditions worse unless running time, stops and crossing delays can be reduced."

PUBLICATION OF COST FIGURES

When an engineer is requested to point out wherein the paper of his profession can be improved, he is most likely to say: "You ought to publish more costs." Whereupon the editor smiles a weary smile, not of disdain but of ineffable sadness. It is a fact that nothing is more keenly sought by technical papers than costs first, costs second and costs last. But few engineers are willing to make public this information in detail, and still fewer executives will sanction such a course by a broad-minded subordinate.

A stock objection raised by the operator, when costs are requested, is that such figures would be of no use as a guide to others. And then our old bugaboo "local conditions" is trotted forth with all the impressiveness of the stuffed lion in a Christmas pantomime. Of course, it is not pretended that figures are everything. In fact, figures offer only a starting point; but a starting point we must have.

The objection to giving out costs has lost much of its force in view of the detailed accounting data that must now be filed with public utility commissions. Many of these data are available to anyone who cares to copy them; but unless the corporation is willing to aid in their interpretation, the most misleading conclusions may be drawn, for in the broadest sense the word "costs" must be understood to include an explanation of accounting practices and engineering standards. To illustrate: One company includes the service cars in its "maintenance of cars" account; a second does not; and a third charges the car equipment department for the use of service cars at a car-mile rate, which includes a charge for energy and other items usually ignored. As these diverse practices do not appear in the reports as published, the most efficient operator might well seem to be the least efficient.

Apropos of misinterpreted figures, a certain engineer protested quite vehemently at a published comparison with his costs as taken from a government publication. Yet a few months before the same engineer refused to permit the publication of a descriptive article, with costs, that would have placed the practices of his company in a more desirable light.

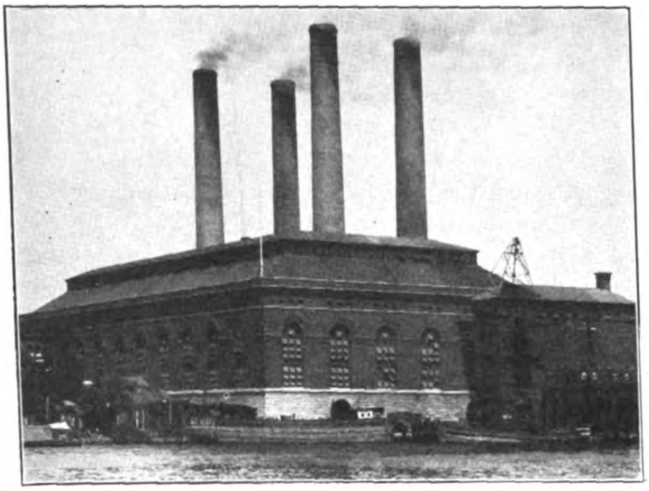
In short, engineers and executives should give up the idea that they lay themselves open to attack when they permit costs to be published. The unmistakable trend of the times is toward publicity; and as with liberty, the evils of publicity are curable by still more publicity.

Interborough Power Plant Enlargement

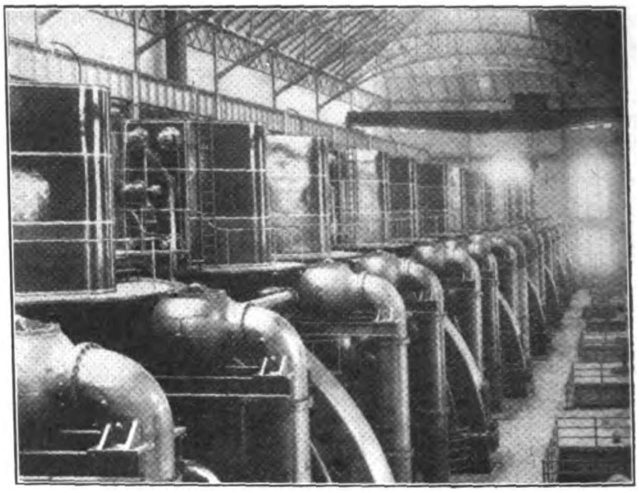
One-Half of the Seventy-Fourth Street Power Station, Which Supplies Power to the Elevated Railways, Is Being Remodeled, Increasing Its Capacity by 300 Per Cent on the Same Floor Space

On account of the prospective increase in the demand upon the power-generating plants of the Interborough Rapid Transit Company in New York, due to the third-tracking of the elevated lines, the Seventy-fourth Street station is being remodeled. The changes are now approaching completion, two out of three new 30,000-kw turbo-generator units being in operation, and carrying all of the load except during the peaks when the remaining 7500-kw turbine and four reciprocating engines are sometimes called upon for assistance. One unit, shown in Fig. 3, is finished complete, and the second is undergoing an exhaustive series of tests. The foundations for the third unit are under construction.

The remodeling, which is being done with a view to the ultimate installation of a total of eight 30,000-kw units, is being carried on within the original building. For the present it involves principally the substitution of three turbine generators for four engine generators (see Figs. 4 and 5); the making over of one-half of the boiler plant opposite the turbines by replacing Roney stokers with Taylor underfeed stokers, adding superheaters and removing the economizers; the partial replacement of motor-driven triplex, with turbine-driven centrifugal boiler-feed pumps, and the complete rearrangement of the electrical switching system with the addition of current-limiting reactors.



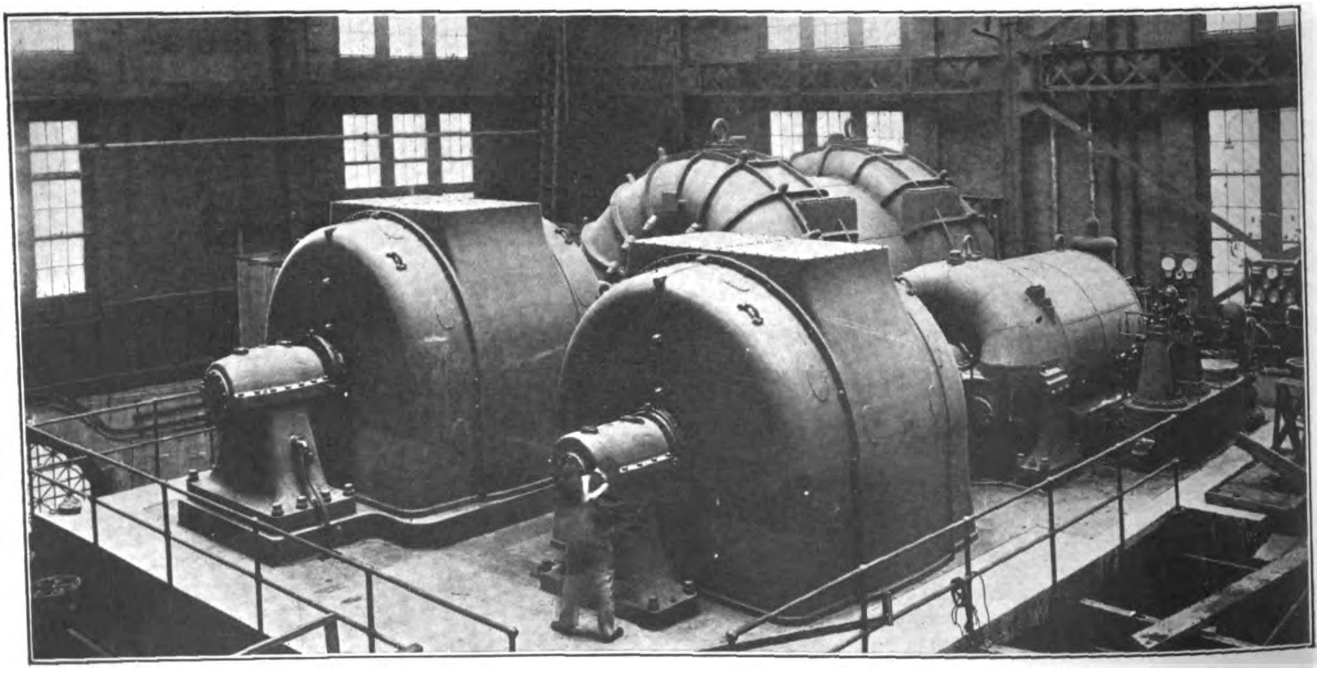
INTERBOROUGH POWER PLANT—FIG. 1—VIEW OF SEVENTY-FOURTH STREET STATION



INTERBOROUGH POWER PLANT—FIG. 2—INTERIOR BEFORE ALTERATIONS

The Power Plant of 1901

The old power plant,* built during 1901, was the model steam power plant of that time. Its appearance



INTERBOROUGH POWER PLANT—FIG. 3—NEW TURBINE UNIT is shown in Fig. 2. It contained eight Reynolds, Allis-Chalmers double, horizontal-vertical, cross-compound engines of 12,000-hp actual or 8000-hp normal rating each, driving 11,000-volt, revolving-field Westinghouse alternators, the largest built to 1901. Each engine unit was essentially two separate compound engines at the ends of the shaft, each having a 44-in. high-pressure cylinder and an 88-in. low-pressure cylinder and of 60-in. stroke, the speed being 75 r.p.m. By the 135-deg. setting of the cranks eight impulses per revolution were obtained.

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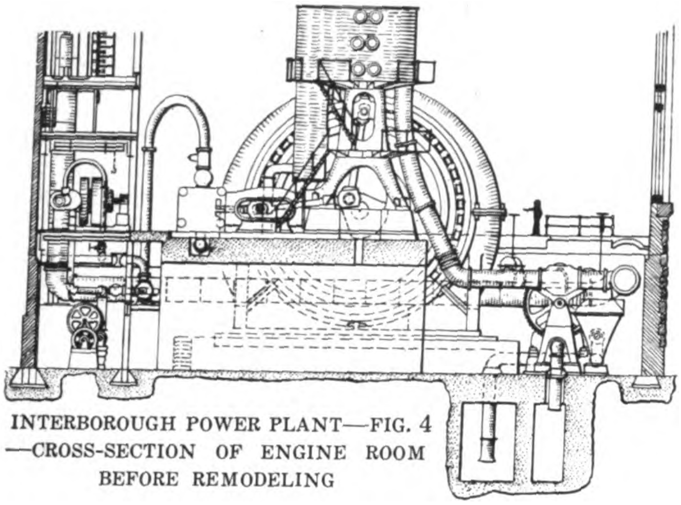
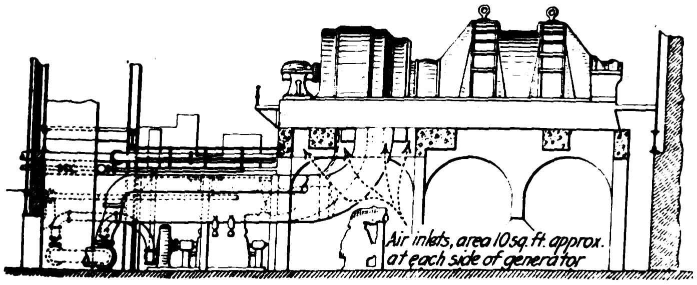
*This plant was fully described in the issue of the Street Railway Journal for Jan. 5, 1901.


INTERBOROUGH POWER PLANT—FIG. 4 —CROSS-SECTION OF ENGINE ROOM BEFORE REMODELING

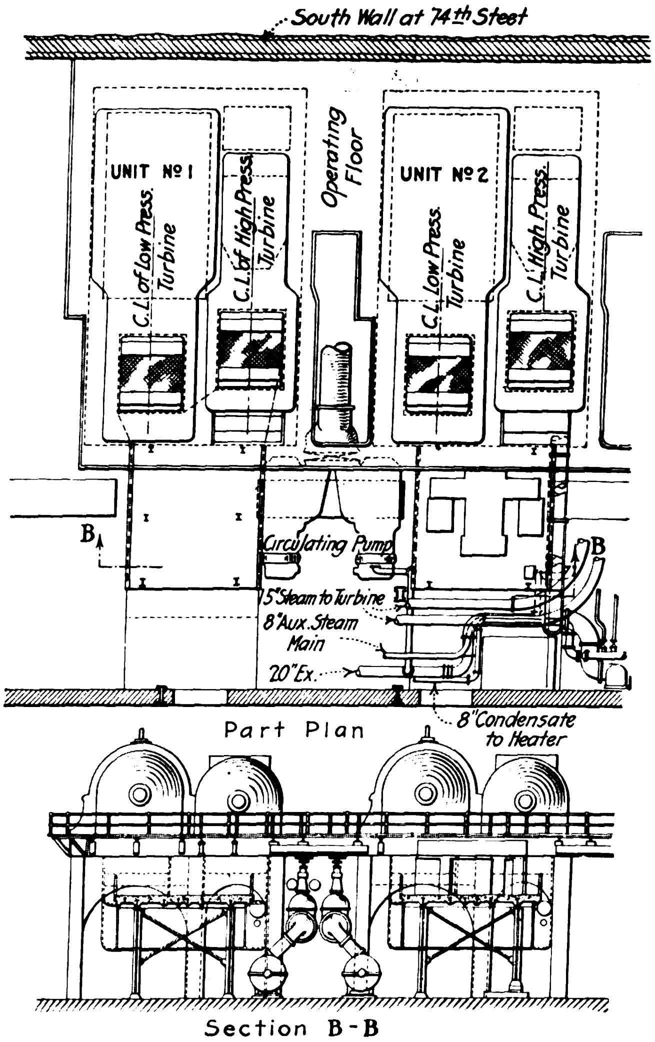
The revolving weight on the bearings of each of the engines was 439,000 lb., and an allowance of 70,000 lb. more was made to provide for magnetic pull between field magnet and armature. The shaft itself weighed 63,000 lb. On account of the great mass of the revolving field magnet it was possible to dispense with the flywheel, a notable advance in slow-speed generating-unit design. To these engines was later added a 7500-kw Westinghouse turbine unit.

The engines exhausted into Worthington jet condensers with triplex motor-driven circulating pumps. These were changed, about 1903, to the barometric type.

The boiler house consisted of a basement, two boiler floors and a row of coal bunkers, the height from the basement to the top of the monitor being 128 ft. The basement was divided into three longitudinal compartments for the purpose of protecting the pumps from the dust produced by the ash-handling machinery. On each boiler floor were thirty-two B. & W. boilers, with Roney stokers, each rated at 520 nominal horse-power and containing 5200 sq. ft. of heating surface. These were arranged in batteries of two, eight boilers to an engine, the whole forming a generating unit. The boiler house was provided with four Custodis brick stacks of 17-ft. flue diameter at the top and 18 ft. at the bottom, 278 ft. high above the basement floor, the tallest stacks of the kind constructed in this country to that time. A Green economizer was provided for each four boilers, as it was deemed necessary to have these to heat the feed water, all of the auxiliaries being electrically driven. Each unit was served by an electrically-driven Goulds triplex boiler feed pump. Above the boiler floors was a row of three coal bunkers, separated by 35-ft. spaces for fire protection, having a total capacity of 7500 tons, a ten-day supply.


Air inlets, area 10 sq. ft. approx. at each side of generator
INTERBOROUGH POWER PLANT—FIG. 5—CROSS-SECTION OF ENGINE ROOM AFTER REMODELING

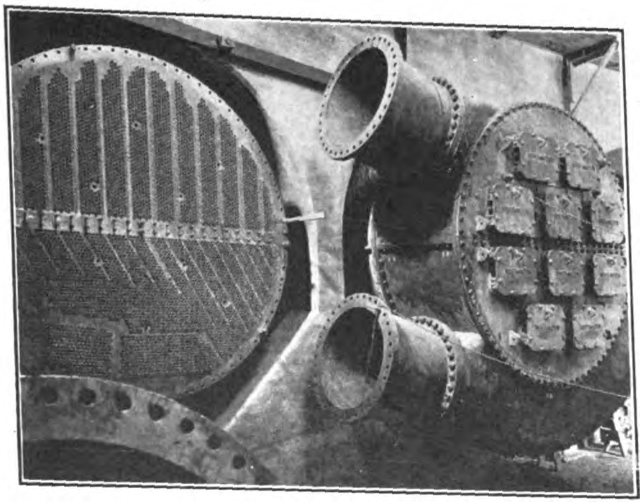
The building housing this plant, seen in Fig. 1, extends from Seventy-fourth to Seventy-fifth Street along the East River, with a width of 204 ft. 4 in. and an average length of 404 ft. It is divided by a longitudinal wall into engine and boiler houses, respectively 93 ft. 6 in. and 104 ft. 2 in. wide. The basements of these are on the same level, 4 ft. 6 in. above high water and 2 ft. 6 in. below Exterior Street, which lies between the plant and the river. Extending across the west end of the building is a vault 18 ft. wide divided into two parts, one for oil storage and the other for switch control storage batteries. The roof of this vault serves as a roadway from street to street on the level of the lower boiler-room floor.



INTERBOROUGH POWER PLANT—FIG. 6—GENERAL LAYOUT OF TURBINE UNIT

The coal and ash-handling plant consists of two towers on the river bank for unloading coal and storing ashes, connected by bucket and belt conveyors with the power plant, distributing and collecting in the manner now standard in such plants. A feature of the tower design was the provision for hoisting coal from barges with a 1½-ton shovel just high enough to give the fall necessary for passing it through the crushers and weighing hoppers.

In the engine house were the basement, 21 ft. 6 in.



INTERBOROUGH POWER PLANT—FIG. 7—CONDENSER AND SECTIONS OF PIPING

high, the operating floor, 107 ft. to the roof, and on one side three switchboard galleries, under the lowermost of which the engine-driven exciter sets were placed. A 50-ton electric crane traversed the length of this house.

The important features of the switching apparatus were the layout of group switches and the use of General Electric motor-operated switches. There were two complete sets of busbars connected by bus junction switches to permit of the operation of the alternators in either two or four batteries. The feeders from one substation formed one group controlled by a group switch in addition to the individual feeder switches. On the benchboard dummy busbars were placed to give the operator a graphic representation of the connections.

THE POWER PLANT OF 1915

The changes listed in the second paragraph, together with incidental changes, will be discussed in the order therein followed. The turbines, fully lagged, will appear as shown in Figs. 3 and 5. They have been rather fully described in the technical press so that only a few salient features need be mentioned. Each cross-compound unit consists of two turbines, a 1500-r.p.m. single-flow reaction turbine, and a 750-r.p.m. double-flow reaction turbine connected as a compound machine with a large receiver between elements. This novel arrangement was chosen to simplify design problems, particularly those relating to temperature range, blade speeds and steam congestion. At the same time the reliability of comparatively small units was secured. The efficiency guaranteed is higher than any heretofore obtained. Taking the amount of heat available in the steam between the conditions of admission and exhaust as a basis, the engines will deliver in electrical form 75.75 per cent of this energy. The total weight of the complete unit is 1,500,000 lb.

The turbine rests upon a foundation consisting of a steel frame encased in concrete, leaving most of the space below available for condensers, receiver and pumps.

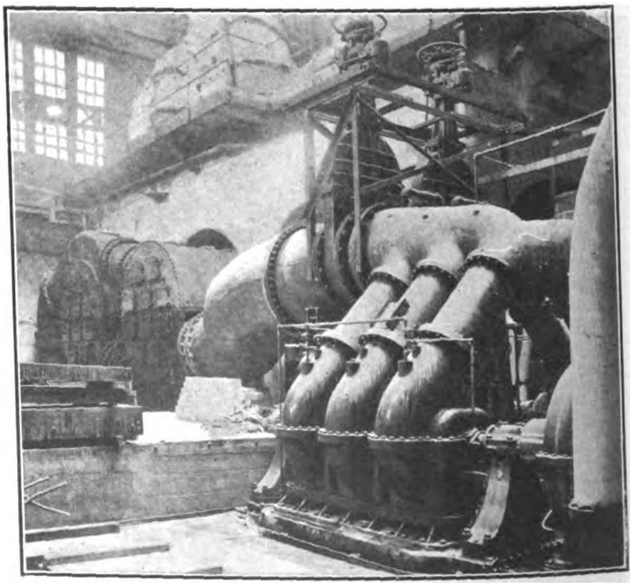
The Worthington surface condenser, of 50,000 sq. ft. cooling surface for each unit, is of the twin-shell type, of simple construction and practically self-contained. The tube arrangement is as shown in Fig. 7, passages being provided by "gashing" to give the freest possible access of the steam to the tubes. The condensers are hung directly from the turbine bedplates, a novel arrangement but one conducive to the elimination of stresses due to temperature changes. The weight of the condenser is, however, not carried by the turbine foundation, but upon a number of spring jacks, adjusted to properly share the load. The receiver is a vertical cylinder, of 7 ft. 9 in. inside diameter and 21 ft. long inside, placed symmetrically with respect to the condenser shells as shown in an accompanying plan. This is as large a receiver as could be accommodated in the available space.

Below each condenser shell and forming an integral part of it is a sump 4 ft. in diameter and about 4 ft. high, into which the condensate drains. This is designated as a "hot well" on the drawing, but there is no hot well in the new plant, using the term in its usually-accepted sense, that function being performed by the feed-water heater.

The piping to and from the condenser is of unusual construction, designed to minimize the number of bends. As shown in Figs. 7 and 9, the water enters the condenser at the bottom through a 60-in. pipe, which dips under the nearer shell to reach the farther one. A baffle inside deflects a share of the circulating water into its proper channel. A similar outlet pipe above takes care of the discharge flow. This is the simplest possible piping layout for a twin shell condenser. Short rubber sleeve expansion joints are inserted in the intake and discharge pipes near each shell. These joints consist of tubes of ½-in., 5-ply-insertion rubber, 12 in. long and of 42-in. and 60-in. inside diameter, each clamped between an outer flange and an inner ring.

Circulating water for each pair of condensers is supplied, as shown in several illustrations, through a pair of tri-rotor, centrifugal pumps having a combined capacity of 75,000 gal. per minute. These discharge through separate motor-operated gate valves, the discharge pipes uniting beyond the valves. The full capacity of the pumps will be required in summer when the circulating water temperature is high, but one pump will be sufficient in winter.

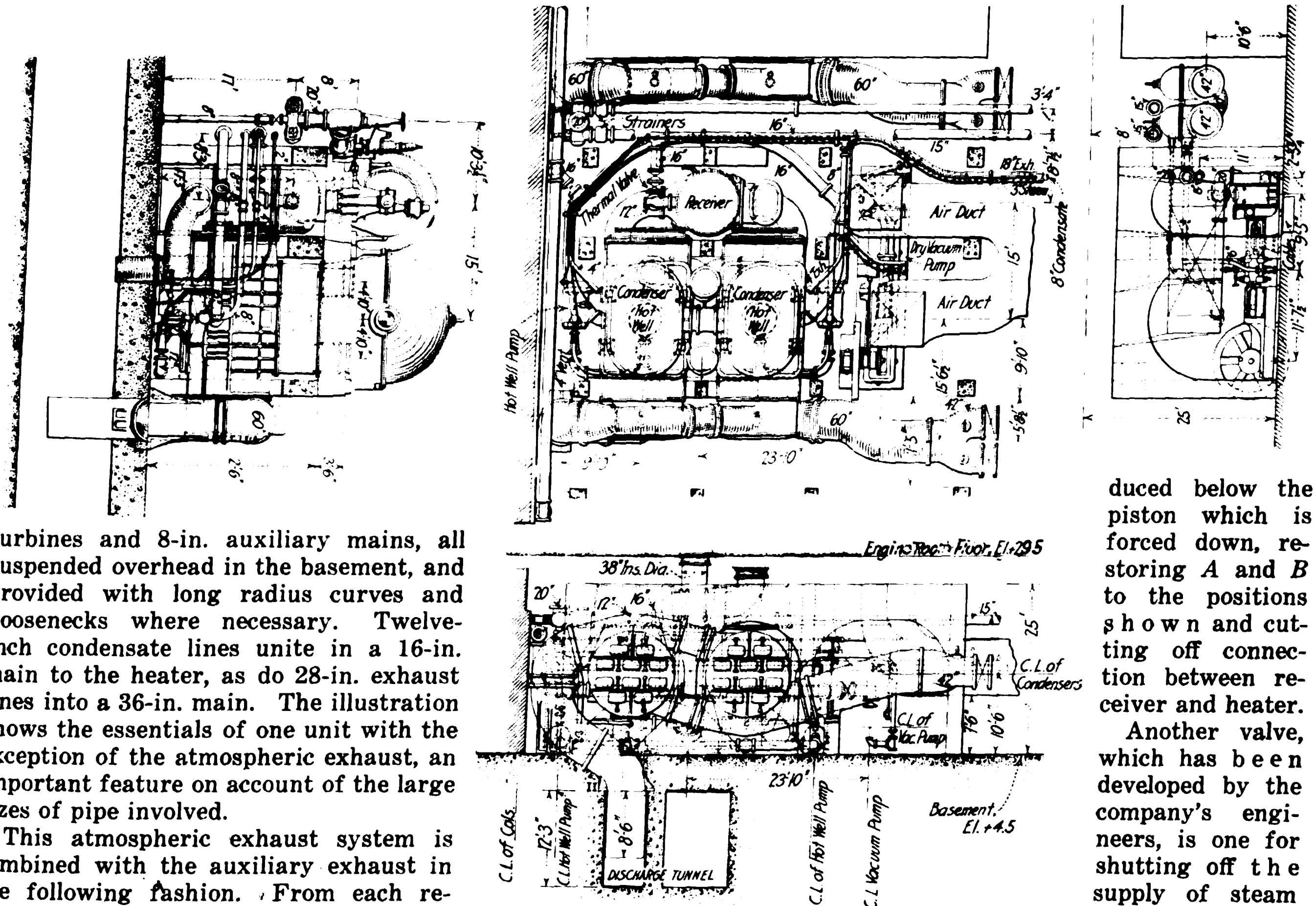
The pumps are driven by steam turbines rated at 240 hp each. The pumps draw from a new tunnel 12 ft. 6 in. x 12 ft. 6 in. in section. They discharge into two tunnels, one 8 ft. 6 in. x 12 ft. 3 in., and one, 5 ft. x 12 ft. 3 in., which is the combination of the original intake and discharge tunnels. These will supply condensing water for eight units. The mouth of the intake tunnel is about 150 ft. upstream from the nearer discharge tunnel. New motor-driven revolving screens of the type shown in one of the illustrations have been installed near the river end of the intake



INTERBOROUGH POWER PLANT—FIG. 8—TRI-ROTOR CIRCULATING PUMPS tunnel, the driving motor being housed in a small building at the right, not shown. The screens are rotated for cleaning purposes daily. The location of the condensers with respect to the river level makes it possible to circulate the condensing water readily, the power required being only that necessary to overcome a small amount of friction, principally the friction head of the condenser and piping.

The condensate pumps for each unit are of the centrifugal type, turbine driven and of 800-gal. per minute capacity each. One pump is sufficient, the second being a reserve. One reciprocating dry vacuum pump is provided for each unit, with a capacity for two. The vacuum pumps are cross-connected between units.

The general turbine-room piping scheme is shown in Fig. 10. It comprises duplicate 15-in. mains for the turbines and 8-in. auxiliary mains, all suspended overhead in the basement, and provided with long radius curves and goosenecks where necessary. Twelve-inch condensate lines unite in a 16-in. main to the heater, as do 28-in. exhaust lines into a 36-in. main. The illustration shows the essentials of one unit with the exception of the atmospheric exhaust, an important feature on account of the large sizes of pipe involved.



INTERBOROUGH POWER PLANT—FIG. 9—PLAN AND ELEVATIONS OF CONDENSER

This atmospheric exhaust system is combined with the auxiliary exhaust in the following fashion. From each receiver is a 30-in. line into which the auxiliary exhaust lines are connected. An atmospheric relief valve is in each line near the receiver. This is a standard relief valve weighted to open on about 28 lb. per square inch absolute pressure by means of a hydraulic piston and standpipe accumulator. The three lines lead into a tapered header, from which two 30-in. risers, sealed with back pressure valves, extend above the roof. From the header a 42-in. pipe leads to the feed-water heater. This is also protected with a riser and valve.

Between the receiver and the feed-water heater is a "thermal" or "heat-balance" valve for equalizing the distribution of heat in the system. This valve is shown in cross-section in Fig. 11. Its function is to bleed steam from the receiver into the heater when there is a deficiency of supply to the latter from the auxiliaries, or vice versa. At about 27,000 kw the receiver pressure reaches atmospheric pressure, continuing to rise until at 32,000 kw it is about 3-lb. gage.

In the figure the left-hand opening in the chamber leads to the heater, the right-hand one to the receiver. There are two piston valves, *A* and *B*. When heater pressure is above atmospheric, the latter being applied to the upper side through a pipe connection, *A* rises and bleeds steam through port *C* to the receiver. Whenever the receiver pressure is higher than that of the heater, *B* rises, admitting steam through port *D* to the heater. A dashpot at the top of the upper valve chamber prevents sudden acceleration of *A*, and through *A* provides a cushion for *B*. In action the valves do not lift very high off their seats.

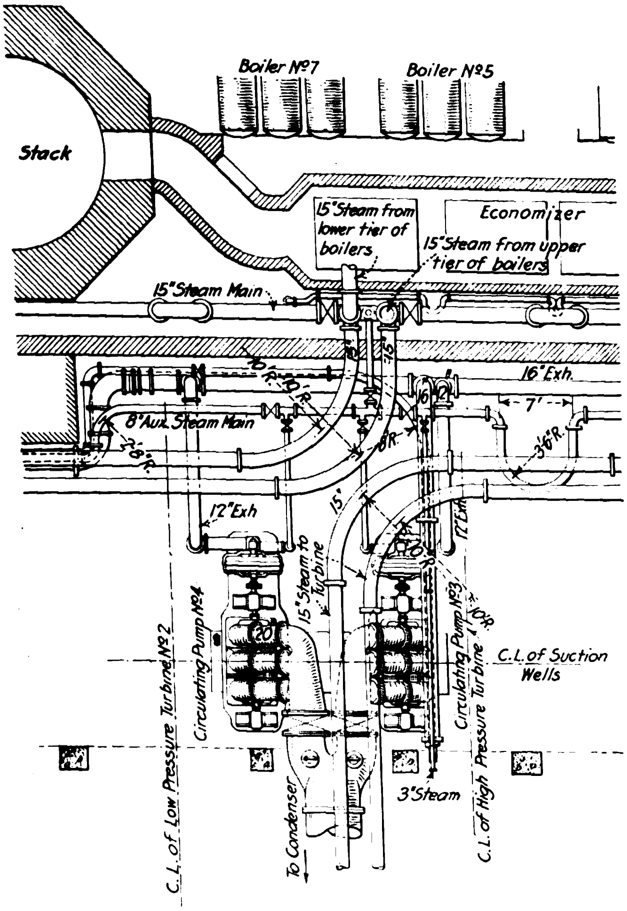
Above the valve is an auxiliary cylinder *E* with live steam above its piston and with pressure controlled by the turbine automatic stop governor below. The piston is loosely packed and leaky and ordinarily floats. When the automatic stop governor operates, pressure is reduced below the piston which is forced down, restoring *A* and *B* to the positions shown and cutting off connection between receiver and heater.

Another valve, which has been developed by the company's engineers, is one for shutting off the supply of steam in case the vacuum falls below a predetermined value. It consists of a float, the level of which is controlled by the height of a mercury column connected to the condenser. The valve is adjusted to trip the pilot valve of the actuating piston on the main throttle when the vacuum falls to, say, 15 in.

In the boiler house the original boilers are being retained, but one-half are being rebuilt to the extent of adding standard B. & W. superheaters to give 200 deg. of superheat when the boilers are delivering three times their rated output. The Taylor underfeed stokers which are being installed under one-half of the boilers are standard, but on four of the boilers air tuyeres have been installed along the side walls, directing jets over the fires and protecting the side walls.

One Hoppes open-type feed-water heater 9 ft. in diameter and 21 ft. long. with a capacity of 1,600,000 lb. per hour has been added to do the work of the displaced economizers, there being now a good supply of steam from the turbine-driven auxiliaries. It contains 240 pans, each 4 ft. long, having a total area of 3400 sq. ft. In this heater the surplus heat is being absorbed to such an extent that an occasional gentle puff of steam from the relief valve on the heater indicates how little heat is wasted in this part of the system.

As the remodeled boiler plant provides only superheated steam, provision had to be made for the auxiliary supply of saturated steam for the reciprocating engines. In the line connecting the old and new boiler plants is connected a receiver from one of the old engines. This is placed in a vertical position and the superheated steam is led in at the top, passing downward nearly to the bottom through a 15-in. tube. Near the top water is sprayed into the steam through a spraying nozzle, the surplus collecting in the bottom from whence it is returned to the water system. The wet steam rises in the space between the tube and the casing, drying as it rises, and saturated steam is taken off near the top. This device is known as an "attemperator."

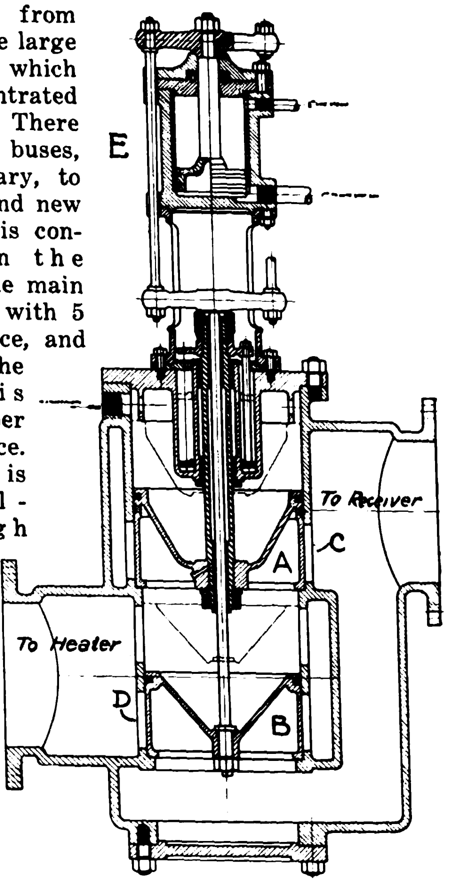

Stack
Boiler No. 7
Boiler No. 5
15" Steam from lower tier of boilers
Economizer
15" Steam from upper tier of boilers
15" Steam Main
10' R.
15'
16" Exh.
8" Aux. Steam Main
7'
7'-8" R.
8' R.
3'-6" R.
12" Exh
15'
12" Exh
15" Steam to Turbine
10' R.
10' R.
16
12
20
Circulating Pump No. 4
Circulating Pump No. 3
C.L. of Suction Wells
C.L. of Low Pressure Turbine No. 2
C.L. of High Pressure Turbine 1
To Condenser
3" Steam

INTERBOROUGH POWER PLANT—FIG. 10—PIPING FOR ONE UNIT

In the boiler-room basement much space has been saved by the removal of four triplex pumps, accommodating three turbine-driven centrifugal pumps sufficient in capacity for the entire plant, and the stoker fans and turbines. For each pair of boilers there is one turbine driving two stoker fans direct and the stokers also through helical reduction gears from the blower shafts. In the ashpit section of the basement, ashpits of expanded metal plastered with cement have been recently put in.

The electrical distribution of the plant has been entirely remodeled with a view to providing adequately large switches, feeders, etc., and to protecting the underground cables from damage due to the large amounts of power which will now be concentrated on short-circuit. There are two sets of buses, main and auxiliary, to which each old and new generating unit is connected. Between the generator and the main bus is a reactor with 5 per cent reactance, and between it and the auxiliary bus is one with 2 per cent reactance. The main bus is sectionalized through oil switches, groups of feeders being taken off from each section.

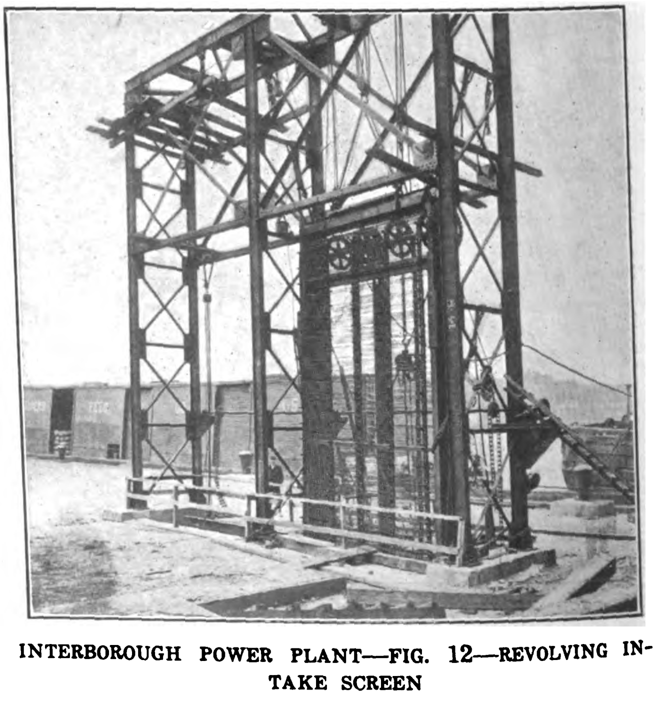
The reactance coils are placed on the exciter gallery conveniently located with respect to the generators. The 5 per cent coil is about 4 ft. 6 in. in diameter and 8 ft. 6 in. long, and the 2 per cent coil is about 4 ft. 6 in. in diameter by 3 ft. 6 in. long.


E
To Receiver
C
A
To Heater
D
B

INTERBOROUGH POWER PLANT—FIG. 11—HEAT-BALANCE VALVE

The oil switches are of standard General Electric manufacture, type H6, with 10-in. pots.

The generators have been designed for their rated capacity, 30,000 kw, with 55 deg. Cent. temperature rise. They are ventilated by means of fans which form part of the revolving field. The air is taken in through the openings below the bedplates, shown in Fig. 5, and is



INTERBOROUGH POWER PLANT—FIG. 12—REVOLVING INTAKE SCREEN discharged through ducts to the boiler house, eventually reaching the stoker fans. The generators have about 8 per cent reactance, and the armature windings are braced with extraordinary firmness to withstand the mechanical effects of short-circuits.

The changes described in this article were designed and carried out by the engineers of the Interborough Rapid Transit Company, under the direction of Henry G. Stott, superintendent of motive power. Those in responsible detail charge were Reginald J. S. Pigott, mechanical construction engineer, and Gaylord C. Hall, electrical engineer.

Safety First for You and Me

An Account of Chicago's Safety Work, Particularly the Use of Moving Pictures in Parks and Schools—Accidents to Children Have Been Reduced 80 Per Cent

BY H. L. BROWNELL, SAFETY INSPECTOR CHICAGO SURFACE LINES

In these "safety first" days where we see "safety first" banks, "safety first" politicians, etc., we must not lose sight of the fact that "safety first" means simply "We are our brothers' keepers." During more than twenty-five years of traction work I never could become "hardened" to the necessity of accidents, even in a large city like Chicago. The idea was always with me there must be some way to prevent them. About three years ago the "way to prevent" presented itself. I was relieved of all my other duties and was requested to investigate the safety work of other companies and start a safety movement with our company. I thus became acquainted with such noted safety men as A. H. Young, supervisor of labor and safety, South Works, Illinois Steel Company, South Chicago, and R. C. Richard, of the Chicago & Northwestern Railroad, the "father" of the safety movement on railroads. These men gave me my first ideas on practical safety work, yet I found that none had done anything directly with the public, although their work with the employees naturally affected the public, although indirectly.

I conceived the idea of a practical education of the public with moving picture films and was allowed to try it, after much protest from the company as to the cost and practicability of educating 3,000,000 people. Nearly six months elapsed before I could secure the moving picture films and slides I wanted to start the work. I began first in the city parks and then went to the schools. I have given 600 moving picture lectures during the past eighteen months, principally in Chicago, yet I have spent week-ends in some twenty other cities in ten different states to start safety campaigns elsewhere. I have always been glad to give my time to work of this kind.

Three trips stand clearly in my mind, especially one made to Youngstown, Ohio, about a year ago to start the campaign. Youngstown had a local council of National Council Safety but had not been able to start the work actively. Dudley Kennedy, of the Youngstown Sheet Steel & Tube Company, reported to me at the time of our safety congress in Chicago in November, 1914, that the work of the hospital and undertaker had since been cut down 50 per cent. A second trip was that to St. Louis, Mo., last summer. I learned that the municipal moving pictures in the parks were drawing larger crowds than the near-by band concerts. My offer to give two lectures on a Saturday and Sunday night was accepted. I used a megaphone during the lecture and showed the films and slides to about 20,000 persons during the two nights. The third excursion was a recent week-end trip to Dayton, Ohio, where I lectured to 10,000 children and three large audiences of adults. I had one audience of 3000 children in Memorial Hall. I also gave one lecture in National Cash Register Hall.

During the summer of 1914, the second season of my lectures in the Chicago Parks, I had an audience of 20,000 one night and distributed 20,000 "safety first" pamphlets. On Christmas eve, 1913, I showed the safety films to 100,000 persons in Grant Park, Chicago, in connection with other films secured for the Christmas Tree Festival Association.

Most of my work, however, has been with the children, who have responded so quickly that fatal accidents to Chicago children have been reduced 80 per cent. I have lectured and shown my films to about 300,000 of the children in this city. During one week recently I lectured at six public schools and eleven parochial schools.

I also supplied free to the board of education 14,000 cards with two subjects; one card is 14 in. x 18 in., the other 14 in. x 22 in., to be placed in each of the 7000 school rooms in Chicago. My safety pamphlet "Safety Instructions for School Children," was first issued a year ago free to the teachers for use as a text-book. Later this pamphlet was issued to the 400,000 children at the time the speakers of the Public Safety Commission visited the schools. I had charge of that work as chairman of Safety Day in Chicago Public Schools. I reissued an enlarged pamphlet in the autumn of 1914, supplying free 10,000 copies to the board of education for the teachers. This pamphlet is now called "Safety Instructions for School Children and Grown-Ups." The ten golden rules of safety in this pamphlet have commanded much attention from the newspapers, and one of the great Chicago dailies has reprinted them.

During the month of July, 1912, there were fourteen fatalities on the line of the Chicago Railways. This was before the public safety work was begun, but in July, 1913, after starting that work no fatal accidents occurred, although we carried 10 per cent more passengers and the streets were more congested.

In February, 1914, with the consolidation of all the street railways under the Chicago Surface Lines, carrying more than 3,000,000 passengers daily, I changed my working territory for several months from the north and west sides to the south side of the city. During the month of June, 1913, there had been eight fatalities in that section of the city, but in June, 1914, there were none. The coroner of Cook County, in which Chicago is located, was so interested in our record that he called together the Public Safety Commission of Chicago and Cook County, the first of its kind in this country. The work of this commission was immediately felt. I helped to organize it as chairman of committees on organization. I am also chairman of the safety committee of the Illinois Manufacturer's Association and chairman of the publicity committee of Chicago local council No. 3 of National Council Safety. At our annual safety congress, last held in Chicago in November, 1914, a thousand delegates were in attendance. Miss Ida M. Tarbell, who is writing safety articles in the *American Magazine*, was one of the noted speakers at this congress. At a round table meeting the delegates voted to stop all drinking of liquor by their employees during service hours, well knowing the relation of liquor drinking to accidents.

My second lecture on safety before the Illinois Manufacturing Association related to loss of time by factory employees on account of injuries received outside of the factory. My first lecture was on safety in the street.

The coroner's records issued under date of Jan. 20, 1915, show a reduction of 464 deaths in the year 1914. Undoubtedly this was due in large part to the safety work undertaken.

National Electrical Safety Rules

United States Bureau of Standards Is Completing the Preliminary Edition of a Set of Rules Somewhat Along the Lines of the Code of the National Fire Protection Association—The Railway Association Is Participating in Its Preparation

Dr. E. B. Rosa, chief physicist of the bureau of standards, has prepared a digest and analysis of the contents of the forthcoming National Electrical Safety Code. As electric railways are vitally concerned in this and have taken a leading part in the safety movement an extended abstract of the analysis is given herewith.

The proposed code consists of four principal parts, preceded by a group of definitions and followed by two appendices. The rules on stations are divided into nine sections, and ten numbers are reserved for each section, although there are fewer than ten rules in most sections. For convenience of the different administrative authorities they had to be dealt with separately. Each of the four parts is as nearly complete in itself as possible.

DISTINCTION BETWEEN STATION AND UTILIZATION EQUIPMENT

In a paragraph introductory to the rules for stations it is stated that the rules apply to the electrical supply equipments of indoor and outdoor stations and substations, and also to similar equipment, including generators, motors, storage batteries, transformers and lightning arresters when in factories, mercantile establishments or elsewhere, provided they are in separate rooms or inclosures, under the control of properly qualified persons, when such rooms or inclosures are inaccessible to others. Thus, the room or rooms in which the transformers, high-tension switches and distributing switchboard are installed in a factory are regarded as a substation, if under the charge of a qualified person, and subject to the rules for stations. On the other hand, the electrical wiring, motors, switches and other equipment distributed about a factory or other building where employees generally have more or less access to them are regarded as utilization equipment.

The rules for utilization equipment have been prepared for circuits and apparatus at not over 750 volts. Anything inclosed in rooms not accessible to employees generally will come under the rules for stations. Anything of higher voltage than 750 not so inclosed, and remaining accessible to others than properly qualified electrical operators, must, in addition to complying with the rules for stations and such of the utilization rules as apply, have all live parts incased in permanently grounded metal conduit or cases or otherwise guarded to prevent access or unsafe approach by any person to the live parts.

OVERHEAD LINES

The most difficult section of the rules to prepare has been that on overhead lines. There is so much difference of opinion and of practice, and so much of the printed material has been proved not to be suitable for use in these safety rules, that it was necessary to study the subject thoroughly and start afresh on many points. The rules for crossings of energy-transmission and signal lines over railways and other transmission lines, for conflicting lines, for clearances between conductors on the same lines, for climbing space, attachments to poles, etc., have been studied and discussed in conferences very thoroughly and while they are not as yet in all respects satisfactory, they have met general approval from many very competent engineers who have examined them.

No restriction is placed on the voltages that may be carried on overhead wires, either in the country or in cities, but higher grades of construction and greater precautions are specified for high voltage wires. Probably the greater number of accidents from 2300 volts on the streets is partly due to the fact that the line construction concerned is inferior to that usually provided for 6600 volts or 13,000 volts.

The danger from fallen wires due to breaking of the wires or failure of the poles makes it very necessary to require something definite respecting the strength of construction of overhead lines in cities and congested communities, apart from the requirements made for crossings and conflicting lines. But the requirements

SECTIONS OF THE FOUR PARTS OF THE PROPOSED NATIONAL ELECTRICAL SAFETY CODE

PART 1. STATIONS AND SUBSTATIONS (SIXTY-FIVE RULES)

Nos. of Sections		Nos. of Rules
10	Protective Arrangements of Stations	100-105
11	Protective Arrangement of Equipment	110-117
12	Rotating Equipment	120-125
13	Storage Batteries	130-136
14	Transformers, Reactances, Induction Regulators, Balance Coils, etc.	140-144
15	Conductors	150-156
16	Switches, Fuses, Controllers, etc	160-168
17	Switchboards	170-179
18	Lightning Arresters	180-186

PART 2. ELECTRICAL SUPPLY AND SIGNAL LINES (FORTY-NINE RULES)

Nos. of Sections		Nos. of Rules
20	General Requirements	200-207
	Overhead Lines	
21	Construction Required for Crossings, Conflicting Lines, and Lines on the Same Supports	210-213
22	Clearances of Conductors at Crossings	220-223
23	Clearances of Conductors (Other than Crossing Clearances)	230-235
24	Guarding Live and Arcing Parts	240-243
25	Supporting Structures	250-256
26	Conductors and Insulators	260-262
	Underground Lines	
27	Manholes, Handholes and Ducts	270-277
28	Conductors and Equipment	280-284

PART 3. UTILIZATION EQUIPMENT (SIXTY-TWO RULES)

Nos. of Sections		Nos. of Rules
30	Protective Arrangements (General Rules)	300-307
31	Conductors	310-317
32	Switches, Fuse, Controllers, etc	320-327
33	Switchboards	330-337
34	Motors and Motor-Driven Devices	340-345
35	Arc Welders and Electrical Furnaces	350-352
36	Lighting Fixtures and Signs	360-368
37	Portable Devices, Cables and Connectors	370-374
38	Electrically Operated Cars, Cranes and Elevators	380-383
39	Telephones and Other Signal Apparatus	390-392

PART 4. OPERATION OF ELECTRICAL EQUIPMENT (116 RULES)

Nos. of Sections		Nos. of Rules
	Rules for Employers	
40	Organization	400-407
41	Protective Methods and Devices	410-417
	General Rules for Employees	
42	General Precautions	420-428
43	General Operation	430-437
44	Handling Live Equipment and Lines	440-449
45	Killing Supply Equipment and Lines	450-459
46	Killing Moving Parts	460-466
47	Making Protective Grounds	470-474
	Special Rules for Employees	
48	Supply Station and Switchboard Operation	480-487
49	Overhead-Line Operation	490-496
50	Underground Operation	500-506
51	Series Arc Lamp Operation	510-513
52	Meter Operation	520-524
53	Testing Operations	530-535
54	Signal Line Operation	540-545
55	Tunnel and Subway Operation	550-557

Appendix A—Grounding Circuits, Equipment and Lighting Arresters.

Appendix B—Sag Tables for Hard-Drawn Copper and Aluminum Conductors.

are not so high as for crossings over railroads or for crossings or conflicts with signal lines. Hence two grades of construction are specified, these being designated as *A* and *B*, and they differ only with respect to the factors of safety specified for the supporting structures. For steel structures and reinforced-concrete poles and cross-arms the factors of safety are three and two for grades *A* and *B* respectively; for wood poles they are four and two respectively.

Those who are familiar with crossing specifications that specify a factor of safety of six for wood poles may regard four for the highest grade of construction as too low. But careful consideration of the question seems to indicate that six is an excessive factor of safety even for new poles, when reckoned on the basis adopted, which is the same as that usually taken, namely, assuming all wires loaded with ice to a radial thickness of 0.5 in. and a wind pressure of 8 lb. per square foot on the sectional area of the wires and on the poles. This corresponds to a wind velocity of about 60 m.p.h. When a high factor of safety is assumed it is generally in part to provide for extreme conditions, but in this case, because of their known though rare occurrence, fairly extreme conditions are assumed as the basis of calculations of the wind pressure, and a factor of safety of four requires considerable guying of poles when as many as twelve No. 2 wires are carried on a 40-ft. pole line.

It is provided that wood poles and cross-arms shall be replaced when their factors of safety have decreased to one-half that required when new. This is not a severe requirement where poles are guyed, as the support of the guys is included in the calculation of strength. But in cities it happens frequently that guys cannot be used, and in such cases this requirement makes it necessary to keep careful account of the depreciation of the poles. There is much need of experimental work to determine more accurately the extent to which guyed poles support unguyed poles one or more span lengths away and other quantities that enter into the calculation of factors of safety of overhead lines. It is hoped that before the rules are revised in 1916 much additional information will be available that will be useful in line construction as well as in making the requirements more precise and treatment more adequate in this section of the safety rules.

Sag tables are given for hard-drawn copper, and aluminum wire and minimum sags are specified, so that a factor of safety of two will be obtained for the conductors under the extreme conditions specified. It is specified that the sags in the case of soft-drawn copper be at least double those for hard-drawn copper, the ultimate strength of soft-drawn wire being only one-half that of hard-drawn wire. Under this rule soft-copper conductors under heavy loading of ice and wind will stretch and the sag will increase. This serves as a safety measure to prevent breaking, but makes it necessary to tighten up the wires frequently after severe storms to keep the clearances normal, and to prevent blowing together. Most companies prefer to do this rather than use hard copper for distribution lines.

One important difference from some specifications previously proposed is that in the present rules clearances are specified for normal temperatures and without ice loading or wind, so that the company or inspector can tell by examining the crossing or line under normal conditions whether it meets the rule. Some of the previous specifications have provided that the clearance should be a certain amount under the most severe conditions of wind and of ice-loading. This made it practically impossible, when the line was inspected under normal conditions, to tell whether the requirement had been complied with or not, since the exact conditions are not stated and so many varying factors enter into the problem.

In general the rules have been so drawn as to specify the results to be attained and often the method, leaving as much as possible of the details to the discretion of the companies.

EXISTING INSTALLATIONS

The rules of Parts 1, 2 and 3 apply, of course, to all new installations, unless modified for special reasons by the proper administrative authority. The question as to what extent they should apply to existing installations has been considered carefully. Obviously, if they did not apply at all to existing installations, they would have comparatively little useful influence for many years to come.

The statement made in the introduction to the rules in regard to this question is as follows:

"The rules apply to existing installations: (*a*) in extensions and reconstruction, except where for special reasons this is impracticable; (*b*) in cases of serious danger that can be obviated by conforming to the rules; (*c*) in the placing of guards and grounding of parts for the protection of employees and others where the expense is not substantially greater than would be required for providing such protection for new equipment."

The time allowed for compliance with (*b*) and (*c*) will, of course, be fixed by state or municipal administrative authorities.

It is not expected that expensive changes will be made in existing equipment in order to comply with the rules except in so far as it is necessary to do so in order to remove a source of serious danger. But in most cases grounding of machine frames, instrument cases or conduits, or erecting of suitable guards (where exposed live parts require it), can be done at substantially the same expense as though it were new equipment, and in all such cases it is expected that it will be done within some reasonable time.

INTRODUCTION OF THE CODE

It is the hope of the bureau of standards that when the code has been revised once more and approved by the Washington conference and republished, it may be adopted very generally and with the minimum changes by individual states and cities. It is suggested, however, that the first year may be made a trial year, during which the companies, inspectors and commissions may become thoroughly acquainted with its practical operation, and that it be not inforced in any strict sense until after the first year. We believe that if the utilities and other companies coming under it are invited to "try out" the code, to comply as well as they can, to report wherein it is not satisfactory, and to assist in the effort to remedy its defects by revision at the end of the first year, far better results will be attained in the end than if it were made compulsory at the start. Some commissions and municipalities might delay adopting it formally if a strict inforcement were expected from the beginning, whereas they might be entirely willing to adopt it at once in the experimental way suggested. It is believed that this plan will secure the full co-operation which is much to be desired.

A copy of the preliminary edition of the first three parts of the code will be sent on request to anyone wishing to receive it, as well as a copy of the revised operating rules, which will shortly be issued as the second edition of Circular No. 49. When the first three parts are republished after approval by the Washington conference, the operating rules will be added and the whole will constitute the complete National Electrical Safety Code.

Rochester Train Operation

Operation of Motor and Trailer Combinations Has Relieved Traffic Congestion in Downtown Section—Descriptions of the Service and the Trailers Used are Presented

Since October, 1913, the New York Railways—Rochester Lines has been operating a rush-hour train service comprising a total of twenty-five units, each made up of a sixty-four seat center-entrance trailer and a forty-four seat end-entrance motor car. As yet the company has made no detailed studies of loading speeds, but it does know that the increase of 145 per cent in the seating capacity per train has relieved the congested portion of Main Street far more than would have been possible with an equivalent seating addition in individual motor cars. The adjustment for trailer service was made by cutting down by one-third the number of scheduled stops on all prepayment lines, and these are the only ones on which trailers are operated. This change eliminated stops as short as 250 ft. and lengthened a number to, say, 500 ft.

TRAILER SERVICE

Owing to the large proportion of factory business, the morning rush in Rochester begins as early as 6 o'clock and ends with the high school service at 9 a.m. The evening rush ranges from 4:30 to 7 o'clock. The number of trains per line is now as follows:

Main and West	seven morning, seven evening
Parsells and Genesee	six morning, seven evening
North and South Clinton	six morning, seven evening
University and Lyell	one morning with two from Genesee
Lake Avenue (Kodak Plant)	two morning, two evening

In some cases, as that of the Parsells and Genesee run, the trains are run as extras on one line and then as regulars on another.

The effect of trailer operation on relieving congestion on Main Street between State and Clinton Streets is well indicated by stating what the headways are now and what they would have to be if single cars were operated. In the case of the Main and West and the Parsells and Genesee lines the headway would have to be three minutes instead of five minutes, and the cars so operated would have to find a place among cars of non-trailer lines with the following schedules: Park and Dewey, two minutes; Lake and Monroe, two minutes, and Portland and Plymouth, three minutes. It must be appreciated, too, that the portion of Main Street used by all of these lines is the business heart of Rochester, with heavy passenger loading and plenty of interference from other traffic. It may be added that before rerouting its downtown lines in 1913 the company was trying to operate 160 cars in each direction every hour over Main Street between State and Clinton Streets. After rerouting, but before trailer service was begun, the number was cut to 110. The company now operates the same number of cars but with fewer train units, because of trailers, and with greater seating capacity.

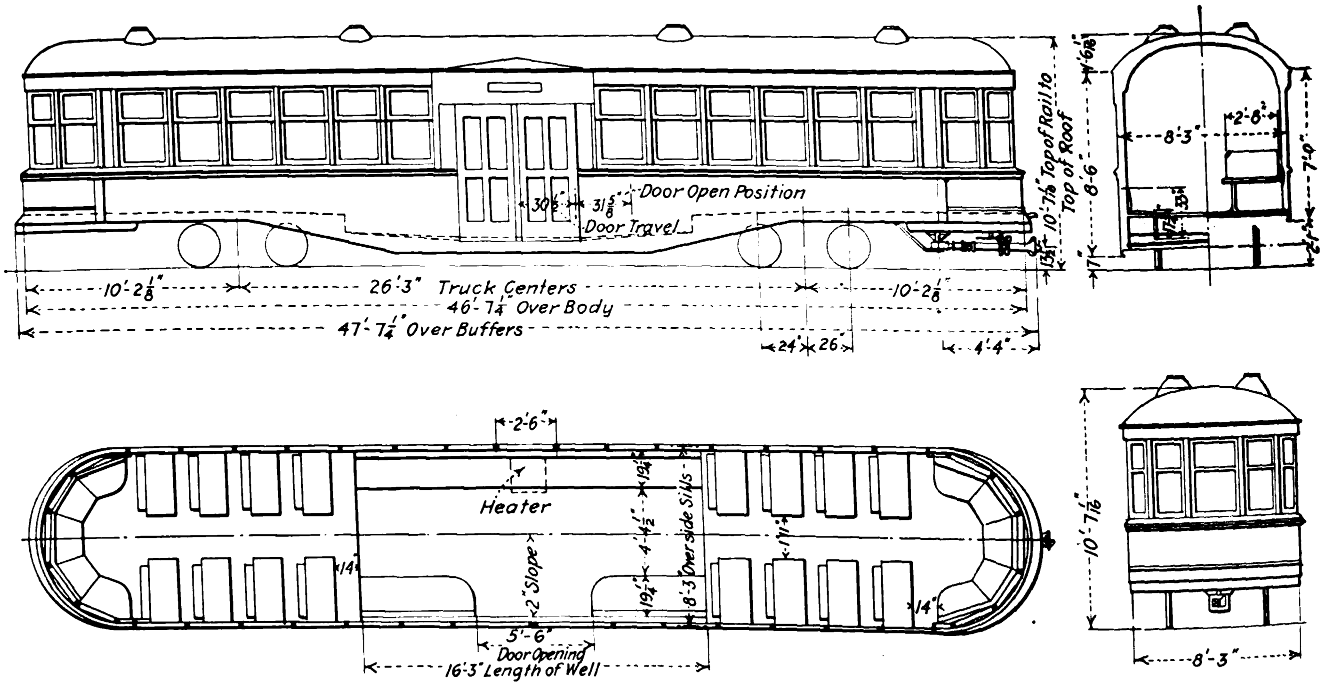
ELECTRO-MECHANICAL FEATURES

Each trailer is hauled by a 24-ton motor car which carries four 50-hp motors. The company has forty motor cars of this type in service, and as they are really over-motored for Rochester conditions they serve their present purpose admirably.

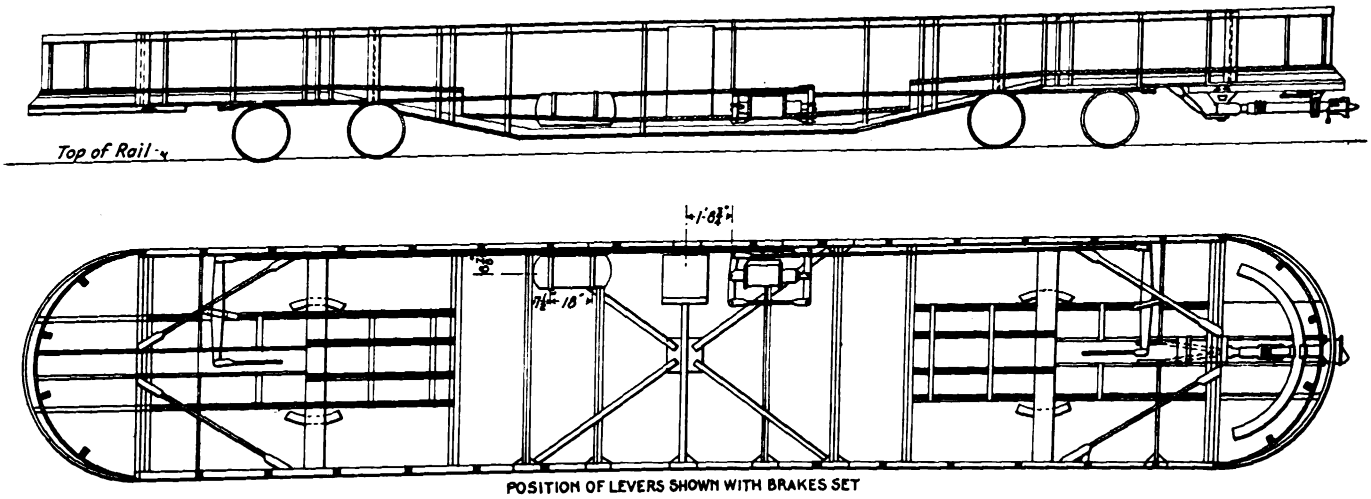
The trailer itself is so designed that eventually it may be used as a two-motor car. In this case one of the panels at the motorman's end would be replaced with a door, and 26-in. wheels with suitable motors would be substituted for the 24-in. wheels. The height of the first step would be changed from 13 in. to 15 in.

The trailer as furnished by The J. G. Brill Company is built up of ⅛-in. plate with angle-iron underframe, but in future cars a channel-iron underframe would be used to save weight over the present equipment, which was built under emergency conditions. The sides are stiffened by a dropper bar 3 7/16 in. x 1 in. x ⅜ in. which is carried all the way around the car. This car is 46 ft. 7¼ in. over the body and weighs, completely equipped, 28,200 lb.

A striking innovation is that the well extends far beyond the door opening, its length being 16 ft. 3 in. com-



ROCHESTER TRAIN OPERATION—ELEVATION AND PLAN O F TRAILER, SHOWING HOW THE WELL EXTENDS GREATLY BEYOND THE DOOR WIDTH



ROCHESTER TRAIN OPERATION—UNUSUAL UNDERSEAT LAYOUT OF AIR-BRAKE EQUIPMENT AND BRAKE LEVERS TO OPERATE LOW-FLOOR TRAILER

pared with 5 ft. 6 in. for the doors. This construction was introduced to hasten the loading and unloading of the car. If the riser is in line with the door opening it is thought the sudden change in level hinders maximum entrance speed and quick starting where, say, more than ten passengers are taken on. The Rochester arrangement permits a large number of people to enter the well at one time before any one of them has to take a step upward. The less agile passengers tend to seek the longitudinal seats of the well while the others hasten to the cross-seats on the higher level. The cross-seats are 36 in. over all, with an aisle space of 23 in.

The height at the doorway edge of the well is 13 in. The floor of the well is first inclined 2 in. upward toward the center and then another 3 in. in a longitudinal distance of 8 ft. 6 in. Next a riser of 11 in. is met, followed by a slope of 2 in. in 5 ft. to the bolster line, where the maximum height of the car floor above the rails, 2 ft. 7 in., is attained.

The doorway is served by two clear glass sliding doors which are operated by Consolidated mechanism. During very cold days in the winter of 1913-1914 some trouble was experienced from sticking doors. This was first thought to be due to failure of the air supply, but it was finally traced to the freezing of oil. This trouble was readily corrected.

The exceptional width of the well and consequent scant clearance to the pavement beneath led to a special arrangement of the air-brake equipment which, except for the compressor, includes the usual appurtenances of a Westinghouse straight air system with automatic emergency features. As it was necessary to get both the brake cylinder and reservoir under the seating, holes were cut out in the floor for them accordingly. Further, the brake cylinder is installed at an angle. Its levers are below the floor level, while the pull-rods, located in this instance on the opposite side of the cylinder, are above the floor level. The by-passing of the pull-rods is effected under the car seats as shown, one rod being a little longer than the other. Each of these pull-rods is carried beyond the trucks to a lever which has a short pull-rod extending backward to the corresponding truck, as indicated on the drawing.

The trailer is attached to the motor car with Tomlinson couplers, and a jumper crossing is provided to supply energy to the door motor, the forced draft heater motor, the lamps and the light signal which is displayed in the motorman's cab when all doors of a train are closed.

The trucks are of Baldwin design built with off-center bolsters in accordance with the suggestion of G. M. Cameron, master mechanic of the Rochester Lines. This construction will permit the trailer trucks to be used eventually as motor trucks with the same distribution of tractive effort now standard on Rochester maximum traction equipment.

Economy in Stationery Forms

I. A. May, comptroller of The Connecticut Company, New Haven, Conn., has recently issued a notice to the department heads of that company giving some suggestions as to ways and means in which they can practice economy in ordering stationery forms. The notice calls attention to the stock sizes in which paper is manufactured, cut and sold. These sizes are usually 17 in. x 22 in., or 34 in. x 22 in., and all forms used by different departments should be ordered in some such multiple of these sizes. The notice says therefore: "Order all paper blanks or forms 8½ in. x 11 in., or some exact multiple, sub-multiple or division of these dimensions. Study the form you are about to order and if it is not some multiple of 8½ in. x 11 in. then draft out a new blank that is. The department using the form is in a better position to make changes than the printer or multigraph clerk. One exception to the above may be paper or forms 8½ in. x 14 in., this being regular legal cap.

"Why not save money? Paper is heavy and costs from 6 cents to 13 cents per pound; there should be no odd sizes and no waste. The employees can save for the company a substantial sum in one year by studying standardization as outlined above. Protect your stationery from dirt and dust. Do not use new envelopes for telephone messages, etc. Use scratch pads. Saving first should be given a place with safety first."

Compensation Law Figures for First Six Months

Some interesting figures are reported by the New York State Compensation Commission on the operation of the workmen's compensation law for the first half year of its enforcement. Claims numbering 18,930 were allowed, on which compensation totaling $1,576,801 was paid, the average sum paid in each case being $83. During the period from July 1, 1914, to Jan. 1, 1915, a total of 130,723 workmen were injured, but only 22,221 claims for compensation were made. The disparity is due to the fact that compensation is allowed only for injuries resulting in disability for more than fourteen days, and also that many injuries occurred in employments not included under the law.

The law covers 180,000 industries, which employ

2,000,000 workmen. On Dec. 31, 1914, there were 7119 policies in force, on which the semi-annual premiums amounted to $692,583.64. Dividends ranging from 15 per cent to 50 per cent have been allowed to policyholders on the first six months' experience.

Transportation in the Fair Grounds

Intramural Railway, Auto Trains, Rolling Chairs and Moving Platform at the Panama-Pacific International Exposition

In laying out the Panama-Pacific International Exposition grounds the designers made special effort so to locate the various structures that chief points of interest would be as close together as consistent with the desired architectural effect. This has been accomplished with marked success, but owing to the imposing height of the facades and the consequent width of avenues required, considerable distances have to be covered in visiting even a few of the palaces. The total length of the aisles between exhibits in the main group of palaces alone is more than 42 miles, and as the Marina, or ocean boulevard, is 2½ miles in length, the absolute necessity of an efficient system of intramural transportation is at once evident. Recognizing this, the exposition has granted concessions for three independent means of transportation; by steam railroad, by auto train and by wheel chairs.

THE "OVERFAIR RAILWAY"

The steam line, known as the "Overfair Railway," operates over 2½ miles of double-track line, running practically the entire length of the grounds. The locomotives which have been built for this railway correspond in every respect with the standard Pacific type engines, except that all dimensions are only one-third full size. The same scale has been carried out in all the rolling stock, only the seats for the passengers being full size. The track gage is 19 in. Passenger cars are 42 in. wide and 20 ft. long, being equipped with full-width cross-seats and canopy tops.

The system has a total of seven stations, including two terminals, and, when operating ten-car trains, the total carrying capacity is about 1600 passengers. The trains travel at a normal rate of 10 m.p.h. Each station is provided with turnstiles and pay-as-you-enter coin boxes, so that no fares are collected on the trains. In addition to the trackage there have been built within the exposition grounds repair shops, roundhouses, turntables and depots. The rolling stock has all been built at the machine shops of the concessionaire at Oakland, Cal., and the total investment in the system, including all equipment, is placed at $150,000.

Six Pacific-type locomotives and one switch engine have been built. The former are 17 ft. long and weigh 21,000 lb. each. They operate under a steam pressure of 200 lb. per square inch, although the boilers withstood a water test of 460 lb. per square inch without developing any leaks. At present anthracite coal is the fuel used, but since the system was put in operation it has been decided to convert the locomotives to oil burners. The locomotives have the regulation air-brake equipment, and a complete block-signal system is being installed under the supervision of Southern Pacific signal engineers. The concession is held by L. M. MacDermot of Oakland, Cal., who personally designed and supervised the construction of all the rolling stock.

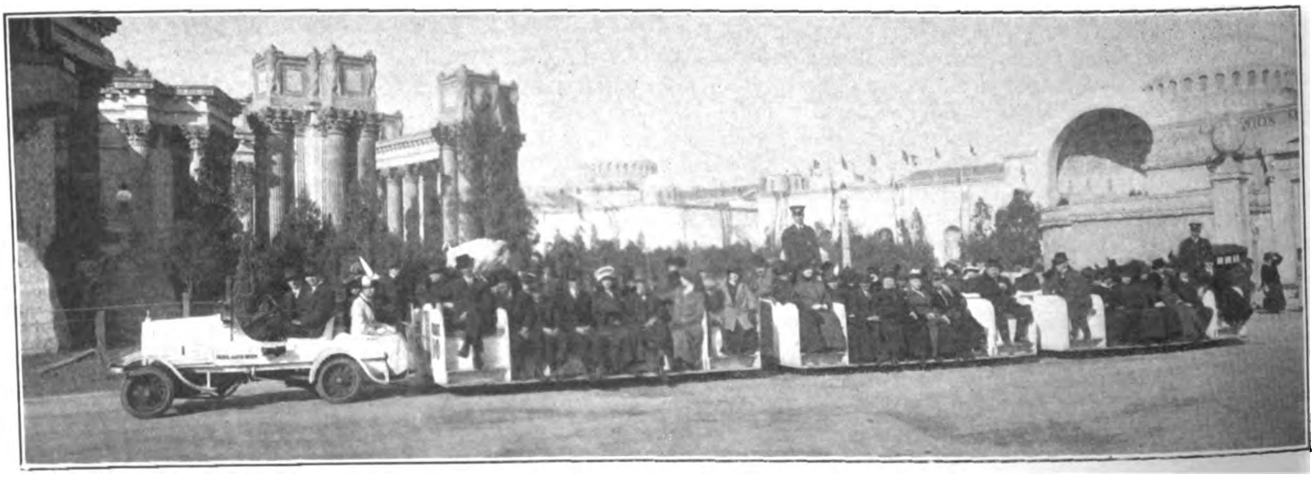
AUTO TRAINS

To provide access to various parts of the grounds not reached by the "Overfair Railway" a concession has been granted for the operation of auto trains. These are made up of two or three open trailers attached to a small auto tractor whose normal rate of travel is about 5½ m.p.h. Seventeen of these trains are in service, and they make a circuit through the grounds about 2.2 miles in length. The cars each have a seating capacity of twenty, so that with all trains in operation the total carrying capacity is about 1020.

The auto trucks are equipped with 26-hp Ford engines geared down so that for five revolutions of the flywheel the rear axle turns once. They are mounted on special chasses with 21-in. x 5-in. wheels with solid rubber tires. The trailers are built with longitudinal seats facing outward and flanking the central aisle used by the conductor in collecting fares. The trailers have 24-in. x 3½-in. wheels, also equipped with solid rubber tires. The braking system consists of a shoe connected midway in the drawbar which is automatically forced downward when the tractive pull is slackened. The step from pavement to footrest, which overhangs the wheels by 17 in. on each side, is about 6 in. The design of a coupling that would make the trailers track effectively has been the chief problem in the working out of the details of these trains. A coupling of entirely original design was finally developed, but the details have not been made public pending a decision on patent applications.

WHEEL CHAIRS

The two methods of transportation already described do not take visitors inside any of the palaces, although it is to be noted that most of the time spent on foot is in visiting the exhibits and covering the many miles



AUTO TRUCK AND THREE TRAILERS AT THE PANAMA-PACIFIC EXPOSITION of interior aisles. To meet requirements in this direction wheel chairs, resembling those used at Atlantic City, are provided to be rented by the hour to visitors. Three types are available: the ordinary wheel chair for one or two passengers to be pushed by an attendant; the same chair with a bicycle attachment which the attendant rides, and the electric storage-battery chair for two, which is operated by one of the passengers, the maximum rate of travel for the latter being about 3 m. p. h. The wheel chairs are allowed within the main palaces at certain hours, and as there are practically no stairways on the grounds it is possible to cover the entire exposition without any considerable amount of walking.

A 1147-Foot Moving Platform

Although not to be classified as a feature of the general transportation scheme, there is within the grounds what is said to be the largest moving platform yet built. This encircles the 200-ft. x 565-ft. oval amphitheater of the Panama Canal concession on the Zone. The platform is 1147 ft. in length and has a seating capacity of 6000. It is divided into 8-ft. sections so it can move freely around the curves, and each section is inclosed by a 2-in. pipe railing. Electric motors are used for operating the platform, on either side of which a rack-and-pinion drive is arranged beneath the floor. It moves continuously at a speed of 47 ft. per minute, making its complete circuit once in twenty-four minutes. Each seat on this moving platform is provided with a telephone receiver and each spectator receives his own independent lecture on the points of interest in the course of his journey along the Canal Zone. The relay-telephone system in use was recently developed for this purpose in the laboratory of Thomas A. Edison.

New Special Work Standards

New standards recently adopted by the Manganese Track Society and the Manganese Steel Foundries Society have just been issued in booklet form. A standard contour for grooves in crossings and frogs and a standard flare in the guards of solid manganese steel crossing arms and wings of solid frogs were adopted by these societies and are illustrated in this booklet. Standard specifications for manganese steel in castings for track work have also been adopted by the joint standardization committee and include the following elements in chemical composition:

	Percentages	
Elementts	Not less than	Not more than
Manganese	10.00	14.00
Carbon	1.00	1.40
Phosphorus	....	.10

The specifications also provide that drillings from the finished articles shall be furnished to the inspector from time to time on request for check analysis. A rough cast specimen ¾ in. x ½ in. in size shall bend cold on the flat side around a diameter of 1 in. to an angle of 180 deg. without breaking. The bending may be accomplished by pressure or by blows. Bending test demonstrations from test bars poured from the same heat as the castings, when required, shall be made in the presence of the inspector at the foundry where the castings are made.

The employees of the Ottumwa Railway & Light Company, Ottumwa, Ia., have organized an employees' club. The company has turned over a portion of the basement of the office building for the club's quarters and this will be fitted up with billiard and pool tables, etc.

Statistics of Steam Railways

Report of the Interstate Commerce Commission Gives Interesting Comparative Figures for the Years 1913 and 1914

According to a preliminary abstract of the twenty-seventh annual statistical report of the Interstate Commerce Commission covering the fiscal year ended June 30, 1914, made from the annual reports of carriers having operating revenues above $100,000 and of carriers operated under agreement or lease by these companies, the steam roads in the United States on June 30, 1914, represented 247,397.59 miles of line operated, including 11,298.88 miles used under trackage rights. The aggregate mileage of railroad tracks of all kinds covered by operating returns for these roads was 377,102.45 miles. There were 64,760 locomotives in service on June 30, 1914, an increase of 1382 over the previous year. The total number of cars of all classes was 2,503,822 (or 58,314 more than on June 30, 1913), which equipment was thus assigned: Passenger service, 53,466 cars; freight service, 2,325,647; company's service, 124,709. The total number of persons reported as on the payrolls was 1,695,483, or an average of 685 per 100 miles of line. As compared with corresponding returns for June 30, 1913, there was a decrease of 119,756 in the total number of such railway employees. The total amount of wages and salaries reported as paid to railroad employees during the year was $1,373,422,472.

On June 30, 1914, the par value of the railroad capital outstanding was $20,247,301,257. This amount includes capital held by the railroads concerned, as well as by the public. Of the total amount of such capital outstanding, there existed as stock $8,680,759,704. Of the total capital stock outstanding $3,019,020,981, or 34.78 per cent, paid no dividends. The amount of dividends declared during the year was $451,263,197, being equivalent to 7.97 per cent on the dividend-paying stock. The average rate of dividends paid on all stocks outstanding was 5.2 per cent. No interest was paid on $1,331,581,452, or 11.94 per cent, of the total amount of funded debt outstanding (other than equipment trust obligations).

The figures presented below include the expenditures for new lines and extensions during the fiscal year 1914: Investments to June 30, 1914, (236,706.60 miles of line represented) $16,936,697,840; investment to June 30, 1913 (234,220.06 miles of line represented) $16,424,359,514—increase over 1913, $512,388,326. This increase was divided: Expenditures for additions and betterments, $516,061,290; expenditures for new lines and extensions, $121,705,678, and miscellaneous charges unclassified, $851,008, less credits, $126,279,650.

The number of passengers carried during the year ended June 30, 1914, was 1,053,138,718, the increase over 1913 being 19,459,038. The average receipts per passenger per mile for 1914 were 1.982 cents; the average receipts per ton-mile, 0.733 cent. The average operating revenues per train-mile were $2.45, and the average operating expenses per train-mile, $1.76. The ratio of operating expenses to operating revenues was 72.21 per cent.

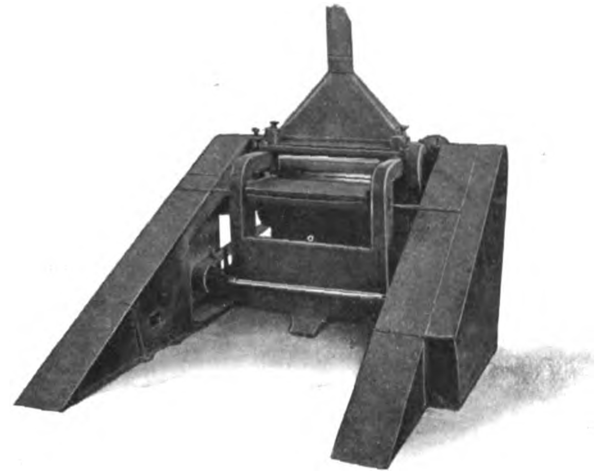
The operating revenues for the year ended June 30, 1914, were $3,047,019,908 and the operating expenses, $2,200,313,159. The corresponding returns for 1913 were: Operating revenues, $3,125,135,798, and operating expenses, $2,169,968,924. The operating revenues per mile of line operated (including line operated under trackage rights) averaged $12,400 and the operating expenses $8,955 for the year.

Reducing Accidents in the Milwaukee Shops

All Machines Are Covered with Guards to Insure Greatest Safety to the Employees

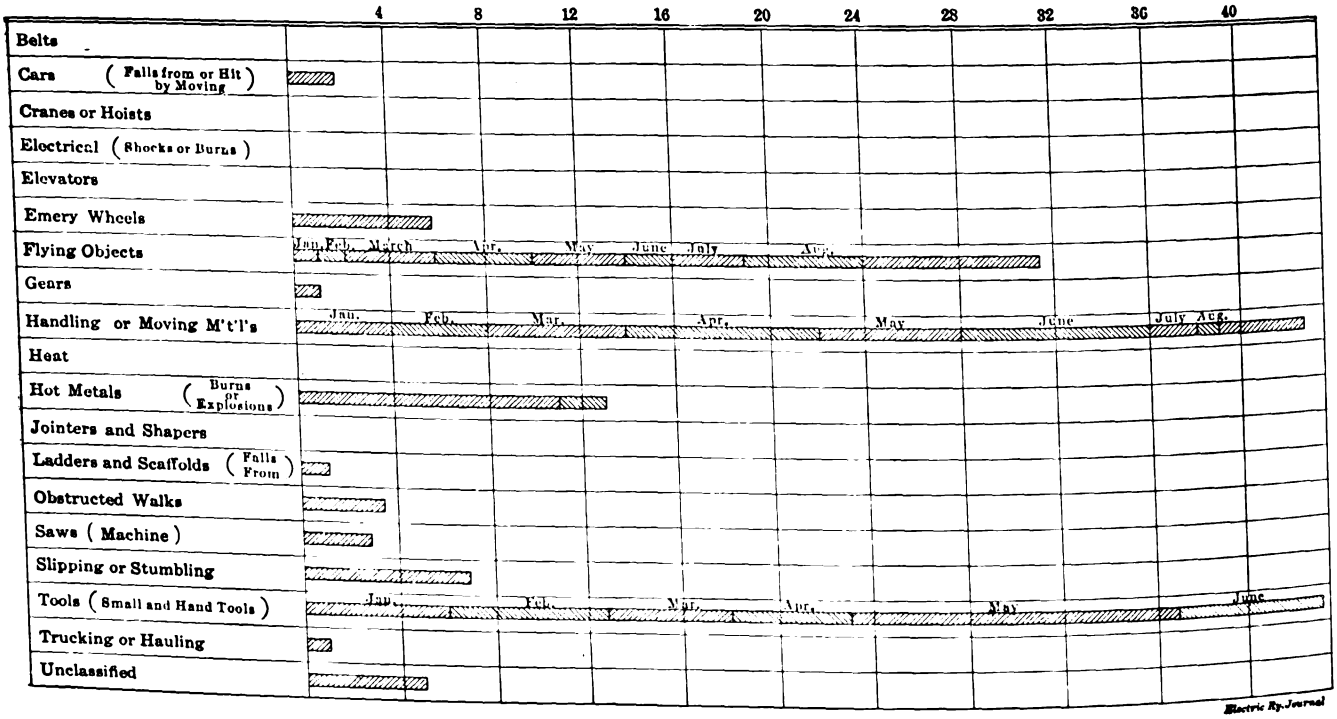
In line with the safety movement on The Milwaukee Electric Railway & Light Company's property, the general repair shops during their construction and since their completion have received much thought in regard to safe operation. All machine tools were purchased with a clause in the specifications requiring that they be guarded in accordance with the regulations of the Industrial Commission of Wisconsin. Before the company moved into its new shops at Cold Springs, practically all the old machines were fitted with guards to attain the greatest safety consistent with practical operation.

From time to time numerous special devices have been added to the safety equipment. Thus the car transfer tables have been supplied with bells which signal automatically as the table is moved; all emery wheels are supplied with safety collars while the operators of all grinders are furnished with goggles. Following reports of accidents or in anticipation of them, guards of various kinds have been added to the machine tools, or other precautionary measures have been taken to eliminate the recurrence of certain types of accidents.


MILWAUKEE SHOPS—VIEW OF GUARDED PLANER

For the past year the enforcement of regulations for safety in the shop has been placed largely in the hands of special committees which are under the general supervision of the shop inspector. The personnel of these committees includes gang leaders, or rank and file employees who have suitable qualifications for such work. There are one or more representatives of the committee in each department of the shop, and they are accordingly charged in a general way with the safety of their fellow employees. It is the duty of each committeeman to make a detailed report of and comment on all accidents in his department. Suggestions for any device or improvement to remove the cause of the accident described are also included in such reports. These reports are filed with the chairman of the committee, who personally investigates the accident, notes its cause and effect, and makes a record on the monthly accident summary.

In order to impress the employees in the various departments with the importance of this work and to give them some line on the most hazardous occupations, a summary of all accidents is prepared on a large-scale chart which is posted in conspicuous places in each department. This summary classifies the accidents as to causes and allocates them to the various shop departments. In order to set forth more clearly the causes of the accidents which are most hazardous, a graphic comparison of accidents is made a part of this chart. A graphic chart is shown in one of the accompanying illustrations. It is believed that the moral effect of disseminating this accident information has also tended to reduce shop accidents. Although accidents continue to occur after one year's operation, it is apparent that serious accidents have been appreciably reduced in number and that very little working time is lost because of minor casualties. Records for previous years also show that the average number of accidents per month in the shops was about fifty, while the average shown for the year 1913 has been lowered to twenty per month. This accident percentage is based on the employment of approximately 350 men.



MILWAUKEE SHOPS—GRAPHIC COMPARISON OF ACCIDENTS

Note—Tool accidents on original record are carried out to August and show a total of 116.

COMMUNICATIONS

The Jitney Bus in Los Angeles

LOS ANGELES RAILWAY
LOS ANGELES, CAL., April 8, 1915.

To the Editors:

The first jitney bus was operated in Los Angeles on July 1, 1914, over a route 4.33 miles in length. This was a five-passenger automobile. It continued to operate for two or three weeks alone and attracted little attention. Then, one by one, other machines of a similar character entered the work. On Sept. 22 twelve of them were operating on the original line, and on Oct. 16 twenty-seven autos were operating on two lines. About this time a local paper espoused the cause of the bus drivers in such a way as to lead the people to believe that there was great profit in the work. This resulted in the rapid increase of the jitney-bus service.

Careful checks were made from time to time from the beginning of this service, accurate records being kept of the license number of each automobile found in the service. The number of buses found in service on the various dates is shown in the following table:

Oct. 26, 1914	71	Jan. 4, 1915	556
Nov. 6, 1914	251	Jan. 11, 1915	501
Nov. 10, 1914	304	Jan. 28, 1915	452
Nov. 16, 1914	433	Feb. 4, 1915	466
Nov. 30, 1914	543	Feb. 7, 1915	349
Dec. 3, 1914	747	March 1, 1915	486
Dec. 31, 1914	761	March 18, 1915	492

Sixty-six of the buses found in the check made on March 1 were not found operating on March 18, but there were seventy-two new ones on March 18 that had not been operating on March 1. Buses are now operated over nine routes in competition with the cars of the Los Angeles railway, making the following one-way mileages: 3.52, 3.58, 4.10, 4.33, 4.68, 5.03, 5.04, 5.14. 5.82.

The unreliability of the jitney-bus service, as compared to that furnished by the street cars, is well illustrated in the number of revenue trips into and out of the city made by the buses between 6 a.m. and 6 p.m. on certain dates as follows:

Date of Check	Round Trips	Date of Check	Round Trips
Nov. 30, 1914 (clear)	2657	Jan. 4, 1915 (clear)	2492
Dec. 3, 1914 (clear)	3315	Jan. 11, 1915 (clear)	2987
Dec. 4, 1914 (raining)	2994	Jan. 28, 1915 (raining)	1563
Dec. 10, 1914 (raining)	2179	Feb. 4, 1915 (clear)	3482
Dec. 31, 1914 (clear)	3200	Feb. 7, 1915 (Sunday)	1526

On the mornings when a hard rain was falling not 5 per cent of the jitney buses went into service, but they would all be in service within an hour after the rain stopped. On Jan. 28 it rained more or less all day, and about 5 p.m. the rain set in with great violence and continued all night. The checkers found that by 6 p.m. the jitney buses had practically disappeared from the streets. During all of these rains the street cars made every scheduled trip.

The City Council in Los Angeles has passed an ordinance in relation to the jitney-bus service of which the vital portions are that each driver must carry an identification card and at the time of making application for his license must furnish two photographs of himself, taken within thirty days of that date, one to attach to the identification card and one to his application. He must be examined regarding traffic regulations and must demonstrate his ability to drive the motor bus he intends to operate.

The permit to operate a bus sets forth the route over which it must operate and the terminal points of such route, but the route may be changed at any time by filing a written application with the Police Commission and the payment of a fee of 50 cents. A fee of $1 is charged at the time of the issuance of the original license. Buses are not allowed to discharge passengers within 50 ft. of a cross street in the business section of the city nor within 75 ft. of a cross street where street car tracks turn. Each bus must carry a sign showing the fare charged, the route traversed, the terminals of the route and the license number.

No more than one passenger or one passenger with child in arms is permitted upon the front seat, nor to occupy any portion of the bus forward of the back of the driver's seat. Each driver must file in the office of the city clerk a bond in the sum of $5,000, which shall inure to the benefit of the city of Los Angeles, and shall provide for faithful observance of the ordinance, or for the benefit of any passenger or other person who may be injured on account of the misconduct or negligence of the driver of the bus.

The Los Angeles jitney-bus operators have heretofore been paying $15 per quarter as license fee, but through a ruling of the city attorney, effective April 1, 1915, they are being charged only $7.50 per quarter. This is in addition to the $1 referred to in the regulatory ordinance. However, the jitney-bus operators consider the conditions laid down in the ordinance as onerous, and have filed with the city clerk a referendum against the ordinance. This, under the law, prohibits the ordinance from being put in effect until it has been submitted to the people at an election.

The following clipping from a Los Angeles daily paper of April 2 indicates that there may not be very much protection to any one injured in connection with the operation of one of these jitney buses, even if the bond which is offered is in force:

"A joker that has appeared in the insurance policies offered to jitney-bus drivers may cause the Los Angeles City Council to emulate the example of Oakland in dealing with the jitney-bus question. It also may further complicate proceedings surrounding Council action, it is said.

"The joker—so called because it is situated far down in the liability policy—relieves the insurance company of the responsibility of payment of damages until after the bus owner himself has paid them. The company then reimburses the bus owner. It has been pointed out that if the bus owner is financially irresponsible the persons injured might never receive damages. The insurance company, it is said, could withhold payment to the bus owner until he had recompensed the injured parties.

"The Oakland Council, in adopting an ordinance concerning the operation of jitney buses, is said on good authority to have inserted a proviso making it compulsory for the insurance company to make good the damages whether or not the bus owner they have insured can do so. The companies immediately increased their rates."

In the checks made since Jan. 1, 1915, the record shows that 802 buses have worked in the jitney service; but on March 18 only 492 of these were operating, a decrease of 38.6 per cent. From the best information that we can secure, the cheapest operated five-passenger auto bus costs nearly 5 cents per mile to operate exclusive of wages, but including depreciation. The average earnings of these machines, however, do not exceed 5 cents per mile. In fact, from the checks made of the passengers carried, with 20 per cent added for short riders who did not pass the checkers, it was found on four different days that the average earnings were 4 cents, 4.9 cents, 4.6 cents and 4.8 cents per mile.

The fact that so many of these drivers are constantly retiring from the work proves that the above calculation is very nearly right. The average period for a driver to stick at the work is about sixty days. It requires that length of time for him to learn that he is not taking in money enough to keep up his repairs, and that his wages come out of the machine.

In California the State derives its revenue exclusively from taxation of the gross incomes of corporations. This gives the State a vital interest in the revenues of corporations. In a recent hearing before the revenue and taxation committee of the Legislature at Sacramento, with a view of arriving at some basis by which the State could levy a license on jitney-bus operators to make up for the loss from the reduction of the income of the railways, the representative of the jitney-bus interests pleaded that no regulation should be levied by the State for the reason that the operators of these buses were poor men and could not afford to pay a license to the State. A member of the committee took the position that from the very fact that the operators of these buses were poor men they were, therefore, incompetent to assume the obligations incident to the public-carrying business.

From the experience in Los Angeles it appears likely that the jitney-bus business will continue on the present basis until such time as full responsibility is placed upon persons engaging in this business. The fact that it is unprofitable does not deter persons from entering the service, as there will always be some who do not believe the reports they hear and others who are willing to operate at a loss, as they may be out of employment and need the money they can take in daily by this simple means.

In general, five-passenger automobiles constitute probably more than 90 per cent of the machines in this work, although no careful check has been made of this. Checks for short periods show the percentage of seven-passenger cars and others with semi-bus bodies averaged about 7 per cent of those passing the checkers.

E. L. LEWIS, Superintendent.

Bay State Arbitration

BAY STATE STREET RAILWAY COMPANY
BOSTON, MASS., April 12, 1915.

To the Editors:

In response to your request for further information as to the basis of my statements of ratio of wages to revenues in my testimony before the board arbitration in Boston last week, I give herewith the table of original data.

RATIO OF WAGES OF TRAINMEN TO TRANSPORTATION REVENUE

	Total Revenue for Transportation	Wages Conductors and Motormen	Wages as per cent of Revenue
(1) Bay State Street Railway Company	$9,276,882	$2,035,657	21.9
(2) All street railways in Massachusetts	38,908,061	8,428,720	21.7
(3) All street railways in New England	54,130,142	10,819,328	19.98
(4) All street railways in United States	520,184,773	95,451,625	18.35

In the table items Nos. 1 and 2 give data for year ending June 30, 1914, as reported to the Massachusetts Public Service Commission and given under the headings, "Total Revenue from Transportation" and "Wages of Conductors, Motormen and Trainmen."

Items Nos. 3 and 4 are from Bulletin No. 124 of the bureau of the census, which is the latest census report on "Central Electric Light and Power Stations and Street and Electric Railways, 1912." $520,184,773 in the total of the following revenues: Passenger, parlor, chair and special cars, freight, mail, baggage, express and milk, and other transportation revenue, as shown on page 98, table 16 of this bulletin. $95,451,625 is the total wages of conductors and motormen, from page 83, table 10.

ALBERT S. RICHEY.

Bureau of Standards Safety Rules

ALLEN & PECK, INC.
SYRACUSE, N. Y., April 9, 1915.

To the Editors:

I note in your issue of April 3 an abstract of an article appearing in the *Electrical World* of that date by Dr. E. B. Rosa, chief physicist of the United States bureau of standards, regarding the safety rules now in course of preparation by the bureau. I hope that the full import of these rules will be realized by the electric railway companies.

The bureau has done an enormous amount of work on this code of safety rules, and is endeavoring by all means in its power to produce a set of rules which will make for the safety of those engaged in the electric industry by preventing danger to both life and property. A glance at the representation on the proposed committee which the bureau hopes to form for the purpose of discussion and action on the draft of the rules next July, will give some idea of the scope of the work as undertaken. It also indicates quite positively the attitude of the bureau with regard to its desire to promulgate an entirely practicable and workable code. The bureau, through its representatives, has expressed very clearly in informal conference, as well as by circular letter, its desire for the full co-operation of companies and individuals interested in the various industries whose requirements call for operation of electrical apparatus and lines. It has frankly asked for suggestions and constructive criticism of those sections of the rules which thus far have been sent out in tentative form. This has naturally resulted in redrafts, simplified and improved.

Electric railways are as much interested in this matter as are lighting and power companies and industrial consumers of power. The electric railways, through the American Association and its affiliated associations, and the sectional associations, should make it their business to become advised of the status of the work being done and interest themselves in assisting the bureau as much as possible. It must be recognized that a set of safety rules covering, as this will, the safe operation and construction of electrical apparatus and supply lines, would assist greatly in standardizing the practice of electric companies in all parts of the country. To accomplish this, however, the rules must be simple and practical, suitable for inserting in the instruction book of any operating company. It is for this reason that the bureau should have the fullest co-operation of the association and its membership.

Any company which has undertaken to produce an instruction or rule book for the guidance of its electric operating and construction forces will readily admit that the task of making clear, concise, complete and "foolproof" safety rules is a prodigious one, and will realize the advantage of having available an adequate set of safety rules bearing the stamp of a country-wide standard. It is, of course, conceivable that it may be necessary and advisable to revise these from time to time and that tentative adoption in the first instance may be very advisable. In any case, the step must be a progressive one and one which is in line with reason and logic. The American Association in the past has frequently indicated, by its activities, a progressive desire to co-operate in matters of interest to its membership, and can safely be counted on for active co-operation with the bureau.

W. J. HARVIE.

[NOTE—An additional article by Dr. Rosa, giving a digest of the previous code, is given on page 750 of this issue. An editorial on the subject appears on page 741. —EDS.]

American Association News

Committee Activity Is Conspicuous as May 1 Approaches—President Allen to Speak in Washington Next Month—H. H. George Gives Fine Paper in Newark—Elevated Club of Chicago Considering Forming a Company Section

JOINT CLAIMS AND T. & T. COMMITTEE

The first meeting of the joint committee appointed by the Claims Association and the Transportation & Traffic Association to handle the problem of claims, was held at the Hollenden Hotel, Cleveland, Ohio, on April 12. The members present were B. B. Davis, Columbus, Ohio; E. E. Slick, Anderson, Ind.; R. P. Stevens, Youngstown, Ohio, and A. D. B. Van Zandt, Detroit. W. F. Weh, Cleveland, Ohio, was made a member of the committee, completing the Claims Association representation. The question considered was the safety-first movement, as it relates to the public, to railway employees and to school children. It was decided to formulate a set of questions to be submitted to member companies as to their experience with films and whether they can be exchanged in such a way as to broaden the knowledge of all those interested in the work that is being done to reduce the number of accidents. These questions were formulated in the rough and left in the hands of Mr. Slick to be put into shape. Mr. Stevens, chairman of the meeting, will forward them to Secretary Burritt for distribution.

COMMITTEE ON SCHEDULES AND TIME TABLES

A meeting of the committee was held at association headquarters on April 14, those in attendance being Alexander Jackson, Public Service Railway; Howard F. Fritch, Bay State Street Railway, and J. C. Nelson, Ford, Bacon & Davis. The report on the method to be recommended for making and recording periodical traffic counts was considered fully. The curves developed, showing the influence of frequency of stop on schedule speed, together with the charts showing the effects of fully-vestibuled cars on schedule speed, was also discussed. A summary of near-side stop practice has been developed, and a curve drawn showing the increase in this method of operation from 1906 to date.

WASHINGTON COMPANY SECTION

A meeting of company section No. 4 was held jointly with employees of the commercial department of the Potomac Electric Power Company on March 22. William L. Clarke, assistant secretary of the companies, presided. Milton E. Ailes, director of the Washington Railway & Electric Company, was introduced by President C. P. King. He outlined the general business conditions and gave an interesting history of the development of the local company. Van H. Manning, of the United States bureau of mines, then gave a lecture on mining. This showed the processes in the production of coal and gold and was illustrated with lantern slides and moving pictures. The speaker dwelt particularly upon mine disasters and the relief work of the bureau of mines. The addresses were followed by musical selections by the Pepco Glee Club, a piano solo, and the serving of a buffet lunch. In attendance were forty-five members of the section and thirty employees of the power company.

The next meeting will be held on April 30, when C. Loomis Allen, president of the association, will address the section on the subject "Individual Effort." This is part of the movement fostered by Mr. Allen to bind the sections closely together.

PUBLIC SERVICE SECTION

The regular meeting of company section No. 2 was held in Newark on April 15, with a large attendance. H. H. George, assistant engineer maintenance of way, gave an exhaustive paper on the organization of the engineering department of the company and gave a detailed description of its methods of working. With the aid of many lantern slides he explained the standards of construction and the construction records and described the recently acquired machinery for reducing construction and operating costs. He distributed Data Sheet No. 4 for the section loose-leaf note-book, containing comparative information of the quantities of materials entering into track construction in 1895 and 1914 and the relative costs. This sheet was made the basis of a statement of the company's track practice. Martin White, superintendent maintenance of way, sent a communication, which was read by President Maguire, contrasting track work in earlier years and to-day and his statements were emphasized by R. E. Danforth, general manager, who showed how engineering estimates are often low due to failure to take all factors of construction into account. He gave a number of personal reminiscences to prove this. Martin Schreiber, engineer maintenance of way, told the section some stories illustrating special problems of his department, showing how it had established its reputation with the company officials. He contrasted the organization of the present day with that of fifteen years ago, showing that a great deal of work was turned out then with a small force, but that engineering organizations must develop with the times. His strongest point was that engineers must be doing pioneer work if they are to progress. Being "up to snuff" to-day is no assurance for the future.

Elevated Club of Chicago

"Relations with the Public" was the topic of discussion at the fifth meeting of the Elevated Club of Chicago held on March 24. A record attendance of 126 officers and employees of the elevated railroads was reported. G. H. Pierce, statistician of the company, gave an illustrated talk on the above topic, bringing out interesting facts regarding the development of Chicago and the present service provided by the elevated railroads. His purpose was to inform the members of the part which the elevated railroads have played in the development of the city and to advise them regarding the service so that they can answer questions intelligently.

Other features of the meeting were the question-box discussion and numbers by the musical clubs. The question box takes a regular place in the programs and the timely questions contributed never fail to arouse interest. The glee and mandolin clubs have been organized recently, and they made their initial appearance at this meeting. The announcement was made also that the club will give a banquet in the near future.

As this issue of the ELECTRIC RAILWAY JOURNAL goes to press the April meeting of the club is being held. It is understood that at this meeting the club will take action upon the proposal to enroll itself as a company section of the railway association.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Types of Motor Axle Bearings—Use of Different Types for Each Half

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

While rolling stock superintendent on a large system, the writer carried out a series of trials of the different types of motor axle bearings.

The bearings originally fitted to the motors were of the ordinary split malleable-iron shell type, with white metal (babbitt) linings which on most systems have given reasonable satisfaction; in this case, due to the fact that the track was in very bad condition, the white metal was subjected to excessive hammering, so much so that the softer grades of this metal could not be used due to squeezing out, while the harder white metals often failed by cracking in the shells.

Another objection to anti-friction metal for this class of bearing is that the flanges wear very rapidly, due to the rubbing of the gear-wheel boss on one bearing and the thrust collar on the other. Now the clearance between the gear wheel and the side of the gear case is generally small, and if the wear referred to is considerable, rubbing will be set up between the gear and case.

The writer's experience has been that excessively worn bearing flanges very commonly are not attended to until the gear case has been badly damaged by the rubbing of the gear wheel. By the number of scored gear cases to be seen on other systems, it is evident that this trouble is very common.

For several reasons it is desirable to reduce the number of anti-friction metal parts on rolling stock, namely, from the point of view of prime cost, from the difficulty of getting the men to realize sufficiently the value of this metal to prevent wastage; also from the fact that in taking worn axle bearings out of the housings they are only too frequently dropped in the pit from a considerable height and generally thrown roughly about, so that pieces of the soft metal become detached from the shells to be cleared up eventually with the grease and dirt for cartage to the dust heap.

Axle bearings of bronze are quite a success in operation and are a great improvement over the old type; both the radial and flange wear are very small, and such bearings are now being generally adopted on new motors. To use this metal for the axle bearings of old motors, however, means that their thickness must be considerable. Such bearings are therefore very expensive. However, in making comparisons it must be borne in mind that the scrap value of a worn-out bronze bearing bears a high proportion to the original price, so that the initial cost is not so important as would at first appear.

Probably the only objection to the use of bronze axle bearings is that they constitute a strong temptation to pilfering. It is, of course, very easy to arrange some system for checking the deliveries of new bronze bearings to workmen and to depots against those returned as worn out, but whatever system is adopted it will be found impossible to prevent some of them going astray.

Many trials have been carried out on plain cast-iron axle bearings. With an unfailing oil supply they have done fairly well, but of course one cannot always depend upon having perfect lubrication, especially in winter. No matter what mixture of cast iron was used it was found in all cases that sooner or later the upper half of the bearings became badly scored. In consequence the bearings so damaged the axle journals that the latter had to be taken out and skimmed; a noticeable feature, however, was that the wear in the bottom half was negligible, and that on either of the flanges was also very small indeed.

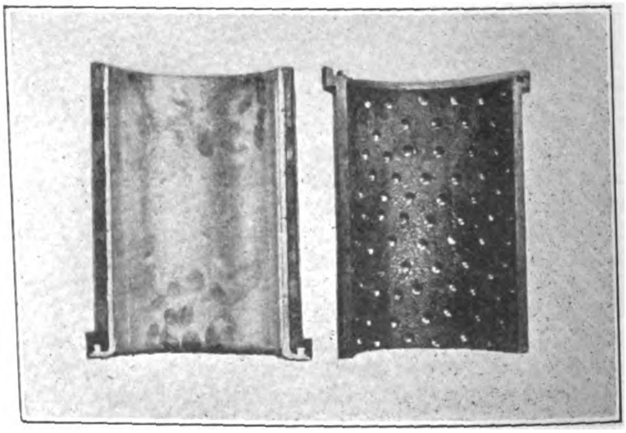
As a result of these tests a composite type of bearing was adopted which shows to great advantage as compared with others; this consists in utilizing for the top half a bronze bearing, and for the bottom half a bearing of cast iron. The arrangement has been well tried out and found perfectly satisfactory; it possesses all the advantages of an ordinary bronze bearing without any disadvantages and costs much less than the latter.

A cast-iron bottom half can of course be effectively used with an anti-friction metal top half, and in this case the saving is also great. The cast-iron half will outlast many top halves and, as compared with an ordinary soft metal type, this composite bearing will be found to reduce flange wear (and consequently also cross movement of the gear wheel in its case) to a negligible quantity.

Home-Made Cast-Iron Axle Bearing

BY A. P. LEWIS, SUPERINTENDENT POWER AND SHOPS
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

For several years the Cleveland, Southwestern & Columbus Railway has been experimenting with cast-iron motor axle bearings. As a result it has adopted a 3/8-in. cast-iron babbitt-lined shell, which is giving just as satisfactory results as the bronze motor axle bearings formerly used and at a lower cost. At first much difficulty was experienced in obtaining a bond between the iron shell and the babbitt, but this was overcome by the boring of tapered holes on the inside of the shell. These holes are drilled with a special tool which makes the bottom of the hole larger than the top and thus serves to dowel


CAST-IRON AXLE BEARING, LINED AND UNLINED

the babbitt in position. In order to key the babbitt around the collar a dovetail groove is cut in the collar of the cast-iron shell. A lined and unlined shell babbitt are shown in the illustration on page 760. A pair of these cast-iron shells weigh approximately 20 lb., and the machine work necessary to prepare the shells for the babbitt costs about 80 cents. Some of these bearings have been in service for about four years, giving approximately 200,000 motor-miles before rebabbitting is necessary. No breakage of the shells has occurred. When the babbitt has worn through, the cast-iron shell produces no more serious results than a bronze shell in the same condition.

Relay Setting to Maintain Uniform Acceleration

BY P. V. SEE, SUPERINTENDENT CAR EQUIPMENT HUDSON & MANHATTAN RAILROAD, JERSEY CITY, N. J.

The uniform acceleration of all cars in a multiple-unit train is of the utmost importance, for jerking is not only annoying to the passengers but detrimental to the equipment.

On the Hudson & Manhattan Railroad, where all cars are equipped with motors and full automatic control, it has been found possible to secure this desirable uniform acceleration by the frequent adjustment of relays. The necessity for this adjustment, of course, is due to the wearing of the dashpot plungers.

Up to two years ago the relays were set by the usual method of operating a light car on an idle track. The controller would be put in the full multiple position and the relay adjusted until the last step of the contactors was secured in fifteen seconds. Notation of the current taken by the motors at each successive step was also made. This method was unsatisfactory and costly.

For instance, it proved a physical impossibility for an observer to read and call off accurately fourteen minimum current values in fifteen seconds. Furthermore, variations in grade, differences in brake adjustment and variations in line voltage made it hard to secure exact relay setting. In addition, the method called for the services of a train crew and three shopmen, and because of tunnel conditions the work had to be done during the midnight hours. Owing to these drawbacks it was decided to set the relays on a test bench.

A 4-volt, 600-amp motor-generator set was obtained. With this set the current could be raised and lowered at will, so that a relay could drop and make contact at the exact current value desired. The speed of the dashpot could then be determined by a stop watch. It was found that relays set on the bench by this method gave much more uniform results than those set on the car according to the old method.

Our cars are geared for 65 m. p. h. and have to be operated on a 4 per cent grade. It was desirable to adjust the relays on these cars so that in case one car in a two-car train had contactor trouble the good car would be able to start hauling the other car from any point on the 4 per cent grade. In order to accomplish this it was necessary to set the current element of the relay to operate at about 350 amp and to depend for starting at other times entirely on the dashpot adjustment. This setting of the relays is also accomplished on the bench with the aid of the motor-generator set.

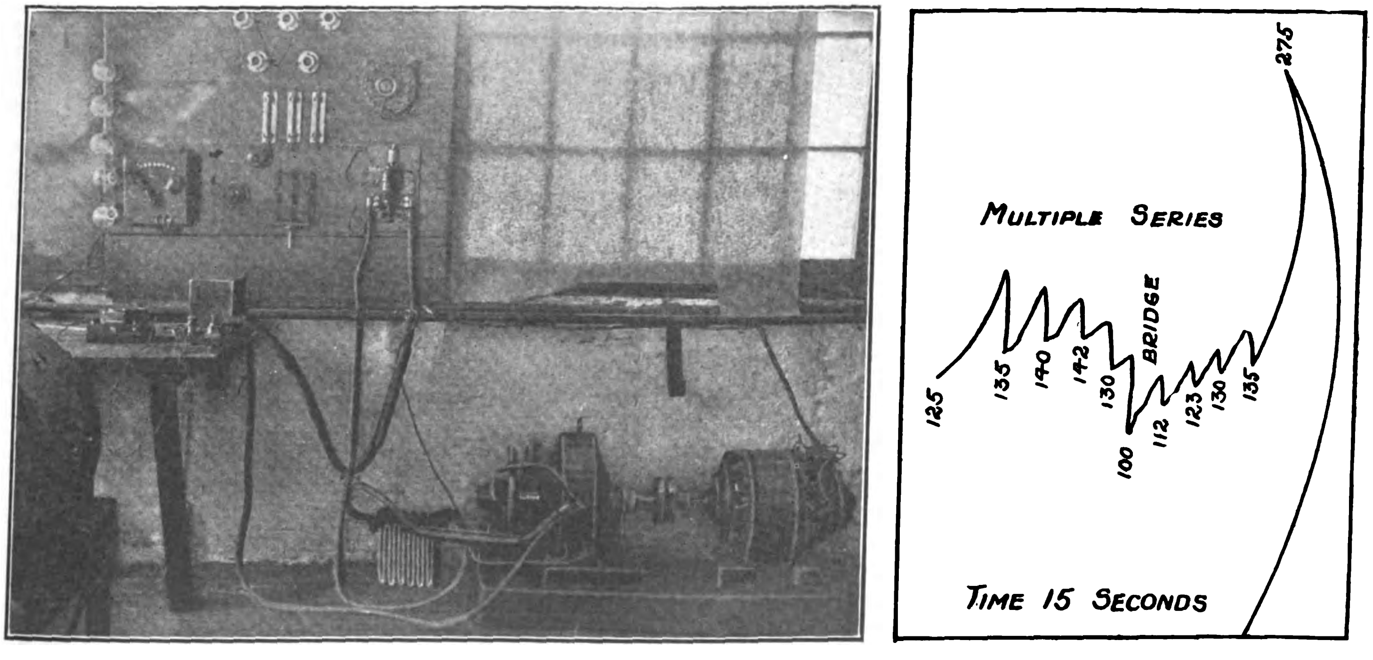
The adjustment of the dashpots is checked once a month on the inspection pit by timing full ten steps with a stop watch. Under this system of adjustment an inspector and helper can remove from a car four to five relays per day, adjust the same and replace them on the cars, thus greatly reducing the cost of the work.

Graphic Geometrical Progression Method for Starting-Resistance Calculation

BY W. F. COORS, SCHENECTADY, N. Y.

The several interesting articles on proportioning railway motor starting resistance which have appeared in recent issues of the ELECTRIC RAILWAY JOURNAL have brought out many ideas bearing on the solution of the problem and leading to the same practical results.

While it is generally conceded that there are enough outside factors entering into the solution of this problem to upset fine calculations I feel that our old friend,

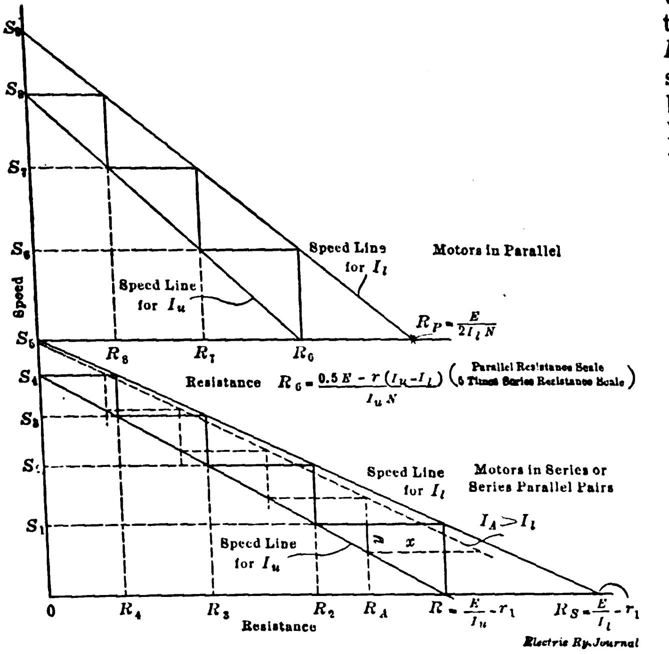


MOTOR-GENERATOR SET, CONTROL PANEL, AMMETER AND SHUNT; GRAPH OF CURRENT PASSING THROUGH THE NO. 1 MOTOR OF A CAR—IN THE GRAPH TIME PROGRESSES FROM RIGHT TO LEFT

The graph was secured from a recording ammeter. The acceleration occurred in exactly fifteen seconds from the time the controller was turned on until the last step in multiple was secured. The multiple steps on this curve show only one-half of the current consumed by the car.

geometrical progression, may still have a place in the field as one method of solution. As no one else has described this, the following plan, which is in actual use, is given without elaborate explanation.

Let I_u and I_l represent upper and lower limits of starting current, respectively; r, the resistance per motor; r_1, the collective resistance of the motors in series; R, R_2, R_3, etc., the rheostatic resistances for the respective steps; s_1, s_2, s_3, etc., the speeds corresponding to the different steps and values of starting current; and N, the number of motors.



STARTING RESISTANCE CALCULATION—FIG. 1

MOTORS IN SERIES OR IN SERIES PARALLEL PAIRS

On a sheet of cross-section paper lay off as an abscissa, OR equal to $(E/I_u) - r_1$, and as an ordinate lay off OS_4, the speed corresponding to the current I_u on the speed-current curve for the voltage $E/2$. See Fig. 1.

The straight line S_4R represents the relation of speed and rheostatic resistance for the current I_u because the speed is proportional to the counter-emf, $E - [I_u(r + R)]$, and this is inversely proportional to the rheostatic resistance, I_u being constant.

Assume a value for I_l about 70 per cent of I_u, lay off OR_8 equal to $(E/I_l) - r_1$, and locate S_6, representing the speed corresponding to the current I_l on the speed-current curve, for the voltage $E/2$. From S_6 draw a straight line to the point R_8, corresponding to the current I_l. Then from the point S_4 draw a horizontal line intersecting the sloping line S_6R_8, and from the point of intersection draw a vertical line to the horizontal axis, determining the point R_4. Through the intersection of this vertical line and the line S_4R draw a horizontal line, determining the point S_3 and cutting the line S_6R_8. From this point of intersection draw another vertical line cutting S_4R and determining R_3. From the point of intersection with S_4R draw another horizontal line cutting S_6R_8 and determining S_2. In this manner a series of unequal, similar right triangles, representing the controller steps, may be laid out between the sloping lines corresponding to I_u and I_l.

It is not likely that the values of the current limits will have been chosen so that the last vertical line will intersect S_4R at R but an error in assumptions is easily allowed for as follows:

If the value of I_l has been chosen larger than that required (say I_a), the line RR_8 (shown as x in the figure) will fall above the horizontal axis. If the value of I_l has been chosen less than that required (say I_b), the line RR_8 will fall below the horizontal axis. (This is omitted to avoid complicating the figure.) From these two possibilities the correct value of I_l can be determined in the following manner:

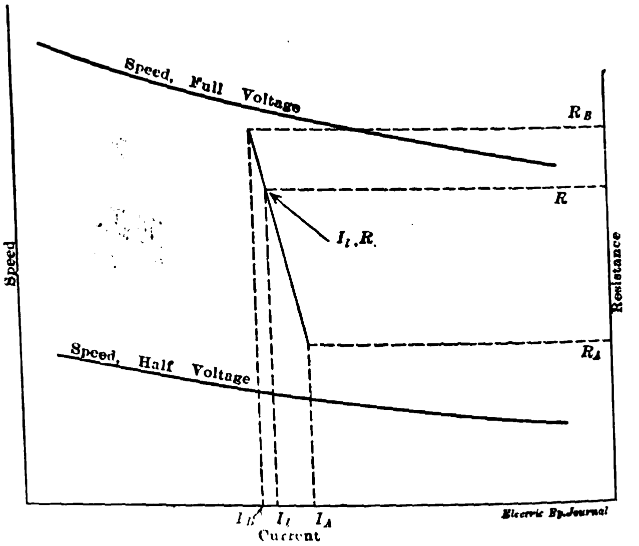
Note the values of resistance R_a and R_b where the last vertical line y cuts the sloping line drawn for I_u under these two conditions. Plot these two points, I_a, R_a and I_b, R_b, with resistance as ordinates and current as abscissas, as shown in Fig. 2, and draw a straight line between them. By noting where the given value of R lies on this line the corresponding value of I_l can be determined and the speed-resistance steps correctly drawn, using this value.

R will then represent the resistance which will limit the current to the value I_u when the voltage is first applied with the motors at standstill, and S_1 the speed when they have started and the current has fallen to the value represented by I_l. At this point the resistance $R - R_2$ should be cut out of the circuit and the current will rise again to I_u, and so forth on the succeeding steps. When $R_4 - O$ is cut out the current will rise to I_u at the speed S_4 and the latter will gradually increase to S_6 as the current decreases to value I_l. At this point with no external resistance in the circuit it is necessary to switch the motors into parallel for further increase in speed between the given limits of acceleration current.

MOTORS IN PARALLEL

On a horizontal line drawn through the point S_6 set off OR_6 equal to $\dfrac{0.5E - r(I_u - I_l)}{I_uN}$.

This formula expresses the fact that when the change-over from series to parallel occurs the counter-emf of the motors is equal to half line voltage at a current value of I_l. But as we wish to allow the current to rise to I_u there is an additional voltage drop in resistance equal to $r(I_u - I_l)$. The change from I_l to I_u also, of course, changes the counter-emf somewhat but this may be neglected in view of its small value and of the rather critical condition during the short change-over period.



STARTING RESISTANCE CALCULATION—FIG. 2

From the point R_6 draw the sloping line for I_u to the point S_9, the speed corresponding to the current I_u on the speed-current curve at full voltage. Next set off R_p on this horizontal line equal to $E/(2I_lN)$ and draw the sloping line for the current I_l to the point S_8 which represents the speed at the current I_l, from the speed-current curve.

The same scale of resistance as used for the calculation while the motors were in series may be used in this case if the values of R_p, R_6, etc., per motor are desired. This is convenient when considering certain schemes of transfer connections but the values must be divided by the number of motors if the actual external line resistance is wanted. It is convenient for graphical purposes to increase this scale five times.

When the sloping lines for I_u and I_l are drawn, the required controller steps may be laid off as outlined for the series diagram, although it may be necessary to slightly alter the value of I_l in order to make the parallel diagram graphically correct.

In the diagram R_6 represents the value of the total external resistance in the line which will limit the current to the value I_u per motor at the speed S_5 when the parallel connections are made; and R_p the resistance which will limit the current to I_l per motor under the same conditions. When the motors are switched into parallel with the resistance R_6 in the line the current will rise from I_l to I_u at the speed S_5, and as the speed increases to S_6 the current will fall to I_l, when the resistance $R_6 — R_7$ should be cut out, allowing the current to rise to I_u again. In the same manner $R_7 — R_8$ and $R_8 — O$ may be cut out, and S_8 will represent the speed at the current I_u with no external resistance in the line.

This method is sufficiently accurate for ordinary purposes, the values of the resistance steps being slightly changed to allow the use of the same rheostats for series and parallel motor connections. However for locomotives, where the trailing load introduces outside factors, it becomes necessary to plot speed-current and tractive effort—current curves for the locomotive at the given acceleration for the average load for each step of the controller. Extra resistance on the first steps is necessary for switching and running light, and the steps should be proportioned in such manner that the increment of tractive effort for each step will not exceed 10,000 lb.

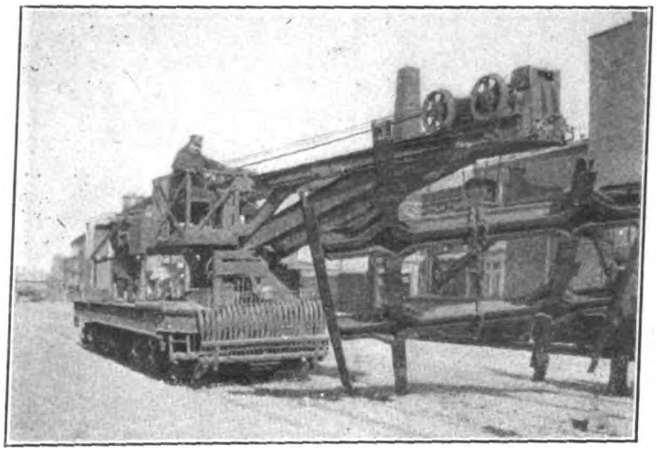
A Pillar Crane Car for Track Work

BY E. M. T. RYDER, ENGINEER MAINTENANCE OF WAY THIRD AVENUE RAILWAY SYSTEM

Before the use by the Third Avenue Railway System of the pillar crane car illustrated, very heavy and complicated underground slot special work in New York City was always installed and removed by main strength and awkwardness. As many as fifteen to thirty men were necessary to handle some of the pieces with very large risk of accident and much delay in installation.

This pillar crane car has a reach of 18 ft. and a capacity of 6 tons. It was tested by lifting ten 9-in. girder rails, 30 ft. long, in one pile. The center of the mast overhangs the center of the rear truck about 3 ft., both to increase the effective reach and to give room on the deck of the car for piling 30-ft. rails between the mast and the cab. For all that, the dimensions of the car are such that its clearance lines do not exceed those of the standard passenger car and it can go anywhere they can.

The fixed horizontal boom was chosen in preference to one that can be raised and lowered for these reasons: It is always below the level of the trolley wire and cannot be accidentally brought in contact with this wire; again, it carries the hook on the traveling carriage, which permits a considerable portion of the floor of the car to be loaded directly by the crane itself and which affords great flexibility in unloading and placing material. This is because the three motions available, rotation, horizontal and vertical movement, make it unnecessary to move the car itself in placing heavy pieces of special work. The dead load capacity of the car is rated at 20 tons. The narrow cab is about the same width as the pillar crane, so that 60-ft. rails can be loaded on each side of the car. There is an ample tool box under the center of the car. The car is equipped to run either on the overhead trolley or the underground electric conduit system.



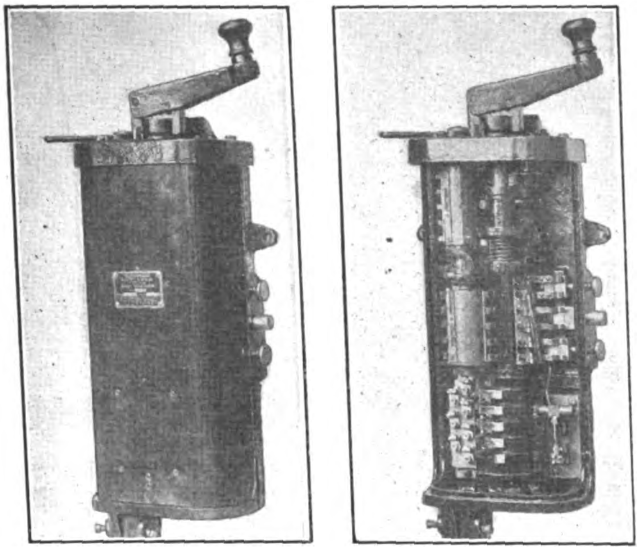
SPECIAL PILLAR CRANE CAR OF THE THIRD AVENUE RAILWAY SYSTEM

The crane car was furnished, complete, with crane, by the McGuire-Cummings Manufacturing Company from general designs by the Third Avenue Railway. The crane was manufactured by the Whiting Foundry Equipment Company. It was modified from that company's standard design at the request of the Third Avenue Railway in two important particulars: First, it was heavily counterbalanced so as to be able to operate with the boom at right angles to the car without overturning; second, a special design of hoisting sheaves was conceived to enable the hook to be raised practically to the level of the boom itself in order to give working height above the floor of the car.

PILLAR CRANE CAR OF THE THIRD AVENUE RAILWAY SYSTEM HANDLING SPECIAL WORK

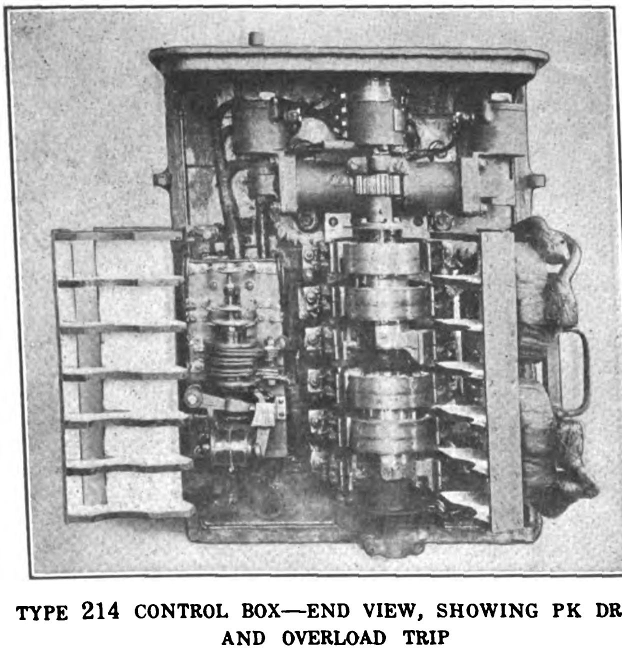
Electrical Equipment of Belmont Tunnel Cars

The dual subway system of New York City is the largest city transportation project ever conceived, requiring for its operation when complete about 2500 motor cars. This system will be operated by two companies, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, both of which have adopted Westinghouse electropneumatic control.

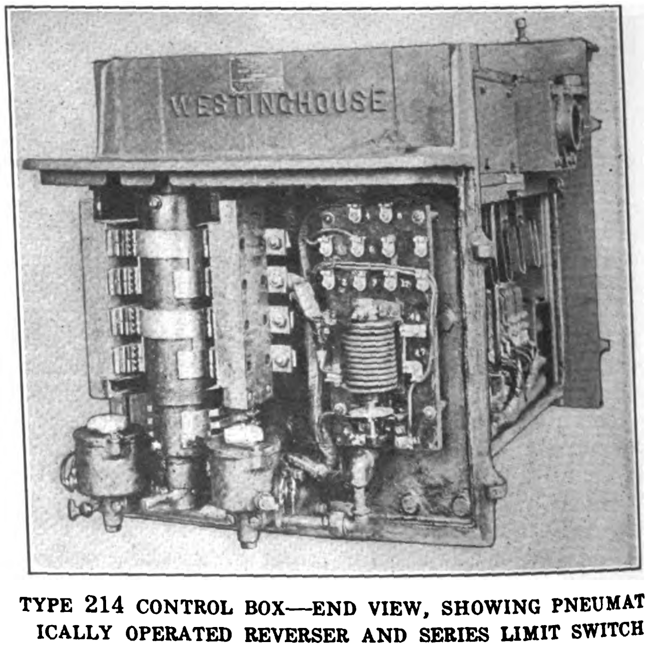


TYPE 27-A MASTER CONTROLLER COVERED AND WITH COVER REMOVED

The Belmont, or Steinway, Tunnel will be the first new section placed in operation by the Interborough Rapid Transit Company and will probably be opened about June 1. The route of the tunnel is from Lexington Avenue and Forty-second Street, in the heart of Manhattan, under Forty-second Street and the East River to Jackson Avenue in the borough of Queens. The tunnel, which is of the single-tube type, is 8375 ft. long and has a maximum grade of 4½ per cent. There is no physical connection with the present subway, but both terminals of the Steinway Tunnel will ultimately be linked with the enlarged system.



TYPE 214 CONTROL BOX—END VIEW, SHOWING PK DRUM AND OVERLOAD TRIP



TYPE 214 CONTROL BOX—END VIEW, SHOWING PNEUMATICALLY OPERATED REVERSER AND SERIES LIMIT SWITCH

The motor cars to be used in this tube are of the same general type as the steel cars now used in the Interborough subway, and are being built by the Pressed Steel Car Company, McKees Rocks, Pa. In order to maintain a very rapid schedule the trains are equipped with automatic electric couplers and electrically-controlled air brakes.

The most important part of the Type 214-A automatic control, which is furnished on these cars, is the switch group. This combines the reverser, PK drum for cutting out resistance and for field control, and six electropneumatically operated switches, two of which act as line switches and four to function the series, bridging and multiple combinations of the motors. The PK drum is operated on the principle of an unbalanced air pressure, and is an adaptation of the PK control so successfully used by the New York Railways and the Third Avenue Railway of New York. By the use of this switch group a very compact arrangement is secured, resulting in a large reduction of weight, additional room for other apparatus, less conduit work, wiring and hangers, with a corresponding reduction in the cost of installation.

The master controller, located in the motorman's cab, is the Westinghouse Type 27-A. It is equipped with an improved form of deadman's release which acts upon the control circuit of the electrically-operated air brakes, thus obviating the necessity of any additional valves or magnets. When the handle is released in any operating position a connection is made which energizes all emergency magnets throughout the train, instantly applying the brakes. As an additional safety precaution, in case the brakes should fail, a switch is provided on the master controller to enable the motorman to stop the train by bucking the motors.

Power to operate the control circuits, air-brake valves, governor-synchronized line, emergency car lights and signal lights is furnished by a 32-volt storage battery. The batteries are connected to be charged in series with the car lights or compressor motor, whenever either or both are in operation.

A series limit switch interposed in the motor circuit is located in the central box to govern the acceleration of the train. Automatically the greatest possible acceleration is secured without exceeding a predetermined maximum value of current input to the motors.

A line relay is provided to open automatically the battery circuit to the switch group in the event of power being shut off the line or while passing over a gap in the third-rail. Upon restoration of power and the closing of the line relay the switches pass through their regular cycle, depending upon the position of the master controller. The emergency lights are connected across a disk of the line relay and are lighted whenever the relay is not energized.

The train line consists of eighteen wires, seven of which are used for switch control, five for brake control and the others for the auxiliary circuits. The wires are of unusually large cross-section, being designed to operate a sixteen-car train in certain contingencies.

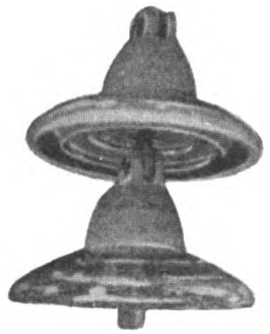
Each one of the motor cars is equipped with two Westinghouse No. 302-F-2 field control motors, rated at 125 kw (167 hp), at 500 volts. These motors have two separate field windings on the main poles. By connecting the two field windings in series during acceleration a relatively high tractive effort at low speed is secured with a small current. After all the resistance has been cut out, one of the field windings is disconnected, thus reducing the field flux. This gives a higher speed for any given armature current. While the full field connection is intended primarily for acceleration, it may be used to some extent for slow-speed running.

The frame is of soft steel, cast in a single piece. The projections of the frame, to which the axle caps are bolted, extend over the axle, to a large extent relieving the axle cap bolts of the weight of the motor. At each end there is a large bored opening through which the armature, pole pieces and field coils may be removed. These openings are closed by housings (securely bolted to the frame), which carry the bearings and oiling devices. Removal of the housings is made easy by the provision of tapped holes.

Both armature and axle bearings are arranged for oil-and-waste lubrication. Large waste pockets having an opening into the low-pressure side of the bearings are provided. Separate oil reservoirs permit the fresh oil to be fed and filtered up through the waste to the bearing. The depth of oil in the reservoir is easily gaged so that the most economical height may be maintained. Suitable oil guards and wiper rings prevent the oil from reaching the inside of the motor.

Insulating Composition Material

An insulating material containing boron, which is called "boro-porcelain," is being made by Fred M. Locke, Victor, N. Y. With this material a low dielectric constant and high dielectric and mechanical strength are obtained while the coefficient of expansion is almost as low, it is declared, as fused silica. According to the manufacturer, the voltage required to arc over the surface of an insulator made of this material is 20 per cent to 30 per cent more than for one of high-grade porcelain, and the dielectric strength is 50 per cent greater than that of porcelain. It is especially adapted for use with high-voltage transmission lines.



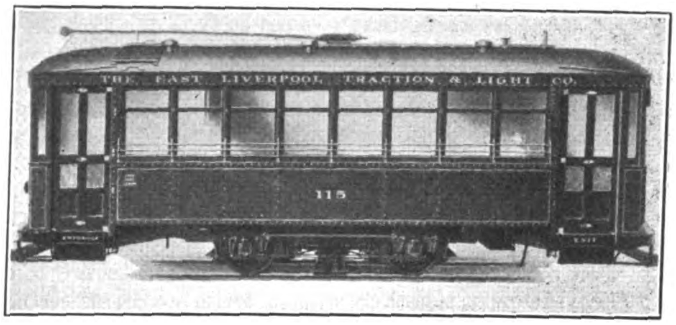
INSULATOR OF "BORO-PORCELAIN"

All-Service Cars for East Liverpool

The East Liverpool Traction & Light Company has recently received from the Niles Car & Manufacturing Company four single-truck cars of a rather unusual type. These have been designated as "all-service" cars, as they can be used for one-man or two-man operation, for near-side or far-side stops, for single-end or double-end equipment, or for either prepayment or interior collection of fares. At East Liverpool the new cars are being operated by two men, although later it is expected to use the cars in one-man service.

The control of all doors and steps is effected by removable handles convenient for the motorman or conductor. When the car is operated by one man all doors and steps are locked in closed position except those to the right-hand side of the motorman. When used as a two-man car the rear door on the right-hand side of the vestibule is opened and closed by a handle that is located on the line of the body end sill.

It is considered that the particular advantage in having a car built in this manner is that the one-man idea is more or less experimental on most electric railways, and with this car a railway is enabled to do its experimenting with different schemes of operating but without the expense of rearranging the car or of purchasing several different types. Should one-man service prove to be impracticable on any line owing to peculiar circumstances surrounding its operation two-man service could be resumed without rebuilding the equipment.



EAST LIVERPOOL ALL-SERVICE CAR—EXTERIOR VIEW SHOWING DOOR AND STEP ARRANGEMENT

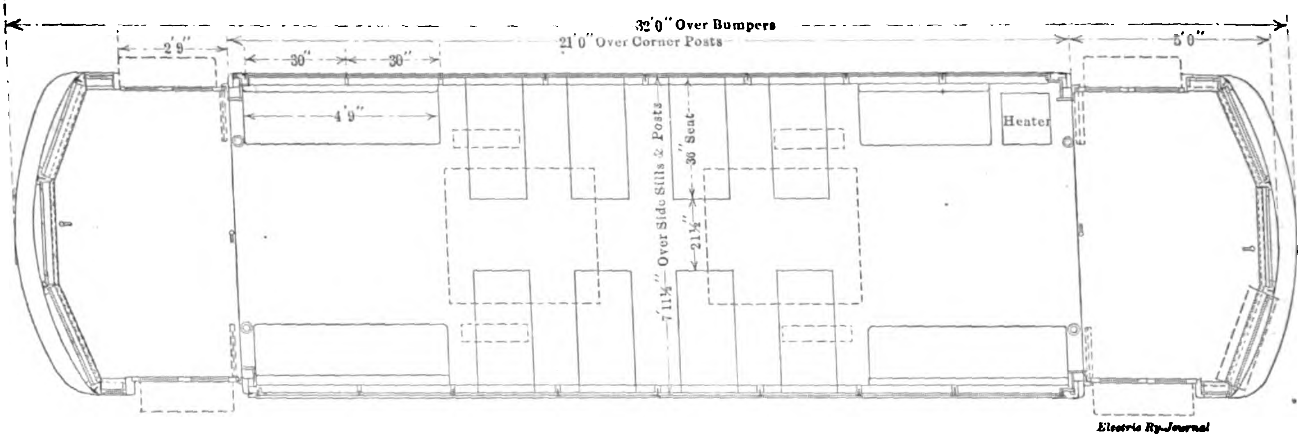
DETAILS OF CONSTRUCTION

The car frame is made up of standard, commercial, rolled-steel shapes and plates with sections as light as consistent with the necessary strength for service involving a maximum speed of 20 m.p.h. under ordinary operating conditions. All joints are riveted, welding having been permitted only where necessary to exclude water or where mechanical joints could not be made. Countersunk rivets are used only where round-head rivets could not be used, and no attempt has been made to conceal the rivet heads, as it was desired to advertise to the public the fact that the cars were made of steel through their different appearance from the old-style, smoothly-finished, wooden cars.

The general dimensions of the car are as follows:

Length over bumpers	32	ft.	0	in.
Length over vestibule	31	ft.	0	in.
Length over corner posts	21	ft.	0	in.
Length of platforms	5	ft.	0.	in.
Width over all	8	ft.	2	in.
Width over sills	7	ft.	10	in.
Height from bottom of sill to top of roof	8	ft.	8	in.
Height from floor to underside of ceiling	7	ft.	8	in.
Side-post spacing			30	in.
Width of door opening			33	in.
Height of floor			36½	in.
Diameter of wheels			33	in.

The floor and roof are sheathed with wood, the former being of 7/8-in. yellow pine laid longitudinally on the underframing, with the customary floor strips mounted



EAST LIVERPOOL ALL-SERVICE CAR—PLAN SHOWING SEAT AND PLATFORM ARRANGEMENT

upon it. The roof is of the turtle-deck type and is provided with six Globe ventilators. The roof sheathing is 7/16-in cypress and this is nailed to white-ash carlins which are reinforced by the steel T-irons which form the framework of the sides and roof.

A fully-inclosed vestibule is provided at each end of the car. This is depressed 9½ in. below the car floor to provide step heights of 13½ in. and 13 in. respectively. The vestibules are sheathed inside and out with No. 14 gage sheet steel, and the vestibule sash are arranged to drop into the space that is thus provided.

The posts are 2-in. x 2-in. x ¼-in. steel tees riveted to the side sills, the belt rail, the top plate and the steel side sheathing. The sheathing below the windows which forms the plate girder that carries the load is composed of No. 14 gage steel made up in three sections. The side sill and belt rails are composed of steel angles, the former having 3-in. x 4-in. legs, and the latter 2½-in. x 2½-in. x ⅜-in. legs. The top plates, which are 3-in. x 2-in. x ¼-in. angles, are riveted to the top of the side post together with a letterboard of ⅛-in. steel plate that is riveted to the side post under the vertical leg of the angle top plate and welded at the joints.

EQUIPMENT

Eight reversible Hale & Kilburn walkover cross-seats are provided, together with four longitudinal seats. This gives a total seating capacity of twenty-six. The cross-seats are spaced on 30-in. centers so that they are symmetrical with the windows. The windows are equipped with Edwards sash locks and have pantasote curtains with Curtain Supply Company's metal rollers and Forsythe ring fixtures.

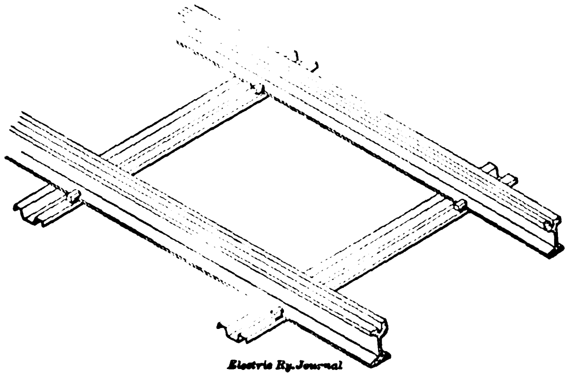
The headlining is of 3/16-in. agasote equipped with molding to relieve the monotony of the headlining, the interior finish in general being attached to wooden battens which are bolted to the steel frame. The interior finish is of natural dull cherry with sanitary finish, but the ceiling is painted cream color. The side walls below the windows are sheathed with ¾-in. compressed cork covered with ¼-in. agasote that is finished in cherry color.

Each end of the car is equipped with an Esterline "Golden Glow" headlight and also with a Peacock brake drum and a bronze ratchet handle. The lighting equipment provides for two lamps in the headlight, six in the main body of the car and two in the vestibules. These are wired five in series with No. 14 flexible wire. The lights in the body of the car are hung in Dayton shade holders equipped with Alba reflectors for 36-watt tungsten lamps. All the switches and fuses for lighting circuits are inclosed in a cherry cabinet lined with transite at one end of the car. The usual push buttons and a Consolidated signal buzzer are also provided. A Peter Smith No. 3-P forced ventilation hot-air heater is installed in one corner of the car.

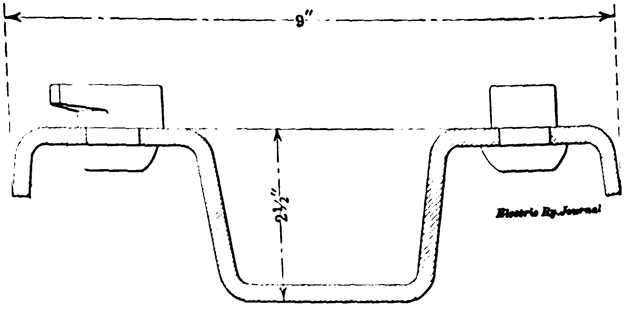
The power circuits are all laid in metal conduits installed in accordance with the Underwriters' specifications. The trucks are Baldwin Locomotive Works, Class X, with an 8-ft. wheelbase and 33-in. cast-iron wheels mounted on 4½-in. axles.

A Trough-Shaped Steel Tie

The Cambria Steel Company, Johnstown, Pa., has in wide use for mine and industrial railways the Slick rolled-steel tie which has also been made available in a larger and heavier form for street railway service. As shown in the accompanying sketches, the tie is of trough shape with broad wings or flanges, the entire construction being intended to provide ample bearing surfaces on the ballast or concrete. The rail fastenings are flanged buttons so attached to the ties that they cannot be misplaced or lost. It is asserted that when these fastening buttons are turned over the rail flanges and the tie bedded, they will hold the rails on the ties indefinitely.



PERSPECTIVE SHOWING RAILS ON TROUGH-SHAPED TIES



Cross Section of Tie

SECTION OF TROUGH-SHAPED STEEL TIE, INCLUDING RAIL FASTENINGS

News of Electric Railways

SUBWAY FRANCHISE TAXABLE

The Supreme Court of the United States on April 12 sustained the Court of Appeals of New York, in holding that the Interborough Rapid Transit Company must include its earnings from the subway in the amount upon which its franchise tax is paid. In its opinion, handed down by Justice Holmes, the court seemed to accept the corporation's view that the statute under which the subway was constructed amounted to a contract exempting the operator from taxes upon his interest in it, but in sustaining the lower court the federal tribunal adopted the reasoning that the franchise tax, though measured by earnings on exempted property, was not a tax on that property but merely on the privilege of operating it in a corporate way.

It was pointed out at the offices of the Interborough Rapid Transit Company that the effect of the decision of the Supreme Court with regard to the franchise tax would be merely that the company would have to resign its claim to about $1,500,000, which it has already paid to the State. According to the established practice of the company, it has paid the sum demanded each year under protest, and consequently it will not now have any heavy arrears to make up.

SYRACUSE STRIKE SETTLED

Compromise in Controversy Involving Amalgamated Association and the Brotherhood

The strike on the lines of the Empire United Railways, Syracuse, N. Y., is over. The difficulty involved, namely, the recognition of one union against another, is regarded as presenting one of the most peculiar labor situations in the history of electric railroading. For three years the Empire United Railways have had a labor contract with the Brotherhood of Locomotive Engineers and the Order of Railway Conductors. Last year the men on the Auburn & Syracuse Electric Railroad were organized by the Amalgamated Association, and a contract was made with that organization providing for the same wages as the men were then receiving. This year the Amalgamated attempted to organize on the Empire United Railways and succeeded in inducing a few men to join the organization, but the company refused to make a contract with the Amalgamated on that road, inasmuch as it had a contract with the Brotherhood. This contract the Amalgamated declined to recognize, and when the company still refused to deal with the representatives of the Amalgamated they called a strike. So far as the Empire United Railways was concerned the strike was a failure. Not a trip was lost by that company, and it is reported that it did not even have a car behind schedule. The Auburn & Syracuse road, however, was completely tied up, not a wheel turning from Thursday morning, April 8, until noon Monday, April 12.

No question of wages was involved. The only issue was the question of recognition of the Amalgamated as against the Brotherhood. If the company made a contract with the Amalgamated, it was in trouble with the Brotherhood, and vice versa. Furthermore, after the Auburn & Syracuse road was tied up, the men in the employ of the New York State Railways in Rochester, Syracuse and Utica, whose tracks the Empire United used for terminals, voted to strike if the Empire cars were permitted to run into the city. The Buffalo union threatened the International Railway with similar action in connection with the Buffalo entrance. To prevent interference with its running rights the Empire United, in behalf of its own cars and the Buffalo, Lockport & Rochester, secured a writ of injunction forbidding New York Railways—Rochester Lines, from refusing to accept the Empire cars. A similar injunction in favor of the Auburn & Syracuse was secured in Syracuse on April 9 against the Syracuse lines, after the trolley and feed wires just outside the city limits had been cut.

A conference in Chicago on April 10, between Horace E. Andrews, of the New York State Railways; W. D. Mahon, of the Amalgamated Association, and W. S. Stone, president of the Brotherhood, brought no result. Later, through the efforts of J. H. Lynch, State Commissioner of Arbitration of New York, a compromise was reached whereby the Empire United Railways agreed to recognize and make a contract with the Amalgamated substantially the same as that in existence on the Auburn & Syracuse Road, such agreement, however, not to violate or in any way affect the contracts between the company and the Brotherhood. To this the representatives of the Brotherhood acquiesced. The terms of the settlement were left to arbitration.

The Empire United Railways had beaten the union on that property and was in a strategic position which indicated a similar result on the Auburn & Syracuse. The fear of provoking a general strike all over New York State with its far-reaching consequences finally induced the management to agree to a compromise. Public sympathy was not with the men, and even such newspapers as have occasionally been hostile to the company expressed a lack of sympathy with and disapproval of the strikers.

LABOR AGITATION ON COAST

Attempted Seattle Strike—Agitators Repulsed in Portland and San Francisco

From all indications no further effort will be made to organize the employees of the Puget Sound Traction, Light & Power Company, Seattle, Wash. No demonstrations have occurred since the affair of March 31 when labor agitators stopped cars of the company and attempted to force the trainmen to join the union. A statement issued by the company follows in part:

"The disgraceful scene enacted in Seattle under the guise of a strike of street railway employees is directly traceable to the incendiary utterances of one Samuel Atkinson, a professional organizer and agitator, and William B. Fitzgerald, executive board member of the Amalgamated Association. The meeting called at the Labor Temple was for the express purpose of attempting to stampede the trainmen from their cars. The plan for the stampede has been discussed for some weeks past. The tactics employed by the agitators in this affair are the same as those employed in riotous scenes in other cities. The fact is that the crowd was assembled at the Labor Temple and the meeting was opened by officers of the temple and subsequently turned over to Atkinson and one Flyzik, aided by Fitzgerald. After haranguing the crowd and working them up to a point where they were ready for anything, word was given and they started forth on their mission of destruction, while Messrs. Atkinson, Fitzgerald and Flyzik and their assistants kept in the background and watched the result of their work.

"Atkinson and Fitzgerald canvassed the trainmen of this company for weeks and tried by every means to bring about the organization of our men. They played what they considered a trump card. The attitude of the trainmen was not a surprise to us, and the fact that they did not surrender their individuality and rights as American citizens to the domination of the hide-bound, narrow-minded organization of street car men is distinctly to their credit. That our faith in their loyalty has been more than justified is something of which this community should feel justly proud. That we are gratified goes without saying."

Samuel Atkinson, general organizer of the Amalgamated Association, is quoted in part as follows:

"The work of education will go on—we are not quitting, but we are wise enough to know when we are not wanted. We shall not again try to organize these men until we are assured that they are good union material."

Employees of the Portland Railway, Light & Power Company, Portland, Ore., have voluntarily signed a statement addressed to the officers of the company pledging their loyalty to their employers. After the disorder in Seattle, it was reported that attempts would be made to organize a strike among the men in Portland. The Portland men have an organization, the Brotherhood of Electric Railway Employees, officered and managed entirely by the men.

It was stated in San Francisco on April 5 that an attempt by the Amalgamated similar to that made in Seattle was contemplated there. These plans were discovered well in advance and are said to have resulted in thirty men being dismissed by the United Railroads. Charles N. Black, vice-president of the company, is quoted as follows:

"It is particularly unfortunate that professional organizers from other parts of the country should select this of all times to start anything in this city. There are ten men looking for a job to every man I will let out. It is also bad for the general welfare of the city that any attempt to create a disturbance should be initiated. San Francisco is making special efforts to attract visitors from everywhere; times are hard and there are plenty of people out of work."

CANADIAN RAILWAY PROPOSALS

The Forest Hill Electric Railway, Toronto, Ont., failed on March 30 to secure another extension of time from the railway committee of the Ontario Legislature for the construction of its proposed line.

The bill of the Toronto & York Radial Railway before the railway committee of the Ontario Legislature has been defeated. The company asked permission under old charters to run lines to Oakville and Newmarket, and several lines through York Township.

The Ottawa & St. Lawrence Railway's bill before the railway committee of the Ontario Legislature has been thrown out by the committee. The plan was to build between Ottawa, Morrisburg, Smith's Falls, Arnprior and Carleton Place. The company wanted a further two years' extension in which to spend 15 per cent of the total cost of construction.

The Eastern Ontario Railway asked the Ontario Legislature for an extension of two years in which to commence construction of its line through Whitby, Ont. Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, announced before the railway committee that he was opposed to the bill as it was against the Hydro-Electric Radial interests. In consequence the committee rejected the measure.

The Toronto, Barrie & Orillia Railway asked the Ontario Legislature for five years in which to complete the line. The company has already constructed 7 miles of the line. This bill has been passed with an amendment to the effect that the 7 miles must be placed in operation before the rest of the road is proceeded with and that the Hydro-Electric Commission of Ontario be permitted to take the road over at cost.

The following resolution respecting the subsidization of hydro-radials was unanimously passed by the City Council of Toronto on April 8 and will be forwarded to Ottawa:

"Resolved, that this Council respectfully urges upon the dominion government the necessity of declaring its policy with respect to such subsidies, and that said policy be so expressed that it will allow provincial public service commissions with powers from the provinces similar to those given to the Hydro-Electric Power Commission of Ontario, to anticipate said subsidies and proceed with the immediate construction of the roads."

NEW YORK COMMISSION INVESTIGATION

Statement of Probable Recommendations of the Legislative Investigation Committee

It was stated on April 9 that the salient recommendations of the report of the Thompson legislative committee on its investigation of the Public Service Commissions of New York would be the authorization of the first district commission to supervise telephone companies in New York City; reduction of the second district commission from five to three members; insistence upon the inforcement of the law making corporation officials criminally liable for failure to obey decisions, and the appointment of deputies of the commissioners to take depositions as to facts.

It is expected that the Thompson report will be accompanied or closely followed by bills providing for the changes recommended. A majority of the committee believes that the up-State commission does too much detail work and will recommend the reduction to three members, and that deputies hereafter shall investigate complaints and take testimony of fact to be presented for the adjudication by the commissioners.

THE NEWPORT FRANCHISE

The proposed street railway franchise for Newport, Ky., was discussed at a meeting in the Mayor's office in that city on April 6, when President Cartwright and Secretary Polk Laffoon, of the Cincinnati, Newport & Covington Railway, Mayor Helmbold and members of the City Commission representing the city, and a committee from the Business Men's Club were present. The railway officials object to section No. 9, which gives the city control of the operation of the road, and to the portion relating to the settlement of labor troubles and to the 3-cent fare required within the city limits. If the company must operate within the city for 3 cents then the rate to Fort Thomas and across the bridges into Cincinnati must be more than 5 cents. It would be impossible to make a transfer arrangement with the Cincinnati lines, as the portion the latter lines would receive under a 3-cent fare would not be adequate for that company. Objections were also made to the proposed rental charge of $1,500 per route-mile per annum for the use of the streets. The city officials claimed that the company should pay no rental on the Cincinnati end of the line, but should contribute to the Kentucky cities, since the passengers were all taken into Cincinnati to transact business. It was finally agreed that the railway officials should redraft the franchise.

At a conference between city officials and representatives of the railway on April 13, all of the disputed questions on the proposed new franchise, with the exception of the rental to be paid the city, were practically cleared away. Mr. Laffoon proposed that the control of service be subject to rearrangement at the end of each five-year period in order that changing conditions may be taken into consideration. The question of rentals will be discussed by the representatives of the city and the company at a future meeting.

HEARINGS ON CINCINNATI TRANSIT BILL

A public hearing on City Solicitor Walter M. Schoenle's rapid transit bill took place at the Business Men's Club in Cincinnati, Ohio, on April 9. The draft of the bill was discussed section by section. A number of amendments of minor importance were made.

At a public meeting on April 10 the Schoenle bill was again discussed. Suggestions made at a former meeting had been incorporated in the draft. Representative Paul P. Rover expressed the belief that some of the provisions are unconstitutional and could not be enacted into law. Mr. Schoenle said that a State law would be required to secure the construction of a rapid transit loop. George Puchta of the Rapid Transit Commission said that it would be impossible to have a private corporation build the road and take city bonds in payment for it. It is understood that the bill will be brought before the Senate utilities committee at once.

On April 14 A. S. White presented a new plan to the Rapid Transit Commission by which the loop would be built in units. The commission will probably take no action on this or any other proposition until the Legislature acts on the Schoenle bill.

The Behne bill, which was passed in the Senate on April 8, may introduce a problem in this case if the House of Representatives acts favorably upon it. It provides that if a bond issue for an enterprise of this kind is to carry with it the faith and credit of the municipality, it must be submitted to a vote of the electors and receive more than two-thirds of the votes. Where Council authorizes the issue the lien is on the property alone.

Senator C. F. Bauer introduced a bill on April 6 providing for a rapid transit commission for Cincinnati. His purpose in doing this, with Mr. Schoenle's bill in course of preparation, is not clearly understood.

Plans are now being made to extend the Cincinnati approach of the Suspension Bridge from Second Street to Third Street. This will make a difference in the route that will be taken by the Cincinnati, Newport & Covington Railway and in the franchise that will be necessary for it.

TOLEDO FRANCHISE COMMITTEE DISCHARGED

A resolution offered by Councilman Redd and adopted by the City Council of Toledo, Ohio, on April 12 resulted in the discharge of the franchise committee, which has served many months, and the appointment of a new committee. The resolution provided that all the members of the new committee should be members of the Council and that four members of the old committee should be members of the new one. These provisions operated to sidetrack Mayor Keller and City Solicitor Thurstin, who had been members of the old committee. The committee appointed in conformity with the resolution consists of President Hassenzahl and Councilmen Redd, Sievert, Dotson, Hein, Brown and Ruppel, the last four having been members of the former committee. It was stated that the other two members of the old committee had not co-operated with the Council members in endeavoring to reach an agreement on the franchise question and that they were apparently unwilling to do so.

On April 8 Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, expressed his conviction to the Citizens' Franchise Association that it will be necessary to raise among Toledo people the money for any improvements that are to be made on the road. About $1,500,000 will be needed for this work. A resolution has been adopted by the Central Labor Union to the effect that the legislative committee of that organization investigate the cause of delay on the two ordinances before the Council providing for the issue of $8,000,000 bonds for the purchase of the local railway property.

QUESTIONS UP AT CLEVELAND

Opposition developed to the proposed construction of a crosstown line on 123d Street, Cleveland, Ohio, at a meeting of the street railway committee of the City Council on April 12. The matter will probably not come to a vote in the Council for some time.

The rate of fare on the Cleveland, Southwestern & Columbus Railway between Cleveland and Berea was discussed in the County Commissioners' office in Cleveland on April 15. Village Councilmen insisted that the fare be reduced from 15 cents to 10 cents, but the company officials stated that if forced to that point it would run no cars through Berea after December, 1916, when the franchise expires. The company has been asked to aid in the improvement of the streets used by it in the village and a new franchise was requested in return.

The officials of Lakewood, a suburb of Cleveland, and Peter Witt, street railway commissioner of Cleveland, have been unable to agree upon the features of the franchise which will secure for the village an extension of the West Madison route. Mr. Witt has demanded that the village so amend its regulations regarding interurban traffic that interurban cars will not be required to stop for local passengers. Mr. Witt has announced that he will ask for legislation for two more new carhouses.

REPORT OF CONNECTICUT COMMISSION

The third annual report of the Public Utilities Commission of Connecticut for the year ended June 30, 1914, is largely a volume of statistics for the corporations under the jurisdiction of the commission. These included twenty-three street railways, an increase of eight during the year. On June 30, 1914, the total amount charged by all reporting railways for construction and equipment was $91,095,017, of which $20,991,977 was for construction, $43,992,510 for equipment and $26,110,529 for miscellaneous properties outside of the street railway holdings of the Connecticut Railway & Lighting Company. The total capital stock as of June 30, 1914, was $73,055,900 and the funded debt $21,051,578. The total operating revenues of the companies for the year amounted to $15,656,593, an increase of $377,324, while the total operating expenses were $10,119,014, an increase of $546,813. The net operating revenues totaled $5,537,589, a decrease of $169,485, but the gross corporate income was $7,470,344, an increase of $74,054. The total addition to surplus by all operating companies was $269,158, a gain of $297,307. The total mileage operated in the State was 1505.87, and the total cars owned, 3530, of which 3075 are with electric equipment.

CALIFORNIA RAILROAD COMMISSION REPORT

The California Railroad Commission has just issued its annual report for the year ended June 30, 1914. The financial tables presented, however, are for the year ended June 30, 1913. On that date the total amount of capital stock outstanding for electric railways in California amounted to $244,378,952, while the funded debt totaled $162,595,342. The gross revenues were $36,077,841, and the operating expenses, $22,963,578, leaving a net revenue of $13,094,263. Taxes and interest totaled $9,487,526, so that the net income amounted to $3,606,737. The total number of passengers carried was 683,228,905, of which 526,424,880 were fare passengers, 554,570 revenue transfer passengers and 156,249,455 free transfer passengers. The total single-track mileage operated as of June 30, 1913, was 2805.25, of which 147.11 miles were constructed during the year.

Up to June 30, 1914, valuation work had been completed by the commission for twenty-eight companies, four of which were the following electric railways: Los Angeles Railway Corporation, San Francisco-Oakland Terminal Railways, Petaluma & Santa Rosa Railway and San Francisco, Napa & Calistoga Railway. A little attention in valuation matters was also devoted to the Northern Electric Railway, Oakland, Antioch & Eastern Railway, Pacific Electric Railway, Visalia Electric Railway and United Railroads of San Francisco.

HEARING ON NEW HAVEN BILL

The legislative committee on railroads gave a hearing at the State House at Hartford, Conn., on April 8 to the New York, New Haven & Hartford Railroad on its bill to amend its charter to bring about changes in the financial administration of the company, in accordance with the new policy decided upon by its directors. The bill provides that the company shall not hereafter exercise or possess any of the rights, privileges, powers, or franchises possessed by the Consolidated Railway prior to the merger of the New Haven company with and into the Consolidated Railway on May 31, 1907, except such as may be required for the operation, maintenance or improvement of any property which it now owns or operates, or for the sale, of any property, except such as may be required to generate or transmit electricity, and it shall not hereafter acquire any securities issued by any other corporation. The measure also provides that not less than two-thirds of its directors shall be citizens residing in New England.

The legislation which is being sought in Connecticut is in accordance with the effort to obtain the passage of harmonious and constructive bills so as to bring about the financial readjustments which are proposed. The trustees of the Boston & Maine Railroad are trying to secure legislation that will enable them to adopt a plan of readjustment. The bills of the New Haven company having this end in mind are now before the Legislatures of Massachusetts, Rhode Island and Connecticut. In Massachusetts the bill of the company has the unanimous approval of the Public Service Commission of that State.

Ohio Commission Resignations Asked.—Governor Frank B. Willis of Ohio has asked for the resignations of fourteen members of various state commissions, among them C. C. Marshall and Oliver H. Hughes of the Public Utilities Commission. Both Mr. Marshall and Mr. Hughes were appointed by former Governor Cox.

Ohio Bills Reported for Passage.—The Britton bill giving interurban terminal companies the same rights on the streets of municipalities as steam railroads now have was reported to the House of Representatives for passage by the public utilities committee on April 7. This committee also reported the Myers bill for passage. It authorizes interurban railways to join the railroads in the construction of union passenger depots and joint terminals.

Ohio Municipal Ownership Bill Passed.—The Behne bill, pertaining to the issue of bonds for the purchase or construction of utility plants by municipalities, was passed by the Senate of Ohio on April 7. It provides that where a municipal council authorizes a bond issue for this purpose by ordinance, the bonds shall be a lien on the utility property only. If it is desired that the faith and security of the municipality shall stand for the bonds, the matter must be submitted to a vote and receive a majority of two-thirds of the votes. After three years a certain amount of the income of the plant must be set aside to pay the interest and as a sinking fund to retire the bonds.

Railway Men Learning to Run Electric Trains.—A class in electricity at the Pennsylvania Railroad Y. M. C. A. in Philadelphia is fitting 278 employees of the system to man electric trains to Paoli, when the new service opens on June 1. Nearly half of the class, 128 students, are engineers and firemen of steam locomotives, who want to be transferred to the new branch of the service. The class is under the general supervision of the mechanical instruction committee of the Railroad Y. M. C. A. The electric features are being taught by Clarence Roberts, assistant foreman of engines of the Philadelphia Terminal Division, and the air-brake features are in charge of Russel M. Smith, the division's air-brake instructor.

Washington Utility Law Amended.—An amendment to the public utility law of the State of Washington has been adopted recently. By it the doctrine of "regulated monopoly of public utility service" will be placed on the statutes of the State, and in addition the law places privately-owned and municipally-owned utilities on the same basis. Any new public utility under the recently amended law must secure a certificate of public convenience and necessity from the State Commission before beginning business, and this certificate may only be granted after public hearing. The law defines public utility as used to mean "every street railway, interurban railway, electric, water, gas and steam heating plant and system and vessel now or hereafter constructed and whether municipally or privately owned."

Advertising "Electrical Prosperity Week."—An appropriation which will be sufficient to insure the advertising of "Electrical Prosperity Week" in every city and town in the country, was recommended by the "Electrical Prosperity Week" committee, which met on April 7 at the Engineers' Club, New York. This recommendation will be submitted on April 19 to the directors of the Society for Electrical Development, Inc., for approval. The committee's recommendation as to plans carried with it an appropriation of $50,000 for special expenditures such as printing and extraordinary expenses. In addition to this the society will devote part of its regular appropriation to the work. This will make the society's expenditures more than $100,000. Figuring all costs, it is likely that fully $500,000 will have been spent before the close of the campaign.

Dual System Modification in Connection with Cars.—The Public Service Commission for the First District of New York has sent to the Board of Estimate & Apportionment for approval an agreement modifying the dual system contract with the Interborough Rapid Transit Company, so as to relieve that company from the necessity of paying into the depreciation fund $1,618,950 for the 478 composite cars, which the commission recently ordered removed from the subway. As the company proposes to use the trucks and motors of these cars for all-steel car bodies, the proposed modifying contract cuts down the required depreciation payment from $1,618,950 to $530,355, which represents the accrued depreciation upon trucks, motors, etc., plus $40,000, estimated as the accrued depreciation on the all-steel car bodies, prior to the beginning of permanent operation under the new contracts.

Conference of Pan-American Finance.—All the countries of the New World have indicated unofficially their desire to accept the invitation of the United States to take part in a Pan-American financial conference to be held in Washington next month. Arrangements are being made by Secretary McAdoo so that, in addition to the distinguished foreign delegates, a large number of representative bankers and financiers of the United States will attend. Aside from the unusual conditions which the war offers, it has been pointed out as an essential reason for calling the meeting that capital for the development of Central and South America for many years has been furnished by Europe, and that the great bulk of American exports has been sent to that continent. The financial and commercial relations between Europe and the western hemisphere have been developed and promoted, while commercial and financial relations among the American republics themselves have been long neglected. Means of correcting this condition will be discussed.

Public Service Commission of Pennsylvania.—Five bills embodying suggestions of counsel for the Public Service Commission of Pennsylvania for amendment of the public service company law of 1913 have been introduced into the Legislature by Mr. Forster, Philadelphia. They will be sent to the judiciary general committee, which has referred all bills of that character to a sub-committee for study. The bills presented include the following: Conferring on the commission authority to suspend rates for ninety days; empowering the commission to appoint examiners to sit at any place designated and to receive testimony from litigants, thus enabling hearings to be held anywhere in the State; doing away with the necessity of obtaining the commission's consent to making of contracts between municipalities and public service companies, but retaining the power of the commission to regulate rates and service and to prevent useless and wasteful competition by acting on franchises; abolishing the requirement of approval of contracts for joint use of poles, but retaining the right to regulate and to rule in complaints; providing for fees of witnesses before the commission.

Asks Advance of Traction Cases in Ohio.—United States District Attorney McPherson on April 9 submitted to the United States Court of Appeals at Cincinnati a motion to advance the hearings on the appeals of several electric railways against former Collector of Internal Revenue Bettman and Collector Gilligan. The suits were brought to secure the refund of taxes alleged to have been illegally assessed against the companies. United States Judge Sater found that they had exercised charter rights in purchasing property and issuing bonds during certain years for which taxes were assessed and that they are not entitled to certain of the refunds claimed. The plaintiffs in error in the cases are the Columbus, Newark & Zanesville Electric Railway, the Dayton & Western Traction Company, the Fort Wayne, Van Wert & Lima Traction Company, the Indiana, Columbus & Eastern Traction Company and the Cincinnati Street Railway. All these roads except the Cincinnati Street Railway are under lease to the Ohio Electric Railway and contend that as lessor companies they are not subject to the excise tax imposed under the federal corporation income tax law.

Seattle Bond Procedure Questioned.—Seattle's municipal street railway bond issue, authorized by the voters in 1911, in the sum of $800,000, may be held invalid, as a result of the offering for sale of $125,000 of the securities. Preparation of the transcript showing all of the preliminary steps looking to the bond issue, has developed the fact that the bill authorizing the submission of the proposition to the people was introduced at a charter meeting of the City Council on Jan. 3, 1911, and was passed at an adjourned meeting of the Council on Jan. 9, 1911. There was a week between introduction and passing, but at that time the charter provided only two charter meetings a month, on the first and third Mondays, so that the meetings on the second and fourth Mondays were adjourned meetings. In 1913 the city sold $300,000 of the securities to the State of Washington. The Supreme Court validated the bonds, the point of introduction and passage at the same charter meeting of the Council not being raised. This money was used for the construction of Division "A" of the present municipal system. It is proposed now to sell $125,000 of the railway bonds in order to pay loans made to the street railway fund from other funds. Caldwell, Masslich & Reed, New York, N. Y., have been employed to pass on the various bond issues that are to be offered for sale in May.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The next meeting of the Central Electric Railway Association will be held on June 17 and 18 on a boat which will make a forty-eight-hour round trip from Cleveland to Buffalo and return.

Financial and Corporate

ANNUAL REPORTS

Washington Railway & Electric Company

The comparative statement of income, profit and loss of the Washington Railway & Electric Company, Washington, D. C., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Gross earnings from operation	$5,048,435	$4,943,315
Miscellaneous income	33,890	10,221
Total earnings	$5,082,325	$4,953,536
Operating expenses (including taxes)	*2,863,736	2,669,971
Gross income	$2,218,589	$2,283,565
Fixed charges:		
Interest	$1,147,534	$1,104,576
Miscellaneous	29,582	22,339
Total	$1,177,117	$1,126,915
Surplus	$1,041,472	$1,156,650

*Includes depreciation of equipment six months ended Dec. 31, 1914, in accordance with Interstate Commerce Commission's classification of accounts effective July 1, 1914.

In spite of the adverse business conditions of 1914 and the unusual increase in passenger earnings in 1913 on account of the presidential inauguration, the gross earnings for 1914 increased $105,130 or 2.1 per cent. Miscellaneous earnings increased twofold, while the total earnings increased $128,789 or 2.6 per cent. The explanation given for this good showing is that Washington is in no sense an industrial center and it felt little financial depression during the year in comparison with conditions that prevailed in other large cities.

The operating expenses for 1914 showed an increase of $193,765 or 7.2 per cent. These amounts are not directly comparable, however, for the 1914 total includes $43,571 for depreciation of equipment during the last six months of the year under the Interstate Commerce Commission classification effective on July 1, 1914. The gross income of the company decreased $64,976 or 2.8 per cent, the fixed charges increased $50,202 or 4.4 per cent and the surplus decreased $115,178 or 9.9 per cent.

The report states that early in the year it became necessary to decide whether a policy of retrenchment should be adopted in view of the general business depression. It would have been easy to abandon or postpone certain improvements, but the management decided to go forward on broad lines, with the result that there was disbursed or set aside for maintenance and depreciation $853,328, being nearly $50,000 more than in any previous year. The net expenditures by the railway companies for additions, extensions, betterments and new equipment amounted to $129,242. The net expenditures by the Potomac Electric Power Company for similar purposes amounted to $265,012. The total mileage of the system by an addition of 2.058 miles is now 168.78 miles, In the mechanical department the following work in part was done: 170 double-truck cars equipped with air brakes; one electric locomotive and three line cars built complete; 115 cars painted; fifty trucks and motors transformed from winter pay-as-you-enter to open summer cars, and vice versa; 152 cars equipped with new style fender and wheelguard rigging, and five standard waiting stations have been built.

During 1914 a total of 465 claims was settled at an expense of $134,112. The year's work of the medical department included: 5231 office and 1967 house calls made; 143 operations performed; 1837 surgical dressing cases; 180 consultations with outside physicians, followed by detailed reports to the claim department; 825 vaccinations of employees. Under the profit-sharing plan the amount received on Jan. 1, 1915, by trainmen, depot clerks and starters who had been in service for a year or more was $27.17. This was less than the previous payment of $42.53 on account of increased damage claims. Three accidents alone diminished the 1914 check by $30.76. It is the opinion of C. P. King, president, that general co-operation was lacking during the year. A plan has been adopted for 1915, however, which will give due recognition to the more efficient employees, both by marking them for preferment and by increasing their share under the profit-sharing system.

Delaware & Hudson Railroad

The annual report of the Delaware & Hudson Railroad, New York, N. Y., for 1914 states the following in regard to allied electric railways: The gross operating revenues of the United Traction Company, Albany, N. Y., decreased $47,272; Hudson Valley Railway, Glens Falls, N. Y., $43,508; Schenectady (N. Y.) Railway, $89,199, and Troy & New England Railway, Troy, N. Y., $940, while those of the Plattsburgh (N. Y.) Traction Company increased $1,832. The decreases in net operating revenues were as follows: United Traction Company, $201,379; Hudson Valley Railway, $48,659; Schenectady Railway, $92,294; Troy & New England Railway, $634, and the Plattsburgh Traction Company, $713.

The business depression, particularly during the latter part of the year, adversely affected the revenues of all the traction companies, while, at the same time, various causes increased cost of operation. The unusually severe weather in the earlier months of the year very greatly increased the cost of removing snow and ice. The United Traction Company's cost of power is steadily increasing, owing to operation of heavy modern steel cars and inability to purchase the additional power as cheaply as under the first contract. Effective July 1, 1914, various operating employees were granted increases in wages, amounting to about $15,000 for the last six months of the year. Similar increases were granted to employees of the Hudson Valley Railway, aggregating approximately $3,000.

The Hudson Valley Railway, after several years of continued effort, has secured the right to cross Broadway in Saratoga, which will enable it to install a belt line service in Saratoga and materially to improve the through service between Albany and Glens Falls. A new concrete viaduct has been constructed over the Hudson River, connecting Glens Falls and South Glens Falls. A new bridge over the Barge canal south of Fort Edward has been completed, and the Whitehall bridge in Fort Edward has been raised 2.4 ft. to facilitate traffic on the Barge canal.

Besides other improvements, the use of heavier cars and the increased frequency of service of the United Traction Company have necessitated the erection of a new substation in Albany, to centralize the power distribution in that city so that delays to traffic may be avoided. This substation will have an ultimate capacity of 9600 kw and be completed in the spring of 1915 at a total estimated cost of $150,000.

The report makes note of the commission order of Dec. 11, 1914, requiring the United Traction Company to make changes in its facilities and services in Albany which, if they can lawfully be required, would necessitate capital expenditures that would involve raising $1,106,580 and entail material and continuing additions to operating expenses without being productive of any additional revenue. It is stated that from Jan. 1, 1907, to Nov. 30, 1914, the company expended $1,787,977 for capital purposes, and $206,310 is still to be spent for work in progress, while a sum of $166,826 will be required for paving in Albany and Troy under present plans. The new capital expenditures required by the order are felt to be not self-sustaining, and proceedings under the order have been stayed pending judicial decision in the matter.

As compared with 1907, the rates of wages of the conductors and motormen employed by the United Traction Company show an increase of more than 27 per cent, a result of resort to arbitration in settlement of labor difficulties. The pay of other employees has increased proportionately. The total payroll for 1914 was about $240,000 higher than it would have been except for these increases.

SECURITIES AUTHORIZED IN CALIFORNIA

The annual report of the California Railroad Commission states that during the year ended June 30, 1914, 154 applications for the issuance of securities were made for a total amount of $298,679,795, of which $217,564,768 was approved. Applications for $14,749,113 were denied, applications for $3,780,111 were dismissed and applications for $67,601,271 were still pending at the end of the year. During the year the electric railways of the State made applications for securities amounting to $66,589,859, of which $6,309,828 was authorized. Applications for $268,600 were denied, while applications covering $60,161,432 remained pending. The authorized securities were divided in class as follows: Stock, $824,058; bonds, $3,621,000; notes, $1,564,770, and certificates, $300,000. According to the purpose of issue, the new securities were divided thus: For refunding purposes, $223,000; for deposit as collateral, $1,533,000, and for additions and betterments, $4,553,828.

BIG IDAHO CONSOLIDATION

National Securities Corporation Formed to Acquire Properties in Southern Idaho and Adjacent Territory

The holders of the first and refunding mortgage bonds of the Idaho-Oregon Light & Power Company, Boise, Idaho, who had deposited their bonds with the Priest protective committee, have received from that committee a circular stating that the committee has purchased the property at a foreclosure sale and is now working on the details of the reorganization plan. The Idaho-Oregon Company has been controlled by the Idaho Railway, Light & Power Company. Now the National Securities Corporation has been organized for the purpose of acquiring properties in southern Idaho and adjacent territory, and it has acquired the interests of the Idaho Railway, Light & Power Company and the Idaho Power & Light Company and is in the process of acquiring other properties. Since the purchase of the Idaho-Oregon property by the committee, it has procured from the National Securities Corporation a proposal to purchase the bonds deposited with the committee, paying therefor in securities of the National Securities Corporation. The Committee has entered into an agreement covering the details of the proposed purchase, subject to the assent of the depositing bondholders.

The following plan is therefore submitted by the committee: Holders of Idaho-Oregon bonds, par value $1,000, will receive in exchange the following securities from the National Securities Corporation: $450 par value in thirty-year 6 per cent gold debenture bonds, $450 par value in thirty-year 6 per cent income bonds and $400 par value in common stock or voting-trust certificates. No preferred stock is to be issued now; when issued, it will be used for the conversion of the debentures and the income bonds, or for acquiring cash or property. The debentures are the senior securities of the company except a temporary issue of ten-year 6 per cent collateral-trust notes, which it is contemplated will be ultimately retired with the proceeds from the securities of the underlying companies. These collateral notes have been subscribed for at 90 with a bonus of common stock, and the right is granted to all assenting depositors to participate at the same price as the original subscribers, pro rata.

DEFAULT IN DES MOINES

Des Moines City Railway Defaults Payment of Interest on Bonds—Franchise Difficulty and Jitney Competition the Causes

The Des Moines (Ia.) City Railway has defaulted the April 1 payment of interest and sinking fund on its $2,408,000 of 5 per cent refunding bonds. The company's present position is said to be primarily caused by the fact that it has found it absolutely necessary to make very material expenditures for improvements and additions in order that its property might be well maintained and at the same time that it might carry on its franchise litigation and negotiations. Under the circumstances it could not sell bonds to reimburse it for the expenditures made for improvements and additions, and accordingly was obliged to create a floating indebtedness now amounting to $1,202,914, payment of which was demanded. Furthermore, a decrease in earnings on account of jitney competition lowered the working capital, and the default necessarily followed.

For some years the Des Moines City Railway has been in litigation with the city in connection with its franchise rights. The Supreme Court of Iowa about two years ago rendered an adverse decision to the effect that the company's franchise was not considered to be perpetual, as claimed by the company, but had in reality expired. The company was given until March 22, 1915, to secure a new franchise, and the time was later extended by the Iowa Supreme Court to June 22, 1915. During the last two years the company exerted every possible effort to obtain a new franchise, but without success. As a result of the expenditures which it was called upon to make in connection with the franchise litigation and negotiations and also with the very material expenditures for improvements and additions, the company about exhausted its credit and cash resources.

The Illinois Trust & Savings Bank, as trustee, has instituted proceedings in the United States District Court in behalf of the bondholders to establish the contention that the franchise has not expired. It is expected that a bondholders' committee will be organized in the very near future. Pending the settlement of the suit the bondholders have applied for a restraining order to prevent interference by the city. The franchise situation now seems to be improving as a result of the present situation. The Chamber of Commerce has taken active steps in investigating the jitney situation and from this point of view plans to aid the company in securing a satisfactory franchise.

According to a statement issued by Harris, Forbes & Company, New York, the strong position of the company from the point of view of earnings is shown by the following figures for 1914: gross earnings, $1,371,044; operating expenses and taxes, $934,716; net earnings, $436,328; bond interest, $141,610; and amount available for interest on floating indebtedness, depreciation, etc., $294,718. In view of the value of its physical property and its earning capacity the company is said to be conservatively capitalized with a net indebtedness of $3,941,914.

LEASES TO CITY PROPOSED

Long Island Railroad and New York & North Shore Traction Company Suggest Lease of Lines by City

Ralph Peters, president of the Long Island Railroad, has submitted to the Public Service Commission for the First District of New York a formal proposition for the leasing by the city of part of the Long Island tracks to Whitestone and Little Neck, to be used in connection with the city's rapid transit line to Corona. Mr. Peters suggests that the agreement should provide for a trackage arrangement to cover a period of ten years with the privilege of renewal for a similar period, the agreement to be terminable upon three years' notice by either party. He asks as rental $250,000 a year and in addition wants the city to pay its proportion of the cost of operation and maintenance as well as a certain percentage of the cost of additional tracks, stations and other facilities. The commission has referred the proposal to its chief engineer and counsel for reports. Under the law, as it stands at present, there is some doubt whether the commission has the right to lease privately-owned tracks for this purpose, and in order to remove this doubt the Legislature has been asked to pass an amendment to the rapid transit act. The draft of a bill for such amendment has been forwarded to Albany by the commission.

The New York & North Shore Traction Company, which operates an electric railroad in Queens County from Flushing to Whitestone and to the city line of New York at Little Neck, together with an extension in Nassau County, has made a proposition to the Public Service Commission for the First District to lease its lines to the city for use in connection with the new rapid transit system at an annual rental of $98,761.50, which represents 5 per cent on the bonds and 6 per cent on the stock of the company. The commission has the matter under consideration.

Chicago (Ill.) Railways.—The directors of the Chicago Railways have declared the full 4 per cent interest on the $2,500,000 of non-cumulative adjustment income bonds, payable on May 1 for the year ended Jan. 31, 1915.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—The Cleveland & Eastern Traction Company has called a special meeting on May 3 to amend its charter so that it may sell electric current for light and power. The company purchases current at wholesale from the Cleveland Electric Illuminating Company.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Columbus Railway, Power & Light Company has filed a new $5,000,000 first and refunding mortgage to the Girard Trust Company, Philadelphia, as trustee.

Kansas City Railway & Light Company, Kansas City, Mo.—The Dennis committee, representing a large majority of the holders of $5,478,000 of 6 per cent collateral gold notes of the Kansas City Railway & Light Company, has issued a circular urging further deposit of the notes by May 15. This is similar to the circular sent out to holders of the $10,200,000 of first lien refunding 5 per cent bonds, as noted in the ELECTRIC RAILWAY JOURNAL of April 10. The committee states that an immediate separation of the stock ownership in the street railway and electric light properties, under existing financial conditions, presents serious difficulties and it may become necessary to foreclose very promptly the various mortgages resting upon the properties and upon securities representing these properties. Proceedings are already in progress to foreclose the mortgages upon the street railway properties which constitute in part the security under the note agreement. Such foreclosures probably would necessitate the purchase of the pledged securities by holders of certificates of deposit representing the notes deposited with the committee. For this reason as large a deposit of notes as possible before May 15 is desired. Mayor H. L. Jost is reported to have expressed his belief that a reorganization of the street railway properties will be effected before the expiration of the time limit on July 7.

Long Island Railroad, New York, N. Y.—At the annual meeting of the Long Island Railroad on April 13 L. L. Kellogg, representing Dick Brothers & Company and other minority stockholders, protested against the re-election of the retiring directors. The entire board, however, was reelected by a vote of 170,404, 135,878 votes being cast by the Pennsylvania Railroad. The total minority vote was 25,317. Prior to this meeting Herbert C. Lakin had been elected a director to succeed A. J. County, resigned.

Memphis (Tenn.) Street Railway.—The directors of the Memphis Street Railway have deferred the usual quarterly dividend of 1¼ per cent on $2,500,000 of 5 per cent cumulative preferred stock.

Monterey & Pacific Grove Railway, Monterey, Cal.—The California Railroad Commission has refused to authorize the Coast Valleys Gas & Electric Company, which controls the Monterey & Pacific Grove Railway, to issue $100,000 of bonds until the question is settled as to who is the guarantor of $300,000 of thirty-six-year 6 per cent bonds of the subsidiary company. After several transfers the railway came under the ownership of the Coast Valleys Gas & Electric Company, but this company contends that the guarantee of the railway bonds made at the time of first issuance was either assumed by one of the intervening parties in ownership or did not pass from the original guarantor. The commission holds that it has no power to adjudicate the question of liability and suggests that the parties settle the matter between them or take it to court. The controlling company for a time paid the interest on the railway bonds but suddenly discontinued to do so. A recent default in bond interest on the part of the railway was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

Mt. Vernon (Ohio) Railway.—On April 6 Robert L. Carr was appointed receiver of the Mt. Vernon Railway and instructed to operate the property until further orders from the court. This action was the result of a petition filed by N. L. C. Kachelmacher, president of the company, who presented a claim for $4,125 for services rendered.

Northern Electric Railway, Chico, Cal.—On March 29 the holders of the underlying bonds of the Northern Electric Company voted to grant the bankers' syndicate an extension of thirty days within which to carry out its reorganization plan. The suggested plan, as stated before in the ELECTRIC RAILWAY JOURNAL, embodies five agreements. It is reported that the sufficient signatures for all except the last have been obtained to render these provisions operative. Under the last agreement, which calls for subscriptions at 90 for $1,400,000 of underlying bonds, it is said that only about one-half had been subscribed for prior to March 30.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—At the annual meeting of the Oakland, Antioch & Eastern Railway on April 5, 56,000 of the 87,000 shares of outstanding stock were represented. The annual report showed a total of 124 miles of track and 586,000 passengers. The gross revenue was $542,180; the operating expenses, $394,689, and the gross operating income, $147,623. Five new directors were added, as follows: Jesse W. Lilienthal, C. Osgood Hooker, F. H. Beaver, A. Haas, and H. A. Lardner. Former members of the board of directors who were re-elected are Walter Arnstein, S. L. Naphtaly, H. C. Breeden and J. S. Walter. H. T. Scott and H. A. Mitchell are to be added to the board at a later meeting.

Ohio Traction Company, Cincinnati, Ohio.—The Ohio Traction Company has sold to Cincinnati bankers and Ervin & Company, Philadelphia, an issue of $1,500,000 of 6 per cent gold coupon notes dated March 1. The authorization of these notes by the Ohio Public Utilities Commission was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 6.

Philadelphia Company, Pittsburgh, Pa.—The directors of the Philadelphia Company have declared a quarterly common stock dividend of 1½ per cent, payable in cash on May 1 to holders of record on April 17. This payment compares with 1¾ per cent paid quarterly from August, 1912, to February, 1915, inclusive, although the November, 1914, and the February, 1915, payments were made in scrip.

Public Service Corporation, Newark, N. J.—The Public Service Corporation of New Jersey has applied to the Board of Public Utility Commissioners for approval of an issue of $5,000,000 of bonds and $8,300,000 of stock by the Public Service Newark Terminal Railway. These new issues are to cover the construction of the Newark terminal with connecting tracks to the Public Service Railway, costing about $6,000,000, and to provide for the sale at par to the Public Service Corporation of $7,500,000 of capital stock in exchange for an equal amount of obligations of the Public Service Railway. Subject to approval by the board, it is proposed to consolidate the Public Service Newark Terminal Railway and the Public Service Railway, after which the stock of the railway will be issued share for share for the stock of the terminal company. It was stated by counsel in a hearing on the application that the perpetual interest-bearing certificates of the Public Service Corporation would receive as additional security $7,500,000 of stock of the Public Service Railway now represented by floating indebtedness ranking prior to the certificates, and also an additional $800,000 par value of stock of the railway represented by the stock interest of the terminal company in the terminal property. J. E. Aldred has been elected as his successor and as a member of the executive committee.

United Railways & Electric Company, Baltimore, Md.—It is announced that Francis E. Walters has resigned from the board of directors of the United Railways & Electric Company. J. E. Aldred has been elected as his successor and as a member of the executive committee.

United Railways Investment Company, San Francisco, Cal.—Although the United Railways Investment Company has changed its fiscal year to June 30, as previously announced in the ELECTRIC RAILWAY JOURNAL, the company is presenting a general balance sheet and a statement of income, profit and loss for the year ended Dec. 31, 1914, for the information of its stockholders. Its income during this year amounted to $1,949,199. Its expenses were $80,012 and other charges $1,147,977, a total of $1,227,989. The net income for the year amounted to $721,209. The addition of the profit and loss surplus at the beginning of the year, amounting to $5,222,528, and the subtraction of a profit and loss credit of discount on bonds purchased for the sinking fund, amounting to $75,146, gave a profit and loss surplus as of Dec. 31, 1914, of $6,018,883.

Virginia Railway & Power Company, Richmond, Va.—The Philadelphia Stock Exchange has listed an additional $180,000 of preferred stock of the Virginia Railway & Power Company, making the total preferred stock listed $7,879,400.

Warren, Brookfield & Spencer Street Railway, Brookfield, Mass.—On April 8 the property of the Warren, Brookfield & Spencer Street Railway was sold at public auction to Frank L. Palmer, Saco, Maine, for $160,000. Mr. Palmer's bid was the only one made. As noted heretofore in the ELECTRIC RAILWAY JOURNAL, four attempts were previously made to sell this road for an upset price of $150,000, but last February the receivers secured permission from the court to reduce the amount to $50,000. It is believed that the property was purchased by Mr. Palmer for the bondholders, who will later reorganize and form a new company.

West Jersey & Seashore Railroad, Camden, N. J.—Joseph W. Cooper has been elected a director of the West Jersey & Seashore Railroad to succeed N. Parker Shortridge, deceased.

DIVIDENDS DECLARED

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Connecticut Railway & Light Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Denver & Northwestern Railway, Denver, Col., quarterly, 1 per cent.

Green & Coates Streets Passenger Railway, Philadelphia, Pa., quarterly, $1.50.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 2½ per cent, common.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Mar., '15	$408,880	......	......	......	......
1 " " '14	415,528	......	......	......	......
3 " " '15	1,255,167	......	......	......	......
3 " " '14	1,251,340	......	......	......	......
ATLANTIC SHORE RAILWAY, SANFORD, MAINE					
1m., Feb., '15	$20,961	*$19,977	$1,604	......	......
1 " " '14	18,835	*22,139	2,644	......	......
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO					
1m., Feb., '15	$25,260	*$16,594	$8,666	$10,939	†$2,274
1 " " '14	24,813	*16,232	8,580	10,829	†2,248
2 " " '15	52,972	*33,613	19,359	21,900	†2,541
2 " " '14	53,627	*33,027	20,599	21,618	†1,017
FT. WAYNE & NORTHERN INDIANA TRACTION, FORT WAYNE, IND.					
1m., Jan., '15	$152,083	*$88,586	$63,497	$49,678	‡$14,138
1 " " '14	161,341	*92,406	68,935	47,407	‡21,656
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.					
1m., Jan., '15	$473,192	*$199,436	$273,756	$33,566	$240,190
1 " " '14	487,055	*204,653	282,402	32,570	249,832
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., Jan., '15	$62,079	*$36,818	$25,261	$16,986	‡$12,676
1 " " '14	62,650	*35,682	26,968	17,103	‡13,390
7 " " '15	491,370	*279,831	265,482	118,901	‡108,252
7 " " '14	463,586	*265,483	198,103	117,317	‡94,902
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1m., Feb., '15	$89,201	*$68,734	$20,466	$35,991	†$15,525
1 " " '14	90,021	*63,821	26,201	35,285	†9,084
2 " " '15	187,837	*140,546	46,991	71,917	†24,925
2 " " '14	195,509	*132,301	63,209	70,342	†7,133
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Feb., '15	$260,451	*$164,986	$95,465	$50,854	$44,611
1 " " '14	248,006	*154,878	93,128	50,031	43,097
2 " " '15	541,289	*346,964	194,325	101,105	93,220
2 " " '14	518,966	*326,169	192,797	99,493	93,304
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY					
1m., Feb., '15	$1,833,772	$1,090,922	$742,856	$812,147	†$69,291
1 " " '14	1,779,009	1,096,891	682,119	802,233	†120,114
8 " " '15	15,777,297	9,163,401	6,613,896	6,472,515	141,381
8 " " '14	16,025,075	9,434,982	6,590,093	6,401,075	189,018
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., Jan., '15	$436,197	$205,144	$231,052	$137,720	‡$99,508
1 " " '14	441,823	204,473	237,349	135,409	‡108,532
7 " " '15	3,068,902	1,467,164	1,601,737	948,283	‡700,385
7 " " '14	3,060,942	1,467,629	1,593,312	938,227	‡708,803
WESTCHESTER ELECTRIC RAILROAD, MOUNT VERNON, N.Y.					
1m., Feb., '15	$16,079	$20,445	$4,365	$1,384	†‡$5,748
1 " " '14	14,909	20,435	5,525	1,164	†‡6,677
8 " " '15	175,280	181,032	5,752	10,270	†‡15,933
8 " " '14	169,431	170,127	695	8,743	†‡9,265

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

Buffalo, Portland, El Paso and Tuscon Added Cities Which Have Passed Ordinances—One State Bill Passed and Others Pending

The ordinance governing the operation of the jitney in Buffalo, N. Y., was signed by the Mayor on April 6. The measure makes it unlawful for any person to use any streets in Buffalo for the operation of any motor vehicle for the carriage of persons at hire, at a rate of fare of 15 cents or less for each passenger, without first securing a license. Applicants for permission to operate in the city must file with the city clerk a map of the designated route, together with a statement containing the schedule to be maintained, the number of cars to be operated and the fare. All applications for permission to operate are to be referred to the committee on streets of the City Council for a public hearing. The Council may approve or modify any or all such routes, operating schedules or headways. The license fee is to be as follows: for each vehicle not to exceed five passengers, $75; for each vehicle having a capacity of more than five but not more than ten passengers, $100; and for each vehicle having a carrying capacity of more than ten passengers, $150. Before the license is granted the applicant must file a bond for $5,000 for one vehicle and $1,000 for each additional vehicle. If the applicant elects to do so, he may, in lieu of giving the bond, deposit $5,000 with the city treasurer for one car and an additional sum of $1,000 for each additional vehicle.

The ordinance regulating jitneys and automobile buses in Portland, Ore., has been passed by the City Council. It will go into effect on May 2. Among the provisions of the ordinance are the following: drivers must secure license. A license fee of $2 per month for all machines carrying seven or less passengers, and 25 cents per seat per month for larger machines. Machines must follow routes designated in the license. Service must be maintained from 6 a.m. to 10 a.m., and from 3:30 to 11 p.m. On Sunday, service may be started at 7:30 a.m. The fare is fixed at 5 cents. Machines carrying fourteen passengers or more are to stop at all railroad crossings. The number of passengers is limited to the seating capacity of the machine. Drivers are to take an examination. Machines are to be officially inspected monthly. Drivers must be at least eighteen years old. Routes are not to be changed except by permission of the commissioner.

On April 1 the City Council of El Paso, Tex., passed an ordinance regulating the jitney. This measure goes into effect on April 24. It provides among other things that no person shall operate an automobile in passenger service without first securing a chauffeur's certificate; that an examining board shall be appointed by the Mayor to pass upon all applicants for certificates; that each motor bus operated in the city shall be licensed by the city; that applicants for city license shall state their name, residence and business address, the number of vehicles to be run and the seating capacity of each car; that a bond shall be executed before the license is issued, such bond to be in the sum of $5,000 for the operation of less than six vehicles, $10,000 if the number is more than six and does not exceed ten and $15,000 if the number exceeds ten.

Favorable action has been taken by one board of the General Council of Louisville, Ky., on an ordinance which provides for the regulation of the jitney in that city and, it is stated, approval of the other board and that of the Mayor is assured. Only one vote was cast against the measure in the lower board. The principal provision of the ordinance is for the deposit by every operator of every jitney bus of a $5,000 surety bond or other security to that amount whenever a license is taken out. Licenses are graduated from $10 to $25 a year, according to the seating capacity of the vehicles, and it is provided that each machine in such service shall display on it the name of the owner or operator and the route and destination of the car; that no machine may be run except by licensed chauffeur and that where the owner runs his own car he must have such a license. No machine shall be operated while persons are sitting or standing on the running boards or anywhere else except inside the car. Penalties of from $10 to $25 are provided for violation of any provision of the measure, each day the violation is persisted in to count as a separate offense.

The ordinance regulating the jitney passed in Tucson, Ariz., provides that drivers shall name a specified route over which they propose to run their cars and show that there is a need for such service as it is proposed to establish. They must agree to run their cars at specified hours of the day. Where a permit is approved an indemnity bond for $2,500 for each bus must be filed with the Council, and all buses seating less than seven passengers must pay in advance a license of $15 a quarter. Buses seating from seven to ten passengers must pay $20 a quarter, and larger buses must pay $30 a quarter.

A measure to regulate the jitneys is before the City Commissioners of Rock Island, Ill. The ordinance makes it necessary for those who intend to engage in passenger transportation to secure a license. Owners must designate the route intended to be traveled. The commissioners are empowered to modify any route or operating schedule. Every owner must pay the sum of $100 in advance for each machine carrying from one to five passengers, $125 for each car carrying from five to seven passengers, and $150 for each car carrying more than seven passengers. The indemnity bond is fixed at $10,000 for not more than two cars and at $20,000 for more than two. No vehicle is to be permitted to carry passengers in excess of its seating capacity.

The Frailey bill to regulate the jitney has passed the Senate of the Iowa Legislature and is expected to pass the House. The measure provides a law empowering city councils of all cities and towns to regulate jitney traffic by requiring license fees, fixing streets and routes upon which the jitneys must operate, and requiring the filing of indemnity bonds to protect the city and the public. Penalties for violations are provided. When the bill becomes a law the Des Moines City Council is ready to pass an ordinance as it provides. The aim of the proposed Des Moines ordinance is to protect the public from irresponsible operators. Emil G. Schmidt, president of the Des Moines City Railway, believes that competition from the jitney will be lessened when the new law goes into effect. Des Moines now has ninety jitneys in operation. The Frailey bill was published in full in the issue of the ELECTRIC RAILWAY JOURNAL of April 10, page 733.

The Thompson bill pending in the Senate of New York, referred to in the ELECTRIC RAILWAY JOURNAL of April 3, makes jitneys common carriers and subject to the public service commission law and also gives cities the right to regulate their operation. The measure was passed by the Senate on April 14. The companion bill in the Assembly is before the judiciary committee.

Governor Carlson of Colorado on April 10 signed a bill making jitney buses and companies public utilities and placing them under control of the State Public Utilities Commission.

The matter of regulating the jitneys in Atlanta remains unsettled. City Attorney James L. Mayson recently ruled that jitneys could not be required to apply for franchises. In view of this declaration Alderman Albert Thomson said recently: "If we are going to have jitneys permanently in Atlanta we should charge them for the use of the streets just as we do the Georgia Railway & Power Company. If we lack sufficient authority over the streets to require franchises we should apply to the Legislature. It might be a good idea to pass a prohibitive license until we are able to secure proper regulation."

A bill to regulate the jitney is before the City Commissioners of Galveston, Tex. The measure provides for licensing motor-bus operators, fixing the license fees as follows: for each motor bus seating five persons or less, including the driver, $30 a year; six or seven persons, including the driver, $35; eight to fifteen persons, including the driver, $45; sixteen to twenty-nine persons, including the driver, $55; thirty or more persons, including the driver, $75. A minimum indemnity bond in the sum of $5,000 is suggested.

Attorney-General Walter C. Owen of Wisconsin has rendered an opinion to the effect that the jitney does not come under the provisions of the Wisconsin public utility act. He says that the jitney should be classed with taxicabs and the hack. The jitney bus business is essentially a private one.

The jitney made its appearance in Seattle, Wash., on Dec. 14. Approximately 650 cars were in operation in the latter part of February. On April 8, however, approximately 300 were in operation. It is believed that 90 per cent of the cars in operation in the city are five or seven-passenger touring cars. No restrictive legislation had been passed by the municipality up to April 8 other than to revise the general traffic ordinance of the city, requiring that drivers of cars for hire pass an examination as to their ability as drivers and their condition of health. Some few drivers have been found unfit under these examinations, but the number of cars which have had to suspend on this account is not appreciable. At the recent session of the Legislature the State passed a bill over the Governor's veto requiring that all auto buses file with the Secretary of State an indemnity bond in the sum of $2,500, as noted previously in the ELECTRIC RAILWAY JOURNAL. This law went into effect on April 10.

Chief of Police Lang of Seattle, Wash., made the point on April 1 that in fifty-nine days there were 334 accidents from the jitney in that city. Of this total 199 resulted in damage to the machines, ninety-six visited greater or lesser bodily injury upon passengers, and thirty-nine caused injury to both passengers and vehicles. He recommends the restriction of the jitney bus to paved thoroughfares where street cars do not run; a rule requiring the jitneys to be lighted after dark; the stationing of police officers along jitney routes; provision against overcrowding, and suspension of jitney drivers for violation of rules of traffic.

It is reported by the jitney associations in Kansas City that as many as 70,000 persons have been carried as passengers in the buses and touring cars in a single day in that city. Some forty buses are now in service. One of the newest buses has windows which operate like those in street cars, and is equipped with electric lights. This bus has seats for twenty passengers and has straps for ten more. The opening of the Federal League baseball season in Kansas City brought out many buses and private cars to take patrons to the game. Many men in Kansas City are investing their savings in jitneys, companies are being formed, and in some cases men of small means have pooled their savings in order to put three or four buses in service. Despite the increase in the number of automobiles the Metropolitan Street Railway carried within 10 per cent of the normal number of passengers during March. The question of single or double indemnity for personal injuries received while a passenger on a jitney seems likely to be settled in favor of double indemnity by the casualty companies. One of the leading companies is known to have paid double indemnity to a policyholder who was injured in a jitney accident, and other companies are declaring that they will pay double indemnity. A few still leave the matter in doubt. So far as known, however, no company is writing jitney liability insurance in Kansas City.

The Vincennes (Ind.) Traction Company has announced that it will hereafter sell six tickets for 25 cents or twenty-five tickets for $1. At the same time Louis J. Fohr, president and superintendent of the company, announced that he would seek to obtain the approval of the city of his plan to place only one trainman on each car instead of both a motorman and a conductor. It is said that the changes which are proposed are due in a measure to the competition of the jitney.

The executive committee of the Safety First Federation considered the matter of the jitney at an executive session held in New York on April 8. Among those who attended the conference were Charles M. Talbert, director of streets of St. Louis; John Gillespie, police commissioner of Detroit; and W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America. The conference being executive no report of the proceedings is available, but Mr. Talbert expressed himself at length to the newspaper men in regard to the menace of the jitney in St. Louis. It will be recalled that it was Mr. Talbert who invoked the police power in St. Louis against the jitney. Mr. Talbert spoke particularly about the menace of the second-hand car in jitney service. He said that in St. Louis a large supply of discarded cars, so broken down that private owners would not risk using them, was rolled out from the scrap heap for use as jitney buses. In consequence the city officials ordered all jitneys to be inspected at the city automobile garage once every two weeks and limited the carrying capacity of the cars. He was quoted to the effect that a comprehensive plan of regulation was dropped a few days before a local election, as the politicians feared the effect of this plan on the voters. Mr. Mahon is reported as having said that the Amalgamated Association plans a nation-wide campaign against the jitney because street railway employees are being laid off. The Amalgamated Association was prepared to urge that as a matter of fair play, the jitney drivers should be compelled to put up a bond of $10,000 to indemnify the victims of accidents.

Although the local transportation committee of the Chicago City Council looks with favor on some of the proposed 10-cent bus lines, it has criticised Montague Ferry, commissioner of public service, for devoting so much of his time to some of these projects, he having prepared and introduced an ordinance for a bus service and taken interest in securing signatures to bus petitions.

Municipal Traffic Engineer Kirkpatrick, of Portland, Ore., reports that since the completion of his recent survey of the jitney situation in that city, no new cars have been added to the service and that forty-five of the cars then in service have been put out of business by accidents. Mr. Kirkpatrick reports that many other former jitney drivers have gone out of business, but that their cars are being operated as jitneys by new owners. Mr. Kirkpatrick says that jitney drivers when they realize that there is no profit in the business sell their cars and retire quietly. He says: "It is my opinion, from careful observation and study, that the jitney business will adjust itself. It will need no regulation. I know of many jitneys that are for sale and I know of a long list of others that have been sold. The State license transfer records also show this fact. Appreciable slumps in the business will be seen when the cars now operating begin to wear out, or the repair bills become excessive by reason of age. I can see no possible way for touring car operation in regular service to become profitable."

Competition among the jitney operators in Atlantic City, N. J., has become so keen that the fares have been cut in some instances to 3 cents. The men operating jitneys on Atlantic and Pacific Avenues conceived the idea that it would be advisable to co-operate and attempt to secure from the city an exclusive franchise to members of the Jitney Omnibus Association. Cold water was promptly thrown on this proposal by Theodore Schimpf, city solicitor, who said that the proposal to license twenty drivers and eliminate all others was unconstitutional. Riding in an automobile is certainly not a novelty to most of the visitors to Atlantic City, and this fact has been advanced to explain the keen competition for the limited amount of patronage which is available.

Many of the daily papers throughout the United States have used in prominent places extracts from the article on jitney costs which was published in the ELECTRIC RAILWAY JOURNAL of Feb. 13, from the other articles on the jitney which have appeared in this paper, and from the literature on the jitney issued by the American Electric Railway Association.

ADEQUATE SERVICE QUESTION

Convenience of Public Limited Only by the Constitutional Limit of Confiscation

The Public Service Commission of the State of Washington has issued an order restoring service of Alki and Fauntleroy Street cars through Town to Virginia Street; directing the Puget Sound Traction, Light & Power Company to provide seats for substantially all persons using these cars, and insisting on continuation of through service on the Ballard Beach Street line. The order is of considerable interest on account of the reference which it contains to the subject of adequate service. The commission said in part:

"The service for which the company is entitled to receive compensation in the form of a return on its investment is the service defined by law that is adequate and sufficient. The law does not authorize the company to demand a return on its investment for providing a service which is 50 per cent adequate and sufficient, or anything less than 100 per cent adequate and sufficient. The measure of compensation to which the company may be entitled is not graduated according to the degree of proficiency with which it discharges its duty. The law does not authorize the company to demand one-half of a reasonable return on its investment for furnishing a service which is 50 per cent adequate and sufficient. Hence a proceeding such as this, to require the company to provide adequate and sufficient service facilities, is not a proceeding affecting rates.

"It is not incumbent upon the commission to make a valuation of the company's property before requiring the company to furnish adequate and sufficient service facilities. The company may not defend against such requirements by showing that the particular service demanded is not profitable, and in this case it is no defense for the company to show that a particular line of its system is or is not profitable. The sole question is the convenience of the public, limited only by the constitutional limit of confiscation. It is not contended it would be just or lawful to specify an unreasonable service; but a just and reasonable service that considers the frailties of women and others, who of necessity are required to use street cars, should at all times be required and furnished. A service which required patrons to stand for long distances is neither safe, adequate nor sufficient.

"The idea has been permitted to grow up that street railways shall not be required to furnish comfortable accommodations for all their passengers, and that in order to pay interest on bonds, dividends on stock and other charges, men and women must be subjugated to inconvenience and to unseemly conditions. This commission is not in sympathy with such an idea.

"The commission has ordered a valuation of the company's property. If it should appear upon the valuation that the company cannot provide adequate and sufficient service and at the same time earn a reasonable return upon its investment, the commission will increase its return. On the other hand, if it appears from a valuation of the company's property that the rate now charged is excessive, the commission will order the rates reduced."

A. L. Kempster, general manager of the company, is quoted in part as follows:

"There is little comfort in the declaration that the appraisal of the company's holdings may result in permission to increased rates. Such appraisal, though under way at the present time, will take a long time to complete even though we are throwing our books and records open to the commission's engineer and its field staff to facilitate the work. In the meantime, should we comply with the orders of the commission we would be compelled to shoulder a still further increase of losses. We have twenty days in which to appeal against the order of the commission, and proper action will be brought for this purpose in the immediate future."

Fare Boxes in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., installed fare boxes on the Troost and the Prospect lines on Easter Sunday.

Accident in Detroit.—Several persons were killed and about twenty others were injured on April 14 when a car of the Detroit (Mich.) United Railway was struck by a switch engine of the Detroit, Toledo & Ironton Railroad.

First Toronto Hydro-Radial.—The official opening of the London & Port Stanley Railway, which will be the first "hydro-radial" in operation in Ontario, is to be held on July 12. Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, will preside.

Running Board Equipment Completed.—More than fifty open cars of the Springfield (Mass.) Street Railway have been equipped with double running boards in compliance with the law passed in 1914, prohibiting the use of running boards that are more than 15 in. from the ground.

Change in Freight Rates.—The Empire United Railway, Inc., Syracuse, N. Y., has announced that effective on May 1, 1915, the charge for a motor freight car furnished for the transportation of freight by special service between local stations will be 60 cents per mile, with a minimum charge of $25 in addition to the regular freight charge.

Extension of Order Against Overcrowding.—On April 9 the board of health of New York issued overcrowding orders against the Smith Street and the Gates Avenue surface lines of the Brooklyn Rapid Transit Company. This makes a total of five orders issued against Brooklyn lines since the start of the crusade by S. S. Goldwater, commissioner of health.

New Jersey Rate Re-hearing.—The State Board of Public Utility Commissioners of New Jersey has granted the application of the Pennsylvania Railroad, Philadelphia & Reading Railroad and the West Jersey & Seashore Railroad for a rehearing of their request for permission to put into effect a schedule of advanced passenger rates between points within the State. No date was set for the rehearing.

Advance in Fare.—The Orange County Traction Company, Newburgh, N. Y., has announced that effective on June 1, local one-way fares in both directions between Newburgh and Orange Lake Park or between Walden and Orange Lake Park will be 10 cents, an advance of 5 cents between the hours of 2 p. m. and 12 o'clock midnight. The chartered car rate for one way or round trip between Walden and Orange Lake Park will be $10.

Hearing on Open Cars in Toronto.—The Ontario Railway board on April 7 took up the matter of abolishing open cars in Toronto, but adjourned the hearing until May 15. Alderman Gibbons contended that the open car was a menace. R. J. Fleming, manager of the Toronto Railway, opposed the change. He said that an order requiring center aisles would mean the rebuilding of all the cars. The width of the devil strip made it impossible to widen the cars.

Procedure in Regard to Complaints.—Upon motion of Commissioner William Hayward, the Public Service Commission for the First District of New York has directed its secretary to notify all public service corporations that failure upon their part to respond promptly to letters from the secretary in regard to informal complaints will be deemed sufficient reason for the institution of formal proceedings, requiring the attendance of the officers of the companies at the commission's offices.

Tickets as Prizes for Safety Essay.—One book of fifty street car tickets has been given by the Knoxville Railway & Light Company, Knoxville, Tenn., to each of forty-three pupils of the city's public schools for the best essays on safety first, written and submitted during March. At the same time the company announced that the offer was renewed for April and that winners would be awarded the prizes early in May. Every pupil in the city's schools is eligible to compete and one prize winner is chosen from among the essays submitted by each class.

Los Angeles Railway Wins Fare Case.—The District Court of Appeals in Los Angeles, Cal., handed down a decision on April 6 upholding the right of the Los Angeles Railway to charge 10-cent fares from the city to Eagle Rock, Glassel and other points in that district. The suit against the Los Angeles Railway was brought under the old public utilities act of 1878, which provides for a penalty against any street railway in each instance where an overcharge is demanded. This section is plain on the subject, but, according to the Appellate Court, it was completely repealed in 1911 by what is known as the California public utilities act.

Increase in Fare Proposed.—The Idaho Traction Company, Boise, Idaho, has filed with the Public Utilities Commission of that State a new schedule of passenger rates, to become applicable, if approved by the commission, on the interurban lines of the company. The new schedule asks for an increase from 2½ cents to 3 cents a mile in the one-way rates, and from 2¼ cents to 2½ cents a mile on the round-trip rates. The increase requested on commutation rates is from 1¼ cents to 1½ cents a mile, and on school rates from 1 cent to 1¼ cents a mile. This rate would cause an increase on a one-way ticket between Boise and Caldwell, from 75 cents to 85 cents, and on a round-trip ticket from $1.25 to $1.45.

Extension of Copper Zones in Indiana.—At the hearing held on April 12 before the Public Service Commission of Indiana on the petition of the Indianapolis & Cincinnati Traction Company to change the basis of its passenger fares from the nickel zone to the copper basis, the commission stated that it would issue an order granting the petition of the company for the change in its tariffs. The order will be substantially the same as that granted the Terre Haute, Indianapolis & Eastern Traction Company on March 29, which was published in the ELECTRIC RAILWAY JOURNAL for April 10, page 734. The fares will be based on the rate of 2 cents a mile for the distance actually traveled, ½ mile at 1 cent to be taken as the unit.

Cleveland Suburban Operating Controversy.—The contention between Peter Witt, street railway commissioner of Cleveland, Ohio, and the suburb of Lakewood has assumed a queer angle. Mr. Witt recently gave the village until May 1 to enact an ordinance permitting the interurban cars to run through its territory without stopping under penalty of having the day service on Clifton Boulevard reduced from ten to fifteen minutes and the night service eliminated entirely. Mayor Tyler, however, contends that the franchise granted to the Cleveland Railway in 1901 confers on the Lakewood Council the right to regulate car service between midnight and 6 a. m. Lakewood councilmen say that the interurban cars are going through their city by tolerance, and that they can be stopped at the boundary line if Council chooses to take action in that direction.

Freight Shipments Increase.—With arrival of spring and spring weather, the freight business of the Louisville & Interurban Railway, Louisville, Ky., has grown to considerable proportions, all manner of freight being carried, farm implements, seed, fertilizer, etc. C. H. Wyatt, general freight agent for the company, has been engaged for some years in impressing the farmers of the territory reached by the company's lines that their time, at seasons like this, is worth much more when spent or exerted in the fields than when given to hauling supplies out from town. New equipment in the way of motor-driven flat cars has been added to the service to take care of the increased business in coal and building materials. A recent development is that of the Ohio River Sand & Gravel Company in locating big bins on the tracks of the Louisville Railway. It is thus possible for these building materials to be loaded expeditiously and at low handling cost.

The Ohio Service Case.—In order to enable the company to carry its case to the United States Supreme Court the Ohio Supreme Court granted the Hocking Valley Railroad a temporary injunction on April 9, to prevent the Public Utilities Commission of Ohio from inforcing its order to the effect that electric railway service shall be resumed between Hamden and Wellston. As has been stated in the ELECTRIC RAILWAY JOURNAL, the company sought to supplant the electric service between these two points with a steam service. The commission ordered the company to resume electric railway service and the case was carried to the Ohio Supreme Court, which decided that the order was not unreasonable and refused to disturb it. The United States Supreme Court will be asked to decide the question of whether a particular kind of service may be discontinued on a certain branch line because it is unprofitable when it is not shown that the entire line is unprofitable.

Seven Years Without a Fatality.—*Safety* for March, 1915, published by the American Museum of Safety, New York, N. Y., contains the brief submitted by the Hudson & Manhattan Railroad in competition for the Brady medals of the museum. The company, in a letter by W. C. Fisk, the president, says: "The Hudson & Manhattan Railroad was a competitor for the Brady medals for the year ended June 30, 1914, and expects to compete continuously throughout the years to come. That this company was not successful in winning the medals this year is not an implication of any lack of safety appliances, or of constant effort on the part of the officers and employees to promote safety and health. This company enjoys a reputation of being 'the safest railroad in the world,' and we are happy to state that in the seven years from the beginning of operation, to Feb. 26, 1915, we carried 329,357,277 passengers without a fatality attributable to train operation."

Personal Mention

Mr. O. W. Brain, chief electrical engineer for railways and tramways to the New South Wales government, has accepted the position of president of the Electrical Association of Australia.

Mr. John A. Crilly, claim agent of the Hartford lines of the Connecticut Company, completed fifty years of service on April 7 with that company, the Hartford Street Railway and their predecessors. Mr. Crilly is sixty-eight years of age. He is active in civic affairs in Hartford and has served in the Council of that city.

Mr. A. Mueller has resigned as superintendent of the Mankato (Minn.) Electric Traction Company to become manager of the New York Department Store in Mankato. Mr. Mueller has been connected with the Mankato Electric Traction Company for the last five years, three years as cashier and bookeeper and two years as superintendent and purchasing agent.

Mr. J. E. Aldred has been elected a director of the United Railways & Electric Company, Baltimore, Md., to succeed Mr. Francis C. Waters. Mr. Aldred has also been elected a member of the executive committee of the company. Mr. Aldred was formerly president of the Consolidated Gas, Electric Light & Power Company, Baltimore, and the Pennsylvania Water & Power Company.

Mr. Emil N. Thyse has been appointed superintendent and purchasing agent of the Mankato (Minn.) Electric Traction Company to succeed Mr. A. Mueller, who as noted elsewhere in this column has assumed the managership of the New York Department Store in Mankato. Mr. Thyse has been connected with the Mankato Electric Traction Company for the last five years as a conductor.

Judge John W. Slocum, of the Monmouth County Common Pleas Court, last year's president of the Senate of New Jersey, was on April 2 appointed by Governor Fielder and confirmed by the Senate as a member of the State Board of Public Utility Commissioners to succeed Mr. Thomas J. Hillery, of Morris County. Mr. Hillery had been on the board since its creation and was the only Republican remaining of the three.

Mr. C. H. Robbins, chief clerk of the Yakima Valley Transportation Company, North Yakima, Wash., has been appointed superintendent of transportation, and Mr. Max Vestal, who has been chief electrical engineer, has been appointed superintendent of way and equipment. These appointments mark a slight change in the organization of the company's operating department, the two positions having been created following the recent resignation of Mr. F. H. Drake as superintendent.

Mr. William F. Turner, who has maintained an office in Portland, Ore., since 1911 as a consulting engineer, has been elected president of the Oregon Society of Engineers. Mr. Turner was born in Quincy, Ill., in 1858. He was graduated from Knox College in 1879 and from Cornell University two years later with a degree of M. S. After various engineering experiences Mr. Turner entered the employ of J. G. White & Company, in 1899 and continued with them until 1907. For that company he acted as managing engineer at Auckland, New Zealand, where he supervised the construction of electric tramways paving, conduits and power plants. Returning to New York he engaged in general engineering practice and subsequently accepted the appointment as Northwest manager for W. S. Barstow & Company.

OBITUARY

W. S. Walcott, formerly superintendent of the Salem division of the Bay State Street Railway, Boston, Mass., is dead. Mr. Walcott was born in Danvers on Feb. 9, 1862. He entered the employ of the Salem & Danvers Street Railway as a driver and later became connected with the Boston & Northern Street Railway.

Henry W. Poor, banker and internationally known as the publisher of *Poor's Manual*, died suddenly on April 13 at his home in New York. He was born in Bangor, Maine, in 1844, and received his education at Harvard University, from which he was graduated in 1865 with the degree of A. B., taking the degree of A. M. in 1872. Mr. Poor settled in New York immediately after graduation in 1865, and started in the banking and publishing business as a member of the firm of H. V. & H. W. Poor. He started publishing *Poor's Railway Manual* in the same year, and soon became widely known.

George Cutter, one of the pioneers of the electrical industry and the organizer and vice-president of the George Cutter Company, South Bend, Ind., died of heart failure on April 6, 1915, in Los Angeles, Cal. Mr. Cutter was born near Boston in 1853. He was intimately associated with the introduction of the Bell telephone in 1876. In 1881 he went to Russia for the International Bell Telephone Company. Two years later he became connected with the Thomson-Houston Company, and as engineer for that company he made a second trip to Europe. In 1889 he started in business for himself in Chicago in the manufacture of electrical appliances. In 1898 he organized the George Cutter Company, which designs and manufactures specialties for outdoor electric lighting.

J. A. Gaboury, whose death in Baltimore was noted briefly in the ELECTRIC RAILWAY JOURNAL of April 10, was born in Quebec, Can., in 1851. He moved to Florida in the early seventies and built several railway lines. From that place he moved to Montgomery, Ala., acquired control of the street railway properties, mapped out Capital City Park, and rendered other conspicuous services, among them being the application of electricity to the horse cars. Losing heavily by fire at Montgomery, Mr. Gaboury moved to Jacksonville to become general manager of the Jacksonville Mining & Manufacturing Company. He owned the waterworks plant there at the time of his death. In his career he built the street railway line at Columbus, Ga., the railway and electric light system at Bowling Green, Ky., and Greenville, Miss., and was interested in constructing sewerage systems at Macon, Ga.

W. A. Foote, vice-president of the Michigan Railway, Kalamazoo, Mich., and president of the Consumers Power Company and the Commonwealth Power Company, all of which are controlled by the Commonwealth Power, Railway & Light Company, died suddenly at his home in Jackson, Mich., on April 14. Mr. Foote was a native of Adrian, Mich. With his brother, J. B. Foote, W. A. Foote established the electric-lighting plant at Jackson many years ago, and subsequently organized the extensive interconnected transmission system which now links the towns and cities of central Michigan. Among the achievements of the Foote interests have been the construction successively of the first 72,000-volt transmission line, the first 100,000-volt line and the first 140,000-volt line. Mr. Foote was about sixty-five years old. He is survived by a widow and two daughters, also his brother, who is an officer of the Consumers Power Company and other properties.

CHICAGO UTILITIES WANT STATE CONTROL

At a hearing before the House committee on public utilities and transportation held in Chicago, Samuel Insull, president of the Commonwealth Edison Company, Chicago; Bernard E. Sunny, president of the Chicago Telephone Company, and Leonard A. Busby, president of the Chicago Surface Lines, were witnesses. Mr. Insull stated that he believed in regulation, but that if his company were left entirely alone for ten years the rate for electricity would be lower than with regulation. It would be a step backward to have utilities regulated by the city alone as opposed to State authority. Mr. Busby stated that he believed it was best to have a single commission for the whole State. He had no objection to a local commission divorced from petty politics.

THE KANSAS CITY STATION

A group of men interested in North Side property between the retail district and the Missouri River, were heard on April 6 by the Council committee in behalf of their project for an interurban railway station between Sixth Avenue and Seventh and Grand Avenue and Walnut Street. They urged the development of the North Side and predicted that ultimately cars on the interurban lines would have to be routed away from Main, Walnut and Grand Streets in the business district because of congestion. In that event the proposed site would obviate much inconvenience.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Wichita, Kan.—The Arkansas Valley Interurban Railway has asked the Council for a franchise for a line from Twenty-first Street west to Mascot Avenue and then north to the city limits.

Boston, Mass.—Charles S. Baxter, attorney for the Boston & Eastern Electric Railroad, appeared before the committee on street railways at the State House recently to urge the passage of the bill providing for an extension of the time within which the company must file the bond of $400,000 required by its charter for the construction and operation of its line. Mr. Baxter said that up to last January the people behind the Boston & Eastern Railway had expected to file the bond before April 1 of this year, to which time the General Court in 1914 had granted an extension, but had been unable to do so, and now ask for an extension to April 1, 1917.

Crystal, Mich.—The Muskegon-Saginaw Electric Company has received a franchise from the Council in Crystal to build an electric line on certain highways in the township and also to build a line through the village of Crystal. This is part of a plan to build an electric line to connect Muskegon, Casnovia, Crystal, Egelston, Moorland and Saginaw. [Jan. 13, '15.]

Port Huron, Mich.—The Detroit United Railway has been ordered by the St. Clair County Road Commissioners to move its tracks off a portion of the right-of-way of the main line in Port Huron. It is declared that the company has no franchise for the ground it is using.

Newark, N. J.—The Public Service Railway will ask the Council for a franchise across the Jackson Street bridge. The line will form a connecting link between the tracks on Market Street, Newark, and those on Fourth Street, Harrison. The Board of Public Utility Commissioners has approved the ordinance of West Orange empowering the Public Service Railway to operate an extension of its double track in Central Avenue from the dividing line between West Orange and Orange, westwardly to the westerly line of Valley Street.

Albany, N. Y.—The Public Service Commission for the Second District has received an application from the Lehigh-Buffalo Terminal Railway Corporation for a certificate of convenience and necessity, and for consent to issue $50,000 capital stock, and $5,000,000 debenture bonds for the acquisition of property and the construction of facilities at Buffalo. [Aug. 15, '14.]

Albany, N. Y.—The United Traction Company will ask the Council for a franchise to build a loop at Grand Street, Hamilton Street, Trinity Place and Madison Avenue and to extend its Arbor Hill line in Albany.

Buffalo, N. Y.—The International Railway has received an extension of time on its franchise to lay tracks in East and Delavan and West Delavan Avenue in Buffalo.

Niagara Falls, N. Y.—The Niagara River & Eastern Railway has applied to the Public Service Commission for a certificate of convenience and necessity to build an electric railway between Buffalo and Niagara Falls. [Dec. 12, '14.]

Wilmington, N. C.—The Wilmington & Philadelphia Traction Company has asked the Council for an extension of time on its franchise in which to build the new Washington Street and Boulevard extension in Wilmington.

Cleveland, Ohio.—The Cleveland Railway has asked the Council for a franchise for the extension of the Madison Avenue (N. W.) line from West 117th Street to Rocky River.

East Linden, Ohio.—The East Linden Electric Railway has received a franchise from the Council in East Linden. The company now holds a franchise for 3 miles outside the city limits, in Atcheson Avenue, Mock Road and Parkwood Avenue to East Linden. The Columbus Council has under consideration a franchise for this company, covering about ½ mile of line, south in Joyce Avenue from Fifth Avenue to a connection with the present system near the Leonard Avenue viaduct. [March 20, '15.]

Ottawa, Ont.—The Ottawa City Council has appointed a special committee to consider the construction of a bridge on Pretoria Avenue to permit of the extension of the Ottawa Electric Railway to Ottawa East.

Erie, Pa.—The Buffalo & Lake Erie Traction Company has received a twenty-five-year franchise from the Council for the double-tracking of East Sixth Street and a new line in West Seventeenth Street from State Street to Peach Street in Erie.

Montreal, Que.—The Quebec Legislature has extended the time within which the Town Council of Mount Royal may enter into agreements for the construction of electric lines in Mount Royal with the Montreal Tramways Company, or its subsidiary, the Public Service Corporation.

Richmond, Va.—The Virginia Railway & Power Company has asked the Council for a franchise to remove its tracks on First Street, from Duval Street south to Broad Street in Richmond.

Madison, Wis.—The Janesville & Madison Traction Company has asked the Council for a franchise for about 1 mile of new track in Madison. G. Pickhardt, 409 Washington Building, Madison, president. [Oct. 17, '14.]

TRACK AND ROADWAY

Marin County Electric Railways, Mill Valley, Cal.—The Railroad Commission has issued an order granting the Marin County Electric Railways an extension of time to and including July 1, 1915, within which to sell stock for the construction of its electric railway in Mill Valley. [March 6, '15.]

***Mountain Valley Water Company, Hot Springs, Ark.**—Surveys have been made and capital has been secured by this company for the construction of an electric railway from Hot Springs to Mountain Valley.

San Francisco, Cal.—Final arrangements have been made by the Supervisors to build a loop at the beach terminus of the Geary Street line in San Francisco, $2,300 being appropriated for the work.

Southern Pacific Company, San Francisco, Cal.—That the old Valencia Street line of this company eventually will be made the nucleus of a fast suburban electric system down the peninsula was stated recently at a hearing before the State Railroad Commission by E. J. Foulds, attorney for the Southern Pacific Company.

Stockton Terminal & Eastern Railway, Stockton, Cal.—J. E. Adams, president of this company, appeared recently before the commission and presented evidence on the company's application for the commission's authority to issue $319,000 of bonds to build an extension of its railway from Bellota to Jenny Lind. The application contains the alternative proposition that if the commission fails to approve of the bond issuance it sanction an extension of 2 miles of railway beyond Bellota at a cost of $21,000.

Bristol & Plainville Tramway Company, Bristol, Conn.—Plans are being made by this company to extend its lines in Bristol and change the location of its tracks from Park Street to Divinity Street in Bristol.

Capital Traction Company, Washington, D. C.—This company proposes to build an extension from Seventeenth Street and U Street N. W. south on Seventeenth Street to I Street; thence to Thirteenth Street; thence to H Street, and thence to Seventh Street. It also proposes short links of track on Fifteenth Street and on Eighteenth Street and a loop at the intersection of Seventh Street, Louisiana Avenue and C Street N. W.; the estimated cost, including equipment, is about $750,000. The Public Utilities Commission will hold a hearing on April 22.

Arkansas Valley Interurban Railway, Wichita, Kan.—Orders have been placed by this company for 2800 tons of steel rails and 60,000 ties. The voting of the terminal bonds by the city of Hutchinson assures the construction of this interurban railway on up the valley.

Peoria, Galesburg & Western Railroad, Galesburg, Ill.—Surveys have been made and plans are ready to begin work as soon as financial conditions are improved to place the bonds for the construction of this proposed railway to connect Peoria and Galesburg. W. T. Irwin, Peoria, president. [Jan. 10, '13.]

***Hodgenville, Ky.**—An electric railway to connect Greensburg, in Green County, Ky., and Hodgenville, in LaRue County, Ky., is being considered by residents of those two counties. The right-of-way would be readily obtained to run past the Lincoln farm, and timber for all the necessary ties, etc., could be obtained at small cost along the right-of-way, while at one end of the line connection would be made with the Louisville & Nashville Railway at Greensburg and with the Illinois Central Railway at Hodgenville. A. H. Benningfield, Taylorsville, is interested.

St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La.—This company reports that contracts are all awarded and construction has been begun on this 14-mile line to connect Covington, Abita Springs and Mandeville, La. The motive power will be crude oil engines and the company will operate three cars. It will furnish power for lighting purposes and its power plant will be located at Helenbirg. The repair shops will be located at Mandeville. Capital stock, authorized, $200,000. Capital stock, issued, $120,000. Officers: Joseph Birg, Mandeville, president; Lewis L. Morgan, Mandeville, vice-president; Harvey E. Ellis, Covington, secretary and treasurer, and H. T. Carroll, Mandeville, superintendent. [March 20, '15.]

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company reports surveys completed, from Detroit to Lansing and expects to begin construction soon. The company holds fifty-one township franchises and fifteen city and village franchises between Detroit and Grand Rapids, all of which are identical in their terms and conditions. These franchises all provide for a uniform rate of 2 cents per mile or fraction thereof, and that no single fare shall be less than 5 cents. The road is to be operated by any motive power excepting the necessary side tracks, switches, etc. Capital stock, authorized, and outstanding, $25,000. Officers: Henry M. Wallace, president; W. T. Utley, vice-president; R. G. St. John, Detroit, secretary and treasurer. [July 11, '14.]

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—Surveys are under way for this company's line from Little Falls to Pierz. B. H. Bradley, chief engineer. [March 27, '15.]

St. Louis & Western Traction Company, St. Louis, Mo.—This company reports that on account of financial conditions no definite plans have been decided upon when construction will be begun on its 40-mile line between St. Louis and Gilmore. James D. Houseman, 701 Roe Building, St. Louis, president. [Aug. 8, '14.]

Big Horn Canyon Irrigation & Power Company, Hardin, Mont.—Surveys are being made by this company for an electric railway from Hardin to Custer, Mont. John J. Harris, Hardin, president. [Jan. 19, '15.]

Exeter, Hampton & Amesbury Street Railway, Exeter, N. H.—Plans are being made by this company for the removal of its tracks in Portsmouth between the Ashworth Hotel and the casino, and relaying them from the Ashworth Hotel down Marsh Avenue to the rear of the casino, where a transfer will be located.

Public Service Railway, Camden, N. J.—A permit for the construction of a short cut on the electric line from Camden to Haddonfield has been granted to the Public Service Railway by the Public Utility Commission of New Jersey. The permit provides for a new route in Star Avenue, crossing Border Street, and the necessary connections. It also provides for a new line in Border Street. In addition a double track on the White Horse Pike, from Ferry Avenue to Haddon Avenue, will be built.

Brooklyn (N. Y.) Rapid Transit Company.—Senator Bernard M. Patten, of Queens, has introduced a bill to permit the extension of this railway from Corona over tracks of the Long Island Railroad to Little Neck, via Whitestone and Flushing.

New York State Railways, Rochester, N. Y.—This company is interested in securing the immediate installation of a scenic railway or modern type of amusement device ride in Sea Breeze Park, which is owned and operated by this company. It will consider a proposition on the basis of 25 per cent of the gross receipts, with a guarantee that the amount of percentage shall not be less than $1,500 for any one year, the period of agreement to be for ten years.

Chardon, Jefferson & Meadville Interurban Railway, Cleveland, Ohio.—Preliminary arrangements are being made by this company for the construction of its proposed electric railway to connect Chardon, Hampton, Rock Creek and Jefferson, Ohio, 30 miles. F. A. Pease, Cleveland, engineer. [March 27, '15.]

Goldsboro (N. C.) Street Railway.—This company reports that it has been reorganized and will place its line in operation again at once. Additional track will be laid and other improvements made. Contracts for material will be placed immediately.

Atlantic & Carolina Railroad, Kenansville, N. C.—This company has placed in operation its 10-mile line between Warsaw and Kenansville. A gasoline motor car and a trailer are used. Connection is made at Warsaw with the Atlantic Coast Line. A. R. Turnbull, Norfolk, president. [Aug. 8, '14.]

Oklahoma Interstate Railway, Oklahoma City, Okla.—John R. Rose, promoter of this railway, has arranged with the Commercial Club to extend the interurban line from Miami to Afton via Vinita to Centralia. Vinita is to furnish a cash bonus of $30,000 and a right-of-way 100 ft. wide from the city limits to Vinita northeast to the county line 2 miles west of Afton and also one-half of the distance to Centralia. [March 20, '15.]

***Oklahoma (Okla.) Rapid Transit Company.**—S. A. Horton, attorney at law, 1014-1017 Concord Building, Oklahoma City, Okla., has announced that this company has been organized to build an electric railway from Oklahoma City to Tulsa, Muskogee and Bartlesville, Okla. The proposed route is about 300 miles long, reaching the principal cities in the eastern part of Texas and extending through oil territory. Negotiations are in progress to sell bonds and let construction contracts.

Oklahoma Union Traction Company, Tulsa, Okla.—The reconstruction of this company's lines in Tulsa has been begun.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—It is reported that LeRoy Park and associates of this railway who are promoting an electric railroad from Kingsport to Newport, are considering, at the solicitation of local parties, an extension of their railroad and power transmission lines into Morristown. The new railway is planned as a standard-gage, low-grade, low-curvature line, to carry both freight and passenger traffic, connecting the Carolina, Clinchfield & Ohio Railway at Kingsport with the Tennessee & Carolina Railroad at Newport. [March 6, '15.]

McConnellsburg & Fort Loudon Railway, McConnellsburg, Pa.—Surveys are about completed for the proposed line from McConnellsburg to Fort Loudon, Pa. Bids are now being received. The company has secured rights-of-way, and capital stock of $60,000 is nearly all subscribed and paid in. Subscriptions for the bonds are now being taken. The route crosses a mountain and connects with the Cumberland Valley Railroad at Fort Loudon. A. Spotwood Dandridge, engineer. [March 13, '15.]

Chester & Lancaster Railway, Phoenixville, Pa.—Plans are being considered to build a proposed electric line to connect Lancaster and Phoenixville. Several meetings have been held in a number of small towns in Lancaster County, and according to reports the project is being considered favorably. The plan as outlined by the promoters is about as follows: The proposed line to start at Blue Ball, where it will connect with an electric line already built to Lancaster. From Blue Ball the line will go through Conestoga Valley to Churchtown, thence to Morgantown, to Goodville, Elverson, St. Peter's, Knauertown, Falls of French Creek, Coventryville, Pughtown, Birchrunville, Chester Springs, Kimberton, Harveyville, thence in West Bridge Street to Nutts Avenue and connect with the Pottstown & Phoenixville Railway.

Reading Transit & Light Company, Reading, Pa.—This company plans to expend $165,000 in improvements in Reading during the year.

Bryan & College Interurban Railway, Bryan, Tex.—This company has ordered $16,880 worth of equipment and materials from Fairbanks, Morse & Company, Chicago, Ill.

Beaumont, Liberty & Houston Traction Company, Houston, Tex.—Plans are being made to begin work at once on the proposed line between Houston and Richmond. Edward Kennedy, president. [March 27, '15.]

Southwestern Traction Company, Temple, Tex.—Arrangements are being made by this company for the completion of the line from Waco to Austin.

Glen Rose & Walnut Springs Railway, Walnut Springs, Tex.—Plans are being contemplated by this company to build a line from Glen Rose northeast to Fort Worth, Tex., about 40 miles. The company has nearly completed its 14-mile line between Glen Rose and Walnut Springs. J. H. Farr, president. [Dec. 12, '14.]

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Among the improvements planned by this company are the paving and double tracking of its line on Market Street in Parkersburg.

Badger Railway & Light Company, Whitewater, Wis.—Surveys are being made by this company for a line from Whitewater to Lake Geneva, with a branch to Fort Atkinson and Jefferson. Construction will be begun as soon as the weather permits. The line will be 25 miles long, and 6 miles have been built. It is planned to use gasoline-propelled cars.

SHOPS AND BUILDINGS

Iowa Railway & Light Company, Cedar Rapids, Ia.—This company has recently placed a contract for two new boilers and coal and ash-handling apparatus for its generating station at Cedar Rapids.

Centerville Light & Traction Company, Centerville, Ia.—This company has completed the additions to its carhouses in Centralia.

Stark Electric Railway, Alliance, Ohio.—This company is installing two 500-hp Sterling boilers and Jones underfeed stokers at its power house in Alliance.

Toronto (Ont.) Civic Car Lines.—This company expects to complete, in about six weeks, the new carhouse at the corner of Hillingdon Avenue and Danforth Avenue, this being in the northeastern part of Toronto. The carhouse is of concrete, tile and steel, and has accommodation for twelve cars. There is a wing in connection with the building 50 ft. x 109 ft., a portion of which is two stories. The wing is for shop and stores purposes. A temporary carhouse was constructed during January on Bloor Street west, between Dorval Road and Indian Road. This building is 85 ft. long x 21 ft. wide, heated, and will accommodate two single-truck cars. This structure is to serve the new Bloor Street line, and it is located in the western portion of Toronto.

North Branch Transit Company, Bloomsburg, Pa.—This company is building and equipping a new car repair shop.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Interurban Railway, Wichita, Kan.—This company plans to build a substation at Burton.

Milwaukee Northern Railway, Minneapolis, Minn.—This company has completed about half of the work on a new terminal building on Sixth Street between Cedar Street and Wells Street in Milwaukee.

Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio.—This company has completed its new outdoor type of transformer substation on Wilson Avenue in South Steubenville, Ohio. Construction is of steel tower with concrete foundations. The capacity is 3000-kv.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is building a new three-story brick combination passenger freight and substation in New Castle. The cost is estimated to be about $65,000.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Among the improvements planned by this company during the year will be the erection of its new generating plant in Parkersburg. The cost is estimated to be about $500,000.

Manufactures and Supplies

ROLLING STOCK

Austin (Tex.) Street Railway will purchase two pay-as-you-enter cars this spring.

Goldsboro (N. C.) Street Railway expects to purchase at once new and second-hand single-truck cars.

Southern Wisconsin Railway, Madison, Wis., is reported as having in the process of preparation plans and specifications for ten city cars.

Paraguayan Company, Inc., New York, N. Y., expects to purchase a large number of motor buses or gas-electric buses in the near future for use in Paraguay.

Lehigh Traction Company, Hazleton, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 13, 1915, as having issued specifications for ten all-steel center-entrance cars, has ordered this equipment from The J. G. Brill Company.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 6, 1915, as having issued specifications for ten all-steel interurban cars, has ordered this equipment from The J. G. Brill Company.

Phoenix Construction Company, New York, N. Y., has received bids for five closed steel cars, 21 ft. between body end posts, for the Anniston Electric & Gas Company, Anniston, Ala., and the Carolina Power & Light Company, Raleigh, N. C., and four cars of 16 ft. body length for the Huntsville Railway, Light & Power Company, Huntsville, Ala. Contracts will be let in a few days.

Toronto (Ont.) Civic Railway, on April 1, opened four tenders for four new single-truck car bodies to be used on the civic car lines. The prices ranged from $2,386 to $3,644. The lowest offer was that of the Preston Car & Coach Company, which offered to deliver them in sixty days. As there were American companies who tendered, the comptrollers, not knowing the duty which might be charged, referred the tenders to the works commission for a report.

Chicago & Milwaukee Electric Railway Company, Highwood, Ill., which purchased fifteen all-steel interurban cars from The J. G. Brill Company, as noted in the ELECTRIC RAILWAY JOURNAL of March 6, 1915, has specified the following details:

Length over vestibules	53 ft. 7 in.
Width over sills	8 ft. 8 in.
Width over all	8 ft. 10¾ in.
Inside width	8 ft. 1¾ in.
Bolster centers	32 ft. 8 in.
Height, rail to sill	3 ft. 4 3/16 in.
Body	all-steel
Interior trim	mahogany
Headlining	steel
Inside sheathing	Agasote
Roof	arched
Underframe	all-steel
Bumpers	Hedley anti-climbers
Couplers	Tomlinson M. C. B. radial
Curtain material	Pantasote
Trucks	Brill M. C. B. type
Sashes	Forsythe Brothers
Seats	Hale & Kilburn
Seat material	Plush and rattan
Motors	Westinghouse
Control	Westinghouse

TRADE NOTES

R. B. Kennard, Allentown, Pa., architect, has changed his address to 237 Second Street, Slatington, Pa.

Universal Iron & Supply Company, St. Louis, Mo., will be pleased to send on request a calibration depth and capacity curve for horizontal cylindrical tanks of any dimensions. This method was devised by H. J. Elson of the company named.

Charles Eckert Young, Technical Advertising Service, Chicago, Ill., has appointed Joseph H. Everston, formerly sales manager of the Arex Company, as copy writer, and Edwin Carrell as art director. This company has moved its offices from the First National Bank Building to Suite 1109, Ellsworth Building, 537 South Dearborn Street, Chicago.

Esterline Company, Indianapolis, Ind., has received an order from the Lehigh Valley Transit Company for "Golden Glow" interurban headlights to replace arc lights on its Philadelphia-Allentown high-speed service.

American Vanadium Company, Pittsburgh, Pa., has appointed Merrill G. Baker as assistant general manager of sales. Mr. Baker has been identified with the iron and steel trade for the past eleven years, and was recently connected with the Cambria Steel Company as assistant to general manager of sales of that company.

ADVERTISING LITERATURE

Welding Material Company, Inc., New York, N. Y., has issued a bulletin on its variable voltage arc welder.

McCord Manufacturing Company, Detroit, Mich., has issued a sheet on its forced-feed lubricator for use in connection with mechanical shovels, drag-line excavators and wrecking cranes.

New Haven Trolley Supply Company, New Haven, Conn., has issued catalog No. 1, describing and illustrating its various types of fare registers, fare boxes and other electric railway supplies.

American Ingot Iron Company has issued a reprint from the *Railway Age Gazette* of Feb. 19, 1915, which contains a description of successful results obtained by their use under sliding banks and in other unfavorable locations.

Standard Underground Cable Company, Pittsburgh, Pa., manufacturer of wire and cable, has issued a folder outlining the three years of progress of this company. The folder contains a description of its exhibit at the Panama-Pacific Exposition. This company has also issued bulletin No. 201-1, which contains specifications of its standard C.C.C. wire.

American Rolling Mill Company, Middletown, Ohio, has issued a bulletin appropriately entitled "Next to Excellence Is the Appreciation of It," which reproduces a series of letters written by a number of well-known companies expressing favorable opinions regarding their experience with the use of Armco-American ingot iron for condenser and boiler tubes, culverts, sheet metal for buildings and various other uses as an effective rust resistant.

Spray Engineering Company, Boston, Mass., has issued a catalog illustrating and describing its spray system for cooling water for condensers, transformers or water jackets. Illustrations are shown in the catalog of these sprays as installed in a number of power plants, including that of the Philadelphia & Westchester Traction Company, Philadelphia, Pa. Another catalog issued by the same company describes its system for washing and cooling air for steam turbine generators. Among the companies which use this system are the Richmond Light & Railroad Company, Lehigh Valley Transit Company and the Metropolitan Street Railway, Kansas City, Mo.

Van Dorn & Dutton Company, Cleveland, Ohio, has issued a folder entitled "A Feature of Lowest Operating or Maintenance Cost," which describes its various types of grade-hardened or grade-treated motor gears and pinions. An illustrated tooth section in the folder shows the tool steel wearing surface and the toughened core. In the production of its grades hardened and treated materials are selected by this company with particular reference to what it is desired to accomplish. The solid gears are made from either steel castings or the forged or rolled steel blanks, as may be desired; the split gears from cast steel only; while the pinions are produced from hammered or forged steel.

Railway Storage Battery Car Company, New York, N. Y., has issued a folder which outlines the features of the Edison storage battery for railway operation. Its chief advantages are said to be its low first cost and maintenance cost, as it requires no overhead construction or expensive attendance, and has only one rotating part in the motor; and the reliability and long life of the storage battery. The above points are well supported in the folder by reproductions of a number of letters from storage-battery railways of wide geographical distribution and by newspaper reports of recent successful tests of this kind of equipment. The company has also issued supplementary bulletins showing photographs and data of three types of storage-battery cars: the city type, as exemplified by a car of the Suffolk Traction Company, Patchogue, L. I.; the suburban type as shown by a car of the Long Island Railroad and a 50-ft. interurban car operated by the Cambria & Indiana Railroad, Colver, Pa.

Harris Winthrop & Company, New York, N. Y., are issuing an interesting pamphlet giving facts relative to the capitalization, earnings, indebtedness and records of fifty-two stock issues that were quoted on the New York Stock Exchange in March, 1915, at or below $16 a share. The high and low prices of each issue for the years since 1907 are tabulated. The bankers do not recommend the purchase of any of the stocks named. It is stated that some may be absolutely worthless, but others may represent equities which, if preserved, may greatly increase in value in prosperous times. It is thought that if a sufficiently wide distribution of the risk is made, these securities offer a good chance for speculation. The list contains Interborough-Metropolitan common stock and United Railways Investment common stock. The bankers embody in their pamphlet a list showing how many securities selling at low prices in 1894 made marked advances by 1906.

NEW PUBLICATIONS

The Federal Reserve Act. By C. W. Barron. Boston News Bureau Company. 1914. 223 pages. Cloth, $2.

This is a reprint of a discussion of the principles and operation of the federal reserve system, as originally published in the *Wall Street Journal* and the *Boston News Bureau.* It includes a description of the financial, commercial and industrial characteristics of each of the federal reserve districts, and also the complete text of the federal reserve act, fully indexed, and of pertinent preceding legislation. The twenty-eight sections of the book are really essays on credit, and are written in a free, non-technical style that enables the reader fully to grasp the essential details of the new system.

Graphic Methods for Presenting Facts, by Willard C. Brinton. Published by the Engineering Magazine Company, New York, 1914. 7½in. x 10¼in., xii + 371 pages. Price $4.

Mr. Brinton has given in convenient form for reference sample graphical representations of data from all fields in which such representation has been found useful. A total of 255 diagrams and pictures form the basis of an illuminating discussion of the principles involved in clearly and attractively presenting information by this method. The subject matter is divided into seventeen chapters, each introduced by a short generalization followed by comment upon the examples illustrated. The chapter headings are these: Component parts, simple comparisons, simple comparisons involving time, time charts, curve plotting (two chapters), comparison curves, component parts shown by curves, cumulative or mass curves, frequency curves, correlation, map presentations, maps and pins, curves for the executive, records for the executive, corporation financial reports, general methods and a few cautions.

In discussing the graphs the author not only calls attention to the technical features from the graphic method point of view but also interprets many of the data from that of the user of the charts. By this means he imparts a readable quality to the book which it would hardly have if it were a mere compilation of diagrams and comments upon graphic characteristics.

It is unfortunate that Mr. Brinton lends his influence to the use of the word "curve" to denote a stepped or other line containing angles. Webster defines the word, as it is popularly understood, as "a bending without angles." While it may be technically correct to speak of a broken line as a curve, as it would be to refer to a circle as a polygon, in the interest of general clarity "graph," "locus," "diagram," "chart," "solid line," "dotted line," etc., answer the same purpose and conform more nearly to ordinary usage. It is, of course, true that "curve" is used to a considerable extent by engineers; e.g., "speed-time curve," "power-station load curve," etc., but this does not necessarily justify its use unless it is allowed to become a "good usage." Then it is too late to make a change.

That a book of this sort should prove valuable at present may be inferred from the growing interest in diagrammatic and pictorial record and display of facts. This tendency is evident in the electric railway field as elsewhere. Compared with curves and other diagrams numerical tables of statistics are dry and uninteresting to the average reader. In mathematics instruction teachers are more and more coming to use graphical forms of expressing equations, and graphical solutions of problems are increasingly popular with students.

Electric Railway Journal

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IMPERIUM IN IMPERIO

The late remarkable strike on several electric railways of central New York is not without its moral for other operators. Here existed a condition that must have been considered ideal by the men. They had been organized for collective bargaining, their unions had been recognized and their rights and privileges had been signed and sealed in formal contracts. Not a man had uttered a complaint concerning his wages, hours or discipline. Yet, in spite of these undisputed facts, one of the unions had the assurance to declare a strike because, forsooth, the railways would not violate their written pledge with another union organization. A strike for more money or better working conditions is always understandable, but a strike which is instigated for no better reason than a jurisdictional clash between labor factions in which both employer and public suffer is absolutely inexcusable. It is certainly detrimental to the best interests of labor.

NOT A CONFESSION OF INCOMPETENCY

Prof. Charles Zueblin of Boston considers any suggestion for a 6-cent fare in Boston to be a confession of incompetency and feels it to be perfectly easy to demonstrate that a street railway in a metropolitan city which cannot operate profitably on a 5-cent fare is grossly mismanaged. To him the fact seems to be of no significance that the railways are paying higher wages than formerly, that the general high cost of living has affected them as much as other enterprises and individuals, and that the public is getting not only a much longer ride than it did when the 5-cent fare was established but a much higher grade of transportation in every way. In his own city of Boston, for example, the public demands in the way of subways and other improvements have been so great that whereas ten years ago the capital investment on which the company had to pay interest was only four times its annual gross revenue the investment has now grown to six times that amount. These facts are matters of record, but it is much easier to ignore them and say that the railway company ought to charge no more for transportation than it did formerly. But in spite of Professor Zueblin the 6-cent idea is spreading in Massachusetts, the reason being that the companies have at last been able to convince the authorities that they have the right to transfer to the riding public a part of the burden imposed upon them by the latter's legislative and arbitration representatives. Far from being a confession of incompetency, the movement is rather a proof of a better realization of public responsibility for higher railway costs.

ENFORCED EXPENSES AND ADVANCED RATES

The foregoing situation reminds us of a recent address by William A. Glasgow, Jr., before the Law Association of Philadelphia, in which the speaker made some thoughtful comments regarding the increasing of rates in proportion to enforced increases in operating expenses. Back of all the rate struggles of the last few years has been the regrettable but undeniable fact that legislative and arbitration bodies have an indiscriminate and irresponsible power to impose increased expenses on carriers but that the latter are devoid of direct power to protect their net revenues by increased rates. Fundamental justice requires that some method be found for holding the creators of such expenses to a reasonable responsibility. As Mr. Glasgow observes, England found the solution for this question in 1913, so far as freight traffic is concerned, when, by parliamentary enactment, it was provided that whenever railways showed legitimate increases in cost of operation they might recoup their finances by increasing the rates, which should be considered by the railroad commissioners as justified. A similar act by Congress would insure investors against loss from the continuously imposed charges of to-day, and also, through the automatic transfer of such charges to the public, create a wholly desirable direct responsibility to the shipping and riding public on the part of lawmakers and arbitrators. Under such a plan we cannot but wonder to what extent a great deal of the recent legislation and arbitration decisions would have been modified.

ELECTRIC RAILWAY EARNINGS FOR 1914

While the business done by electric railways last year was poor, the losses were not so great as with steam railroads. In fact, an extended study by *The Commercial and Financial Chronicle* indicates that while electric railways did not show their usual annual gain, the gross earnings of 270 reporting companies actually increased 0.72 per cent for the year as compared to 1913. The gross earnings of steam railroads for the same period, however, showed a loss of 6.55 per cent. In the case of net earnings, the electric railways suffered the almost nominal decrease of 0.58 per cent, whereas the net earnings of the steam lines fell off 8.39 per cent. If adjustments are included for fourteen electric railways reporting only gross earnings and forty-eight reporting for the year ended June 30, 1914, the total of 332 lines showed an increase in gross earnings of 0.87 per cent and a decrease in net earnings of 0.53 per cent. Owing to the difficulty of securing reports from all electric carriers and the resultant exclusion of a few of the large companies, the foregoing figures do not cover the entire industry, but it is probably true to say that they reflect the general conditions during 1914. It is true that a total of 120 electric railways showed decreases in earnings, but except under special local conditions these decreases were slight and were outweighed by the increases of others. It is satisfactory to note that during a year full of practically the most unfavorable business conditions in a decade, the electric railways were more than able to hold their own and again to prove themselves more immune to business depression than the steam railroads. While they have many financial problems still to solve in connection with their net earnings, their gross during the coming year should reflect the general resumption in this country of easier business and financial conditions.

THE WANE OF THE JITNEY BUS

Evidence from different sources in Los Angeles shows that the number of jitney buses in service in that city has been decreasing steadily for some time, and as no restrictive ordinance has ever been actually established by the community the condition appears to possess considerable significance. It may not warrant the singing of a formal requiem, but it does demonstrate beyond a doubt that the extent of the movement is distinctly limited. Truly, the jitney bus constitutes one of the most interesting fallacies of modern times. It is even entitled to a niche in the cellar of the Hall of Fame alongside of the Keeley motor and the Albertsen magnetic car, because its success has been due to spectacular features that appealed to the inexperienced and unthinking part of the population. Generally speaking, it is the extraordinary decrease in the cost of the automobile that has made the jitney possible, for the possession of a passenger-carrying vehicle is now within the reach of a vast number of people, among whom are certain to be found individuals who are absolutely unfamiliar with business problems and cannot grasp the principle of overhead charges, depreciation and similar invisible costs. By neglecting these realities, the jitney operator deceives himself into thinking that the business is profitable, but after a few months of operation, when the invisible charges begin to take tangible form, he drops out, only to be replaced by some one with less experience.

This has been shown clearly in Los Angeles, where, according to a communication in last week's issue, the average jitney driver stays in the business only for sixty days. In Los Angeles the jitney cars have hardly been running long enough to wear themselves out completely. In fact, the crest of the jitney wave was reached after the expiration of only five months' time, approximately the same result having been obtained in San Francisco. Consequently, it would seem that the life of the movement is going to be measured, not by the ultimate life of the machines as was originally feared but rather by the number of drivers who can be induced to enter jitney service. Publicity, therefore, is clearly the most effective means for quickly ending the death struggles of this Frankenstein of transportation.

PUBLIC UTILITY TAXATION

The March number of *The Annals* of the American Academy of Political and Social Science contains a summary by Delos F. Wilcox on the complicated subject of public utility taxation. After a preliminary description of the public agency theory of utility operation, the writer raises the interesting fundamental question as to the basis on which the charges for public utility service should be established. To assist in a better understanding of the general subject he mentions several different stages or theories of public utility operation, beginning with (1) public utilities operated for profit and, in the case of private ownership, accompanied by various forms of municipal taxation or partnership agreements intended to give the city a share in the profits; extending through (3) public utilities operated at cost (taxes and interest charges but no amortization included) and (4) public utilities operated at cost (interest but no taxes or amortization charges included), and ending with (7) public utilities operated free at the expense of the taxpayers.

It is apparent, of course, that the question of private or public ownership is not necessarily involved in any of these forms of operation. For example, a municipally-operated public utility might follow the policy of charging a fare sufficient to return a profit, which would go to the city treasury, while a private corporation, subsidized by the city, could probably give service at cost or even free more economically than the city itself could perform this service. The fundamental question in this consideration, therefore, is not whether a utility is privately or publicly owned, but whether it should be regarded primarily as an enterprise for profit, or, if not, in what proportion the cost of the service should be divided between patrons and general taxpayers.

Dr. Wilcox takes the point of view that public utility service is a matter of interest to the general taxpayer on account of the present universality of such service and its fundamental and far-reaching influence upon the organic development of the community. Upon this premise he bases his conclusion that governmental bodies should not seek to make any profit out of utilities in order to relieve the general taxpayer, for such a procedure would mean the taxation of "public property" and "public agencies." While not going so far as boldly to throw down the gage for the operation of utilities at less than cost or free at the expense of the general taxpayers, Dr. Wilcox believes that as the public-agency theory becomes more widely recognized and established, the tendency will be to diminish and finally eliminate public utility taxes and contributions, and even to subsidize utilities by taxation so as to secure better service at a fixed or diminishing rate.

To the advisability of such a plan we wish heartily to dissent. One of the most striking characteristics of modern municipal governments has been the growing burdens of general taxation, and the effort at present should be to lighten these charges rather than materially to increase them. We agree with Dr. Wilcox that the public utility rates should not be so high as to create an abnormal profit at the expense of the patrons.

Such a practice would be comparable to high taxes on the consumption of necessities, like the salt tax of oriental countries. But Dr. Wilcox's premise, based on the universality of utility service—that the interests of the patrons of a public utility are identical with those of the general taxpayers—seems to us fallacious. Transportation service in particular is not used by all citizens alike, and the patrons include many non-taxpayers and even non-residents, for whom the general taxpayer should not be penalized. Many municipal activities, such as the maintenance of the streets and of charitable institutions, schools and the like, cannot be made self-supporting, and the cost of these will always have to be carried by the general taxpayer. But if at a reasonable rate, say at a 5-cent fare, the city, through taxes or a partnership agreement, can gain a profit from a public utility within its boundaries, it will relieve the burden on the general taxes. We should certainly view with disfavor any plan for loading up taxable property with large charges for services which by their special nature and by custom seem properly subject to support by their actual users.

LOSSES IN STEAM TURBINES

In last week's issue the steam turbines now under test in the Seventy-fourth Street Interborough power plant in New York were briefly described. Their installation and testing render timely a brief examination of the energy changes and losses in them.

The thermal efficiency of the Interborough turbines will, in the first place, be about 25 per cent, under the conditions of pressure, superheat and vacuum selected, about 200 lb. gage, 120 deg. Fahr., and 29 in. respectively. That is, of the energy in a pound of steam referred to the temperature of the condensate, one quarter can be taken out and turned into electrical form.

In this transformation from thermal to electrical energy two factors are involved. One is the relation of the pressure and temperature range of the steam to the mechanical energy produced from a pound of steam. The entering superheated steam contains a certain amount of heat energy per pound. In expanding through the turbine it transforms some of this into mechanical form but there is still a great deal of heat energy exhausted into the condenser. The hotter the entering steam and the higher its pressure, and the cooler the exhaust steam and therefore the lower its pressure, the greater will be the proportion of energy transformed. The second factor is the additional loss of thermal, mechanical and electrical energy due to friction, leakage, radiation, etc. The thermal loss first mentioned is unavoidable once the working temperature and pressure range is selected; the other losses are under control to some extent.

The working pressure and temperature range have practical limits in both directions. In the Interborough turbines they are approximately 215 lb. to ½ lb. absolute pressure and 508 to 80 deg. Fahr. respectively. The upper limits are set by the cost of keeping boilers and piping steam-tight against high pressure and the ability of apparatus to withstand the destructive effects of high temperature, especially of temperature changes. The lower limits are set by the temperature of the available condensing water and the mechanical difficulties of providing space in turbines and condensers for excessively low-pressure, and correspondingly large-volume, steam. The steam must therefore cease to do work while it still has in it a large proportion of the energy added to it in the boiler, and this energy is removed and wasted in the condenser circulating water. With the ranges mentioned above about two-thirds of the entering-steam energy is lost in the condenser in this way. At present it does not appear practicable very greatly to decrease this waste.

Suppose, however, that a turbo-generator could be built to turn into electrical form all of the remaining third of the heat theoretically available within the ranges mentioned. It would, of course, need to be free from friction in the steam passages, mechanical friction and windage, heat conductivity, leakage, electrical resistance, and hysteresis and other magnetic-circuit losses. Moreover, the steam would have to lose all of its velocity before leaving the turbine. Such could properly be termed a perfect or ideal unit. In the Interborough turbines the losses mentioned have been brought down to less than 25 per cent of the power that would be generated in the ideal turbine, leaving over 75 per cent of it available for useful work. This 75 per cent of 33 1/3 per cent is the 25 per cent thermal efficiency mentioned in the second paragraph. At full load, therefore, the entering steam carries 120,000 kw of which 80,000 is lost due to the exhaust temperature and pressure, leaving 40,000 kw for possible use. Of this 30,000 kw appears in electrical form, the balance being lost in leakage, radiation, etc. This balance does not include the loss in condenser and condenser-pump friction and condenser-pump radiation which is customarily not charged against the turbine. The condenser-pump exhaust is, of course, not wasted as the heat is absorbed in the feed-water heater. About 900 kw is chargeable to the electric generator. The remainder is largely carried off in the steam in thermal and kinetic form, for bearing friction is a small loss, and radiation is small also, due to the careful lagging and the small exposed surface.

As all other forms of energy tend to degenerate into heat the struggle to produce the higher forms of energy from it is, and must continue to be, an uphill fight. Heat can be produced in simple apparatus at 100 per cent efficiency, but a far lower percentage in efficiency of transformation must be expected when an attempt is made to reverse the process. The figures of heat input and electrical output of the Interborough turbine, quoted above, show that it is very far to the front in thermodynamic progress. Further improvement along standard lines must be slow, for existing losses cannot be materially reduced and the working temperature range can be changed only gradually. Unless therefore an energy-changing process commercially new is developed, no sensational energy savings in the transformation of heat into electrical or mechanical energy are to be expected.

Repair-Shop Procedure at Milwaukee

An Account of the Shop Organization and Its Methods, Including Details of the Permanent Instructions Issued to Inspectors and Repair Men, Together with a Brief Outline of the Departmentalized System for Overhauling Cars

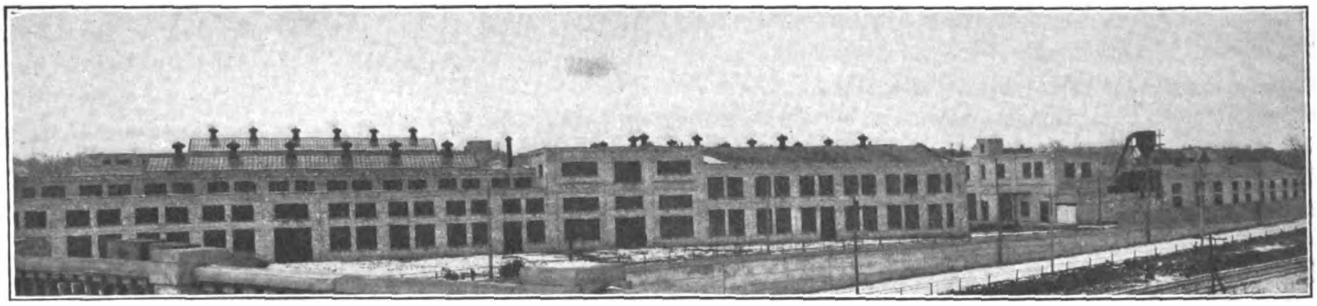
Economy in repair shop operation depends largely upon the care with which the repair and overhauling procedure is planned so that the successive steps are in proper sequence, and important changes, which always entail more or less confusion and delay, are not made frequently. As a part of such a working schedule The Milwaukee Electric Railway & Light Company has adopted an intermediate inspection and general overhauling system of shop work on a predetermined mileage basis. In connection with the shop inspection and overhauling, a definite plan of procedure is followed regardless of the type of car, but when work of an extraordinary nature is contemplated a set of specifications is drafted setting forth just what is to be done to each type of car.

The Milwaukee system requires approximately 685 cars to operate the city, suburban and interurban schedules, the rolling stock consisting of 565 city cars and 120 motor and trailer interurban cars. The total number of city cars allows approximately 6 per cent to be out of service, undergoing repairs or overhauling. Practically all the interurban equipment is required during the summer rush period, but during the winter months only about 75 per cent of the motor cars and 50 per cent of the trail cars are needed to meet the service demands.

The company's public service building, which provides trackage for housing a large number of interurban cars, is situated at the approximate center of the system and forms an important part of the arrangement of carhouses and shops for repairing and storing cars. Prior to the construction of the general shops at Cold Spring Avenue and Fortieth Street, 3 miles northwest of the Public Service Building, this company adopted a general scheme which provided for five carhouses and storage yards in the outlying districts of Milwaukee. By this plan cars in bad order could be transferred to the Cold Spring shops by way of crosstown lines, and if an accident occurred to rolling stock in the downtown district, it was but a twenty-minute run to the repair shops.

The shop buildings cover an area of about 4 acres, with a total floor space of about 5 acres. The blacksmith and machine shops occupy two sections of the repair shop, each adjoining the building devoted to general repair work. Truck and iron work on car bodies is done in the repair-shop space adjoining the partition separating it from the machine and blacksmith shops. Armature and controller work is handled on the gallery above the truck repair space, which is reached by a system of freight elevators. The wood shop and paint shop are in a separate building but connected with the repair shop by a transfer table.

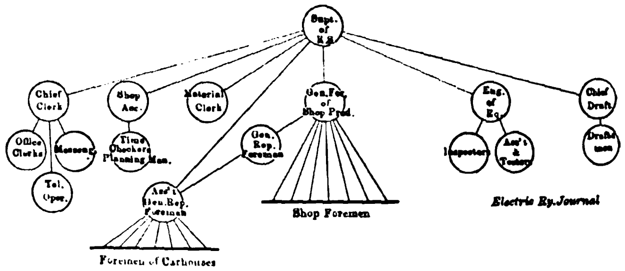
To facilitate the handling of heavy repair parts in the machine shop and blacksmith shop there are electric cranes spanning each bay. Car lifting cranes also span the two bays adjoining the aisle between the repair shop entrances and the truck repair bay. Two small cranes occupy runways in the two bays over the truck repair space, and two pneumatic hoists on I-beam bridges serve the armature repair department.



MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF SHOPS

SHOP ORGANIZATION

All work handled in the general shop, including both repairs and production, is under the supervision of the superintendent of rolling stock. As shown in the organization chart, he in turn is assisted by a shop accountant, an engineer of equipment, a material clerk, a general foreman of shops and production, a general repair foreman and a chief draftsman. It is the duty of the general foreman of production to see that all material required either for the manufacture or repair work, is delivered promptly from the storeroom after it has been requisitioned by the material clerks. Since the introduction of the premium system, which was described in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, added importance has been attached to the prompt and complete deliveries of material, as well as to the inspection of the finished products. The general repair foreman devotes his entire time to car maintenance, both at the carhouses and shops. He is held to strict account for the number of cars in condition for service. In connection with his supervisory duties at the carhouses, he has an assistant who is in direct charge of the carhouse repair forces. On all matters of service the assistant reports to the superintendent



MILWAUKEE SHOP PROCEDURE—ORGANIZATION CHART of rolling stock, but everything regarding repairs is taken up with the general repair foreman.

The shop force is largely made up of men who have been with the Milwaukee company for a number of years. The average wage begins at a minimum of 17½ cents per hour and increases to a maximum of 35 cents per hour. The regular shop force is approximately 300 men, but during periods of heavy construction or overhauling this force is increased to about 600 men.

INTERMEDIATE INSPECTION PROCEDURE

Two crews of trainmen are maintained in service at the Cold Spring shops to handle all transfers of cars between it and the carhouses. These two crews keep in touch with the general repair foreman for instructions regarding all car transfers. Cars are not shopped between the intermediate inspection periods unless unusual repairs are necessary. At the outlying city carhouses, as well as at the two carhouses on interurban lines, all light repairs that can be handled economically in conjunction with the daily inspection work are made. These light repairs include largely brake and controller troubles, as well as work in connection with the car body, consequently only a few small machine tools such as grinders, drills, forges and vises are required.

All cars are lubricated on a 1000-mile basis and, as a rule, the average run per week is 750 miles. Consequently a general inspection of the car at the time it is lubricated is considered frequent enough to check up all ordinary defects. After service of about twenty weeks, or when 15,000 miles have been run, each car is sent to the Cold Spring shops for an intermediate inspection. At this time the only repairs made are those necessary to keep the car in running condition. The work done at this time on some of the more important parts of the equipment is shown by the following instructions for inspection:

"Inspection and Repair of Trucks

"1—The trucks in all cases should be run out from under the car.

"2—The wheel flanges are to be checked by a wheel gage supplied for the purpose. If any wheel shows excessive or unusual wear, the pair of wheels should be replaced.

"3—If thin flanges are developing upon any wheels, the trucks should be trammed to see that they are square. If out of square, other trucks in good condition should be supplied in their place.

"4—Axles should be carefully inspected to discover flaws.

"5—Truck side and center bearings should be rigidly attached to the bolster. The height of the bolster should be checked by the standard gage supplied for that purpose.

"6—The bolster should be in good condition, otherwise the car should not leave the shop. The bolster and springs should be replaced where they are broken.

"7—Journal boxes should be inspected, but removed only in case they are either broken or in very bad condition. The covers should make a reasonably tight fit, and the bearings and check plates should be replaced if it is thought that they would not operate safely for an additional 1000 miles. If the wheels and axles are replaced, it should be seen that the dust guards are in first-class condition.

"8—Truck-brake levers, pins, bushings and brakeheads should be replaced providing they are sprung or badly out of line. Unless the pins and bushings show extreme wear they should not be replaced at this time.

"9—New brakeshoes and turnbuckles should be supplied if they are badly worn, or if the latter have not sufficient stock remaining to complete one day's operation.

"10—Adjust brake release springs.

"11—Care must be taken to have all truck bolts in place and pulled up tight. All truck castings are to be inspected and replaced if the same are cracked or broken.

"Inspection and Repair of Motors

"1—Gage armature clearance with special gage for the equipment being inspected. If the proper clearance is not found the bearings should be removed.

"2—Remove inspection covers and examine brushholders to see that they are properly mounted and that the shunts or pigtails are in good condition, also that the brushes have a remaining life of approximately 1000 miles.

"3—Check motor bolts for tightness with particular reference to motor-axle caps and gear-case bolts.

"4—See that the motor leads, bushings and connectors are in first-class condition, otherwise replace.

"5—Examine gear cases and axle collars. The opening between the axle collars and the motor bearing should be checked with the gage supplied.

"6—The wear on gear and pinion should be checked and they should be replaced providing there does not appear to be 15,000 miles of useful life remaining.

"7—See that all oil-box covers fit tightly, and that all dirt is removed from the motor that would prevent the cover from making a good fit.

"8—All motors are to be thoroughly blown out by means of compressed air.

"Inspection and Repair of Control Equipment

"1—Motor connection boxes should be thoroughly blown out. See that all terminal blocks are tight and make good contact. Motor lead bushings should be in place.

"2—Controllers are to be inspected closely and thoroughly blown out. All badly worn fingers, segments or other parts are to be replaced.

"3—All charred surfaces are to be scraped and shellacked. Tighten all control connections.

"4—Dirt accumulations on resistance grids should be removed and then blown out. Terminals should be tightened.

"5—Trolley bases, poles and wheels should be closely inspected. Trolley wheels to be removed providing they do not show a remaining wear sufficient for a full day's run.

"6—Trolley base connections should be tight, and the tension on the trolley rope should approximate 26 lb. when the pole is at a height of about 18 ft.

"7—Contactors to have the tips filed and adjusted or renewed. They should be fully blown out with compressed air and all parts wiped off.

"8—Lightning arresters are to be gaged and tested to assure their being in working condition. This is to begin in January and continue through September.

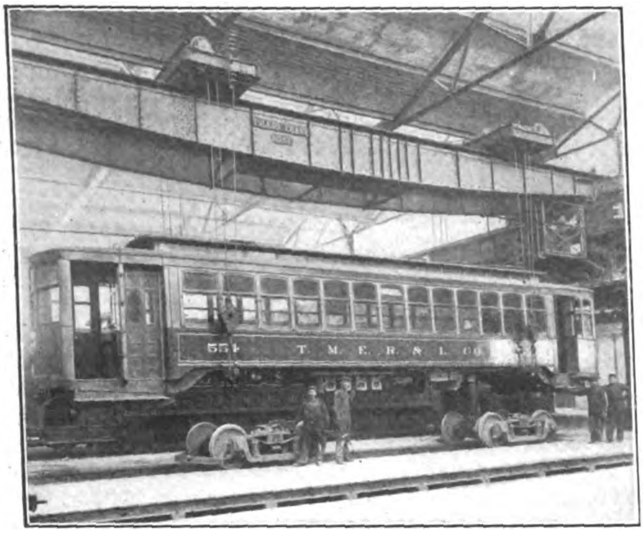
"9—Check and verify all light circuits, switches, door signal devices and stove motor circuits. Stove motors should be brushed, and brush connections inspected.

"10—Push button circuits are to be checked.

"11—Examine circuit breakers and blow out with compressed air. Clean and lubricate carefully.

"Inspection and Repair of Air Brakes

"1—With pressure in the system, the gages in the two ends of the car should not vary, one with the other, 5 lb. Check the pop-valve and adjust so that it will operate at approximately 100 lb. The governor should be adjusted to cut in at 55 lb. and out at 70 lb.



MILWAUKEE SHOP PROCEDURE—CAR BODY BEING LIFTED BY TRAVELING ELECTRIC CRANE IN REPAIR SHOP

"2—The governors, whistles, air cocks, engineering valves and triple valves should be in first-class condition and given an operating test. Emergency air equipment is to be tested.

"3—Inspect the dust collectors, removing all dust deposits.

"4—Examine air switch and fuse.

"5—With pressure on the system, check for leaks.

"6—Inspect dash-hose connections and hose couplings.

"7—Inspect compressor brush-holders and see that they work freely and are clean. Brushes that do not show a remaining life of 900 car-miles should be removed.

"8—Remove all dirt accumulations from compressors with compressed air.

"9—Take armature clearance with gage provided.

"10—Operate pump with inspection doors open and check for unusual sounds which would indicate worn bearings or valves sticking.

"11—The compressor pinions and gears should be examined to insure their being in condition to operate for 15,000 additional car-miles.

"12—The full air pressure should be applied to the brake cylinders in order to check the piston travel, which should be limited to 2½ in. at each end.

"13—The brake levers and pins should be inspected, and badly worn pins replaced."

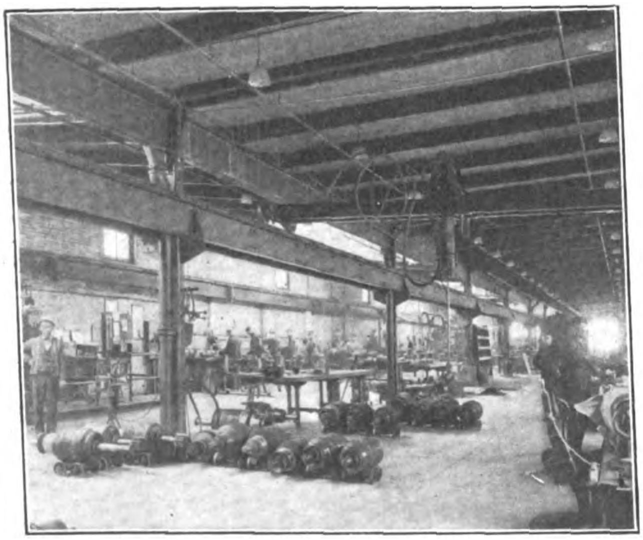
INSPECTION OF CARS

As the various cars reach this intermediate inspection stage, or when they have made approximately 15,000 miles, a general car inspection order is sent out by the shop mileage clerk. On this order the car number, the mileage made since the last shop inspection, and a statement as to whether the work includes an intermediate or a general overhauling, are noted. From this the repair-shop office makes a general car inspection report, which also contains the car numbers and the dates the cars were shopped. The dates are also entered when the cars are completed.

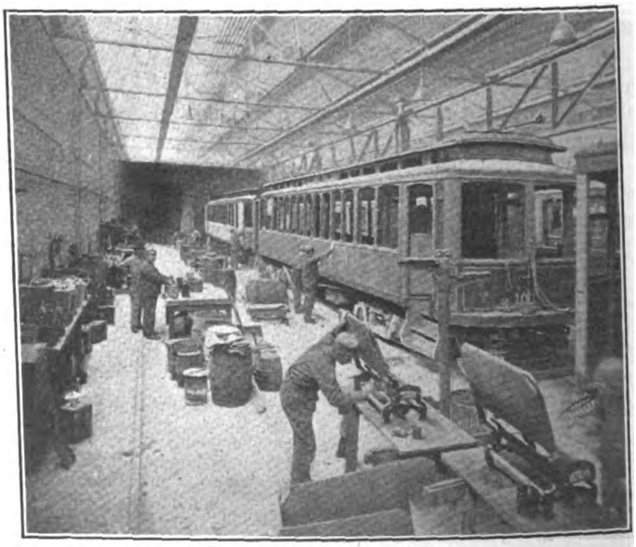
As soon as cars reach the shop, cards which state briefly the general items of work to be covered are inserted in the holders attached to the body. One or more items are assigned to the various sub-foreman or gang leaders, who do the work assigned to them in the manner indicated in the detailed inspection instructions. After completing the assignment, the man responsible for each item signs or initials the work card. It is assumed that when cars have been put through the intermediate inspection they are in condition to be operated from the various stations in a safe and satisfactory manner for not less than 15,000 miles. In other words, such items as gear, wheel and armature changes, which require the use of general repair-shop facilities, must be so taken care of as not to cause the car to be shopped before the scheduled mileage is covered. Also, when a car leaves the shop at the close of this inspection it is in condition to continue in service without attention until the next 1000-mile lubrication period. In order to fix responsibility for slighting any part of this repair work, the initialed cards are retained for record.

GENERAL OVERHAULING PROCEDURE

In addition to the repairs at intermediate inspections, all cars are given a general overhauling at the end of a 45,000-mile period. At this time the cars are carefully inspected in a manner similar to that outlined for the intermediate inspection, with the addition of repainting and varnishing and a thorough overhauling of trucks and electrical equipment. The average time required for this overhauling is from ten to twelve days, whereas only two or three days are required at the



MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF ARMATURE ROOM



MILWAUKEE SHOP PROCEDURE—INTERIOR VIEW OF ERECTING AND PAINT SHOP intermediate inspections. When this work has been done the car should again be in condition for operation without equipment failure or reshopping until the next intermediate inspection after 15,000 miles have been covered.

When a car is brought to the shop for a general overhauling it is set on one of the tracks in the repair shop, after which the car body is raised off the trucks, lowered on dummy trucks and sent to the carpenter shop. The work of overhauling the body in the carpenter shop is assigned to different gangs of men or individuals, who repair the parts needing attention. Any work of a special nature to be done by another department, such as the forge shop or machine shop, is requested on a memorandum order. In the department doing repair work each workman is given a unit time-slip, which indicates the character of work to be done and the account number to which it is to be charged. This card permits his time to be distributed accurately for each day's work. The foreman is required to check the information shown on the slip before the distribution is finally sent to the office of the superintendent of rolling stock.

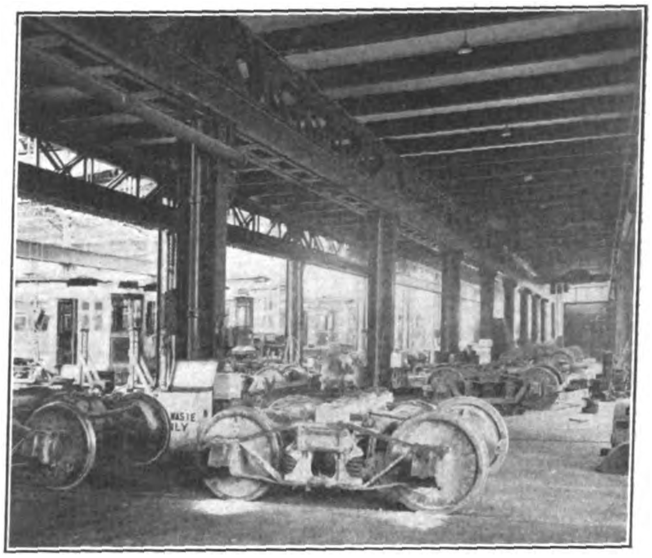
CARPENTER-SHOP AND PAINT-SHOP PROCEDURE

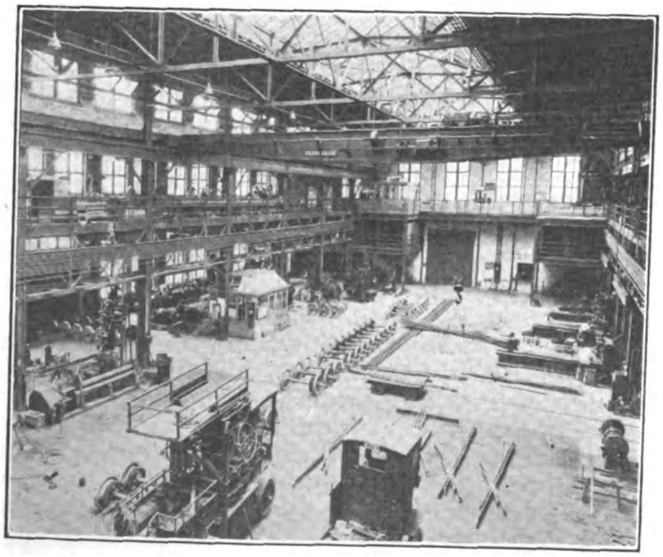
The procedure followed in general repairs in the carpenter shop is about as follows: As a car body is dismantled a list is made of the new parts needed. When this list is complete it is sent to the department clerk, who requisitions the storeroom for the new material required. Since all wooden repair parts are made on storeroom orders and carried in stock, only the exact quantity of material is given out on requisition. Under ordinary conditions the workmen go to the storeroom for this material, but during heavy reconstruction periods special "material chasers" are detailed to do this work. When the repair work has been completed in the carpenter shop a car-body inspector carefully examines the quality of the work, and if it is satisfactory the car is moved to the paint shop.

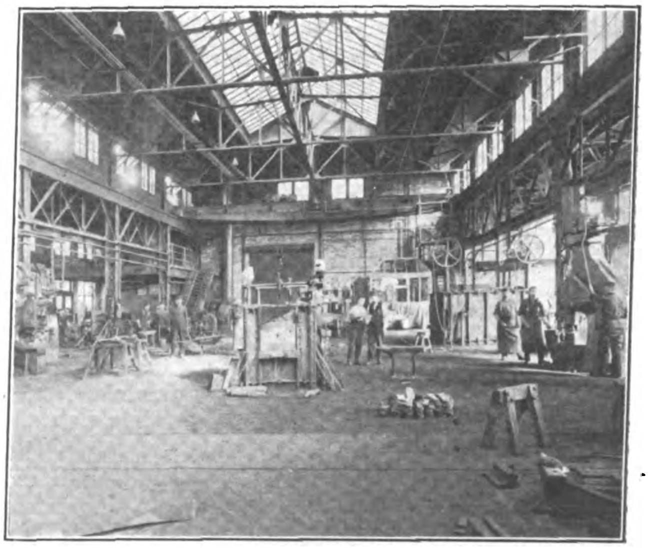
TRUCK AND MOTOR REPAIRS

After the car body has been removed from the trucks the latter are transferred to the truck bay where the motors and wheels are taken out, the wheels being set on wheel wagons and sent to the machine shop. In order to identify each wheel the car number is written with chalk on the inside of the web. The machine shop requires no written order to do wheel work, and as fast as the wheels are removed from the trucks they are set on the storage tracks in this department. When both motors have been removed from the truck, they are taken apart and all worn armature bearings are removed. Defective bearings are cleaned periodically and sent to the sub-storeroom in the truck department, from which they are removed daily for rebabbitting. Following the rebabbitting process the bearings are again returned to the storeroom, where the storekeeper receipts for them on a delivery slip made in duplicate, one being retained by the storeroom and the other being returned to the foreman as his record of delivery.

Armatures are removed from all motors and taken to the armature room on small dollies. Each armature at the time it leaves the car trucks is marked with the car number for identification, the car number being used by the armature-room foreman in compiling his record. A card record is made out for each armature at the time it is received, to indicate the date received and the date the armature was returned in good order. Repaired or rewound armatures are removed from the portable horses to small dollies and assembled on the armature-room floor. Before being returned to service, however, all armatures are given a potential test at 1200 volts a.c. for repair work and 2000 volts a.c. for all new work.


MILWAUKEE SHOP PROCEDURE—TRUCK OVERHAULING SECTION UNDER BALCONY IN REPAIR SHOP


MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF MACHINE SHOP


MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF FORGE SHOP

At the present time all armatures on which repairs have been completed are fitted with bearings on the machine-shop gallery, which is on the same floor as the armature repair room. Babbitted bearings are drawn from the storeroom, the shaft of each armature is callipered and the bearings turned to fit them. This method is to be discontinued, however, and one substituted in which all armature shafts will be graduated to 1/16-in. variance in diameter. If a shaft wears 1/32 in. it is turned to the next 1/16 in. lower. According to this new method, bearings will be babbitted to the graduated armature shaft diameter so that machining will be unnecessary. All repaired armature shafts will be stenciled to show the size of the bore.

The repair work for trucks includes stripping off the brake rigging, which is sent to the blacksmith shop to be overhauled, all holes usually being bushed with cold-rolled steel tubing. Truck frames are tested for square and such readjustments as are necessary are made. Each truck is also stripped of its bolster, which in turn is sent to a bolster repairman, who puts it in good order and paints it. At the completion of this general overhauling the trucks are reassembled and made ready for the repaired car body. Overhauled motors also are assembled on the truck-shop floor, but before mounting in the trucks they are sent to the testing rack, where they are tested and inspected. City car motors are loaded at from 75 amp to 90 amp, the tests being made by coupling two together, operating one as a generator and the other as a motor.

While the trucks and car body are being repaired in the different departments, the controller is sent to the armature room if it is in need of repairs at the time the car is in for overhauling. In case the car wiring is also in need of an overhauling, defective parts are replaced when the car body is being repaired in the carpenter shop. Before the wiring is accepted as ready for service, however, it is given a potential test at 2000 volts.

Compressors are always removed during a general overhauling and replaced by repaired ones, the old compressors being sent to the air-brake department, where they are inspected and tested. If compressor-armature trouble has developed, the armatures are sent to the electrical department. Any mechanical repairs necessary in the compressor are made by the air-brake department.

The final steps in the process of general overhauling are taken when the car body is returned to the repair shop from the paint shop. At this time the body is replaced on the trucks and equipped with fenders before being given final inspection. If it meets with approval, the finished car is then swept and otherwise made ready for service.

Results with Women Conductors

The *Tramway & Railway World*, London, England, published the following paragraphs in its issue of April 10:

James Dalrymple, general manager of Glasgow Corporation Tramways, reports that the experiment of employing women as tramcar conductors has been quite successful, but he points out that the two women who are at present on the cars are members of the tramways staff. Although nothing has been decided by the tramways committee, it may be taken that, should it be decided to employ women, it will only be as a temporary measure to tide the department over the present difficulty of getting men to carry on the work.

J. B. Hamilton, general manager of Leeds Corporation Tramways, in a recent interview with a local press representative, alluded to many obvious disadvantages to the employment of women as tramcar conductors. There is no suggestion that they could not punch tickets and take coppers as well as male conductors, or that they would not be as industrious as men. But there is always a danger of an unruly or amorously-inclined passenger. Mr. Hamilton adds, if conscription were to come about many people might have to revise their views.

Central Electric Committees

A Number of Changes in Personnel of Committees Is Noted—List of Members of New Committees Is Given

The annual Brown Book of the Central Electric Railway Association has just been issued. It shows the officers for the ensuing year elected at the annual meeting of the association on Feb. 25-26, as already published in this paper. It also shows the committees which have been appointed by President Henry for the ensuing year. There are two less committees than last year, five being discontinued and three added. The new committees are those on registration, track and roadway and uniform charges for interchanged equipment. Those discontinued are the committees on claims, insurance, compensation for carrying mail, wood preservation and joint weights and inspection bureau.

A number of changes have been made in the personnel of the committees continued. These changes are as follows: In the committee on constitution and by-laws, E. F. Schneider takes the place of C. L. Henry; in the committee on publication L. E. Gould takes the place of E. M. Haas, and in the supplymen's committee W. D. Hamer takes the place of T. H. Henkle. The finance committee and the standardization committee have each one less member than last year through the omission of the names of C. M. Hawley in the first case and F. J. Stevens in the second case. In other respects the list of the committees as published on page 879 of the ELECTRIC RAILWAY JOURNAL for April 18, 1914, is the same. The membership of the new committees follows:

MEETING REGISTRATION COMMITTEE—W. D. Hamer (chairman), Electric Service Supplies Company; H. C. DeCamp, Westinghouse Electric & Manufacturing Company; J. H. Drew, Drew Electric & Manufacturing Company; W. A. Carson, general manager Evansville Railways Company; T. J. Brennan, general superintendent Dayton, Covington & Piqua Traction Company.

TRACK AND ROADWAY COMMITTEE—T. R. H. Daniel (chairman), chief engineer Terre Haute, Indianapolis & Eastern Traction Company; T. H. Sundmaker, chief engineer Ohio Electric Railway; W. A. Carson, general manager Evansville Railways Company; E. Smith, general manager Toledo, Fostoria & Findlay Railway; L. A. Mitchell, superintendent track and roadway Union Traction Company of Indiana.

COMMITTEE ON UNIFORM CHARGES FOR INTERCHANGED EQUIPMENT—S. W. Greenland (chairman), general manager Fort Wayne & Northern Indiana Traction Company; H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway; S. R. Dunbar, purchasing agent Union Traction Company of Indiana.

The Brown Book also contains the annual report of the secretary-treasurer, the charges for interchange of equipment, the rules governing annual transportation, the new committees of the Central Electric Traffic Association with several of the important bulletins of that association and list of members, and the officers of the Central Electric Railway Accountants' Association.

Deferred Maintenance

The Writer Presents Several Instances from Practice, with Costs, to Prove the Financial Folly of the Short Bond and Neglect in Joint and Special Work Maintenance

BY CARL H. FULLER, FORMERLY ENGINEER MAINTENANCE OF WAY MACON (GA.) RAILWAY & LIGHT COMPANY

There is no place in the complex organization of the modern electric railway where the old saw, "Out of sight, out of mind," may be more aptly applied than to way matters. The railway manager must not blame the valuation commissioner, who is seldom a railway man in any sense of the word, for ignoring the depreciation of "permanent way" when, forsooth, he himself treats his track as a permanent structure undeserving of attention until some morning he finds his cars bobbing along a worn-out groove in the paving, or an interurban car overturned in the ditch because the dirt would no longer hold the rails to gage.

Why are such conditions tolerated? Because the manager who makes it a point to discount his bills for fractional percentages or to figure interest for each twenty-four hours, frequently fails to realize that suspended maintenance, if you choose to consider it in that light, instead of being a conservation of resources is not only an extravagant waste but criminal neglect as well. It is not the purpose of this article to expose any individual's sins, but it is hoped that the citation of a few concrete comparisons will prove that the failure to take the "stitch in time" often increases the cost of maintenance out of all proportion to the temporary saving effected.

COST OF NEGLECTING JOINTS

Low joints with their clackety-clack of loose plates and churning ties are perhaps the most persistent of track defects. If on private right-of-way or in dirt roads where the joint is exposed or is easily accessible, a little attention to the tightening of bolts and the shuffling of joint ties persistently given at regular intervals will keep this evil down to the minimum at a reasonable cost. Even here, however, deferred maintenance may become a costly proposition as shown by the following case: On a certain 3-mile stretch of track, the new trackman had been led to believe that he would have a chance to relay the old 40-lb. rail with new 60-lb., but owing to pressure of work on other lines this track was practically neglected for some eighteen months, during which time the new rail became a vision of the future. In addition to the resulting rough track, five broken axles occurred on this section in as many months, each time tying up traffic from two to five hours. Complete resurfacing was resorted to with the result that on the first 1000 ft. of track so treated eight rails were broken close to the ends in trying to remove the cupped joints, forty-two out of the sixty joints had to be renewed because of broken or worn-out plates, forty-seven bonds were replaced and one-third of the ties had to be renewed at a labor cost of 42 cents per foot of track. Experience on a similar piece of track which had been maintained in good shape indicated that a small gang continuously employed could have kept this section in good condition, making a 20 per cent tie renewal per year at a labor cost of 9½ cents per foot, so that deferred maintenance in that instance cost practically 300 per cent, exclusive of the car repairs traceable to bad track.

In a similar case but with 75-lb. rail, the joints had been allowed to pound for so long that when the time came to make repairs it was necessary to remove this rail from the track, a few bars at a time, haul them to the shop where from 6-in. to 1-ft. lengths were sawn from the ends, and then to redrill and to restore them to the track with new splice plates and bonds. The labor cost for this work was $5.30 per rail. As the ties in this piece of track were fairly good and the track ballasted, the trouble could have been prevented if the joints had been kept up during the previous summer.

In paved streets the problem of low joints becomes increasingly complex, and where radical treatment is necessary often proves very costly, as is illustrated by the following case: In a city track eighteen joints of 7-in. T-rail were laid in granite block paving on a concrete base. These joints had been allowed to pound until a more convenient time, about five years later, when the repeated breakage of pilot boards at the low joints aroused the manager to action. The engineer of way was fully justified in desiring to relay this rail, but his proposition was turned down in favor of an application of a patented joint. However, the ends of the rail were so badly battered down that when these plates were applied the tightening of the bolts in nearly every case resulted in the shearing of the head from the web. This necessitated the hacksawing of 18 in. from the end of each rail and the insertion of a 3-ft. piece between the two ends, using two pair of plates instead of one and bedding three new ties under each joint. Labor, joints, bonds, ties, concrete and paving incidentals brought the cost of these repairs to $18.62 per joint. Had this work been done when the low joints first developed, it is probable that the application of one pair of the patented joints, costing $3.05, and the expenditure of $1 for labor would have saved at least $14. Not counting broken pilot boards and a truck frame, this neglect accumulated 100 per cent interest a year for nearly five years. Further, the repairs, when finally made, were only temporary, as the rail was so badly worn that only three or four more years of service could be expected from it, after which it would have to be relaid at a cost of approximately $4 per foot of track.

THE COST OF BOND NEGLECT

Let us consider the bond. In some quarters there has been a tendency to use the shortest bond obtainable or one containing the least copper, the desire for economy readily securing an audience for the firm which had the cheapest bond to sell. The writer has always favored the longer bond, but on reading H. H. George's article in the ELECTRIC RAILWAY JOURNAL for Sept. 12, 1914, he realized to its full extent the mechanical superiority of the longer bond. In this article Mr. George shows that a 14-in. stranded bond will stand nearly 200 times as many vibrations as a 7-in. bond. But someone says, "In paved streets you have a rigid track and the joints are not subject to vibration as in dirt roads." Perhaps not to so great an extent, yet the vibrations are there just the same. Hence if the life of the bond proves less than that of the paving, an expensive renewal will have to be made. On a certain hill the railway lost several armatures, and the writer was requested to investigate the bonds. The track was laid in brick paving on a concrete foundation which had been down for five years. So far as could be determined by a superficial examination all joints appeared to be in good condition, but when the paving was removed from around the joints and the bonds were exposed to view, three-fourths of them were found broken mechanically in the stranded portion. The splice plates had been drilled 4 in., 6 in., 4 in., leaving the end hole 3 in. from the end of the rail. The bond, 3 in. long between terminal centers, had a stranded length of about 1 in. Installed, these bonds probably cost not more than 50 cents each. A 9-in. stranded bond could have been installed originally for something like 65 cents and under favorable conditions would have lasted as long as the paving; or a 36-in. bond might have been installed at that time for not more than $1, with still greater assurance of remaining perfect. Yet to effect this small saving in the primary cost of bonds the company had to renew more than 300 of them at a cost of $2.17 each, for bonds, labor and repaving.

Compare the foregoing record with a 5-mile stretch of track composed of 45-lb. rail, spliced with old-fashioned fish plates using ⅝-in. bolts and bonded with No. 00 solid wire bonds having pin-driven terminals but with an over-all length of at least 3 ft. As the track was laid on a loamy soil there was no question of the vibration under the heavy double-truck cars, yet after sixteen years of service fully three-fourths of these bonds were in service unbroken, the stiffness of the solid copper being counterbalanced by a length which was sufficient to withstand the vibrations.

SPECIAL WORK TROUBLES

Special work is probably one of the most important and expensive parts of the equipment of the average street railway, sometimes costing more than all of the rolling stock, yet it is the most likely to be abused. It is abused, because the section foreman who installs and cares for it is seldom more than a common laborer; because the roadmaster is often a friend of someone higher up placed where he will do the least (?) damage; or possibly he is a track hand who has worked up to that position but is unable to read intelligently the blueprint that accompanies an order of special work; or because the management is composed, as it often is, of men who have had very little practical knowledge of track work.

A few roads, especially where the managers are engineers, may overdo track design and maintenance, yet in many instances, less attention is given to an order for special work than to one for lead pencils. It is to the credit of the special work manufacturers that they send highly-skilled specialists to take the measurements for their goods and, when the material is fabricated, fit it together carefully on the floor of their shops. Still, this is a matter of self-protection with them, as comparatively few railways, if we except the big metropolitan lines, have engineers and roadmen who are qualified to lay out such work.

There comes to mind the sixteen external joints in a double track "grand union," where, because the roadmaster was a relative to the manager instead of being a track man, he failed to realize the importance of installing properly fitted compromise joints. Instead, he used standard splice bars packed out with pieces of tin cut from discarded cans, a substitution the writer discovered a scant two years later when of all the numerous joints in this set of special work only these sixteen developed "jolts" and the paving was torn up for repairs. As we did not have the proper splice plates in stock these joints were shimmed up temporarily and the paving was restored until special joints could be obtained at a cost of $8.50 per pair. By the time these new plates had been installed the cost of repairs had mounted to $15.86 per joint, and even then the ends of the special work had to be left with cupped places in them because we had no means of regrinding these joints. In addition to this the transportation department had traffic tied up twice on this busy intersection by the skewing of big interurban cars across the tracks while the claim department settled for $500 damage claims—all because of the failure to apply sixteen pairs of compromise joints which should have been ordered with the special work at a cost of $2.60 each. Thus this failure was equivalent to fully 1000 per cent interest on deferred maintenance.

Another illustration: The switch piece at one end of a passing track had become so badly worn that motormen had been running through it for several months in continual dread of being on the ground before it would be renewed. The manager, who was also the purchasing agent, readily consented to the purchase of the most approved and expensive type of switch, but balked on the price of a spring box because, as he put it, they had always used "rubbers" in their spring switches and so might just as well save the price of the spring box. But the motormen becoming venturesome on finding the new switch "easy" and safe, kept trying it out until one day the rubber jumped out of the slot and the rear truck followed the other track, with the consequence of tearing the bolster loose from under the car and wrenching a big hole in the floor. After that spring boxes were ordered on all switches that required them, but the saving of $12 maintenance had been wiped out several times over in car repairs.

There has been much discussion concerning derailments at facing switches due to the wheel climbing the point of the mate. In nearly every case handled by the writer, investigation has revealed that either the mate or the switch alone had been renewed, the new part being purchased from some other manufacturer. In spite of the utmost care in following the general dimensions of the original turnout, the difference in the place of manufacture is sufficient to account for numerous troubles of this kind. This variation was not of such great importance with the older types of special work and lighter cars, but in the modern types with throats ground so closely to theoretical lines, it is just as essential that the renewal parts be furnished by the original manufacturer from the original templets and drawings as it is in making replacements in machinery. In fact, it is a serious question whether it is profitable in the long run to make partial renewals in special work. There is no question that better results may be obtained if a company makes an entirely new replacement while using the good parts out of the old work to replace worn parts in old work relegated to less important lines, than to use old and new parts together.

This may be illustrated by an experience with a new mate which had replaced an old one without any other change in the switch set. No amount of checking revealed the cause for the repeated derailments at this point, and it was thought that certain cars which proved to be the only offenders had something wrong with their trucks. One day, after the engineer had broomed out this mate and powdered it with dust in an effort to trace the wheel travel through it, a big double-truck car passed over it leaving behind a piece of wheel flange fully 3 in. long and too hot to hold in the hand from having just broken on the hardened point of the mate. Although it was impossible to check broken wheels against this particular piece of special work a period of observation satisfied the writer that wheel chipping at this place would in a short time amount to more than the cost of an entirely new set of special work.

Examination of the special work on another road revealed 108 frogs, switches and mates to which from one to five years of useful service might be assured by investing $1,100 in an electric welding and grinding outfit, and the necessary labor to remove the pitted places, estimated at from $2 to $10 each. But the management kept postponing this investment until a more convenient season, with an ever-increasing chipping of wheels from the rough riding of special work. Inside of twenty months it had spent $3,000 in replacements while nearly one-half of the remainder of the special work mentioned had been ruined beyond profitable repair. While it would be impossible to make any estimate of the salvage value of making the suggested repairs, it is quite evident that such repairs would have quickly paid for the equipment to do the work and still leave the equipment available for future work of a similar nature.

CONCLUSION

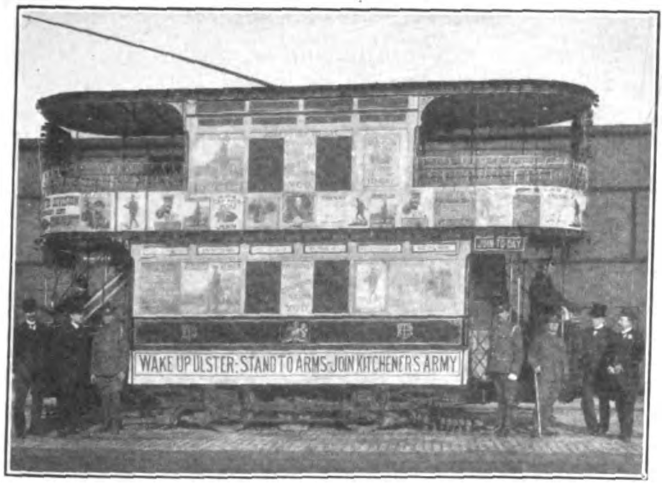
It would be unfair for the writer to identify any of the incidents mentioned since the persons responsible were doing their best to keep their properties efficient at the lowest cost, but the incidents recited may be considered sufficiently accurate and reliable, having been taken from actual cost records, to demonstrate that deferred maintenance or unskilled track work is an expensive method of conserving the roadway and that it is just as important to apply skill and science to the maintenance of track and special work as it is to any other line of endeavor.

Recruiting Car at Belfast

BY A. A. BLACKBURN, M.I.E.E., M.I.M.E., CHIEF ENGINEER BELFAST (IRELAND) CITY TRAMWAYS

The tramways committee of the Belfast Corporation having been approached by the officer commanding the Ulster division of Kitchener's army to assist them in their recruiting campaign, placed a tramcar at their disposal. The car works department then prepared one of its standard cars for the occasion.

The top, side and end boards were very tastefully covered with a large variety of recruiting posters. In the center windows of both the top and bottom compartments were displayed large colored transparencies of the King and Queen, with a poster in the center bearing the words, "Britons, Your Country Needs You." On all other windows were displayed colored posters urgently calling for recruits.



BELFAST CAR WITH A STIRRING APPEAL FOR VOLUNTEERS

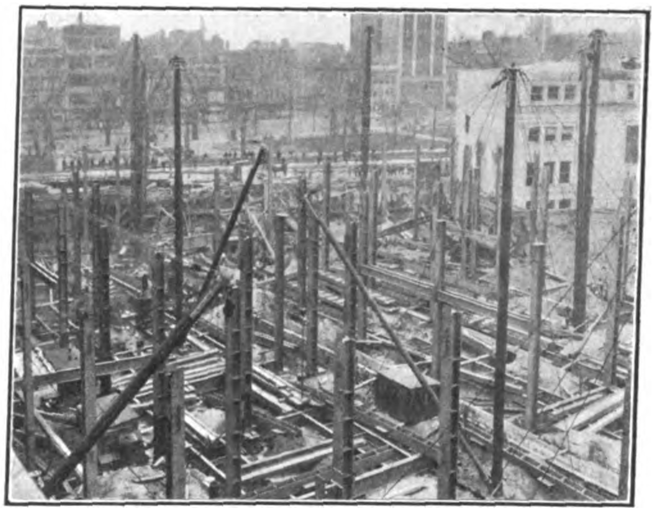
Along the lower panels at the sides of the car were the following inscriptions: "Wake Up, Ulster—Stand to Arms—Join Kitchener's Army" and "Ulstermen, Join Our Heroes at the Front. They Expect You. They Need You." At night the car is brilliantly illuminated with 400 16-cp lamps in colors.

The car traverses all the routes and runs from 9 a.m. until 10 p.m. On the car are three recruiting officers, who have found that this car has brought in quite a number of willing recruits from the outlying districts of Belfast.

Progress on the Newark Terminal

Construction of Subway Nearly Complete—Steel Frame Erection to Upper Train Floor Going Forward Rapidly

The accompanying illustration shows the appearance of the site of the $5,000,000 terminal which the Public Service Railway is constructing in Newark, N. J. Just below the center is seen one of the grillages of I-beams which are on the tops of the caissons, while the steel columns, upon which the elevated train floor will be supported, are shown in process of erection. The mouth of the subway is near the left center of the picture. The construction is going on in four divisions—subway, terminal building, subway loop, and elevated approach. All of these were fully described in the article in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1914, page 1190. The subway is now practically completed with the exception of back filling and restoration of street paving, although no track is laid. The foundation for the building is in place, 125 caissons, from 6 ft. to 16 ft. in diameter, having been sunk to bed rock, an average of 53 ft. below the street level. Columns weighing about 400 lb. per foot are being erected on these. As the caisson centers could not be carried out to the building lines, cantilever girders, weighing up to 1000 lb. per foot, are being installed to serve as upper grillages to carry the columns out to the building lines.



NEWARK TERMINAL—BIRD'S-EYE VIEW LOOKING NORTHWEST, SHOWING STEEL COLUMNS

The frame will be up to grade in about thirty days and the balance of the steel is now being fabricated by the Hay Foundry & Iron Works of Newark, the subcontractor working under the Hedden Construction Company, the general contractor. The subway loop is excavated and a heavy retaining wall is now being built which will form the rear wall of the subway loop and also retain the earth fill which forms a part of the elevated approach. The elevated approach fill has been completed from Mulberry Street to the retaining wall now being built. West of the retaining wall and to the main building the approach will be carried on steel work and on a bridge over Pine Street. Practically all of the track changes required in connection with the rerouting, which forms a part of the general terminal scheme, have been made. It is expected that the terminal will be finished early in 1917.

Iowa Annual Convention

Abstracts of Four of the Papers, Presented at Keokuk April 22 and 23, Are Published—The Subjects Treated Are Safety, Time Schedules, Return Circuits, and the Jitney

The annual convention of the Iowa Street & Interurban Railway Association was being held in Keokuk, Iowa, as this issue went to press. It followed a meeting of the Iowa Section of the National Electric Light Association held on April 20 and 21. All meetings were at the Hotel Iowa. An account of the proceedings of the Iowa Street & Interurban Railway Association will be published next week. Abstracts of four of the papers presented at the meeting follow.

RESULTS OF SAFETY WORK

BY F. K. GEORGE, DIRECTOR OF SAFETY UNITED LIGHT & RAILWAYS COMPANY, GRAND RAPIDS, MICH.

While it may be said that the organization of the safety-first movement among railway employees is as yet largely experimental, the results already attained lend color to the claims of the most enthusiastic supporters of the cause. The railroads of New York State, taken as a whole, reduced the casualties to employees and passengers in the last year of operation of the safety-first work by 70 per cent. In 1914 the Detroit United Railway, by its organization among employees, reduced the number of cars in collision 43 per cent; of passengers hurt in boarding and alighting accidents, 17 per cent; of passengers falling from cars, 37 per cent; of derailments of cars, 11 per cent; of pedestrians hurt by cars, 8 per cent and of vehicles struck, including animals and excluding automobiles, 1½ per cent. There was an increase of 27 per cent in the number of automobiles struck by cars, although in the same period the number of automobiles in Detroit increased more than 50 per cent. Figures as to the actual saving in money are difficult to obtain, but managers can calculate for themselves what a reduction of 43 per cent in the number of cars in collision will do for shop costs.

If these results can be obtained by merely bringing about a more constant thought of safety on the part of employees, much more can be done if the general public can be brought to do its share of the thinking. The problem for the electric railway manager to solve is how the general public can be awakened to a sense of its responsibilities for safety first. The Chicago surface railways appear to have solved one phase of this problem in an effective manner. In 1914 H. L. Brownell, director of safety, delivered scores of lectures in the public schools, showing the children by means of moving picture films and stereopticon views how accidents occur and telling them how to be safe. The result was that fatal car accidents to children were reduced more than 70 per cent in 1914. In July, 1913, seventeen children were killed by being run over by cars, but in the same month of 1914, after the campaign of education in the public schools, not a single child met death from this cause.

The key to a successful safety-first campaign is to arouse the thought of safety first in the minds of everyone. It is a problem of thorough organization, of continued agitation, of constant reiteration of the thought and of intelligent selection of the human elements with which to accomplish the work. No headway can be made in this work if it is conducted in a cold, unsympathetic manner. To arouse the enthusiasm of the employee the organizer himself must be filled with his subject and be able to inject his enthusiasm into those whom he calls in as his aides.

The United Light & Railways Company impresses upon its employees that safety-first work is as much a part of their duties as those for which they are regularly employed. The men who serve on the safety committees are paid the same rate of wages as for their regular occupations. Sometimes, for convenience, the committee meetings are held in the evenings; in every case the committee members go on the payroll at the regular rate for the time so spent. On the departmental safety committees of five members each, no foreman of a department, superintendent or other official can serve, for the company desires the workers themselves to be the active ones. There is, of course, a governing committee containing company officers and committee chairmen.

The increasing traffic of the streets and the country highways presents a problem which the electric railway manager finds difficult of solution. This problem has been vastly complicated in the last few months by the appearance of the jitney bus, but the statistical department should keep a close cumulative record of the jitney bus accidents. The fact should be emphasized that the danger is bound to increase, no matter how stringent may be the regulations imposed upon such traffic.

RAILWAY RETURN CIRCUITS

BY F. V. SKELLY, ASSISTANT SUPERINTENDENT TRI-CITY RAILWAY & LIGHT COMPANY

In order to secure economy in power, an average potential gradient in the track of 1 volt per 1000 ft. is desired. The gradient may be determined by taking the over-all voltage when the average current is flowing in the track. If the system is large, arrangements can be made with the local telephone company for connections at selected points through the railway network. At the telephone exchange, smoked-chart recording voltmeters can be put in these circuits, and the average voltage drop secured for any hour in the day. If this is found to be too high, the rail bonds must first be improved, and if that is not sufficient, negative feeder copper installed.

Poor contact in the rail bond is the principal cause of high resistance, which can only be determined by the use of a good bond tester. One of these instruments of the Roller-Smith type has been used with much success on the tracks of the Tri-City Railway Company. Three feet of bonded rail are compared to an equal length of unbroken rail, and the reading gives direct the equivalent length in feet of unbroken rail. With this machine a series of tests was made on newly installed bonds for 80-lb. rail with the following results: Twin terminal bonds which had been installed one year gave an average reading of 5.6 ft. Oxy-acetylene welded bonds installed about three months gave an average of 3.2 ft., and electric-arc-welded rail joints were of lower resistance than the equivalent length of rail. The accuracy of these readings depends on the amount of current flowing in the rail and near the end of a line it is often necessary to wait for a car to use current before the reading can be made.

I might mention here that the oxy-acetylene welded bond promises to give good results. It is impossible to tear this bond from the rail head, as repeated blows from a heavy sledge fail to dislodge it. The contact resistance is low, and the cost for labor less than for any bond which requires the rail to be drilled. The Twin City Rapid Transit Company made use of this bond as early as 1910 and now claims a cost of only 40 cents per bond installed. Our experience is that the cost is slightly higher. Pin expanded bonds, compressed terminal bonds, soldered bonds and thermit welded bonds have each been tried with varied success.

Our engineers have recently put on trial fifty arc-welded rail joints. After three months of average service the bond resistance was taken, and in every case the resistance of the joint was found to be less than the resistance of an equivalent length of rail. The cost of this joint complete is about $4, which is well within the cost of bolted plates with copper bonds included.

It is very necessary that all special work should be shunted by copper cables capable of carrying the current in the track at that point. This is common practice, but if bonds are poorly maintained the drop across special work often causes serious trouble. The remedy is so simple that only carelessness can account for its existence. A millivoltmeter connected across special work will indicate the condition at a glance. In making such tests we found one steam road crossing around which the voltage drop was from 5 to 13. This crossing was relaid and all trouble removed by carefully shunting all current through a 500,000 circ. mil. cable laid beneath the track. We consider a cross bond every 300 ft. to be sufficient to counteract the evil effects of an occasional bad joint.

If the voltage drop in any particular section of track cannot be further improved by bonding, it will then be necessary to install return feeder cables to drain those sections of track in which the voltage drop from track to power house is high. Our experience would lead us to believe that the insulated negative return feeder will give the best result when an improvement is planned in the return circuit. When copper cables or wires are buried in the ground inspection is impossible and corrosion is rapid. Sections of No. 00 copper wire lying under the track and acting as uninsulated return feeders have been found to have been entirely destroyed by corrosion.

It would be impossible to go further into this subject and not refer at this time to electrolysis, an important source of loss due to the return circuit. It is a well-known fact that stray current leaking from the rails follows the path of least resistance. If the track resistance is high this stray current finds an easier path through the earth and underground pipes. The power loss is less as the conductivity of the return circuit is increased, but wherever the current leaves the underground structures, corrosion of metal by electrolysis takes place. Pipe-owning companies naturally object to this and present their claims when repairs are necessary. The situation in Davenport with regard to electrolysis is an example of partial pipe drainage. At the substation the water and gas pipes are grounded to the cable running to the negative busbars. Under this condition there is practically no difference of potential between track and pipes in the vicinity of the station, but at several points in the city positive districts have been located.

In reviewing the situation, it might be reiterated that too little attention is paid to the track return circuit. The track maintenance department is kept busy repairing special work and paving and has no time to look after rail joints that ride smooth, although they may steam with the heat of lost power. Make a swift examination of your track after any light snow and look for the points on the rail where the snow flakes melt. You will not require a bond tester there to tell you that the bonds are broken. In any event, a thorough examination or test of all bonds and cable connections should be made twice each year, and a record kept in such form that a repair gang can follow it up and correct the faults.

TIME SCHEDULES

BY L. L. SLOSS, SUPERINTENDENT OF TRANSPORTATION DES MOINES (IA.) CITY RAILWAY

The method which I have followed in making schedules for the past ten years is to lay out the form of schedule required for each individual line, based upon statistics compiled as follows: Take, for example, as many eighteen-hour day runs as the individual line has at the time of compiling statistics. Then get from the conductors' trip cards the total number of passengers hauled from the first car in the morning to midnight, setting forth zones every ten or fifteen minutes, the latter zone being usually sufficient in a city situated similar to Des Moines. In a large city, however, St. Louis for example, I have found it necessary to use the ten-minute zone to get a more accurate check on business done during the eighteen hours. This is especially true during the peak loads.

As to the needs of car service at different periods of the eighteen hours, certain time statistics used are as follows: Seventy-five seats for 130 passengers during peak loads, and 100 seats for seventy-five passengers during the middle of the day and at night, or when tripper service is off the road. The one-hour zone may be used, where practical, to strike this average. I will venture to say, however, that sometimes personal observation on certain lines brings better results as to satisfactory service rather than the use of the above figures.

THE JITNEY BUS

BY C. I. PALM, OMAHA & COUNCIL BLUFFS STREET RAILWAY

Last autumn some owners of second-hand automobiles in Los Angeles, being out of employment, thought they could pick up a few "jitneys," or nickels, by carrying players to the various moving picture establishments. The owners of these small cars had read about the big and apparently highly-profitable business being done by a "$500,000 motor coach company," which operated in Los Angeles and to the neighboring villages, but which went into the hands of receivers last December. To the newspapers belongs the credit for the rapid spread of this craze. It has been stated that a Kansas City, Mo., newspaper publisher, who opposed the granting of a franchise to the Metropolitan Street Railway, became so peeved when the franchise was granted by a popular vote that he sought revenge against the street railway company by starting to publish stories of the "success" of the jitneys in cities along the Pacific Coast. Extravagant claims were made of their earnings, but nothing, of course, was ever mentioned about their expenses. A number of small-car owners fell for it, and converted their cars into jitney buses by hanging a 5-cent sign on them.

Newspapers in other cities, imagining they had grievances against the street railway, likewise started spreading the craze.

At this writing we have in Omaha fifty-four jitney buses. Four of these are seven-passenger cars; six are trucks, seating from nine to fourteen passengers; and the remainder are five-passenger cars, mostly Fords. Jitneys started operating in Omaha early in February. On Feb. 19 there were fifteen on the streets. Due to unfavorable weather conditions, they did not increase in number very rapidly; but with the advent of propitious weather, we expect there will be a flock of them of such proportion as to darken the sun. No ordinance looking toward their regulation has as yet been passed by the municipal authorities, although improvement clubs and other civic bodies and letters to the daily press have urged that such an ordinance be passed.

The jitneys in Omaha already have had a number of accidents (one fatal), and as they grow in number and the competition for nickels becomes keener the percentage of accidents will be larger. The operators are organized and call themselves the Omaha Jitney Bus Men's Association. According to the president of the association, it has a membership of seventy-five, and there are but two independent operators in the city.

In Council Bluffs there are eighteen jitneys, all five-passenger cars. They are classed with the expressmen in that they are required to file a bond in the sum of $200.

In general the bond requirement alone or a regulatory ordinance for jitney buses will make jitney men discontinue operation in many instances. In some cities the surety companies have declined to assume the risk. For the insurance of this kind that has been written a high premium has been paid, and it is very likely that the rates will be advanced as the percentage of accidents increases. A report is current that jitney operators in Salt Lake City have discontinued operation because they are now required to furnish bond, and the bonding companies are demanding that they put up collateral to the full amount of the bond. This they have been unable to do. Notwithstanding the absolute fairness of the bond requirement, jitney operators have protested against it, giving as their reason that the earnings from the business will not permit the expense.

Opposition to the jitneys and petitions for their regulation have not come from the street railway companies, but from the business men, improvement clubs and other civic bodies, who have realized the menace and the irresponsibility of the whole proposition. However, the craze has reached its height and is now waning. The small car owner, if he has not already done so, will soon find out that he cannot carry a passenger for 5 cents and make a profit.

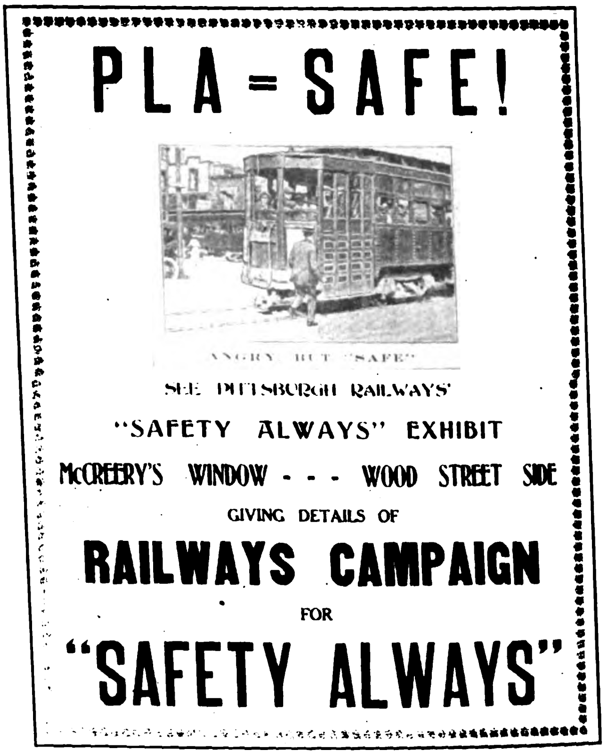
Investigation has shown that very few of the men who operated jitneys a few months ago are still in the business. The personnel of the operators is constantly changing, and the few who are staying with the game are doing so because it is the only employment they can find. They are satisfied with the income remaining from the nickels collected less the cost of gasoline and minor repairs. When their machines are worn out, or if they should ever meet with a bad accident, they realize the jig is up. The proposition is therefore largely a product of unemployment, and cannot continue to exist for any length of time. That it cannot do so under proper regulation is further evidenced by a statement made by the jitney owners in Los Angeles that the passengers on the running board are the profits of the business.

I believe there is a field for the auto-bus, but not as a 5-cent proposition. Its mission is rapid transit de luxe. A proportion of the population in the larger cities would, without doubt, be glad to pay a higher rate of fare than that charged by the street railways for a guaranteed seat in a comfortable and up-to-date vehicle operating at a rapid but safe rate of speed. The auto-bus should take a place between the street car and the taxicab.

Correction of the evil effects of the jitney bus will have to be by the public, and not by street railways. The industry, however, can do much toward this end by a fair and square presentation of facts concerning the effect the jitney will have on a community if permitted to continue operating unregulated. An excellent way to present the facts about the jitney is by the distribution of circulars on your cars. The people who ride on the street cars are the jury in this case, and I know of no better way to present your argument to that jury.

Safety Publicity in Pittsburgh

The Pittsburgh Railways Company has recently been conducting a publicity campaign in connection with the safety-first movement and to this end it has established a "safety always" exhibit in the window of one of the large department stores in Pittsburgh. The exhibit has created a great deal of attention and this has been augmented by the publicity methods used by the railway company in connection with it. The accompanying circular is one of several that have been posted in the cars for the purpose of calling attention to the exhibit, and owing to the fact that this poster deals with the popular objection to fully-inclosed cars, namely, that they prevent passengers from boarding the cars when in motion, it presents a new phase of the system for safety publicity. The photograph showing a passenger who fails to board a car before the doors are shut has apparently appealed to a great many people. This has been shown by the extended comments that have been heard since the utility of the fully-inclosed platform has been thus advertised.



PLA = SAFE!

ANGRY BUT "SAFE"

SEE PITTSBURGH RAILWAYS'

"SAFETY ALWAYS" EXHIBIT

McCREERY'S WINDOW - - - WOOD STREET SIDE

GIVING DETAILS OF

RAILWAYS CAMPAIGN

FOR

"SAFETY ALWAYS"

PITTSBURGH RAILWAYS' SAFETY POSTER

American Association News

Chicago Elevated Company Section Formed with Bright Prospects—B. I. Budd Offers Trips to Convention for Effective Section Work—Important Committee Meetings Held

CHICAGO ELEVATED SECTION FORMED

At a meeting held on April 17, 136 members of the Elevated Club of Chicago out of a total of 158 present signed applications for membership in the new company section No. 6 of the railway association. This will be known as the Chicago Elevated Railway Company Section.

President H. A. Johnson, master mechanic Chicago Elevated Railways, stated the purpose of the meeting, remarking that the success of the club since its formation in October, 1914, warranted the immediate formation of a company section.

A communication from E. B. Burritt, secretary of the national organization, was then read. This set forth the purpose of the company section movement and the benefits to be derived by the individual members. It stated that since its organization the Milwaukee Section had grown 340 per cent, the Public Service Section 277 per cent, the Denver Tramway Section 466 per cent, while the Washington Section showed good progress and good results were expected from the Manila Section.

H. A. JOHNSON,
President
Company Section No. 6

D. L. SMITH,
Secretary and Treasurer
Company Section No. 6

Martin Schreiber, engineer of maintenance of way Public Service Railway and chairman of the committee on company sections, emphasized the points made in Secretary Burritt's letter and explained in some detail the exact workings of the company section. He traced the history of the railway association and its reorganization in 1905, and contrasted conditions now and in the early days. "The company section," said he, "fills two important functions, to assemble suggestions and create new ideas, and to disseminate and localize these." The association does not want individual members for the purpose of increasing the income, as each costs for printing and the like the sum of $4.57. It wants them so that the association may be truly representative of the industry. Mr. Schreiber closed his address with an illustrated description of the new Public Service Railway terminal now under construction at Newark, N. J. (See page 793 of this issue.)

President B. I. Budd next addressed the club and set forth the importance of broadening the scope of its work by becoming a section of the national body. He stated that the company section movement had his hearty support, and that he knew of no better way to obtain individual development. All employees should acquaint themselves with the problems of the industry, many of which are complicated. It is essential that individuals as well as companies should aid in their solution. The increased cost of materials, coupled with the longer haul at the same revenue, necessitates greater efficiency in operation. The public expects it and greater efficiency must be uppermost in every employee's mind to make the industry a success. Also, if men are to succeed they must know what is transpiring in all departments. Mr. Budd said that he hoped the section work would prevent men from running in a rut. The membership should extend to all branches of the service. The national association is doing a wonderful work for the companies and individuals, extending into legislative, economic and political fields. In closing, Mr. Budd expressed his high regard for his employees, stating that he had been with the company for twenty years and therefore realized the changed conditions, and the importance of developing the individual. To encourage the employees to their best efforts he offered to pay the expenses of three of them to the national convention each year, department heads being barred from competing for these prizes.

E. J. Blair, electrical engineer, then urged the importance of forming the company section immediately. He spoke of the work of a club formed ten years ago by the employees of the Metropolitan West Side Elevated Railway, which was short-lived because its interests were too local.

A committee next presented a new constitution for approval and it was adopted, and the following officers were elected: H. A. Johnson, president; T. B. Millne, vice-president; D. L. Smith, secretary and treasurer, and H. B. Savage and E. J. Blair, directors.

A lunch followed the meeting, the formal proceedings of which were interspersed with musical selections rendered by the glee club.

BIOGRAPHICAL NOTES REGARDING PRESIDENT JOHNSON AND SECRETARY SMITH OF THE NEW SECTION

President H. A. Johnson has been in elevated railway work in Chicago since 1908, when he entered the employ of the Metropolitan West Side Railway. Before this he had been connected with the Chicago, Burlington & Quincy Railroad, specializing in locomotive work, a line for which he was prepared at Purdue University. With the West Side Railway he served in the inspection and electrical departments, the armature shop, the power house and the drafting room, later becoming superintendent of motive power and equipment or master mechanic. He was engineer in charge during the construction of the Douglas Park extension. When the elevated railways were reorganized in 1911 he became master mechanic of all.

D. L. Smith is the power supervisor of the elevated railways. He was born in Freeport, Ill., in 1890, and after completing his studies in the public schools took a course in electrical engineering at the University of Illinois. He was graduated in 1911, and immediately accepted a position as wireman with the Metropolitan West Side Railway. After serving for some time in that position he became a draftsman in the electrical department and was later made acting foreman in charge of electrical work. In 1913 he was appointed power supervisor of the elevated railroad system. Upon the formation of the Chicago Elevated Club last October he was elected secretary and treasurer.

WASHINGTON SECTION

In the motormen's literary competition advertised in the poster reproduced in the issue of the ELECTRIC RAILWAY JOURNAL for April 10, forty papers were submitted. The awards will be made at the next meeting of the section to be held on April 30.

DENVER TRAMWAY COMPANY SECTION

At the regular monthly meeting of company section No. 3, held on April 15, the subject discussed was "What Can We Do for Denver?" As the topic was one of general interest, non-members, including the families of the members, were invited, with the result that the attendance was 300 or more. The address of the evening was delivered by Frederick W. Jefferay of Denver. He was followed by John A. Beeler, vice-president and general manager Denver Tramway; Wm. H. Rhodes, line foreman Denver Tramway, and Sheridan S. Kendall, secretary of the State Railroad Commission. As would be inferred from the list of speakers and the attendance, the meeting was a pleasant and profitable one.

MANILA SECTION

The regular monthly meeting of joint company section No. 5 was held on March 2 in Manila, P. I. E. A. Barretto outlined a plan for encouraging saving among employees through the agency of the section, but a motion was passed reciting the opinion that such an effort should be made through individual or other means rather than through the company section. The paper of the evening was by F. J. Tew, on "Maintenance of Motors." After discussion by L. S. Cairns, W. R. McGeachin, W. A. Smith and J. C. Rockwell, C. N. Duffy read extracts from articles in technical journals on the subject of municipal ownership.

COMMITTEE ON EQUIPMENT

The sub-committee on steel axles of the committee on equipment met in New York on April 15 to discuss a proposed revision of the standard specification for quenched and tempered carbon-steel axles, shafts and similar forgings. Those in attendance were R. H. Dalgleish, Washington, D. C., and W. E. Johnson, Brooklyn, N. Y., of the sub-committee, and the following representatives of manufacturers: G. Aertson, Midvale Steel Company; L. W. Conroy, Carnegie Steel Company; J. R. Holcomb, Midvale Steel Company; E. F. Kenney, Cambria Steel Company; R. P. Rapp, Gulick-Henderson Company, and A. A. Stevenson, Standard Steel Works Company. The proposed revision was considered in detail, and recommendations to the main committee will be made as follows: That the form coincide as far as possible with that of the A. S. T. M. specifications and that the title be made more definite. That in forgings under 4 in. in diameter the ultimate strength and elastic limit be increased 5000 lb. each, to 90,000 and 55,000 lb. per square inch respectively. That the provision for application of load in testing in fixed increments be omitted as uncommercial practice. That the definition of the treating charges be made more definite. That a clause requiring a proof test of forgings be added with no definite recommendations as to details. That the number of retreatments be limited to three.

The sub-committee on pinions and gears met on the following day to discuss with the manufacturers specifications which had been prepared. There were present R. H. Dalgleish, Washington, D. C., and W. E. Johnson, Brooklyn, N. Y., of the sub-committee, and, representing the manufacturers, W. H. Phillip, R. D. Nuttall Company; E. S. Sawtelle, The Tool-Steel Gear & Pinion Company, and G. L. Schermerhorn and A. A. Ross, General Electric Company. Specifications for two classes of case-hardened steel pinions, and for quenched-and-tempered forged carbon steel pinions in three different grades were discussed in detail, following which corresponding specifications for gears were taken up. As time did not permit final settlement of all points raised during the meeting it was decided that these should be taken up by correspondence, with the expectation that the needs of the various interests involved could be harmonized before the next meeting of the committee as a whole, which will occur next month.

COMMITTEE ON FARES AND TRANSFERS

This committee of the Transportation & Traffic Association met in Detroit on April 15 and 16. Those present were: J. E. Duffy, Syracuse, N. Y., chairman; J. V. Sullivan, Chicago, Ill.; G. K. Jeffries, Indianapolis, Ind.; C. E. Learned, Boston, Mass., and B. C. Edgar, Nashville, Tenn. A final draft of the report covering the executive committee assignments on transfer-issuing and collecting devices, fare-collection methods on center-entrance and prepayment cars, and through versus zone collection on suburban and interurban lines, was prepared.

COMMITTEE ON PASSENGER TRAFFIC

The Transportation & Traffic Association committee on passenger traffic met in New York on April 12 and 13, those present being: P. P. Crafts, Mobile, Ala., chairman; E. E. Soules, Peoria, Ill.; J. K. Punderford, New Haven, Conn., and E. M. Walker, Dubuque, Iowa. The report on motor buses, trackless trolley and one-man car operation was formulated and after detailed revision will be ready for the executive committee.

Joint Committee on Line Construction

The sixth meeting of the national joint committee on overhead and underground line construction was held on March 31. Most of the time was devoted to discussion of the overhead power wire crossing specification, and the work of revision was well begun. The specification was divided into four sections and the following sub-committees were appointed to handle the work of revision on their respective sections: Sub-committee "A" (structural)—F. L. Rhodes, chairman, G. A. Harwood, R. J. McClelland, R. D. Coombs, J. H. Davis; sub-committee "B" (insulation)—W. J. Eck, chairman, Percy H. Thomas, F. B. H. Paine, R. E. Chetwood, E. B. Katté, A. S. Richey; sub-committee "C" (conductors)—Paul Spencer, chairman, Thomas Sproule, George Cellar, W. I. Capen, R. J. McClelland, H. T. Wreaks; sub-committee "D" (clearances)—C. L. Cadle, chairman, G. F. Sever, W. J. Canada, L. S. Wells, H. S. Warren, E. B. Katté.

Circular letters have been issued to operating companies, tower manufacturers, consulting engineers, and others, requesting data and opinions regarding the proposed specifications.

What the committee particularly desires at this time is the suggestion of specific clauses, or paragraphs, to be added to or changed in the existing specification, and it is hoped that anyone interested in this subject will communicate at once with the secretary, R. D. Coombs, 30 Church Street, New York, N. Y.

COMMUNICATIONS

Engineering Considerations in a Proposed Line

PITTSBURGH, BUTLER, HARMONY & NEW CASTLE RAILWAY

ZELIENOPLE, PA., April 20, 1915.

To the Editor:

I was much interested in the article in your issue of March 13 headed "Engineering Considerations in a Proposed Line." The first consideration when contemplating the construction of a railroad is its possible or probable revenue. Capital is much more easily interested in the building of a very expensive railroad that promises large dividends than in one easy to build whose earning power is doubtful. Then, if the proposed road is a connecting one, that is to say, if it is proposed to connect two trunk lines, the very first question is one of relationship between the trunk lines which it is proposed to connect. If a spirit of friendliness and good feeling exists between the managements and there is a manifest need for such a connecting link and the proposed road can enter the field not as a competitor but as a supplemental line, then the proposed road would certainly prove a revenue producer. On the other hand, if bitter feeling was engendered through fierce competition, it would not matter how much the proposed connecting road was needed; in all probability it would prove a failure because each management would endeavor to route all traffic originating on his road as to keep it from his competitor.

Again, the cities referred to might be sources of large revenues or they might prove very poor feeders. If these cities lay in parallel zones of north and south or east and west travel and 150 miles apart, there would be but little intercourse between them. But if they lay in the same zone, the passenger traffic would be certain to prove most profitable. Before determining the probable income from freight traffic a thorough canvass of each city should be made. Every manufacturing establishment should be visited and information secured of the kind of goods made, annual output, present markets and possible markets along the proposed road. A similar canvass should be made of every town along the proposed line. The proposed railroad might cross and connect with numerous other railroads and complete a delivery service for them at very profitable rates. The originating road is not always master of the situation. In fact, it quite frequently happens that the delivering road holds the key to the situation. All of these matters should be very carefully and thoroughly gone into before any work is done and money expended on the proposed road, except that which is necessary to make reconnaissance surveys. The proper sequence is, first, the reconnaissance survey; second, the traffic survey, then the determination as to whether the road is to be built or the project abandoned. Were this *modus operandi* always followed there would not be so many non-revenue-producing railroad stocks upon the market to-day.

Scan a list of railroad stocks, if you please, and compare the market values with the par values. These glaring discrepancies would not exist if all men engaged in the construction of railroads were practical railroad men, or, in other words, if the promoters of railroad enterprises were always practical railroad men there would not be so many non-productive properties in existence to-day. The men who do the technical work are usually college products whose services can be bought for so much "per," who possess neither practical knowledge nor railroad executive ability.

These are the men who will be able to advise as to the relative costs of the various motive powers and their efficiency, and whether a narrow-gage, broad-gage or standard-gage road should be built and why. With the above facts before them they would also be able to determine whether small units and frequent service or large units and less frequent service would prove the more profitable. The questions of roadbed and track materials are ones which the practical engineer would have no difficulty in solving.

J. B. McINTIRE, General Freight Agent.

Feeder-Tap Resistance in Rotary-Converter Practice

THE CLEVELAND RAILWAY COMPANY

CLEVELAND, OHIO, April 20, 1915.

To the Editors:

I have noticed the editorial entitled "Protecting Electrical Apparatus" which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for April 3. In regard to this subject please be advised that the idea of providing considerable resistance between the switchboard and the first feed-in tap from the feeder to the trolley is not new, as it has been practiced in St. Louis by the United Railways Company since 1902. Again the Public Service Corporation of New Jersey has taken advantage of this practice since 1905. Accordingly in all our work we have taken care to provide sufficient resistance between the nearest point on the trolley wire and the switchboard so as to prevent station knockouts from short-circuits occurring in the vicinity.

There is no fixed rule or method employed to determine the necessary amount of resistance required for this purpose, at any rate I know of none. We are compelled, therefore, to substitute a cut-and-try method by cutting in and out feed-in taps until the desired protection is secured. In Cleveland this question was given very careful consideration when the new sixty-cycle rotary converter substations were placed in operation, and it was necessary in some cases to remove the first feed-in tap from the feed wire to a distance of a mile away from the substation, it being very important, of course, to prevent violent short-circuit current flows in the circuit to which sixty-cycle rotaries are connected.

L. P. CRECELIUS,
Superintendent of Power.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

BOSTON, MASS., April 9, 1915.

To the Editors:

In connection with the discussion of converter flashing and feeder-tap resistance a recent experience of mine with rotary operation may be interesting. About a year ago a suburban electric railway in New England shut down its own power plant and purchased central station power. Its source of current had previously been a d.c. engine-type generator. Sixty-cycle 600-volt rotaries were installed in a substation from which to operate this road, on which cars of twenty-seven tons weight are used. Before shifting over to rotaries, some of the equipments on the cars were in bad shape, but did not give much trouble, as the average voltage at the motor terminals was low. When current from the rotaries was delivered to these cars, however, the voltage on heavy loads was maintained at 600, and numerous short-circuits were experienced.

This was especially frequent just outside of the substation where the feeders and trolleys tapped. The "shorts" were frequently followed by flashovers at the rotary commutators, sometimes from brush-holders to the bearings or frame.

As the superintendent of this road strenuously opposed the removal of any taps, resort to various expedients were necessary, as follows:

First, electrolytic lightning arresters were connected across the terminals of the rotaries. This relieved the stress somewhat, but did not appreciably reduce flashovers. Then, the machine breakers were set high in order to have a feeder breaker trip and not relieve the rotary of the whole load suddenly. This was effective except at such times when excessive overloads were experienced on two or more feeders, in which case the machine breakers would trip, often followed by flashovers. Then time limits, applied to machine breakers, were installed. This helped to reduce flashovers materially, but did not eliminate them. Finally, the taps outside the substation were removed to points about ½ mile distant, and the flashovers vanished.

It has been found especially difficult to convince engineers who have always operated electric railways from motor-generators that short-circuits on rotaries, supplied with power from a large central station, are more vicious and difficult to handle than those on motor-generators. With a d.c. generator driven by a motor, the short-circuit current is limited by the output of the machine, which has a drooping voltage characteristic. In the case of a rotary, however, all of the current back of the rotary in the power house has to be handled by the rotary and the d.c. voltage holds up if the a.c. voltage does. The resistance in the feeder line between rotary and taps may be looked upon as furnishing the equivalent of a drooping voltage characteristic for the rotary which, of course, tends towards the elimination of flashovers.

If the superintendents and engineers of railways operating rotary converters will exhaustively study the operating characteristics of rotaries, there is no question but that their desirability will be more thoroughly appreciated. E. C. BAUGHER,

Manager Railway and Lighting Division.

Removing Pinions from Motor Axles

GENERAL ELECTRIC COMPANY

SCHENECTADY, N. Y., April 13, 1915.

To the Editors:

I have read with very much interest the description of the Chicago Elevated Railways, method of mounting pinions, appearing in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, as well as the two articles on the same subject by R. H. Parsons, in the issues of March 27 and April 3.

The subject covered in these articles is extremely important and is worthy of the most careful consideration by every operator. The methods usually employed are at the root of many pinion failures, sprung shafts, etc.

I am heartily in accord with the points mentioned in these articles with the exception of the reference to the use of a gas ring in removing the pinion. The application of flame to pinion teeth is extremely dangerous and very liable to destroy the value of the heat treatment at the point where the flame touches, even if the flame is applied with the utmost care.

Pinion removal on some of the older types of box-frame motors is a serious problem owing to the limited space between the pinion and the framehead, but the operator can, at a very slight expense, change his frameheads to accommodate a suitable pinion puller.

If a pinion cannot be removed by a properly designed puller it is an indication that too much force was exerted in mounting, and a little care in the mounting methods will obviate the majority of the removing troubles.

The following method seems to give the most general satisfaction for removing pinions: Select a pinion puller which is designed to withstand high stresses without injury to itself and which grips the motor ends of as many teeth as possible, thereby preventing localization of injurious stresses on the ends of two or three teeth. With the jack screw of the puller set up to the limit, the majority of pinions can be removed. If not, with the pinion still under tension of the puller, block up the pinion from the floor to prevent springing the shaft, and provide a metal protection which will span and touch the tops of three or four teeth. Then lay the protector on the tops of the teeth and strike it a sharp blow. This method will take care of the most aggravated cases, but will not have the desired effect unless the underside of the pinion is rigidly supported. A. A. ROSS,

Railway and Traction Engineering Department.

Making the Safety Movement Permanent

THE CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

CLEVELAND, OHIO, April 14, 1915.

To the Editors:

In connection with your editorial entitled "The Brass Band in the Safety Movement," permit me to say that I do not think electric railway companies have yet learned to differentiate between the conditions surrounding the applicability of the safety-first movement on steam railroads and those on the street and interurban railways. The conditions differ widely also on each of these classes of electric roads, although to some extent they are analogous. I will confine this letter to a discussion of the interurban aspect, as I see it.

Most of the accidents on steam railroads are those occurring to employees in the discharge of their duties in the shops, in the switching yards, on the tracks and in the handling of freight trains. The number of passengers injured is comparatively small. On the other hand, the number of accidents to interurban railway employees is comparatively small, while by far the larger number occurs to passengers and trespassers. This is due to the fact that interurban railways cross more streets at grade than the steam railroads and, in addition, run upon the streets of villages and cities.

The function of safety committees on steam railroads is largely to provide ways and means of reducing accidents to employees. The expense of maintaining these committees is largely compensated for by changed physical conditions, the introduction of safety devices, the installation of danger signs, the adoption of new tools and machinery, etc. Very few safety measures are taken, however, to diminish the number of accidents to passengers.

Many interurban roads have established safety committees according to the plans followed by the steam railroads. In consequence, they have found themselves maintaining expensive organizations whose recommendations involve the expenditure of money for new equipment, safety appliances, new tools, machinery, etc. These, no doubt, are beneficial to the road, but in cost are entirely out of proportion to the object sought, namely, to avoid the greatest number of accidents for the least outlay. For instance, it is estimated that about 85 per cent of all accidents are caused by the negligence and carelessness of the employees. It is, therefore, entirely out of proportion if 95 per cent to 98 per cent of the recommendations of safety committees involve the expenditure of money for new equipment. Safety devices are valuable only in so far as they better general conditions. They are not specific enough to eliminate the accidents caused by the employee. Moreover, on roads inspected by public utility commissions, the returns from accidents caused by defective equipment are almost negligible.

There also arises the question of whether the magic words "safety first" have not spent their force and lost their effectiveness. I prefer always to refer to the work as the "prevention of accidents," rather than the "safety first" movement. We often hear and see employees and the public refer to safety-first signs in a jocular way. We see the safety pins and perverted cards used in advertising stunts. We see the slogan used for banks, trust companies, laundries or for almost any other manufacturing and mercantile business, so that I believe it has become so common that it has lost its effectiveness in our business. I am still of the opinion that the only way accidents can be prevented is by using moral suasion and developing a proper spirit in the employee. Educate employees along the lines of their duty toward themselves, their fellow-men and their companies and reach the public through the schools. Then satisfactory results are sure to follow.

E. F. SCHNEIDER, General Manager.

BUREAU OF SAFETY
CHICAGO, ILL., April 16, 1915.

To the Editors:

Under the caption "The Brass Band in the Safety Movement" the ELECTRIC RAILWAY JOURNAL recently printed an editorial which was gladly received by those conservative safety workers who have viewed with alarm the tendency toward spectacular and harmful methods resorted to so frequently for the promotion of safety. It is to be regretted that a work so essential and so beneficial should have been diverted in this "brass band" way.

Accident prevention work is a common-sense work and, like the other activities of the company, is dependent for success upon common-sense methods constantly maintained and intelligently directed.

Whenever an employer desires to promote any of the important operations of his industry, he does so by the development of a carefully-studied and well-executed plan of organization, based upon common-sense methods and by enlisting the co-operation of his organization. The whole force of employees appreciates the saneness of such a plan and therefore gives it loyal support. Accident prevention should not be considered differently but should receive very similar and businesslike attention.

"Safety first" must not be a meaningless, flippant slogan. Safety must be a part of the business of the entire force of men and so recognized by every executive and in the office and in the shop. Not on safety days alone but every day, not by a safety committeeman alone but by every man.

If safety work is considered of secondary importance and is spasmodically or indifferently considered, it will be looked upon by the workmen as a fad and will receive but little earnest co-operation. If, however, the employer impresses upon his men that it is a common-sense part of the business, the employee will readily and earnestly give his support to the movement.

An occasional campaign characterized by entertainment, smokers and moving pictures cannot impress the employee with the seriousness of the safety business. It is rather apt to instill in his mind the thought that there is not much in a subject so presented to call for his serious consideration. The intelligent worker finds the business of living a most serious matter and his labor and ability to earn a living a most important fundamental possession. Any movement designed to improve or to conserve these, his chief assets in life, is absolutely sure to meet with his commendation and his hearty support.

Safety or accident prevention is important to the employer for humanitarian and economic reasons. It is similarly important to every citizen. Safety or accident prevention is particularly important to the worker because he is the directly interested beneficiary and holds largely within his own power the guarantee of his own safety. To the employer it is a matter of humanity to the employees, who are for the time his wards, and of returns on an investment of which he is custodian. To the employee it is a matter which concerns his life and his fortune and ofttimes the welfare and happiness of his dependents. The workman is not slow to realize this, and whenever so impressed and so interested he becomes a part of the safety movement, and that is most effective and most invaluable in the particular plant where he is employed and in the community where he resides.

The man who, because of the hurry of modern times or the desire to excel in his work, sometimes takes chances that might eliminate him from the world's activities, has only to be reminded of these things in order to become interested in this great work of conservation. This is the accident-prevention spirit, the greatest factor in accident-prevention work. It is this spirit of accident prevention which, if fostered and encouraged, will do more than anything else to bring about the desired results to that employer who is anxious to rid his plant of preventable accidents. One such man and his influence are a far greater factor toward real safety in the plant than misdirected and unbusinesslike safety methods ofttimes employed in an effort to obtain quick-cure results. No successful plan for safety and no sustained interest on the part of employees can be maintained without the co-operation born of a realization of this individual responsibility on the part of the man on the job.

Sustained interest in this movement can only be had by maintaining a perpetual organization and sub-organizations, so formed as to include all of the men of the plant and so systematized that periodic meetings will be held in which all of the members of the respective organizations and sub-organizations will have a chance actively to participate. This participation should include the discussion of accidents, the consideration of the causes which contributed to them and the opinions of the workmen as to how such accidents or near accidents might have been prevented. Such meetings of groups of men should be provided with all the information obtainable as to all of the accidents which occur in the plant and with an accurate analysis of the various causes which contribute to these accidents. The workmen should be encouraged to give suggestions for the elimination of physical hazards, for the cultivation of thoughtfulness and for the improvement of habits and practices that tend to cause accidents. Suggestions and recommendations originating from the workmen should receive the most careful attention from those to whom they are submitted, and an explanation should be made in all cases to the workmen of the reasons why any particular recommendations were rejected.

CHARLES B. SCOTT, Secretary and Treasurer.

Safety buttons have been awarded to six employees of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, as recognition of suggestions made by them for additional safeguards for the traveling public.

Equipment and Its Maintenance

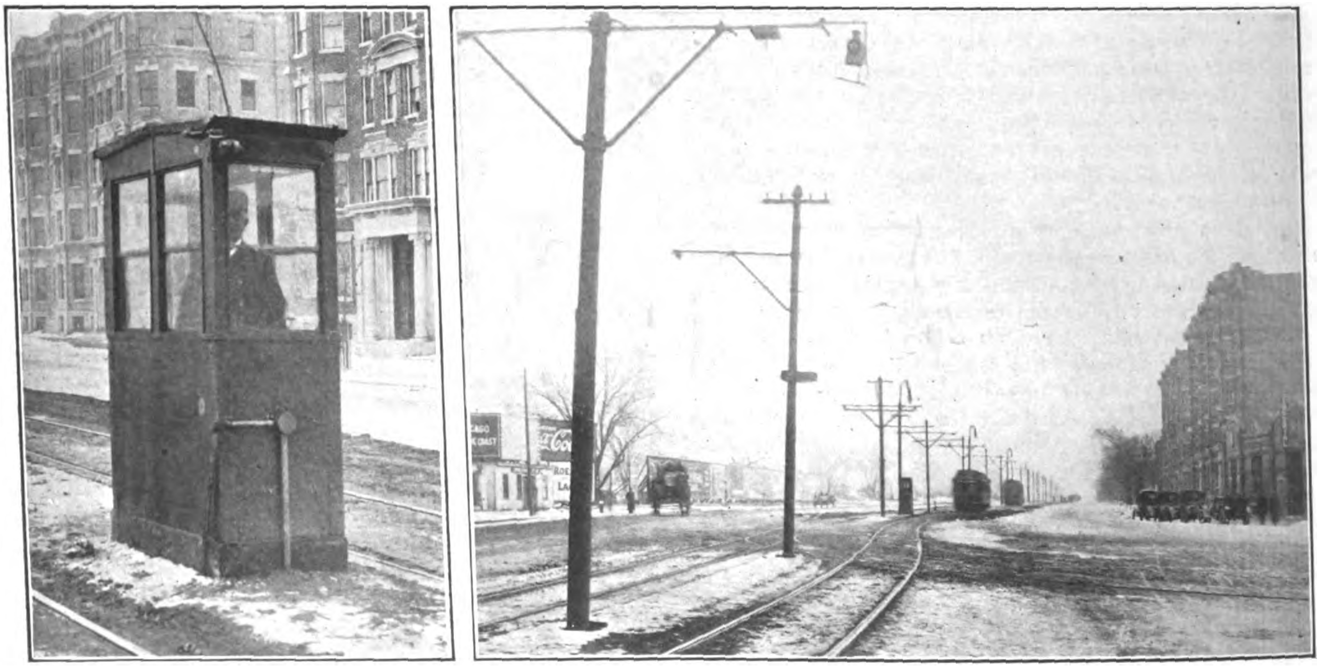
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Dispatching City Cars

BY EDWARD DANA, ASSISTANT SUPERINTENDENT OF TRANSPORTATION, BOSTON ELEVATED RAILWAY

The Boston Elevated Railway has recently constructed between its tracks on the Commonwealth Avenue reservation a sheet-steel booth set upon a concrete base, as shown in the accompanying illustration. The inside dimensions are 5 ft. x 2 ft. 2 in., sufficient to accommodate one man without discomfort. It is lighted by electricity and provided with an electric heater. The front and both sides are provided with windows, allowing a wide range of vision for the individual inside. A telephone has been provided connected with the division headquarters in which the booth is located, and such light equipment as may be required for use in emergencies.



DISPATCHING SURFACE CARS AT BOSTON—DISPATCHER'S BOOTH; SIGNAL CONTROL INSTALLATION OVER TRACK

The man on duty is provided with stool and writing shelf, and he maintains a train sheet showing by routes the exact arrival time of cars throughout the day at this important junction point. He is provided with two switches which control red signals suspended from the trolley pole arm on the two converging tracks on Brighton and Commonwealth Avenues. He can thus hold cars which have arrived ahead of schedule or can properly space cars so that they will alternate on the main line. This is of great value at the in-town terminals, for a great deal of public criticism can be avoided when cars to different destinations are properly alternated, instead of running in groups to the same destination. Such a complete record of car movements approaches the long-established station or dispatcher's records of the steam railroads and obviously can be of service to the claim department, as well as of value to the transportation department in remedying defects in the service and refuting untruthful condemnation of its service.

While opportunity does not always exist to control all lines at strategic points, wherever it does exist it should be the aim of the up-to-date railway to adopt such efficiency methods. Cars are started on time from their respective terminals, or if they are not there is no excuse for such failure. If, then, at some strategic junction point or points they may again be checked and by means of some control signal can be started over again if they are ahead of time, a great deal of the demoralization of the service can be prevented.

On any heavy line each motorman is apt to have his own views as to the operation of his car to fit street and traffic conditions. The initial half of in-bound trips is usually light because the cars are operated in the more sparsely settled territory. If, then, a certain percentage of the motormen on the line make a practice of meeting the congested conditions on the in-town end of the line by running ahead of time over the initial section, they simply aggravate the trouble in that section by unbalancing the traffic load, skipping passengers they should have taken, delaying the following cars and creating the not uncommon condition of bunched cars. This adds to the unavoidable delays in the congested section a further factor, with the result that the elapsed time allowed on the schedules tends to meet these conditions, thereby utilizing a greater number of cars, and consequently crews, than is absolutely necessary to perform the given service.

It is true that inspectors are supposed to prevent just such conditions, but if we stop to consider their multifold duties and the little time which they can give actually to check individual car schedules, it is not surprising that they should work largely by rule-of-thumb methods. On the other hand, with a positive check and full advantage taken of it, pretty nearly the maximum efficiency and economy are obtained. To determine the relative saving, suppose a company operated 1800 cars and that by proper service regulation a reduction of 1 per cent in cars operated could be secured; this would represent a capital investment of eighteen cars at $8,000 each, or $144,000, which could be dispensed with. The interest alone amounts to approximately $8,000, or sufficient to maintain such traffic men at all hours at six strategic points. There would also be a saving in mileage, wear and tear, wages, etc., of no mean proportion.

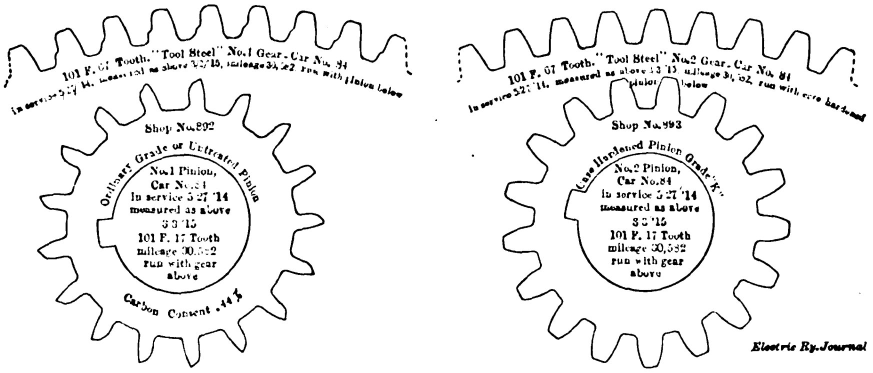
We should not expect that the multitudinous conditions of to-day can be successfully met with the same relative amount of supervision as existed a decade ago. Time ticked off at the same rate then as now, but action ticks off much faster now than then, and individual carelessness has increased, thereby resulting in the need for a greater amount of molding, watching and checking up if the greatest ultimate efficiency and economy are to be obtained.

Working Ordinary and Hard Gears and Pinions Together

By W. H. McAloney, Superintendent Rolling Stock Denver Tramway Company

Within the past four or five years and during the early introduction of high-grade or hard gears and pinions, some operators thought it was good policy to work a hard pinion with a soft or ordinary-grade gear. The claim made for this practice was that the hard pinion would keep its tooth contour for a long time, thereby giving perfect meshing and so eliminating the back lashing or battering which the ordinary grade will not stand so well.

Through a joint error of the storeroom and a shopman, the No. 1 motor of car No. 84 was equipped with an ordinary-grade pinion on May 27, 1914, although this car was otherwise fitted complete with high-grade or hard material. The results of the error are shown herewith.


101 F. 67 Tooth. "Tool Steel" No. 1 Gear - Car No. 84
In service 5/27/14, measured as above 3/3/15, mileage 30,582 run with pinion below
Shop No. 892
Ordinary Grade or Untreated Pinion
No. 1 Pinion, Car No. 84 In service 5/27 '14 measured as above 3/3 '15 101 F. 17 Tooth mileage 30,582 run with gear above
Carbon Content .44%
101 F. 67 Tooth. "Tool Steel" No. 2 Gear - Car No. 84
In service 5/27/14, measured as above 3/3/15, mileage 30,582, run with case hardened pinion below
Shop No. 893
Case Hardened Pinion Grade "K"
No. 2 Pinion, Car No. 84 In service 5/27 '14 measured as above 3/3 '15 101 F. 17 Tooth mileage 30,582 run with gear above
Electric Ry. Journal

AN EXPERIMENT IN GEARING

Left-hand view shows bad effect of meshing an untreated pinion with a treated gear. Right-hand view shows good effect of meshing a treated gear with a treated pinion.

The right-hand portion of the drawing shows that on the No. 2 motor which used hardened material for both gear and pinion practically no wear resulted after 30,582 miles had been made in city service. Contrariwise, as indicated by the left-hand portion of the drawing, the No. 1 motor which used a hardened gear with a soft pinion showed for the same mileage about 25 per cent loss in pinion life and about 75 per cent loss in gear life.

Electrical Equipment of Belmont Tunnel Cars

In connection with the article on page 764 of the Electric Railway Journal for April 17 bearing this title, the statement should have been made that the General Electric Company also is furnishing electrical equipment for this route of the Interborough Rapid Transit Company. The total number of cars is twelve, six with Westinghouse apparatus and six with General Electric apparatus. The GE equipment per car consists of two GE-240-C tapped-field, fully-ventilated motors, and a new electro-pneumatic, low-voltage, lightweight control, designated as PC-2.

Joint Repairs

By S. Gausmann, Brooklyn, N. Y.

While much can be said about the different kinds of joints used by American city railways, the writer will endeavor to cover only the subject of repairs.

Avoid Short Bonds Under Plates

In the older style of plated joints on 9-in. rail most of the joint failures can be traced to the use of short bonds under the plates. The bond holes come so close to the rail ends that they cause the latter to split. It is well to remember this experience even where a modern plated joint is used, for while the use of short bonds under plates might save a little in first cost as against a long bond around the plates, such savings will be more than offset by the early failure of the joints and the consequent cost for repairs.

Complete Joint Repairs by Grinding

Joint repairs receive too little attention and much money is wasted in making these repairs because the work is not completed by grinding. I have yet to see a joint that will not pound from the start if it has not been ground absolutely level.

Many styles of grinders, from the ordinary file to expensive machines are available. No road, no matter how much it desires to economize, can afford to be without some kind of grinder. On account of the amount of grinding to be done at the joints a wheel grinder, if handled by experienced men, is preferable. A good electrically-operated grinder can be constructed, chiefly from old material usually found in electric railway shops, at a cost not to exceed $300. This is but a small investment when the value of its work is considered.

If followed closely joints can be kept in good condition by the use of the file and holder first illustrated in the Electric Railway Journal for Oct. 25, 1913, and described in detail on page 194, Jan. 24, 1914. The common tendency, however, on many railways is to wait until the joints show serious defects, when much more expensive repairs are necessary.

The Dish as Important as the Worn Joint

While many methods have been devised to make repairs to joints, the "dish" in the rail opposite the joint is neglected. This "dish" should always be taken care of by arc welding, by grinding, or by both methods. If this work is not done at the same time that the repairs of the joint are made, the next failure of the joint will be accelerated.

Breaks in the casting of cast-welded joints are often due to poor or to cold metal. Of the various repair methods available, the most satisfactory is to cut in a piece of rail. It may be added that when a break of this kind occurs the metal can be easily removed from the rail and repairs made by cutting in a "dutchman" equal to the size of the opening and by plating the joint, but while this method is inexpensive the job is of doubtful durability.

DRAWING BACK CUT RAILS INSTEAD OF USING SHORT INSERTS

Where old 9-in. track is to be extensively overhauled, without relaying, the old plates should be discarded and new plates substituted, because a close examination invariably will show that the old plates are badly pounded. Further, the rail should be thoroughly cleaned to remove all scale and corrosion before the new plates are installed.

If we cut out broken rails in track which is being overhauled and substitute short pieces therefor we are discarding much good rail and increasing the number of joints in the track. More satisfactory repairs can be made and the life of the rail lengthened considerably by cutting out the bad ends and "bucking back" the rail. In other words, the rails, whether cut or not, are drawn back until they abut. Where possible, the holes remaining should be left in the rail so that they can be used with the new plates. Thus each joint can be repaired by using but one pair of plates, and instead of using short inserts one piece of rail, say 20 ft. long, can be installed at the end.

The cost of doing the work as described is practically the same as simply to repair joints without cutting back, and the track is left in much better condition.

As an illustration we will take 120 ft. of single track, which, with 30-ft. lengths of rails, means eight joints. Let us assume that the rail is broken or battered down at four of these joints. The following will then be the comparative costs of the two methods with wages averaging 18 cents per hour.

In the first method we must cut in 8-ft. pieces of rail at the four joints, replate the joints with the old plates, supply new plates for the additional joints, and bond all joints with one compressed terminal bond around the plates at each joint.

In the second method we cut out bad ends at all joints, put in one piece at the end, replate all joints with new plates and bond as in the first method.

	First Method	Second Method
Cutting rail and removing plates	$2.08	$2.08
Drilling and plating	3.85	2.90
Repairs other joints	1.20	....
Bonding labor	2.40	2.00
Grinding joints and dishes	10.40	8.36
Rail	8.64	4.32
Bonding material	9.36	7.80
Joint plates, new	7.40	18.50
Bolts and miscellaneous	5.17	4.40
	$50.50	$50.36
Credit; old rail and plates	6.30	5.40
Net cost	$44.20	$44.96

JOINT REPAIRS BY REFORMING OLD PLATES

Where joints are to be repaired in old track, without general overhauling of paving, etc., the invariable practice is to reform the old plates. The economy of this is doubtful and depends much upon the length of time that the joints have been permitted to pound and upon the style of plates involved. Where dishes are but slight, the reforming of the old plates is advisable, preferably with a plate bending machine rather than by hand. However, this practice is not economical when the dish has developed considerably because it is then necessary to grind away too much of the head of the rail to level the joint. To be sure, when this is done the track is put in better condition, but the improvement is not permanent.

The arc welder is doing much to simplify joint repairs, for with this method bad dishes and even pieces that have broken out of the rail head can be built up.

The following comparison of the cost per joint according to the various methods described is for average conditions. It is assumed that the plates are in good condition, and no allowance is made for the elimination of split rails, for the cost of opening and closing the pavement, for removing plates, for replating, for bolts and for bonding, as all of these items would be the same in each case.

The wages per hour of men employed are blacksmith, 35 cents, with helper at 20 cents; grinderman, 25 cents, with two helpers at 18 cents; welderman, 25 cents, with one helper at 20 cents and one helper at 18 cents, and two laborers on machine at 20 cents.

	Hand	Machine	Welding
Raising and fitting plates	$0.46	$0.11	...
Grinding	.52	.52	$0.32
Arc welding	...	...	.35
Interest on investment	...	.01	...
Total	$0.98	$0.64	$0.67

While some kinds of plated joints permit the use of the old plates in repairs, the ordinary fish plate cannot be satisfactorily reformed. It should be replaced with new plates, using machine bolts with drive fit. The cost of the new plates increases the cost of the joint, but repairs made in this manner will prove more economical and durable in the end.

TAKING CARE OF SPLIT RAILS

Hardly any road has a standard for the lengths of rail to be cut in to care for split rail ends. Some use 4-ft. pieces while others use 8-ft. pieces, these being cut before they are taken to the work. This practice, however, results in scrapping much rail from which further service can be obtained.

The most desirable and economical way to use rail for this purpose is to make the first cut in track say 8 ft., substituting therefor a piece of the same length. Then, after cutting off the bad ends of the piece removed use it for the next insertion, continuing this salvage operation until the last piece of recut rail is 4 ft. long. In this way we can use up all old rail by cutting out the split or dished ends only. This method has other advantages besides the saving in cost of rail, principally in allowing one to use rail which is worn to the same degree as that in track, thereby reducing the cost of grinding and permitting the wear to continue evenly.

CONCLUSION

There is but little to summarize, but that little is that the secret of efficient joint repairs lies in the thoroughness with which the work is done. This work should always include arc welding and grinding. While the cost might be thought high at the time, the results will justify the greater initial expense in the end.

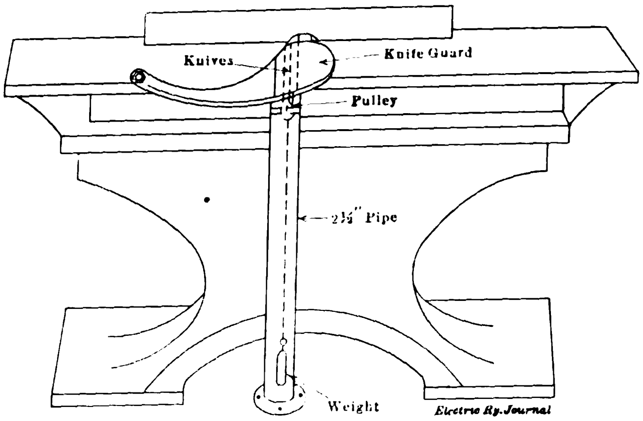
A recent issue of the *Commerce Reports*, published by the bureau of foreign and domestic commerce, gives a brief account of the opportunities for export trade in electric apparatus to Brazil. It speaks of the Para Electric Railway & Lighting Company, operated by J. G. White & Company of London, as having material on the ground for an extension of its lines as soon as the financial condition permits. The lighting system at Maceio, owned by J. Basto & Company, is said to be considering the installation of a small electric railway line.

Knife Guard for Jointer or Hand Planer

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY SYSTEM, NEW YORK

One of the many features of the safety-first movement is to encourage employees, particularly those who are actually in the shops, to send in any suggestions which they believe would tend to eliminate accidents to operators of shop tools. An excellent way to promote this work would be to have some employee of mechanical ability occasionally pay a visit to different machine shops to study the various methods and ways of prevention. Real accident prevention can be accomplished only by those who understand machinery, lectures and moving pictures being of secondary consideration.

The accompanying sketch shows an efficient guard for a jointer or hand planer. Those familiar with this class of machines can readily appreciate the necessity of guarding them because the least slip on the part of the operator is liable to result in the loss of some fingers or part of the hand. This guard is arranged always to cover every part of the knives attached to the machine. It consists of a piece of wood bolted to the machine at one end and arranged to slide back and forth. It is kept flush against the material which passes over the knife by means of a piece of weighted wire or chain. The latter is attached to the under part of the guard on the outer edge and passes over a pulley installed at the upper part of a 2½-in. pipe.



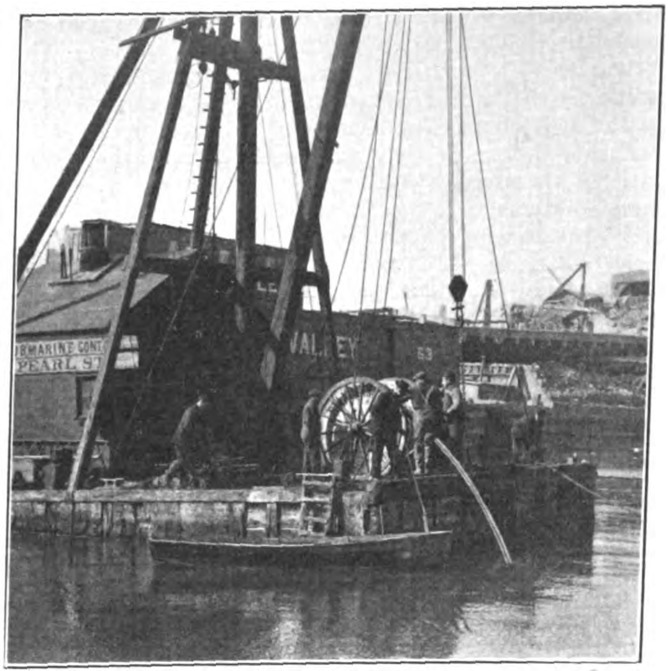
INSTALLATION OF WEIGHTED KNIFE GUARD ON WOOD-WORKING TOOL

A Submarine Cable Installation

Recently the Brooklyn Rapid Transit System installed three submarine cables across Wallabout Canal. Each cable was approximately 275 ft. long. The cable is three-conductor, 11,000 volt, 350,000 circ. mil., 5/32 in., 30 per cent Para rubber over each conductor plus 2/32 in. varnished cambric and a 5/32 in. varnished cambric belt over all, 5/32 in. plain lead sheath jute bedding, No. 4 B. W. G. galvanized steel wire armor and a final jute wrapping.

The factory test was 27,500 volts between the conductors and between the conductors and ground for five minutes before armoring, and a test of 21,000 volts between conductors and between conductors and ground for armoring. The illustration herewith shows the cable in course of installation by the New York Submarine Contracting Company.

After these cables were stretched across the canal and properly located, divers went down and made use of water pressure to place the cables in the bed of the canal to a depth of 17 ft. below mean high water. This was done to prevent the propellers of vessels from injuring the cables. In the manholes on each side of the canal the cables are spliced to three-conductor, high-tension 11,000-volt, sector, paper-insulated, lead-incased cables, and between the manholes and the bulkhead they are installed in 4-in. galvanized iron pipes, so that the cable may be readily removed in case of trouble.

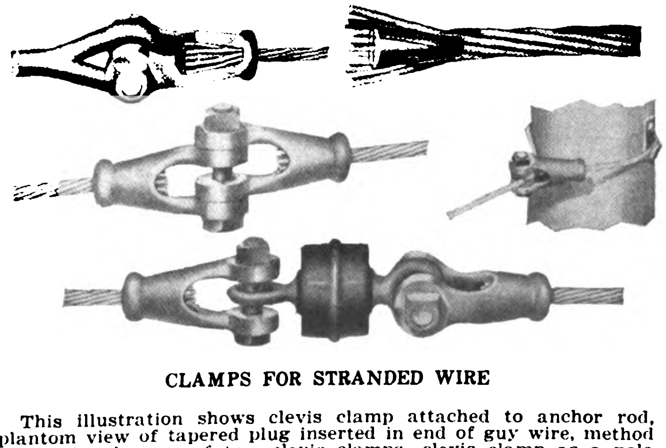


INSTALLING THREE 11,000-VOLT SUBMARINE CABLES ACROSS THE WALLABOUT CANAL

In the manholes a split band was placed over the armor of the cable and against the iron pipe, and the armor was bent back over the clamp to prevent the cable from being pulled from the manhole in case vessels should foul them.

Clevis Clamps for Stranded Conductors

An efficient wire clamp known as the "Marchand," for clamping guy wires, messenger wires and trolley span wire, etc., has been developed by the Steel City Electric Company, Pittsburgh, Pa., and is shown in the accompanying illustrations.



CLAMPS FOR STRANDED WIRE

This illustration shows clevis clamp attached to anchor rod, phantom view of tapered plug inserted in end of guy wire, method of splicing by use of two clevis clamps, clevis clamp as a pole fastening, clevis clamp adapted to strain insulator.

The clamps devised for stranded wire and aluminum conductors are made in the clevis style. It will be seen that the clamping principle applied, as shown in the accompanying phantom view, is the simplest of all, namely, the wedge. The clamp proper consists of a conical-shaped socket and conical wedge. The wedge is slotted to allow compression and has a hole through the center for the passage of the core or center wire.

The strand is first inserted in the socket, and the tapered plug is forced over the core or center wire so that the sheath wires are spread apart. The cable is then drawn back into the socket by the cable strain, the tapered plug compresses and grips the core wire or wires, and the sheath wires are gripped or wedged between the tapered plug and the wall of the socket. The sheath wires are evenly separated by the projections inside the socket to insure equal distribution of pressure on the tapered plug and wall of the socket.

These clamps securely grip each wire of the strand without introducing strains which would tend to weaken the strand at any point. The strand cannot squeeze out or be released upon excessive strains or the sudden release of strain. The deformation of the tapered plug under pressure caused by strain on the strand is amply provided for in this way—the wires that have the greatest strain are imbedded in the malleable metal until the other wires take up their proportion of the total strain to which the strand is subjected.

The large size clevis clamp for seven-wire strand weighs only 24 oz. and will hold ½-in. seven-wire strand guy wire to the approximate breaking point of 22,000 lb. These clamps are designed to carry 50 per cent more load than the tensile strength of the strand to be applied. Only one clamp is required for each connection. When subjected to the maximum strain, less than ⅛-in. of slack is realized from normal to breaking point of the guy wire.

Combination Car for Kansas Interurban Line

The Kansas-Oklahoma Traction Company has recently ordered from the American Car Company, St. Louis, Mo., for its new interurban line, a semi-steel passenger and baggage car, which is shown in the accompanying illustration.

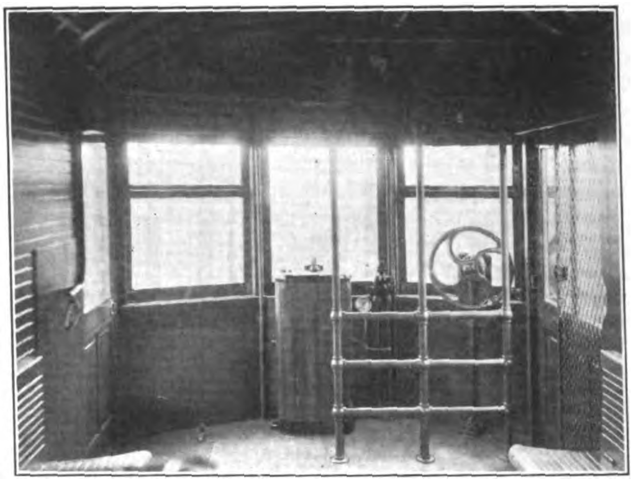
The general dimensions of the car are as follows:

Length over the Hedley anti-climbers	50 ft. 5 in.
Length over the vestibule	49 ft. 5 in.
Length of the passenger compartment	30 ft.
Length of the baggage compartment	15 ft. 2 in.
Width over the sills	8 ft. 5 in.
Height from the sill to the trolley base	9 ft. 2⅛ in.
Height from the top of the rail to the sill	3 ft. 5½ in.

The underframe is composed of side-sill angles with longitudinal I-beams and channel cross-sills. The side of the car is sheathed with No. 14 steel. The car body is mounted on Brill-27-M.C.B.-2X trucks, each of which is equipped with two Westinghouse No. 306 motors; Nuttall gears, Westinghouse pinions and Midvale 34-in. wheels. Westinghouse control and air brakes and American hand brakes are used. The couplers are of the Tomlinson radial type. Pilots are attached to the underframe at both ends of the car.

COMBINATION PASSENGER AND BAGGAGE CAR FOR THE KANSAS-OKLAHOMA TRACTION COMPANY

The seating arrangement of the car provides for fifty-four persons, forty-two in the passenger compartment and twelve in the baggage compartment. The rattan cross-seats in the passenger compartment are of the Brill Winner pressed-steel type. They are 37 in. wide and allow for a 22½-in. aisle. A 24-in. door connects the passenger and baggage compartments. The latter compartment, in addition to four transverse seats, contains two longitudinal folding slat seats. A Peter Smith hot-air heater, located in this compartment, distributes heat through the car by means of ducts. Heavy 1¼-in. pipe framing, as shown in an accompanying illustration, is erected just behind the motorman's position to protect him during the loading and unloading of baggage.



PROTECTIVE RAILING FOR MOTORMAN IN BAGGAGE SECTION OF COMBINATION CAR

Ventilation is obtained through the arch roof by means of eight Brill exhaust ventilators, four on each side of the center line of the roof. Other special equipment includes the Curtain Supply Company's curtain fixtures, Pantasote curtain material, Sterling fare register, National Lock Washer Company's sash fixtures, O. M. Edwards trap doors and Earll trolley retrievers. The interior trim is in bronze.

Automatic Flagman Crossing Protection for the Rhode Island Company

The Rhode Island Company is making installations of automatic crossing protection on its Buttonwoods-Rocky Point line, consisting of twenty-four automatic flagmen furnished by the L. S. Brach Supply Company, New York.

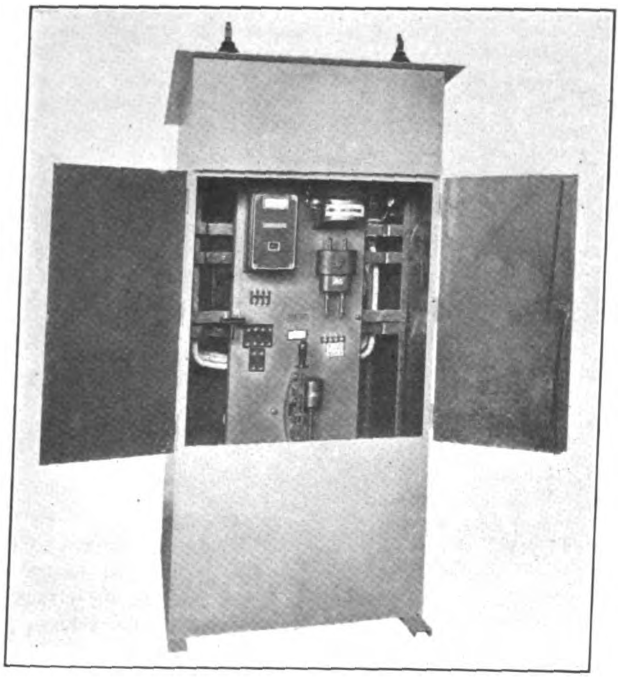
The arrangement is such that on approach of the car toward the crossing a triple warning is given to those using the highway by the visible effect of a swinging red lantern, a moving blade and the ringing of a locomotive type bell. The effect of the swinging red light is furnished from eight 25-watt stationary lamps, to each of which current is supplied alternately backward and forward. As the lamps are behind red lenses, the effect obtained is similar to that of a swinging red light. Long hoods, which protect each lamp, make these lights plainly visible in the daytime at a greater distance than a crossing bell can be heard, especially to automobilists for whom this crossing protection is especially adapted.

The moving blade consists of a large enamel disk, on which the word "stop" appears, in white letters on a red background. This is swung to and fro similar to a pendulum movement. Above the disk is a weather protection for the swinging blade, on which the words "When in motion" appear, so that the combination reads, "When in motion—Stop."

This signal is governed by relays operated from track circuits to be used in combination with the Rhode Island Company's new automatic signal protection furnished by the Union Switch & Signal Company.

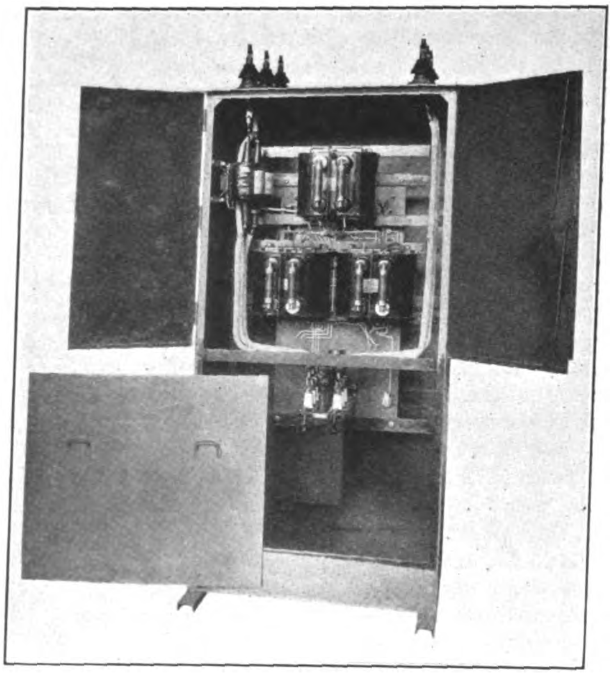
Rural Substation in Railway Signal Work

The field of application of the rural substation is constantly broadening as its merits become better recognized. The main features are, of course, mobility, ease of installation and low initial cost as compared with a permanent indoor substation of like capacity to accomplish the same result. The accompanying illustrations show views of the first outdoor-type steel switchhouses of this class built for railway signal purposes, and used in this connection by the Southern Railway at Inman, S. C., and Austell, Ga. The outdoor substations, of which the switchhouses are a part, effect a considerable saving in outlay as compared with what would have been the cost of a substantial permanent substation to house the equipment. Each house is located at the foot of a pole tower supporting the transmission line, the outdoor power transformers, disconnecting switches, choke coils and lightning arresters.



FRONT VIEW OF 4400-VOLT, THREE-PHASE SWITCHHOUSE FOR RAILWAY SIGNAL SERVICE

The equipment of the switchhouses is a little more elaborate than usually required for power or lighting purposes. The ordinary house has merely an oil switch, or an oil switch and watt-hour meter, with the necessary current and potential transformers. In the house illustrated there are also an extra potential transformer, a voltmeter, a circuit-closing relay, two potential receptacles, and an incandescent lamp with bracket. The extra transformer, two potential receptacles and voltmeter in connection with the other two potential transformers required for the watt-hour meter, allow the voltage to be read on both sides of the oil switch before it is closed. The incandescent lamp gives illumination at night for reading the voltage or for lighting the inside of the house. The circuit-closing relay is used in the usual manner to trip the oil switch in case of overload or short-circuit.



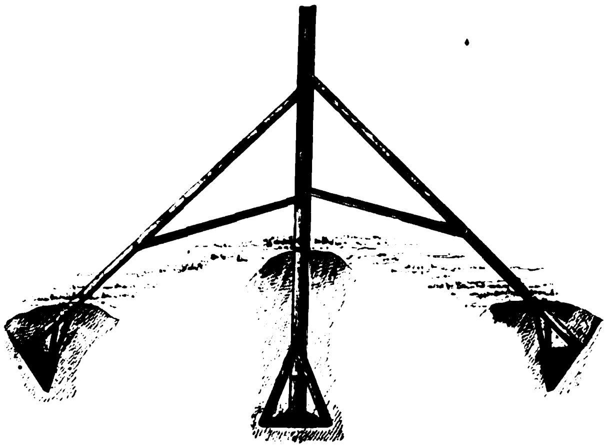
REAR VIEW OF 4400-VOLT, THREE-PHASE SWITCHHOUSE FOR RAILWAY SIGNAL SERVICE

Equipments of this kind are now being built by the General Electric Company. The houses are shipped wired complete, so that the only construction work necessary to put them in commission is to fill the oil vessels and connect the incoming and outgoing leads to the roof bushings.

Wide-Wing Spring Posts for Right-of-Way Fencing

The tendency toward more durable right-of-way fencing than is afforded by the ordinary wooden post or short-lived metal post is indicated by the earth-cushioned spring-post system of the Carbo Steel Post Company, Chicago, Ill. The outstanding merits asserted for this construction may be taken up in the following order:

Easy Transportation and Installation—The posts are made of rust-resisting steel of such high tensile strength that a very light and properly designed section will take care of strains that would upset other posts. It is necessary only to drive the post to one-half the depth used for wooden posts, since the carbo post (anchor-drive type) is furnished with wide wings that give an excellent anchorage. This post, furthermore, can be installed in cold weather.

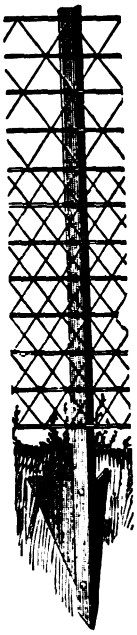


INSTALLATION OF A CORNER POST

Springiness—When in a fence the posts act like a spring—the earth itself becomes the shock absorber of the post. By cutting through the ground at the ground line, the posts transfer the usual breaking-off strains at that line to the fencing itself. Special strain corner posts, with suitable bracing, are provided for curves and sudden changes in grade.

Sanitary—Wooden fencing posts are now recognized as favorite haunts of the clinch bug and other farm pests. For this reason right-of-way fencing through farming country should be free from this source of trouble, even where the law does not forbid wooden posts.

Durability and Maintenance—It has been demonstrated that the short life of fence posts is due to stiffness of the line posts, every line post necessarily acting as a corner. Stiff posts break off because they cannot transfer the strains to the fencing. The wide-wing spring post avoids this source of loss in addition to being proof against fire, vermin and lightning. If properly maintained by means of occasional repainting above the ground line they should be good for thirty years or more. Thus, although the first cost of the post is higher, its permanence when compared with wood is so great that it produces a saving within a few years, aside from its merits in other directions.

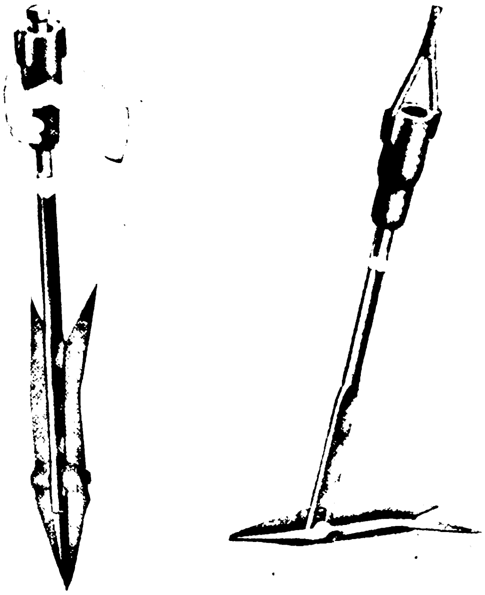


WINGED POST

Ground Anchor Set in One to Two Minutes

The accompanying illustration shows the "Coghlin," a new type of ground anchor which has been placed on the market by the Track Specialties Company, Inc., New York. This anchor has been used extensively in Canada for the past few years.

Briefly described, the device is used to maintain the correct position for fences, smokestacks and transmission poles of all kinds. The rod is ¾ in. in diameter, 5 ft. 11 in. long, and is made of high-carbon, heat-treated and oil-tempered steel. The anchor is driven like a picket, and a hammer is the only tool required to force it into the ground. It locks automatically for driving and opens automatically for anchoring. Once driven, it is set, and the expense of installing is practically nil.



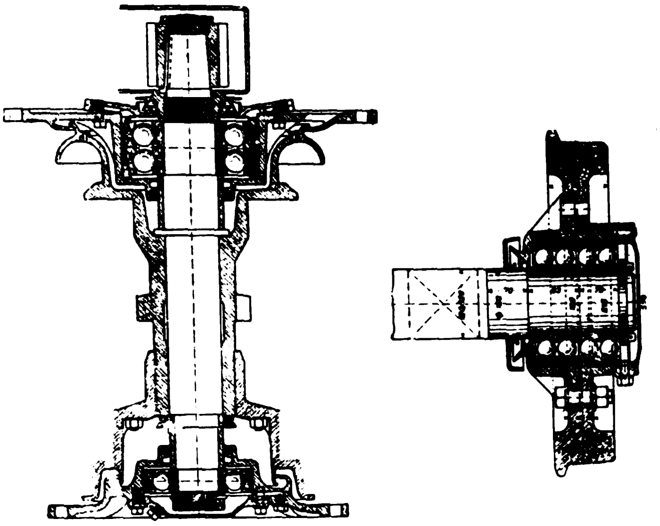
DRIVING POSITION OF ANCHOR; LOCKED IN SERVICE

The special malleable-iron end for connecting the guy wire eliminates the expense of an eyelet. This piece also protects the hand while the anchor is being driven and acts as a swivel to take any twist from the guy.

This ground anchor requires no digging or boring of holes, and its first cost is practically its last. It is stated that it can be forced into the hardest ground in one or two minutes.

Ball Bearings on European Cars

Experiments with the use of ball bearings on railway rolling stock are reported to have been conducted for some time past on the Montreux-Oberland Railway, in Switzerland, where two double-truck cars provided with ball bearings were placed in service in 1910. In 1911 seven more cars were equipped in a similar manner, and the results were so satisfactory that the axles of all new motor cars are now being furnished with ball bearings. At the present time the line has thirty-nine cars so equipped. On two new motor cars the motor shafts also have been equipped with ball bearings.



BALL BEARINGS IN EUROPE—CROSS-SECTION OF ARMATURE SHAFT AND OF RIGID AXLE WITH LOOSE WHEEL

An interesting novelty in the application of ball bearings on this road is represented in the accompanying illustration, which shows the arrangement used in the case of standard 30-ton passenger cars equipped with a single truck having three axles. In this case the axles were rigidly attached to the truck framing and the wheels rotated on ball bearings at the end of the axle. This resulted in easy handling on curves because the two wheels of the same axle revolved independently of each other. Dynamometer tests have shown that there is a resistance of 10.6 lb. per ton with standard bearings, as against 4.6 lb. per ton with ball bearings. The ball bearings are lubricated only once in six months, as compared with once in fifteen days in the case of a standard bearing, the life being estimated to be from ten to fifteen years.

The Oakland, Antioch & Eastern Railway has transferred its executive staff from the California Building, San Francisco, to the company's building at Fortieth and Shafter Streets, Oakland. General administrative offices will still be maintained in San Francisco and are located in the Hobart Building.

News of Electric Railways

BOSTON TRANSPORTATION

Massachusetts Commission Reports to the Legislature on Transportation in Metropolitan Boston

The Massachusetts Public Service Commission has submitted a special report to the Legislature upon transportation problems in Metropolitan Boston, in accordance with a resolve of last year's General Court. The report consists of forty-seven pages of discussion by the commission and an exhaustive supplementary report by William B. Bennett, assistant chief engineer of the Wisconsin Railroad Commission, who was employed by the board to make an independent study of the transportation questions now at the front at Boston. Mr. Bennett was assisted by E. J. Steinberg, engineer in charge of the Milwaukee office of the Wisconsin commission. The full reports are to be printed by the State at a later date. A detailed financial report has also been prepared by J. W. Lester, accountant of the Massachusetts commission, upon the Boston, Revere Beach & Lynn Railroad and the six street railways operating in the metropolitan district, and a report will soon be completed by Prof. W. L. Puffer upon safety on rapid transit lines.

The primary question before the board was the relation of steam and electric railways at Boston to the general transportation problem of the metropolitan area. The report holds that any comprehensive plan for the improvement of steam railroad facilities at Boston must await the financial improvement of the railroads themselves.

The questions with which Mr. Bennett's report deals may be divided into four classifications: (1) Changes in the present service of the Boston Elevated Railway. (2) Future extensions of rapid transit service, including the proposed use of certain steam railroad locations by the rapid transit lines. (3) Unification of street railway and rapid transit lines. (4) Revision of fares.

The commission plans to take up the proposed changes in Boston Elevated Railway service in the future, with public hearings. Briefly these changes concern the rerouting of cars on the surface lines; trailer service; the building of a transfer station for surface and elevated lines at Egleston Square, to relieve Dudley Street station congestion; modifications of Dudley Street station; and changes at Maverick Square, East Boston; Forest Hills and on the rapid transit lines.

With respect to these recommendations, the board concedes that the present routing of cars on both the Boston Elevated and Bay State systems is far from satisfactory at many points, but urges caution in working out a readjustment. The company has already taken steps toward the early use of trailers in the Boylston Street subway and the gradual extension of such service to other lines during rush hours. The board favors the construction of inclosed loop tracks at Egleston Square by which surface car service in the Roxbury-Jamaica Plain district can be better co-ordinated with the rapid transit line, relieving congestion at the Dudley Street station. The removal of certain concessions on the east loop at Dudley Street is also to be considered as a means of increasing the traffic capacity of this station. The board favors reconstructing the Maverick Square portal of the East Boston tunnel to permit the operation of multiple-unit trains.

The Bennett report divides the metropolitan area into six subdivisions tied together in pairs by three main routes intersecting in the heart of Boston; viz., the Cambridge subway with the Dorchester tunnel extension now under construction; the Sullivan Square-Forest Hills line, and the Boylston Street subway and East Boston tunnel. It suggests the joint use by the rapid transit lines of certain steam railroad locations, as one permitting the operation of through multiple-unit trains from Manhattan Square to Harvard Square. This, it is estimated, would call for an investment of $4,000,000 against $7,133,600 for the proposed extension of the Dorchester tunnel from Andrew Square to Cadman Square. The Bennett report also favors the immediate completion of the South Everett elevated line from Sullivan Square and its connection with the Sangus branch of the Boston & Maine Railroad, equipping the latter for electric train operation and handling freight on industry tracks by electric power at night. Another recommendation by Mr. Bennett is the connection of the West Roxbury branch of the New Haven system with the Boston Elevated rapid transit line at Forest Hills. The plans of the board's advisory engineer also include extension of the Boylston Street subway to the Boston Custom House, with connection to the East Boston tunnel, and a subsequent connection of the former to the Newton circuit line of the Boston & Albany Railroad when this is electrified. Still another extension suggested in the Bennett report is one of the East Boston tunnel to the Charles River viaduct and thence via the Southern Division of the Boston & Maine Railroad to Somerville. No attempt has yet been made to ascertain the attitude of the steam railroads toward this joint use of tracks, but the board believes that favorable arrangements might be made in view of the falling off of suburban traffic in the last twenty years on the steam lines.

The commission does not as yet feel convinced that the consolidation of the Boston Elevated Railway and the Bay State Street Railway is necessary to the solution of transportation problems in the metropolitan district. It has given the matter much consideration, but desires more concrete evidence of the benefits of the proposed merger before it sanctions the plan.

The Bennett report recommends that the charter of the Boston Elevated Railway be amended to enable the commission to establish a zone system of fares like that of Milwaukee. The board regards the Milwaukee zone system as an improvement upon the flat fare system. It points out that the gradual increase of the former tends to improve present conditions. The Milwaukee system, however, does not lend itself to conditions of dual corporate operation as found at Boston. The comparative areas of the territories in square miles served by the following transit companies are of interest: Boston Elevated, 80; Philadelphia Rapid Transit, 96; Detroit United Railways, 52; Cleveland Railways, 46; Buffalo International, 40; Indianapolis Traction & Terminal, 34; Milwaukee Railway & Light, 30; New York Railways, 18. In most of these cities fare inequalities exist.

In the opinion of the board, interference with the present contractual relations between the Boston Elevated Railway and the State should be advocated only after clear proof of its necessity. Certain equities have been created by the company's charter which attach to both company and public. Up to the present time the board feels that the contract has worked well as a whole. It has resulted in the extension of a combined rapid transit and street railway service at a flat rate of 5 cents over a metropolitan area larger than any similar area in the country, taking transfer facilities into account. The last eighteeen years have been marked by the practically continuous building of rapid transit lines. The board realizes the importance of prosperity to the Boston Elevated as a factor in the transportation development of the community. It recognizes that the company's stock is now selling below par and that its present financial condition is less favorable than has been the rule in the past. At the same time it does not favor any change in fares at present, believing that the recent disturbance in business conditions may be a large factor in the situation. No steps have been taken by the company toward securing a revision and the board believes that the State should not take the initiative here. The form of relief, also, deserves exhaustive study, and might lie in an abridgement of transfer facilities, a decrease in taxes, reduction in the burdens relative to the care of the streets, etc.

In conclusion the board states that it regrets its inability to solve the problem of fare inequalities in such communities as Hyde Park, Chelsea and Revere. Neither the Boston Elevated nor the Bay State Street Railway favors extending the 5-cent fare system of the former to cover these communities. The board points out that despite these inequalities metropolitan Boston stands in a class by itself with respect to the degree of articulation of electric railway service existing. It offers its services as always, in the investigation of specific problems and will shortly take up in a comprehensive way the transportation changes outlined above in relation to the Boston Elevated Railway.

COMMISSION REGULATION

Mr. Maltbie, Mayor Mitchel and Mayor Harrison All Discuss Public Utility Problems

Milo R. Maltbie, who retired recently as a member of the Public Service Commission of the First District of New York, after having served on the commission since its creation in 1907, was interviewed by the Brooklyn *Eagle* recently as to the tendency in regulation and the work of the New York commission in particular. Mr. Maltbie's remarks in regard to the constructive work of the commission are largely a matter of history. His statements as to the future of regulation and the possible increase in the powers of commissions are, however, of much interest, drawn, as they are, from his long commission experience and his activities in civic affairs prior to his appointment to the commission. In the *Eagle* of April 18 Mr. Maltbie said in part:

"Eight years have passed. Many other states have enacted public utility laws, and commissions have been appointed. But there is now more criticism of state commissions—their personnel and their decisions—than at any time since 1906. I do not say that it is always just, but that it exists no one will deny. Political and personal considerations have too frequently determined appointments. Experienced men have been displaced. Insufficient appropriations have been made. Corporations have fought orders, thinking by litigation and delay, and sometimes by personal attacks and abuse, to render regulation ineffective. They have been their own worst enemies; for by doing so, they are creating an undercurrent of distrust of and opposition to the whole idea of regulation.

"Now, every thinking man knows that the day of unregulated private monopoly has passed. It will never return. The world moves, and the crawfish does not typify its method of locomotion. If regulation breaks down, a more radical remedy will inevitably be adopted, and the public will not again pause and try another rejuvenation of state regulation. Let no one mistake to whom the blame or credit, according to one's viewpoint, of this result will be due. It is almost equally divided between the narrow politicians who look only to the spoils and the shortsighted corporation officials who do not realize that it is better for them, or rather better for the property which they are supposed to represent, to have effective regulation administered by men who are known to be independent and unaffected by their blandishments or threats than to have a kind of pseudo regulation which is to their liking.

"The commission should be given power in unequivocal words to require companies to restore or make good any impairment of their capital and to provide ample depreciation funds with which to renew, repair and replace their property. Investors should be protected. The history of the Metropolitan Street Railway shows that the public may often suffer through the failure to provide for the upkeep of the property. Indeed, sooner or later, the public pays for corporate mismanagement, either through bad service, high rates or losses to investors.

"What is needed is the use of the enforcement clauses as they stand. If the courts will not support the enforcement of the orders of the commission, let the responsibility rest there, and the sooner we know it the better. But I do not believe that they will long continue to do so. Public opinion will reach them if they do, for it will be behind any official who attempts to make regulation effective. The courts have trimmed and paired the powers of the commission, but legislation can be secured to offset such decisions."

Mayor Mitchel of New York has accounted to the committee of 107 for his stewardship of fifteen months. In referring to the campaign of Dr. S. S. Goldwater, commissioner of health of this city, with respect to limiting the capacity of cars the Mayor said:

"Perhaps the most interesting of the undertakings of this department has been that to secure better conditions of transit for the people of the city. Everyone has known for years that our surface and subway cars have been crowded to a point dangerous to the public health. Every agency supplied by State and city has unavailingly attempted to better these conditions. The health department, by the simple expedient of notifying the transit companies that the operation of overcrowded cars is a menace to public health, and by the promulgation of an order of the board of health forbidding overcrowding in the cars, has compelled these companies to increase their service and decrease congestion. This order is issued under power conferred by the charter and its breach is punishable by heavy fine. In the successful use of this power has been found the only effective means of attacking the overcrowding problem in the surface and subway cars of this city. Dr. Goldwater told me only two days ago that the operator of the subway will be compelled, under his regulations, to maintain during the summer a full winter schedule, and thus afford thousands of additional seats to the traveling public."

In his annual message, made public on April 18, Mayor Carter H. Harrison, of Chicago, Ill., reviews the twelve years he has served as chief executive, this period covering the 1907 traction ordinances, the unification of the surface railways and the creation of the Chicago Elevated Railways collateral trust. In discussing public utility questions the Mayor says:

"The more I see of private ownership of the public utilities the more I am convinced that there is but one safe and sane plan for the public to adopt, namely, to set its mind with determination upon public ownership, and not to deviate by a hair's breadth from the most direct course by which it may be attained."

PUBLIC SERVICE NOMINATIONS RECALLED

Governor Brumbaugh of Pennsylvania Has Recalled the Nominations Made by His Predecessor

Martin G. Brumbaugh, Governor of Pennsylvania, has recalled the names of the seven Public Service Commissioners as executive appointments. The commission will continue to perform all the functions of office until successors are appointed. The Governor's letter follows:

"On Jan. 5, 1915, my predecessor in office nominated for the advice and consent of the Senate the following named persons to be members of the Public Service Commission, to serve for the terms set opposite their names, respectively, to compute from July 1, 1913: Samuel W. Pennypacker, ten years; La Rue Tone, nine years; Emory R. Johnson, eight years; Milton J. Brecht, seven years; Charles F. Wright, six years; Frank M. Wallace, five years; Walter H. Gaither, four years. I respectfully advise the Senate that I do hereby recall said nominations."

Political Pennsylvania appears to be at sea in regard to the act of the Governor. Senator Penrose at Atlantic City declined to make any comment until he had learned at first hand the Governor's reasons. Attorney-General Brown is said to hold the view that the letter of recall automatically withdraws the nominations from the Senate and leaves the Governor free to send in new nominations. On the other hand, Senate leaders are quoted to the effect that they still have the Tener nominations and that, parliamentarily speaking, the Governor cannot get hold of them unless the Senate decides that he should have them. In partial explanation of the Governor's act the Philadelphia *Ledger* says:

"As to recasting the public utilities law, it is asserted on authority that the Governor has been much impressed with the arguments of the League of Third Class Cities that the law ought to be amended so as to allow a much greater degree of home rule in the regulation of public utilities. As to the personnel of the commission, it is asserted on like authority that the Governor has been searchingly inquiring into the corporation inclinations or connections of certain commissioners. It is said that in the course of this investigation he disclosed conditions which caused him to feel that the commission should be recast and that new nominations should be made. It is understood that the Governor has in mind the plan of reducing the number of commissioners from seven to five, thus saving $20,000 a year, and he will insist that the commissioners devote more time to their work. In inquiring into the affiliations of members of the commission, the Governor, it is said on authority, employed detectives."

NEW YORK COMMISSION INVESTIGATION

Summary of Legislative Committee Recommendations—Bill Embodying Features of Changes Suggested

The Thompson committee has made public a summary of its report to the Legislature of New York State. This second report made by the committee is concerned chiefly with the doings of the commission for the second district. It does not recommend the removal of any of the members in so many words. It explicitly exonerates them from neglect of duty and official misconduct, charges made against the commissioners for the first district. The report does say that the commissioners were found "more or less inefficient in their administration of the law and in their dealings with the corporations." In the summary of its report the committee says:

"The committee feels that the questions of rates, service and right to exercise franchises are the questions in which the public has the deepest interest. These questions should have the most careful consideration, and in that connection the question of the regulation of the issuance of securities should also be carefully studied. Under a recent enactment of the Legislature of the State of Pennsylvania an entirely new method was provided in relation to the issuance of securities by public utilities corporations. It seems desirable to adopt either in whole or in part the provisions of the Pennsylvania law.

"Its operation should be investigated by the committee for the purpose of determining that question. The question of no par value of capital stock is also a question which may be very profitably studied. The law as it stands today in this State permits the issue of capital stock without having a capital par value appearing thereon as to all corporations except moneyed corporations and public service corporations. It seems desirable to extend this provision to public service corporations.

"The question also of the unrestricted issue of capital stock based upon patents, copyrights, good-will, etc., may be the subject of careful investigation and reflection. The propriety of increasing the liability of stockholders of all corporations for the debts of such corporations is also a question which should have attention.

"In conclusion it seems to the committee that the subject submitted to it is of such great and far-reaching importance that it would be futile for the committee to attempt at this session of the Legislature to accomplish results which might fairly be expected. Because of that fact the committee has determined to recommend that it be continued in existence until the meeting of the next Legislature."

The minority said:

"We cannot express too strongly our condemnation of three changes recommended by the majority in the public service commission law, which boldly destroy regulations of public utilities and render the commission powerless. They are: (1) The destruction of the commission's power to supervise the issuance of stocks and bonds, with the resultant flood of watered securities and a return to the period of stock inflation, exhaustion of railroad property, high rates, and poor service to the public. (2) In increased liability upon stockholders of utility corporations similar to that in national and State banks; (3) Taking away from the commissions their accounting, supervising and accident powers.

"As a further imposition upon the investor in these watered securities it is proposed to make him liable to the creditors of the company up to the par value of the stock. This will destroy the marketability of utility securities, and by discouraging investment must lead inevitably to government ownership, since the State will be required to supply the funds for construction and operation."

On the evening of the day that the committee made public the summary of its report Mr. Thompson introduced in the Senate a bill for the abolition of the present public service commissions and the substitution of a public service commission of seven members. The bill provides that the Governor, with the consent of the Senate, shall appoint seven commissioners to constitute the public service commission, and shall designate one of his appointees as chairman. Three of the appointees must be residents of what now constitutes the first district. They are to constitute the Public Service Commission for the First District. Three appointees must be residents of up-State communities. They will constitute the commission for the second district. The two commissions and the chairman will constitute the Public Service Commission of the State. Under the bill there would be two associate commissioners for New York City, with no designated terms of office, to carry on and complete the duties in connection with the construction of new subways which devolve on the present commission. The term of each of the other commissioners is fixed at seven years to insure rotation and continuity. The salaries are left at the present figure, $15,000. The Thompson bill provides for counsel at $10,000 a year and a secretary at $6,000. The bill provides that only two members of each commission shall be of the same political party.

On April 20 Governor Whitman announced that he would not accept the suggestion of the Thompson committee. The Governor said that he did not intend to act hastily, and that undoubtedly he would postpone action for several weeks. The ouster bill introduced by Senator Thompson of Niagara, chairman of the investigating committee, according to a Senate leader, is unlikely to pass.

PUBLICITY CAMPAIGN IN URBANA

The City Council of Urbana, Ohio, has passed an ordinance granting a new twenty-five year interurban franchise to the Ohio Electric Railway in place of its present franchise, which has more than nine years to run. The action of the Council is due to the change in public sentiment in Urbana which was brought about by a publicity campaign undertaken by the company last February, prior to a referendum election on the franchise question. At first the public was almost unanimously opposed to granting the franchise, and it was regarded as a foregone conclusion that the ordinance would be defeated overwhelmingly at the election. Nevertheless, the company sent a special representative, F. B. Wright, Jr., to Urbana three weeks prior to the election to undertake a campaign of educational publicity, the purpose being to acquaint the public with the company's problems and to strengthen its position in the event that another application for a franchise should be made at some future time.

The opposition to the franchise was thoroughly organized, but so effective were the company's educational efforts that out of a total vote of about 1500 the franchise received within five of a majority. The election being a special one, more than 500 voters, mostly workingmen, did not go to the polls. It was generally conceded that these citizens were not opposed to the franchise but were unwilling to sacrifice their working time in order to vote on the question.

The change in sentiment was so unlooked for that the company immediately renewed its application for the franchise, which the Council passed by a vote of five to two after three readings and two public hearings. The franchise was then approved by the Mayor.

One of the advertisements used in the campaign follows:

"THE SWING OF THE PENDULUM—A TALK FROM THE SHOULDER

"It has been suggested that in applying for an extension of our franchise which has over nine years to run, we are trying to 'put something across' on the city; that we are afraid that a law may be enacted at some future time which may require us to pay Urbana more than we now pay for the right to operate our cars here.

"Such a view is based on the assumption that the pendulum can swing only in one direction—that the burdens which have been imposed on corporations of this class will continue to be increased, will never be reduced.

"For ten years past nation, state and city have added to these burdens annually; old forms of taxation have been increased, new taxes added, additional restrictions imposed, further expenditures required, extra assessments levied.

"Indirectly, but none the less certainly, others besides the corporations themselves have had to bear these burdens.

You, who complain of the high cost of living, the worker who has been laid off because some corporation had to cut expenses, the merchant who cannot make collections, are all helping to carry the load.

"The pendulum has swung very, very far in one direction, but it will swing back because it must swing back if the nation is to grow and the people are to prosper.

"It is possible that the backward swing has already started.

"You may have noticed that the great steam railroads, the first to crumple under the burden, were recently granted an increase in freight rates. They got this increase because their employees, the shippers and the public realized that their own interests demanded it.

"You will not predict that by the time our present franchise expires, franchise and similar burdens will be lighter than they are to-day, but it seems very unlikely, to say the least, that they will be any heavier.

"In the meantime we are paying 5.2 per cent of our total receipts in taxes and nearly 7 per cent in taxes and various local assessments.

"THE OHIO ELECTRIC RAILWAY.

"We repeat that our sole reason for seeking a franchise extension now is that our bonds extend beyond our present franchise."

CINCINNATI TRANSIT MEASURE

The Ohio Senate has approved the Bauer bill, which provides for the creation of a rapid transit commission for Cincinnati and opens the way to the solution of the problem of affording rapid transit to certain portions of the city and bringing the interurban lines to the business section. This is the bill that was prepared by City Solicitor Walter M. Schoenle, of Cincinnati, and afterward approved by the city officials, the present Rapid Transit Commission and the civic organizations.

Senator Moore offered an amendment providing for the city engineer acting for the commission. This was accepted. Another amendment adopted by the Senate prevents the issue of more than $150,000 of bonds without the approval of the people. Under a third amendment in case any bond issue or lease submitted to the voters fails of ratification at the polls the members of the commission are to be discharged and new ones appointed. It is claimed that this bill will not come into conflict with the Behne bill, since the bond issues will have to be approved by the voters. It does not provide for municipal ownership in the usual acceptance of that term, because the road will be leased to an operating company.

Very interesting suggestions made to the Rapid Transit Commission of Cincinnati by A. S. White, New York, were contained in a letter received on April 12. They contemplate the construction of the rapid transit road or loop in units, because it would be impossible to undertake the construction work over the entire route in the beginning. Mr. White further states his belief that the plan he has mapped out will relieve the city of heavy taxation that might follow if great care is not taken in locating the line and planning its construction. Mr. White says that the corporation he proposes to organize to lease these units will also own and operate several interurban lines that now reach the city limits. They will be rehabilitated physically and financially and the lines will be extended north and northeast. The figures named by Mr. White include cost of construction only. The operating company will furnish power, cars and other equipment.

INJUNCTION SOUGHT BY LABOR

A motion was filed on April 14 in the Federal Court at Indianapolis, Ind., by attorneys representing the local branch of the Amalgamated Association, asking Judge Anderson to restrain the Indianapolis Traction & Terminal Company from securing signatures to its form of working contract with employees. The local union men claim that this working contract is in violation of the arbitration award of the Public Service Commission in that it permits men in emergencies or on special occasions to work without the eight-hour rest if they so desire and does not compel them to be off one Sunday each month. In his decision rendered in November, 1914, when a temporary injunction was issued restraining all labor leaders and union officials from attempting to bring about a strike on the local street railway lines at Indianapolis, Judge Anderson ruled that the service contract which was then being signed by many of the employees of the company, was in full force and effect on its signers, and that when all the men had signed the contract it would then take the place of the arbitration award of the Public Service Commission of Indiana and be in effect as to all the employees of the Indianapolis Traction & Terminal Company. About 90 per cent of the trainmen have now signed the individual working contract. It was announced on April 19 that W. B. Wilson, secretary of labor, is, at the request of the Central Labor Union of Indianapolis, sending a committee of conciliation to try to adjust what the labor leaders consider grievances, although officials of the company state that this is the first intimation they have received that there are any differences of opinion which need to be adjusted.

MASSACHUSETTS LEGISLATURE

Two bills providing for the public ownership of street railways within the State of Massachusetts have been killed and the bill fixing the hours of car dispatchers on street railways to eight per day has been laid on the table in the Senate. The House has killed the bill limiting the number of passengers allowable on a street car, and the bill prohibiting defective fenders has also been lost. Leave to withdraw has been given the bill providing that tunnels shall be equipped with emergency outlets, and the bill granting half fares to pupils of normal schools has been referred to the next session in the report of the committee on street railways. A resolution has been passed directing the Public Service Commission to investigate the part taken by electric railways in connection with the oiling and repairing of streets, the order being the outcome of a measure introduced to cut down some of the burdens now carried by operating companies in this connection. The bill authorizing street railways to charge admission fees to parks has been enacted into law. Other bills on which leave to withdraw has been secured are one taxing the surplus of street railways and one requiring an investigation of freight and express business on street railways.

SPRINGFIELD SERVICE NORMAL

Service on the Springfield (Mass.) Street Railway has been continued along normal lines the last two weeks, following the recent strike. The State board of conciliation and arbitration has held several sessions to investigate the causes of the strike, but no formal conclusion has as yet been rendered, and no offer in the direction of arbitration has been made by the board up to this writing. Private conferences have been held at Springfield by the board with the company's officials and with representatives of the employees' union. At these sessions extended discussions of the problem of checking the work of conductors have been held. The company's position has been steadily maintained as set forth in the statement of President J. T. Harmer published in this journal at the inception of the strike. Although the company maintains that the installation of transfer registers is not the general practice on roads the size of the Springfield system, it adheres to its previously expressed willingness to equip its cars with the registers at the request of its employees. The company is also ready to carry out its agreement with the union, which provides for the arbitration of all disputed matters. The company has steadily maintained that its system of checking the work of conductors is accurate and that the evidence secured in this way warranted the discharge of the three conductors whose cases were seized upon by the union as the basis of a grievance. H. M. Flanders, general manager of the company, said at one of the conferences that only after prolonged investigation by different checkers on the cars is a conductor found guilty of misappropriating fares. As many as fifty reports have been considered before a man has been thus adjudged. Recent investigations showed that at least forty-eight out of 250 conductors were turning in irregular accounts, but only four or five were discharged. It is probable that the board may offer its services as arbitrator of the cases of the discharged conductors.

Utility Commissioner Impeached.—Commissioner A. P. Watson has been removed from the Oklahoma Corporation Commission by impeachment proceedings. No appointment has been made to fill the vacancy.

Long Island Enabling Bill Passed.—The Patten bill to empower the city of New York to lease a right-of-way over the Long Island Railroad tracks from Corona to Great Neck in connection with the operation of the new rapid transit lines passed the Assembly on April 20 and now goes to Mayor Mitchel.

Ott Bill Passes.—On April 13 the Ott bill, requiring that motormen and conductors on street and interurban railways be allowed eleven hours rest in each twenty-four hours and that they shall not work more than ten out of each consecutive thirteen hours, was passed in the Ohio Senate. It had previously passed the House.

Ohio Commission Resignations.—O. H. Hughes and Charles C. Marshall tendered their resignations as members of the Ohio Public Utilities Commission on April 19. Their action was taken out of deference to the desire of Governor Willis to have at the heads of the various departments men who are in sympathy with his ideas of administration.

Bills of Particulars in New Haven Cases.—Judge Hunt of the Federal District Court at New York has granted the request of William Rockefeller and eleven other past and present directors of the New York, New Haven & Hartford Railroad for bills of particulars concerning the alleged viotions of the Sherman anti-trust law, for which they have been indicted.

Pierce Bill Defeated.—The Pierce indeterminate franchise bill, referred to in the ELECTRIC RAILWAY JOURNAL of April 10, page 729, has been defeated in the New Jersey House. Before coming up for final passage the measure was amended to prevent the consideration of franchise values by the Board of Public Utility Commissioners as factors in fixing the rates of public utilities.

Progress in Toledo.—At its first meeting on the evening of April 16 the new franchise committee of the City Council of Toledo, Ohio, decided to prepare a tentative agreement for the consideration of the officials of the Toledo Railways & Light Company. It is to contain a clause through which the city may, under certain conditions, acquire the company's property at any time upon giving one year advance notice.

Philadelphia's Loan Amendment.—Senator Vare, as chairman of the committee on municipal affairs, has favorably reported the constitutional amendment which would increase the borrowing capacity of the city of Philadelphia from 7 to 10 per cent for the purpose of developing port and transit facilities exclusively. The proposed amendment was adopted by the last Legislature. The measure will be finally adopted by this Legislature and next fall will go before the people.

New Jersey Marginal Road Bill Approved.—On April 19 the Governor of New Jersey signed the bill initiated by the Jersey City Chamber of Commerce to permit the building of an electric railway to link together the six trunk railroads that now terminate separately on the west bank of the Hudson River opposite New York City. The plan comprehends the building of the line by Jersey City with funds raised from the sale of twenty-year city bonds. The cost of construction is estimated at $1,500,000. A map of the route and sidings was published in the ELECTRIC RAILWAY JOURNAL of April 3, page 663.

Readjustment of Union Agreement in Cleveland.—J. J. Stanley, president of the Cleveland (Ohio) Railway, has notified the local branch of the Amalgamated Association that the company desires to open the working agreement with that organization for negotiations on a new wage scale. First-year motormen and conductors have been receiving 27 cents an hour, with an increase of 1 cent a year until they receive 30 cents an hour. The company proposes that first-year men receive 25 cents and second-year men 27 cents, with an increase of 1 cent a year after the second year until the men receive 30 cents. The new proposition would also eliminate the requirement that the men be members of the union, and substitute a recommendation to that end. It would also prohibit employees in uniform from entering saloons or drinking within three hours of the time they report for duty.

Financial and Corporate

WAR AND BERLIN RAILWAY

Prices of Commodities and Wages Increase—Earnings and Traffic Decrease—5000, or 50 per Cent, of Men at Front—600 New Female Conductors

Although the effect of the European war did not make itself felt on the Berlin surface railways until the autumn of 1914, the annual report of the Grosse Berliner Strassenbahn for this calendar year shows that the losses in traffic because of the war and also because of additional rapid transit and omnibus competition forced a cut in dividends from 8 per cent in 1913 to 6 per cent in 1914 on a capitalization of $25,020,600. In the early days of mobilization there was a feverish increase in travel, but even for August the loss compared with 1913 was 13 per cent, and by December it had increased to 15 per cent. On the other hand, the mobilization of 50 per cent of the operating staff made it necessary to cut the service 25 per cent until the 5000 employees called to the colors could be replaced. For this reason the service on certain parallel lines was reduced or eliminated, while on the active lines trailers were increased, headways were lengthened and the operating speed was raised.

During the first seven months of the year 12,735 people were employed, but during the last five war months there were only 9546. At first the number of applicants for employment to fill the places of the enlisted men was so large that the company thought it would have no difficulty in getting new men. This expectation was not fulfilled, however, because most of the unemployed were quickly snapped up by the manufacturers of war material. Although about 600 female members of employees' families were trained for service as conductors, the difficulties of educating them were great because most of the instructors had been mobilized. Yet by the end of 1914 the number of cars in operation was only 15 per cent less than in December, 1913, a fairly good balance thus being kept between the decreased traffic and the decreased service.

The directors have high praise for the employees remaining in Berlin, who have been obliged to work many extra hours. On account of the increase in the price of foodstuffs and other necessaries, the company has raised wages pending the settlement of the war. In the case of employees at the front who left dependents behind them, the company is paying each wife $6.25 a month, with an additional $1.25 for every child less than fifteen years of age. A donation of 3¾ cents daily is made for what is termed "milk money." Women conductors with children also receive the $1.25 and 3¾ cents allowances. The positions of all men called to the front are being kept open for them. By Dec. 31, however, 151 had been killed in the field.

During 1914 the company carried 426,420,000 passengers as compared to 456,300,000 passengers in 1913. Of the former number, 61,846,870 used commutation tickets. The earnings from passenger transportation were $10,224,480 for 1914 and $11,104,541 for 1913. The number of car kilometers decreased from 106,444,657 in 1913 to 96,893,861 in 1914, while the earnings per car-mile were 16.68 cents and 16.88 cents respectively. The operating ratio was 61.37 per cent in 1914 and 58.64 per cent in 1913. On account of war conditions the amount of money spent for welfare work was greatly increased, amounting to $363,623 in 1914 as compared to $260,990 in 1913, the difference being chiefly caused by war donations for the last five months. The maintenance of rolling stock cost $875,843 in 1914 as compared to $896,991 in 1913. The maintenance of 372 miles of single track right-of-way, including overhead construction, was reduced from $430,944 to $390,442 during the year. At the end of the year the company was paying pensions to 768 former employees and 230 widows.

The total number of cars on Dec. 31, 1914, was 2958, made up of 1813 motor cars (973 single-truck cars) and 1145 trailers. During 1914 the company added fifty single-truck cars with closed vestibules and separate entrance and exit. These cars are arranged to carry twenty-six seated and twenty-three standing passengers.

ANNUAL REPORTS

United Light & Railways Company

The statement of earnings and expenses of the United Light & Railways Company, Grand Rapids, Mich., and its subsidiary companies for the year ended Dec. 31, 1914, follows:

SUBSIDIARY COMPANIES

Gross earnings (including $713,585 for inter-company business)	$6,166,959
Operating expenses and taxes (including $713,585 for inter-company charges)	3,797,534
Net earnings, subsidiary companies	$2,369,425
Interest on subsidiary companies' bonds and notes:	
To United Light & Railways Company	$339,553
To the public	974,583
Total	$1,314,136
Net profit on stocks—subsidiary companies	$1,055,289
Net profit due others than United Light & Railways Company	15,506

UNITED LIGHT AND RAILWAYS COMPANY

Earnings available on stocks owned by United Light & Railways Company	$1,039,783
Dividends and interest receivable	344,294
Salaries and miscellaneous earnings	123,155
Gross earnings—United Light & Railways Company	$1,507,232
Expenses	$103,836
Taxes, general and federal	10,779
Total	$114,615
Net earnings—United Light & Railways Company	$1,392,617
Interest on first and refunding 5 per cent bonds	333,034
Interest on notes	109,887
Bond discount	12,912
Balance available for dividends	$936,784
Dividends—first preferred stock—6 per cent	462,801
	$473,983
Dividends—second preferred stock—3 per cent	63,272
Balance available for common stock and depreciation	$410,711
Credit of depreciation reserve	165,993
Balance—credit to surplus	$244,718

The business of the company in the gas and electric departments showed a satisfactory increase, but because of depressed industrial conditions the railway department showed a slight decrease. The gas sales in cubic feet for the twelve months ending Dec. 31, 1914, were 1,290,701,400, an increase of 89,374,200, or 7.5 per cent. Electric sales in kilowatt-hours were 90,116,518, an increase of 3,742,559, or 4.5 per cent; while the revenue passengers of all classes carried were 35,621,922, a decrease of 935,010, or 2.6 per cent.

In addition to the sum of $169,391 set aside for depreciation from current earnings, the subsidiary companies expended for maintenance an additional $392,750, which was charged directly to operating expenses, making the total for maintenance and depreciation $562,141. The book surplus of the Mason City & Clear Lake Railroad and the Peoples Gas & Electric Company existing at the time of their purchase by the company, in amount $86,399, was also set aside as an addition to the reserve for depreciation. The operating expenses of the subsidiary companies included $249,953 accrued for payment of general and federal taxes, an increase of $41,406 for the fiscal year, and also material increases in wage scales paid to street and interurban railway employees.

During the year the company acquired in exchange for its securities, or by purchase, further amounts of the stocks and bonds of its subsidiary companies. Through sinking fund operations, additional bonds of the Tri-City Railway & Light Company, the Citizens Railway & Light Company, the Iowa City Gas & Electric Company, the Chattanooga Gas Company and the Peoples Gas & Electric Company, aggregating $191,000, were purchased and cancelled. During the year there were also retired $12,767 of certificates of indebtedness and car trust notes of the Cedar Rapids & Marion City Railway and the Grand Rapids, Grand Haven & Muskegon Railway. There were also retired $420,000 of notes issued in part payment of properties, leaving outstanding $500,000 of similar notes to become due on Jan. 1, 1916.

During 1914 $984,924 was expended for additions to properties and extensions of service. Of this total $191,325 was expended on gas properties, $417,699 on electric properties, $373,148 on railway properties and $2,751 on heating properties. Several miles of additional street railway extensions were made in Cedar Rapids and Muscatine, and to the Tri-City system.

In February, 1915, the company sold $750,000 of three-year and $750,000 of five-year gold notes. The resulting proceeds enabled it very materially to reduce its notes payable, so that the amount outstanding March 15, 1915, was $479,386, as compared to $1,354,372 outstanding as of Dec. 31, 1914. The total number of stockholders on Dec. 15, 1914, was 2400 (an increase during the year of 332), of which the large proportion were preferred stockholders.

General Electric Company

The condensed profit and loss statement of the General Electric Company, New York, N. Y., for the twelve months ended Dec. 31, 1914, follows:

Sales billed	$90,467,691
Cost of sales, including all operating, maintenance and depreciation charges	81,496,728
Profits from sales	$8,970,963
Interest and discount	$1,306,876
Income from securities owned	1,313,989
Sundry revenues	263,555
Income from other sources	$2,884,420
Less: Interest on debenture bonds	567,556
Total	$2,316,864
Net income	$11,287,827
Dividends paid	8,142,767
Net surplus for the year	$3,145,060
Surplus at Jan. 1, 1914	16,939,819
Surplus at Dec. 31, 1914	$20,084,879

The total of sales billed for 1914, amounting to $90,467,691, compares with $106,477,438 for 1913, while the cost of sales, including all operating, maintenance and depreciation charges, increased in 1914 from $81,496,728 to $96,207,833. The profit from sales decreased from $10,269,605 to $8,970,963, while the net surplus for the year decreased from $4,908,674 to $3,145,060.

In general the business of the company experienced marked contraction during 1914. Had not a large volume of unfilled orders been carried over from the year 1913, the effect of the general depression would have been still greater. While there was a decrease of about 25 per cent in the value of orders received, the total number of transactions was practically equal to that of the previous year. The unfavorable relation between the number of orders and their value, however, operated to increase materially the cost of securing and handling business. The number of employees engaged at the end of 1914 was about 15,000 less than in the previous year.

During the year the company followed its usual practice in writing off against income account its total expenditures in 1914 for patents, applications, licenses under patents and other outlays relating thereto, amounting to $408,532. Stocks, bonds and other securities are carried at a valuation of $29,667,213, of which $21,056,354 represents the securities of subsidiary companies and $8,610,859 the securities of public utility and other companies. The current accounts and notes receivable are carried at $19,091,026.

The manufacturing floor space was increased by 940,000 sq. ft. during the year, but most of this construction was under way when the year began. The expenditures for additions and improvements to manufacturing plants aggregated $6,006,955 and the amount written off was $4,370,793.

Railway Storage Battery Car Company

The report of Samuel C. Steinhardt, president Railway Storage Battery Car Company, for the corporate year 1914 has just been rendered. It refers to the change in organization of the company and the appointment of Leo Klopman as general manager and Frank Koziell as engineer. The new management has made a number of changes in the policy of the company, owing to the fact that it has been found impracticable to induce the larger railroad systems to use non-standard cars, or cars in which there has been a radical departure from type and accepted car-building standards. Most of the cars sold previously have reported during the year unsatisfactory running conditions, due in nearly every instance to faulty design or improper construction. The best of these cars have been remodeled and sold to the Lorain, Ashland & Southern Railroad. The Railway Storage Battery Car Company now plans to have its cars built by some of the several standard car builders rather than to build them in its own factory.

Among the assets of the company is the entire capital stock and outstanding bond issue of the Wilmington, New Castle & Delaware City Railway and an interest in the securities of the Wilmington Southern Traction Company. These properties were purchased by a former management to afford opportunities for the demonstration of railway storage-battery operation. While this purpose was successful, Mr. Steinhardt thinks there would be a shrinkage in this item if there were liquidation in the immediate future. The report says that Mr. Edison has not only excused the default of the company in purchasing the required minimum of batteries in 1914 but has established the same low minimum for 1915 and has extended to the company its exclusive contract for fourteen months by giving it a date as of March 1, 1915, instead of January 1, 1914. The report also cites the run of one of its cars by the Pennsylvania Railroad from Newark to Philadelphia and says that the engineers of the Pennsylvania Railroad have recommended the purchase of a number of these cars for use on branch lines. Negotiations are now under way to determine the type and character of the car best suited to this service. The company looks forward to a favorable business period and considers that the year now opening will demonstrate not only the operating but the commercial success of the Edison storage-battery car.

ELECTRIC RAILWAY EARNINGS IN 1914

According to a study made by *The Commercial & Financial Chronicle* from financial reports for 270 electric railways, the gross earnings of these carriers increased from $483,923,118 in 1913 to $487,412,007 in 1914, an amount of $3,488,889, or 0.72 per cent, although during the same period the gross earnings of the steam railroads of the United States fell off $208,178,035, or 6.55 per cent. The aggregate net earnings for the electric carriers was $185,476,614 in 1914 as compared to $186,566,064 in 1913, a decrease of $1,089,450, or 0.58 per cent. The steam railroads, however, showed a loss for 1914 of $75,925,113, or 8.39 per cent. Of the 270 railways reporting, 120 suffered decreases in their gross earnings, but in most cases the loss was light and was overbalanced by the gains of the other carriers.

Fourteen railways reported only their gross earnings and forty-eight presented statements for the fiscal year ended June 30, 1914. If adjustments are included to cover these lines, the total gross earnings for 1914 for 332 companies were $553,095,464, an increase of $4,798,944, or 0.87 per cent, while the net earnings totaled $211,020,088, a decrease of $1,126,315, or 0.53 per cent. These figures do not indicate the total earning power of electric railways in the country, for many minor companies and several large ones are not included.

The following figures indicate the percentage increase in gross earnings of the stated year over that preceding: 1905, 8.68 per cent; 1906, 11.49 per cent; 1907, 9.33 per cent; 1908, 0.94 per cent; 1909, 7.49 per cent; 1910, 7.51 per cent; 1911, 6.33 per cent; 1912, 6.36 per cent; 1913, 5.94 per cent, and 1914, 0.87 per cent. A similar record of net earnings shows the following increases: 1905, 10.71 per cent; 1906, 11.01 per cent; 1907, 4.09 per cent; 1908, 0.79 per cent; 1909, 14.03 per cent; 1910, 6.54 per cent; 1911, 5.96 per cent; 1912, 8 per cent; 1913, 5.7 per cent, and 1914, 0.53 per cent (decrease).

CALIFORNIA UTILITY ISSUES

The California Railroad Commission has issued a report covering the financial activities of the public utilities of the State during 1914. The report shows that the public utilities of all classes were authorized to issue securities to the total sum of $226,725,501. For the entire period of the commission's jurisdiction over securities, from March 23, 1912, to Dec. 31, 1914, the utilities were authorized to issue securities amounting to approximately $400,000,000.

The securities authorized for 1914 exceed those authorized for 1913 and eight months of 1912. While no accurate figures are available for the period prior to 1912 it is probable that the security issues of 1914 were the greatest in the history of the State. Not all of the securities authorized were issued, but it may be estimated that approximately 75 per cent either have been already issued or are to be issued. During 1914 the commission denied or dismissed applications to issue securities approximating $17,000,000.

The record of new development shows that work was carried forward during 1914 on 700 miles of projected new railway enterprises, but no segregation is made as to electrical railway and steam mileages. During 1914, however, the electric railways were authorized to issue $8,298,435 of securities for additions and betterments, while of the total of $226,725,501 of securities authorized $17,372,185, or 7.66 per cent, were authorized for all the corporate purposes of these carriers.

Baton Rouge (La.) Electric Company.—The Baton Rouge Electric Company has issued $150,000 of three-year 6 per cent gold coupon notes dated April 1, 1915, and due on April 1, 1918. The proceeds from the sale of these notes, together with the proceeds from the sale of $100,000 of first mortgage bonds, will be applied to the purchase of land and the construction of a steam power station with a capacity of 2000 hp.

Chicago (Ill.) Elevated Railways Collateral Trust.—A syndicate of leading Chicago and New York banks has sold $8,000,000 of Commonwealth Edison Company 5 per cent thirty-five-year first mortgage gold bonds. The proceeds are to be used to retire the $7,000,000 of one-year 5 per cent notes issued in 1914 in settlement of its $6,000,000 guaranty obligation in connection with the formation of the Chicago Elevated Railways collateral trust and in payment of a sufficient number of debentures of the Chicago Elevated Railways to make the total investment $7,000,000. In return for this amount the Commonwealth Edison Company received approximately 200,996 common shares and $1,270,000 of debentures of the Chicago Elevated Railways.

Chicago (Ill.) Elevated Railways.—It is announced that $12,500,000 of first mortgage 5 per cent gold bonds of the Northwestern Elevated Railroad have all been sold and the syndicate offering these bonds has been dissolved. Previous references to the sale of these securities were made in the ELECTRIC RAILWAY JOURNAL of Jan. 23 and April 3.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Ohio Public Utilities Commission has authorized the Cleveland, Southwestern & Columbus Railway to extend the time of payment of $200,000 of first mortgage 6 per cent gold bonds of the Cleveland & Elyria Electric Railroad from the due date of May 1, 1915, to Aug. 1, 1920. The right is reserved to the company, however, to pay at its option any or all of the bonds on any interest date at prices ranging from 101 up to Nov. 1, 1916, down to par after Nov. 1, 1919. Hayden, Miller & Company, Cleveland, have made arrangements to handle the extension. Holders of the old bonds will receive cash for them from the bankers at maturity. If they desire to exchange for the extended bonds, this privilege will be allowed if the new bonds have not been sold.

Interborough Rapid Transit Company, New York, N. Y.—The directors of the Interborough Rapid Transit Company have declared a second extra dividend of 5 per cent on the $35,000,000 of stock. The other extra dividend was paid on Jan. 2. With the regular dividend of 10 per cent the stock is now really put on a 20 per cent basis.

Long Island Railroad, New York, N. Y.—The operation of the Long Island Railroad for the calendar year showed a deficit of $494,131, as compared to a deficit of $977,985 for 1913. The passenger traffic showed a steady growth, particularly in the territory operated electrically. The new business created by the Pennsylvania station and tunnels was very satisfactory. The number of passengers handled in and out of the station amounted to 11,031,845, an increase of 1,402,819 over the previous year. During 1914 the company added to its equipment forty motor passenger coaches, fifteen motor passenger and baggage coaches, three motor passenger, baggage and mail cars and two storage-battery cars. Contracts have been made for twenty new steel cars for electric service, to be delivered in 1915. The company now has 88.6 miles of road electrified (covering more than 200 miles of track) out of a total of 398.48 miles of road. The annual report states that negotiations in connection with the trolley line on Atlantic Avenue, Brooklyn, are still under way. A tentative agreement has been made with the Brooklyn Rapid Transit Company to buy this line, but it has been delayed by failure to secure a proper franchise from the city.

Nashville (Tenn.) Traction Company.—In answer to the various rumors that the Nashville Traction Company, which about eighteen months ago received a franchise to operate in Nashville, was being acquired or about to be acquired by the Nashville Railway & Light Company, officers of the former company have issued a formal denial. This is to the effect that the company proposes to live strictly up to its obligations and that it will build, equip and operate its lines in strict accordance with the prescribed terms of the ordinance. The company has now completed 5 miles of track.

Oakwood Street Railway, Dayton, Ohio.—The holdings of the family of the late Capt. A. L. Stout in the Oakwood Street Railway have been purchased by C. B. Clegg, president, who now holds the greater part of the capital stock of $500,000. Captain Stout was the builder of the road. It is said that the line may be extended through Oakwood as a result of this purchase.

Ocean Shore Railroad, San Francisco, Cal.—Stockholders of the Ocean Shore Railroad met with the directors in San Francisco on April 8 and ratified the action of the directorate in levying a new assessment of $3 per share. It was stated that the funds to be raised by the assessment would be used principally for the purchase of rolling stock and for the meeting of indebtedness incurred by the acquisition of real estate.

Pacific Gas & Electric Company, San Francisco, Cal.—An executive committee for the Pacific Gas & Electric Company has been appointed, consisting of Frank G. Drum, Frank B. Anderson, John A. Britton, C. O. G. Miller and A. F. Hockenbeamer. J. A. McCandless has been elected a director to succeed J. E. Gladstone, resigned. It was announced at the annual meeting of the company that a definite statement regarding dividends on the common stock would be made not later than May 1. John Nickerson, Jr., New York and St. Louis, is offering the 6 per cent first preferred stock of the Pacific Gas & Electric Company, of which $12,500,000 was authorized last year by the California Railroad Commission and of which $9,356,400 has been sold to stockholders and customers of the company at 82½. Of this stock $55,290,700 has been issued and fully paid for and $4,065,700 has been subscribed and partly paid for. The California Railroad Commission on April 16 authorized the company to issue $367,000 of its general and refunding mortgage gold bonds to the Bankers Trust Company, New York, as trustee. These bonds are a portion of the $4,586,661 of bonds authorized on June 30, 1914.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—An order was made on April 15 by Judge Ambrose B. Reid fixing May 18 as the date of the public sale of the road, franchises and equipment of the Pittsburgh, McKeesport & Westmoreland Railway. It was ordered that the property be sold for not less than $95,000. The petition asking the court to fix the date of the sale was presented by James R. Secrist, receiver. Prior reference to this was made in the ELECTRIC RAILWAY JOURNAL of Aug. 22, 1914.

Portland Railway, Light & Power Company, Portland, Ore.—E. W. Clark & Company, Philadelphia, are offering at 98, to yield 6.1 per cent, $5,000,000 of two-year 5 per cent coupon gold notes of the Portland Railway, Light & Power Company. These notes are dated May 1, 1915, and due on May 1, 1917, but are redeemable at par and interest on sixty days' notice. The proceeds will be used to retire $5,000,000 of 5 per cent one-year notes due on May 1. The new notes are secured by the deposit of the entire issue of $5,000,000 of first mortgage sinking fund thirty-year gold bonds, due in 1937, and the entire capital stock, excepting directors' shares, of the Mt. Hood Railway & Power Company.

Seattle (Wash.) Municipal Street Railway.—The municipally owned street railway in Seattle, Divisions "A" and "C," showed a deficit of $2,042 for March, including interest on $300,000 of Division "A" bonds but excluding depreciation and sinking fund. The total cost of operation for Division "A" and Division "C" for the month was $4,838, and the revenues, $2,796. Of the revenues, $1,409 is credited to Division "A" and $1,386 to Division "C." With the advent of better weather and the coming of summer, Division "C" is expected to find itself on a paying basis, for this line serves campers near Lake Burien. Already conditions on this section of the municipal lines have improved, the net loss in March being only $81 as compared to $156 for February.

Washington (D. C.) Utilities Company.—The Fidelity Trust Company, Baltimore, which is trustee for the issue, is offering at 99 and interest, to yield more than 6 per cent, one-year 5 per cent collateral trust gold notes of the Washington Utilities Company. These notes are dated May 1, 1915, and are redeemable at par and interest on any interest date at thirty days' notice. The total authorized issue is $1,500,000, the proceeds of which are to be used to pay off an equal amount of one-year notes maturing on May 1. The notes are secured by the deposit of 27,500 shares of common stock of the Washington Railway & Electric Company, which have a market value of more than $2,420,000. The Washington Utilities Company was formed in 1911 as a holding company for the securities of street railways, interurban companies and other properties in and about Washington, D. C. The authorized capitalization is $50,000,000 of common stock, of which there are 54,680 shares outstanding.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred B; quarterly, 1¼ per cent, common.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., 1 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

BATON ROUGE (LA.) COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'15	$13,906	*$8,769	$5,137	$2,083	$3,054
1 "	"	'14	13,748	*9,514	4,234	2,148	2,086
12 "	"	'15	179,596	*113,502	66,094	25,033	41,061
12 "	"	'14	166,635	*106,576	60,059	25,220	34,839
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.							
1m.,	Feb.,	'15	$6,226	*$7,216	†$990	$1,127	†$2,117
1 "	"	'14	5,786	*7,176	†1,391	1,065	†2,455
12 "	"	'15	122,326	*102,007	20,320	13,283	7,037
12 "	"	'14	122,800	*99,220	23,580	12,997	10,583
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.							
1m.,	Feb.,	'15	$23,439	*$15,059	$8,380	$6,558	$1,821
1 "	"	'14	25,285	*15,698	9,587	6,401	3,185
12 "	"	'15	347,303	*209,699	137,604	78,019	59,583
12 "	"	'14	378,058	*209,448	168,610	73,857	94,753
COLUMBUS (GA.) ELECTRIC RAILWAY							
1m.,	Feb.,	'15	$55,777	*$26,969	$28,808	$28,792	$16
1 "	"	'14	53,510	*22,286	31,224	24,838	6,385
12 "	"	'15	688,655	*305,683	382,971	332,101	50,870
12 "	"	'14	621,919	*289,504	332,415	283,019	‡71,048
DALLAS (TEX.) ELECTRIC COMPANY							
1m.,	Feb.,	'15	$149,397	*$82,309	$67,088	$33,426	$33,662
1 "	"	'14	183,066	*113,819	69,248	26,651	42,594
12 "	"	'15	2,153,492	*1,232,770	920,722	384,372	536,349
12 "	"	'14	2,243,579	*1,322,352	921,227	307,131	614,096
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.							
1m.,	Feb.,	'15	$48,408	*$30,316	$18,092	$8,908	$9,184
1 "	"	'14	50,039	*33,415	16,623	8,242	8,381
12 "	"	'15	669,978	*392,529	277,448	102,830	174,618
12 "	"	'14	491,026	*310,253	180,774	79,837	‡135,794
EL PASO (TEX.) ELECTRIC COMPANY							
1m.,	Feb.,	'15	$79,241	*$42,265	$36,976	$4,198	$32,778
1 "	"	'14	89,664	*47,729	41,936	4,344	37,592
12 "	"	'15	1,031,058	*564,455	466,603	51,112	415,491
12 "	"	'14	913,037	*497,722	415,315	50,432	374,117
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.							
1m.,	Feb.,	'15	$148,941	*$94,347	$54,594	$36,209	$18,385
1 "	"	'14	175,051	*106,501	68,550	38,963	29,587
12 "	"	'15	2,362,731	*1,280,568	1,082,162	438,095	644,067
12 "	"	'14	2,417,005	*1,374,742	1,042,263	429,340	612,922

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

San Francisco, Atlanta, Fargo, Gadsden, Spokane and Little Rock Pass Regulatory Measures—State Bills—The Jitney Convention

The Board of Supervisors of San Francisco, Cal., passed without opposition on April 19 the ordinance regulating motor bus transportation on the streets of San Francisco. The measure provides for an annual license fee of from $10 to $40, according to the carrying capacity of the car for which license is granted. There is also a provision requiring that a bond in the sum of $10,000 be filed before a license is issued to provide for compensating passengers who may be injured or killed while riding in the jitneys. Other requirements of the ordinance are that there shall be no overloading by permitting passengers to ride on fenders or running boards; that in taking on or discharging passengers cars shall be brought to a stop within 2 ft. of the sidewalks and curb, and that the greatest care shall be exercised in approaching crossings or going down grades. Licenses are to be issued by the Board of Police Commissioners. The regulation of jitney traffic is left with the police department.

A jitney bus ordinance has been passed by the Council of Atlanta, Ga., and is now before the Mayor for signature. The ordinance becomes effective immediately on passage except that the city cannot force the jitneys already licensed to take out new licenses until July 10. The license imposed is from $75 to $100 on small cars, $100 to $150 on seven-passenger cars, and $150 to $200 on motor buses. The applicant for a license must set forth the route he intends to use, and a bond in the sum of $5,000 must be filed to protect those who may have claims on account of accident. It is made unlawful for jitney drivers to charge more than a 5-cent fare. Council reserves the right to cancel licenses, and licenses are issued subject to the right of the Council to amend the ordinance. The number of passengers to be carried in any vehicle is limited to the number of people who can get into the body of the car.

The City Commissioners of Fargo, N. Dak., have passed an ordinance regulating the jitney. The measure includes a provision that all vehicles operated for hire, except taxicab or auto liveries, which do not stand upon the public streets, shall secure licenses to operate from the city. If a license is granted the applicant must pay into the city treasury $50 per annum for each vehicle carrying not to exceed five passengers and $75 for each vehicle carrying more than five passengers. The applicant must also file with the city auditor an indemnity bond in the sum of $10,000 for not to exceed two automobiles and an additional $10,000 bond for additional automobiles or vehicles exceeding two, and a bond at the same ratio for any additional vehicles so licensed. The fare charged by any licensed vehicle for the conveyance of passengers for hire is not to exceed the sum of 50 cents for conveying each passenger to any point within the city limits or within 1½ miles of the outer boundary of the city. Any person who violates any of the provisions of the ordinance is to be punished by a fine of not less than $10, nor more than $100, for each offense, or to be imprisoned not to exceed thirty days.

The City Council of Gadsden, Ala., has passed an ordinance regulating the jitneys. The measure makes it unlawful for anybody to operate a jitney between fixed points on a fixed schedule at a fixed charge without first securing a franchise from the city. A license of $25 is imposed for each car, and a bond of $2,000 for each car operated must be furnished.

The bill passed by the Legislature of Tennessee to regulate the jitney has been signed by the Governor. It defined as a common carrier all conveyances intended to afford a means of street transportation similar to that furnished by street railways and makes it unlawful for any common carrier so defined to use or occupy any street without first obtaining a permit or license, such permit or license to embody such routes, terms and conditions as the city or town may elect to impose. A bond in the sum of not less than $5,000 for each car operated is to be filed with the public authorities to secure any damage that may be adjudged against the carrier. All incorporated cities and towns authorized and empowered to grant permits or licenses to such common carriers to operate over the streets are to fix the routes, terms and conditions upon which the carriers may operate.

The Thompson bill introduced in the Legislature of New York to govern the operation of the jitney bus, referred to previously in the ELECTRIC RAILWAY JOURNAL, has been passed by both houses and is now before the Governor.

Representative Morris of Van Wert County has introduced a series of bills in the Ohio Legislature to require the owners of jitneys to secure franchises from City Councils, pay excite taxes to the State and be subject to regulations by the Public Utilities Commission.

Peculiar and adverse conditions exist in Washington in relation to the jitney. All of the drivers and owners of cars for hire in Spokane, Wash., have been forced by the city authorities to suspend operation until they have complied with the State law, which requires a $2,500 bond and a State license, and until they have secured permit in accordance with a new city ordinance passed in that city. Although representatives of the Pacific Casualty Company, San Francisco, say that they have applications from jitney drivers in Tacoma for bonds required by the State law Attorney Ashton Dovell, representing a jitney association in Tacoma, has advised the members not to take out the $2,500 bonds until the Supreme Court rules on the bill's emergency clause, and county and city authorities at Tacoma have made no effort to date to enforce the law requiring State and city licenses and a bond. The city of Seattle also has done nothing to enforce the State law requiring jitney bus operators to carry a bond of $2,500. It is reported unofficially that not more than 350 jitneys are being operated in Seattle at this time, and that less than half of this number are properly bonded and licensed.

The Street Auto Service Company, Salt Lake City, Utah, has abandoned its service. On April 10 only two jitney buses were in operation in Salt Lake out of a fleet of thirty or forty in operation at the height of the fad. The refusal of security and bonding companies to write the bonds required of the jitneys under the new city ordinance without a deposit of collateral security caused the Street Auto Service Company to withdraw its service. The terms of the regulatory ordinance passed in Salt Lake were published in the ELECTRIC RAILWAY JOURNAL of April 10, page 733.

The jitney has ceased to exist in Buffalo. As previously noted in the ELECTRIC RAILWAY JOURNAL an ordinance has been passed and signed covering the operation of motor vehicles, and the Buffalo Jitney Bus Company has practically abandoned its plans for establishing service in the city. No cars have been operated by the company for three weeks.

The referendum petition filed by the jitney interests at Los Angeles, Cal., against the new jitney regulatory ordinance was found to lack the necessary number of signatures of qualified electors, and the city attorney has ruled that the ordinance is now in effect.

The earnings of the Pacific Electric Railway in Long Beach, Cal., fell off to the extent of $52,000 for the first eight months prior to Feb. 15, 1915, and 75 per cent of the loss, or $39,000, is attributed to the inroads of the jitney, according to the testimony of D. W. Pontius, traffic manager of the railway, before a hearing held in Los Angeles on April 9, by the State Railroad Commission of California. The hearing was called in response to protests against the removal of the railway's tracks on East Ocean Avenue.

The official report of the first regular meeting of the executive committee of the Safety First Federation of America, held in New York recently, says that several of the public officials in attendance at the meeting related their experiences with the jitney and that, while the members of the committee were keenly interested in the reports from various cities, the opinion was expressed that jitneys had not been in operation long enough for regulation to be prescribed governing their operation. A reference to this meeting was made in the ELECTRIC RAILWAY JOURNAL of April 17, and several of those who attended the meeting were quoted in their personal capacities.

Judge Crump in the Law of Equity Court at Richmond, Va., has denied the application of the Virginia Railway & Power Company for an injunction restraining jitneys from operating except under a franchise granted by the city. The company has appealed the case to the Supreme Court. The matter of regulation is now before the ordinance committee of the Council. The company has put a few small five-passenger autos in service in the city to determine the desirability of the service for districts where an electric railway franchise cannot be obtained.

The City Council of Spokane, Wash., has passed a jitney ordinance. Control of jitney routes, schedules and hours of service are lodged with the Council, which will issue all permits to operators and reserves the right to cancel them at any time. Jitneys are required to run at least eight hours a day and light their cars at night.

In advance of the opening of the Federal League season at Kansas City, Mo., on April 10, the jitneys were widely heralded as the convenient means of reaching the park. Altogether it was a big jitney day. Many new trucks were in service, and the sunshine brought out a host of touring cars to carry passengers for hire. People flocked into the jitneys, most of which bore signs "To the ball game." The jitneys had almost universally been charging 5 cents for rides even farther than to the ball park, and 10 cents has been the regular rate for longer trips. The jitneys bore no signs indicating the price to the park, though in a few instances the drivers announced that the rate was 25 cents on this occasion. But in very many instances when the people offered their nickels, at the park, they were informed that the price was a quarter. The higher price was paid, with mutterings, in most cases. Few jitneys were on hand, however, to care for the crowds after the game.

Delegations to the national jitney convention in Kansas City on May 4, 5 and 6 are promised from thirty cities so far. Including the representatives of the manufacturers of motor cars and appliances, the attendance probably will exceed 200, and may reach 400. Among the speakers invited are Frank P. Walsh, chairman of the industrial commission; Samuel Gompers, president of the American Federation of Labor; Walter C. White, president of the White Motor Car Company; Henry Ford, of the Ford Company, and E. K. Benson, vice-president of the Studebaker Company. The first response was from Hugh Chalmers, who announced that Lee Olwell, first vice-president of the Chalmers Company, would be present. The program will include speeches and discussions of these subjects: financing the national association; legislation; insurance; equipment; regulation of cars and driving; badges and emblems. Several old line liability companies are said to be dickering with the jitney associations on writing liability insurance, but the rates so far offered are considered excessive.

The jitney is becoming a menace in Philadelphia. The number of cars in service has increased materially lately and the need for regulation has become apparent. A census of the cars has been taken by the police, but the details have not been made public. It is expected that the matter will be taken up at the next meeting of Councils. Among those who have gone on record in favor of regulation is Daniel T. Pierce, of the Barber Asphalt Company, formerly executive assistant of the Philadelphia Rapid Transit Company. Mr. Pierce, who has lately returned from a trip to the South and the West, during which he studied the jitney at first hand, has written to Mayor Blankenburg. Typical regulatory measures which Mr. Pierce mentions are those passed in San Francisco, Salt Lake City, Little Rock, San Antonio, Portland, Louisville, and Seattle.

The City Council of Little Rock, Ark., has passed an ordinance governing the jitney. The bond required is for $2,000. License fees payable to the city by operators of jitneys or other public automobiles, as fixed by the ordinance, are as follows: for cars with seating capacity of five to seven persons, including chauffeur, $3 per month; cars carrying from eight to twelve passengers, $6 per month; cars carrying more than twelve passengers, $8 per month. A feature of the new ordinance requires that all public chauffeurs shall be licensed, after passing an examination as to training and fitness, conducted by the city automobile inspector, an official to be appointed by the Mayor.

In an opinion rendered to the Public Service Commission of Maryland, William Cabell Bruce, general counsel to that body, says the jitneys are common carriers. Mr. Bruce said: "In my opinion it (the jitney bus) is subject to the jurisdiction and authority of the commission in every respect that the steam car or the electric car is, except so far as essential differences of structure and operation necessarily limit the application to it of provisions of the public service commission law relating to the latter."

ACCIDENT SAVINGS DIVIDED

San Diego Electric Railway Distributes $15,468 in Accident Savings Among 304 Men

On Feb. 20 William Clayton, vice-president and managing director of the San Diego (Cal.) Electric Railway, addressed the following letter to the company's trainmen:

"Inclosed herewith is a check representing your share of the savings effected by our safety-first plans in San Diego. After a very careful investigation of the cost of accidents, extending over a period of three years, the company agreed with its motormen and conductors that it would set aside the average cost of car accidents (exclusive of law department expenses, claim department expenses, etc.), during the previous three years in proportion to the gross receipts of the company.

"We started on April 1, 1914, with an absolutely clean sheet; that is to say, none of the accidents that had taken place prior to that date was charged against the fund. Of course, considerable sums of money were paid out between April 1 and Dec. 31, 1914, for accidents which had occurred previous to April 1, 1914. These payments have been met by the company.

"The whole object of this safety-first fund has been to encourage the motormen and conductors to use the greatest possible vigilance in avoiding accidents to the traveling public, whether passengers on the street cars, in automobiles, or pedestrians. We believe that a special reward for vigilance on the part of the motormen and conductors in avoiding accidents is beneficial to the public and the company. The result of the first nine months confirms our judgment that the plan is good, and we are satisfied.

"The total amount of money saved out of the accident fund for nine months was $15,468.69. This check is your share of it. This division has been made on the basis of the number of hours each motorman or conductor has worked in the period of nine months, which is the fairest way, in our opinion, any division could be made. We hope the results of this plan are perfectly satisfactory to our employees and that it will encourage them to still greater effort and greater vigilance in avoiding accidents. It would be a great pleasure to us if we could say at the end of the year that we had had no accidents whatever and be able to turn over to our men 3 per cent of the gross receipts, amounting to $30,000, $40,000, or any other proportionate sum, as reward for the excellence of their judgment or vigilance. The more you can make out of this fund, the better we will be satisfied."

THE SCRANTON EXPERIENCE MEETINGS

In the ELECTRIC RAILWAY JOURNAL of April 10, page 735, brief mention was made of the experience meetings of the Scranton (Pa.) Railway. Every two weeks on Monday morning the superintendent of transportation of the company has a meeting in his office of all dispatchers and inspectors, at which time all matters pertaining to safety-first recommendations and suggestions concerning the operation of the road in a general way are offered and considered. These meetings and discussions usually last from one to one and one-half hours. Every Wednesday morning in the office of W. E. Boileau, the general manager, a meeting is held of the heads of all departments, at which are discussed all matters pertaining to the operation of the road. In fact, it might be called a cabinet meeting, at which the general manager advises with the heads of the departments, and the heads of the departments with each other, looking to the improvement of service, efficiency and economy of operation. These meetings usually last an hour.

Once a month a meeting is held of all employees who can attend, but principally the men from the transportation department, one session being held in the morning one month and in the afternoon the next month. At these meetings short talks are made by the employees, the superintendent, general manager, and some one from the claim or legal department, along the lines of safer and better operation. The management now plans to have others from outside the organization make short talks, and city officials and men interested in the safety-first movement on other roads will be invited to speak. The main object of the meetings is to bring the men in closer touch with the management and secure their hearty co-operation. A stenographer takes down the proceedings, the transcript is duplicated and a copy is sent to each employee. In this way those who are unable to attend are made acquainted with the proceedings.

ANOTHER INCREASE IN FARES

The New Bedford & Onset Street Railway, New Bedford, Mass., has annonnced a proposed increase in its fares effective on June 1. The statement of the company follows:

"The New Bedford & Onset Street Railway has given notice to the Public Service Commission of Massachusetts, as required by the law of 1913, that it proposes to change its rates of fares by substituting 6 cents for 5 cents for each existing fare limit, and selling reduced rate tickets of twenty for $1, in substitution of the present rate of twenty-four for $1, the change to go into effect on June 1. The Public Service Commission will doubtless order a hearing on the matter at an early date.

"The New Bedford & Onset Street Railway has been in operation fourteen years and has demonstrated the amount of business which the communities it serves can furnish. Owing to steadily advancing costs of wages and materials, and the requirements for depreciation and for safety devices and other requirements of the public authorities, without an equivalent increase in its business, the company is not at present in receipt of an income sufficient to enable it to continue its present service and properly maintain its railway, without an increase in the rates of fare paid by the public which it serves."

Increasing Philadelphia-Allentown Service.—The Lehigh Valley Transit Company is operating two new limited trains between Philadelphia and Allentown, one leaving Allentown at 6 a. m., for Sixty-ninth Street, Philadelphia, and one leaving Sixty-ninth Street at 6:57 a. m. for Allentown.

Increase in Fares Suspended.—The Public Service Commission of Massachusetts has issued an order suspending the proposed increase in rates on the Berkshire Street Railway until July 20. This action will prevent the higher rates becoming effective on April 30. The date for the hearing has not yet been set.

Near-Side Stops in Yonkers.—The Common Council of Yonkers, N. Y., has amended the traffic ordinance so as to require the cars of the Yonkers Railroad to stop on the near side of street intersections, empowering the commissioner of public safety to designate certain crossings as exceptions to the rule. Less than a year ago a far-side stop ordinance was passed, but unsatisfactory results made a change necessary.

Sprinkler for Columbus.—The railroads and viaducts committee of the City Council of Columbus, Ohio, has decided to make a favorable report on the ordinance authorizing a contract with the Columbus Railway, Power & Light Company to operate a flusher over 25 miles of city streets. The company will purchase a car designed especially for street-cleaning purposes and will operate it 240 nights in the year at the rate of $10 a night.

Higher Fare Sought.—The New Jersey & Pennsylvania Traction Company has applied to the Board of Public Utility Commissioners of New Jersey for permission to establish a 20-cent rate, instead of the present 15-cent rate, between Trenton and Princeton. Lawrenceville and intermediate points would be affected by the increase. The rate between Princeton and Trenton formerly was 10 cents, but in 1912 the commission permitted an increase to 15 cents.

Chicago, & Milwaukee Electric Railway Increases Fares.—On April 15 the passenger rates on the Chicago & Milwaukee Electric Railroad, Highwood, Ill., an interstate line, were increased in Illinois and Wisconsin. The present fare from Milwaukee to Chicago has been $1.15 one way. The new fare is $1.40, or approximately 2 cents a mile for the 72-mile run. The increased rate will prevail between all points and no reduction for round trips will be made. In order to obtain permission to advance its rates the company appealed to the commissions of Wisconsin and Illinois and to the Interstate Commerce Commission.

Accident on New York Elevated.—In an accident on the Second Avenue elevated line of the Interborough Rapid Transit Company, New York, N. Y., on April 15 at Chatham Square junction a northbound train on the Second Avenue line separated on the switch, part of the train continuing on Second Avenue and the two rear cars jumping off to the west. The first car to leave the track, which was the fifth car of the train, was derailed and a short-circuit resulted. The structure caught fire and the side of the car was scorched before the blaze was extinguished. Two passengers were injured.

Inquiry Into Service Orders.—On motion of Commissioner William Hayward, the Public Service Commission for the First District of New York has decided to appoint a special committee to look into all service orders previously adopted by the commission and to report whether any such orders are obsolete or unworkable. In proposing the resolution, Commissioner Hayward stated that in his opinion it would be better for the commission to have ten good orders which could be enforced than a hundred about which there is any doubt. Chairman Edward E. McCall has appointed Commissioners William Hayward and George V. S. Williams as the committee.

Reduction in Service in Winnipeg.—General conditions, due to the war, present financial conditions in Winnipeg, and jitney competition are responsible for the request of the Winnipeg (Man.) Street Railway to reduce its service in Winnipeg by twenty cars, according to the statement of the railway's counsel to the Public Utilities Commissioner. Nearly 600,000 fewer passengers were carried on the cars last month than in March, 1914. For the first twelve days of April, this year, there were 400,000 fewer passengers than in the corresponding period of last year, and the receipts for the twelve days were $15,000 less than for the first twelve days of 1914.

Seattle Service Questions.—The Public Service Commission of Washington will not issue an order directing the Puget Sound Traction, Light & Power Company to better the Wallingford Avenue service. The city of Seattle, last month, asked for discontinuance of shuttle service on the Alki Point, Faunteleroy, Ballard Beach and Wallingford cars. On March 24 the commission directed the company to abandon the shuttle service on the first three named lines. The Wallingford case, however, was taken under advisement. Holding that it has no jurisdiction, the commission recently dismissed without prejudice the application of the city for a continuance of the contract between the Seattle Port Commission and the Puget Sound Traction, Light & Power Company, under which the latter carried ferry passengers on the West Seattle stub line for a 2½-cent fare. This contract expired on March 16.

Advances in Fares.—The New York State Railways has filed with the Public Service Commission of the Second District of New York, effective on May 14, advances in local one-way and round-trip ticket fares and chartered car rates between stations on the Oneida lines, advances in local one-way and round trip in both directions between stations on Utica lines and stations on Oneida lines, advances in joint one-way fares from Canastota, Chittenango, Clark Mills, Hecla, Kirkville, Manlius, Center, Oneida, Syracuse, Utica, Vernon and Wampsville to various New York State destinations on the New York Central and the West Shore Railroads and advances in joint one-way fares from Canastota, Chittenango, Hecla, Kirkville, Manlius, Center, Syracuse, Utica and Vernon to destinations on the New York, Ontario & Western Railroad, Cleveland to Durhamville inclusive, and Kenwood to Norwich inclusive.

Moving a Baseball Crowd.—Three very recent improvements in the method of handling fares—or, rather, two improvements on one basic new plan—had a good tryout recently in Kansas City, at the opening of the Federal League baseball season. A crowd of about 12,000 persons attended the game; and the Metropolitan Street Railway moved the fans away after the game in sixteen minutes, except for the stragglers. The prepayment system was the key to the facility of handling the passengers. All the cars used were prepayment cars, and most of them were also equipped with fare boxes. Perhaps the most useful feature of the collection, however, was the work of the front door collectors through which passengers were embarked at both ends of the cars at the same time. Downtown the company had its front door collectors stationed at many corners to assist in loading the cars bound for the ball park.

Seattle Suburban Fare Case.—Ralph S. Pierce, assistant corporation counsel of Seattle, Wash., will petition the United States District Court for a judgment on the city's pleadings in the case brought by the receivers of the Seattle, Renton & Southern Railway in an effort to set aside the order of the State Public Service Commission, which prohibits the establishment of a zone system, whereby a higher rate than 5 cents might be charged to outlying districts in the Rainier Valley. The city intervened in this case and pleaded the company's franchise, which requires a service for a charge of not to exceed 5 cents in the city limits. The receivers contended this was not a sufficient defense, for the reason that the Public Service Commission had set aside franchise contracts in other cases. Judge Jeremiah Neterer holds that the city's defense should not be set aside, and that under the Webster decision a franchise agreement is binding until set aside by the Public Service Commission. If Mr. Pierce is successful the Seattle, Renton & Southern Railway will be prevented for at least two years from making any change in rates.

The Louisville-Indianapolis Service.—Attorneys representing the Board of Trade of Louisville, Ky., in the case before the Interstate Commerce Commission by which it seeks to obtain more favorable rates on freight shipments from Louisville north, are in possession of the answers filed by the electric railways. These point out that it is customary in dividing joint rates that apply over "an expensive river crossing" to deduct a bridge toll before prorating, and that the Louisville & Southern Indian Traction Company is entitled to a deduction of 2 cents for each 100 lb. on less than a carload and 1 cent on carload traffic, before the rates are subdivided, as compensation for transporting goods across the bridge between Kentucky and Indiana. The same answers also set forth that the Louisville & Southern Indiana Traction Company is entitled to receive a minimum of 20 per cent of the freight rates as an originating or delivering line, in addition to its bridge tolls and that the connecting lines should receive percentages of the rates in proportion to their mileages. Service between Louisville and Indianapolis is operated over four connecting transportation lines.

New Company Publication.—The Union Traction Company, Indianapolis, Ind., has begun the publication of *Safety*. The first issue is dated April. It contains ten pages, cover and an insert portrait of Arthur W. Brady, president of the company. The announcement made to the employees in regard to the new paper follows: "It gives us pleasure to announce that beginning with April we will publish a magazine devoted to the work of our safety-first organization, and pertaining to the general operation of the property of this company, including the welfare of its employees. It is our intention at the present time to make the magazine a monthly edition and to forward a copy to every employee of the company. In addition to safety-first and welfare matters which are general in character, we expect to publish other subjects of interest taken up at the meetings of our general and local safety boards, as well as the proceedings of our-semi-annual banquets. We trust that the magazine will prove to be so attractive that everyone will take pleasure in reading its contents and keeping posted regarding these matters in which we are all so much concerned. We shall be obliged to any employee for any information or suggestion that may assist us in making the magazine a success."

Personal Mention

Mr. Linus H. Stickle, who for the last two years has been associated with the claim department of the International Railway, of Buffalo, N. Y., and for the last six months assistant claim agent, has been appointed supervisor of claims, a new position.

Mr. W. L. Hemingway, vice-president of the Mercantile Trust Company, Little Rock, Ark., has been elected vice-president of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed Mr. D. H. Cantrell, who has been elected president of the company, as noted elsewhere in this column. Mr. Hemingway has also been elected treasurer of the company.

Mr. Charles A. Coons, formerly with the International Railway, Buffalo, N. Y., has been appointed general superintendent of transportation of the United Traction Company, Albany, N. Y., effective on May 1. Mr. Coons will succeed Mr. John F. Uffert, who since early in 1914 has held the positions of general superintendent of transportation and master mechanic. The appointment of Mr. Coons to the position of general superintendent will relieve Mr. Uffert of his duties in this connection, and he will in future devote all his time to the office of master mechanic.

Mr. Charles H. Guckel has resigned as general manager of the Springfield (Mo.) Traction Company, controlled by the Springfield Railway & Light Company, which in turn is controlled by the Federal Light & Traction Company, New York, N. Y. Mr. Guckel has been connected with public utility companies for the last eighteen years. Before becoming connected with the company at Springfield he was engaged in public utility work at Boise City, Idaho. He was also at one time connected with the Swan Falls Power Company and the Swan Falls Interurban Railroad.

Mr. Joseph A. Kucera has resigned as business manager of the ELECTRIC RAILWAY JOURNAL. Mr. Kucera has had general charge of the business department of this paper or of the *Electrical World* since 1908, and his versatility and business ability are shown by the fact that for some time he was business manager of both papers. Previous to 1908 Mr. Kucera was business manager of the *Electric Railway Review*, Chicago, which was purchased by the McGraw Publishing Company in that year. He originally studied law and is a member of the Chicago bar. Mr. Kucera has not yet announced his plans for the future, but has the best wishes of his former associates in anything which he may undertake.

Mr. A. T. Van Diense, formerly manager of the properties of the Federal Light & Traction Company at Albuquerque, N. M., has been appointed general manager of the Springfield Gas & Electric Company and the Springfield (Mo.) Traction Company to succeed Mr. Charles H. Guckel. Mr. Van Diense was graduated from Purdue University. He was connected with the Westinghouse Electric Company at El Paso, Tex. Previous to that he was manager for a short time of the lighting and ice plant at Deming, N. M., and an irrigation project of the New York Light & Power Company in New Mexico. He next became manager of the property at Albuquerque of the Federal Light & Traction Company, which controls the Springfield system.

Mr. Deaderick H. Cantrell, of the firm of Rose, Hemingway, Cantrell, Loughborough & Miles, has been elected president of the Little Rock Railway & Electric Company, Little Rock, Ark., succeeding the late Judge W. M. Kavanaugh. Mr. Cantrell was formerly vice-president and a director in the company. In assuming the presidency of the company Mr. Cantrell will not undertake to make any marked changes in its policies or organization. As attorney for the company he has at all times been in close touch with its affairs, and by reason of that fact the duties of the office of president will not materially increase his labors or interfere with his general practice of the law as a member of the firm of Rose, Hemingway, Cantrell, Lougborough & Miles. He will continue personally to look after the company's legal business. Mr. C. J. Griffith will remain as general manager in charge of the operation of the road, while Mr. Cantrell will exert his energies in directing the plans and policies of the company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Goldsboro (N. C.) Electric Railroad.**—Chartered in North Carolina, presumably to succeed the Goldsboro Street Railway and to acquire electric railways, and also to build lines in or adjacent to Goldsboro within a radius of 50 miles of Goldsboro. Capital stock, $25,000. Incorporators: G. S. Dewey, Leslie Well and Joseph E. Robinson.

***Dover, Millersburg & Western Railway, Canal Dover, Ohio.**—Incorporated in Ohio to build an interurban electric railway between Canal Dover and Millersburg via Sugar Creek. Capital stock, $10,000. Incorporators: T. F. Phillips, Benjamin George, G. T. Pryor, C. F. Uhl and H. H. Hostetler.

***Huron & Northwestern Railway, Huron, S. D.**—Application for a charter has been made by this company in South Dakota to build a 105-mile interurban railway from Huron to Roslyn. Capital stock, $25,000. Incorporators: F. W. Henderson, Summit; Walter Pelsam, Sioux Falls; C. B. Adams, Chicago; Charles E. Wolf, and Frank Budack, Washpeton, N. D. The same people have incorporated a construction company known as the Huron Development & Construction Company, with a capital stock of $50,000.

FRANCHISES

Henderson, Ky.—The Evansville Railways has asked the Council for a twenty-year franchise in Henderson.

Henderson, Ky.—The Henderson Traction Company has asked the Council for a twenty-year extension of time on its franchise on its line between Henderson and Evansville.

Arlington, Mass.—The Bay State Street Railway has asked the Council for a franchise to replace its present track in Mystic Street with double tracks from Chestnut Street to Massachusetts Avenue connecting with the elevated cars.

Arlington, Mass.—The Boston Elevated Railway has asked the Council for a franchise to double track its line in Boston on Mystic Street to Chestnut Street and in Chestnut Street from Madford Street to Mystic Street, making a loop.

Durham, N. C.—The Durham Traction Company has asked the Council for a franchise for the extension of its lines down Holloway Street to the baseball park in Durham.

Oakwood, Ohio.—The Spaite-Wright Realty Company has asked the Council for a franchise in Oakwood, a suburb of Dayton, for an electric railway to connect with the loop of the Oakwood Street Railway on Brown Street and to extend south along the Lebanon Road to Peach Orchard Road, a distance of 1½ miles.

***Linnton, Ore.**—The County Commissioners of Multnomah County were recently petitioned by residents of Linnton and points adjacent, near Portland, for a twenty-five-year franchise for construction of an electric interurban railway, to operate between Linnton and Portland, to take the place of the United Railway Line, which ceased operation on April 1. The new line, which must be completed and in operation one year after the adoption of the proposed franchise, will be constructed at a cost approximating $100,000. Construction must begin within six months. A five-cent fare will be charged. The petitioners are headed by O. M. Clark, Richard Shepard and J. B. Holbrook, of Linnton.

Easton, Pa.—The Northampton Traction Company has asked the Council for permission to lay a new switch and reconstruct its track with new and heavier rails on North Fourth Street between Church Street and Northampton Street in Easton.

***Petersburg, Va.**—A meeting of the Board of Supervisors of Prince George county was held recently to consider applications from two companies for the privilege of constructing an electric railway through the county from Petersburg to City Point, a distance of 10 miles. The rival companies are the Petersburg & James River Company and the Petersburg & Appomattox Company.

TRACK AND ROADWAY

Parker & Colorado River Electric Railway, Parker, Ariz.—The final survey for this railway has been completed and grading will be begun at once. W. H. Tharpe, Parker, is interested. [Oct. 17, '14.]

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun by this company at once on the improvements that will be made to its right-of-way on South Fair Oaks Avenue between the Salt Lake track and the south city limits in Pasadena.

Connecticut Company, New Haven, Conn.—Work will be begun at once by this company on the extension of its lines along Boston Avenue in Bridgeport, as far east as Central Avenue.

Capital Traction Company, Washington, D. C.—The date for a formal hearing by the Public Utilities Commission on the proposal of this company to build a new north and south line by way of Seventeenth Street and I Street northwest in the city of Washington has been advanced from April 22 to May 27.

Waycross Street & Suburban Railway, Waycross, Ga.—Among the extensions planned by this company for the near future will be a line from its present terminus at its carhouse about ½ mile to Hebardville, along the right-of-way of the Atlanta, Birmingham & Atlantis Railroad. Another extension along Glenmore Avenue about ¾ of a mile to some suitable point at or near a park; also the taking up and removing the line from Gilmore Street to Lee Avenue, and thence extending its line under the tracks of the Jacksonville branch of the Atlantic Coast Line Railroad through Gilchrist Park to a suitable terminus in said park in Waycross.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Plans are being made by this company to inaugurate service between Lewiston and Clarkston on May 3. The actual construction of the railway was practically completed by April 15. H. C. Hartung, Lewiston, general manager. [April 3, '15.]

Fox & Illinois Union Railway, Aurora, Ill.—This company has completed the construction of its 20-mile line from Yorkville to Morris. H. H. Evans, president. [Nov. 28, '14.]

***Rockford (Ill.) Southern Railway.**—This company, which will build a line from Rockford to Rochelle, is to begin survey and engineering work at once. The line will be built by A. C. Lingelbach & Company, Chicago. The cost of the new railway will be approximately $800,000, which will be secured through a bond issue. The Chicago company will build the line and accept bonds in payment for the construction work. The new company will be organized with a capital stock of $50,000 and will be an independent organization. The proposed line will pass through the towns of New Milford, Holcomb and Kings to Rochelle from Rockford. L. Leon de Tissandier, Rockford, engineer.

***Muscatine, Ia.**—Plans are being made to build an electric railway to connect Muscatine, Iowa City and West Liberty. Among those interested are A. D. Bowen, Muscatine, and William Musser, Iowa City.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being contemplated by this company for a line west from Hutchinson to Kinsley.

Worcester (Mass.) Consolidated Street Railway.—The extension of the Greenwood Street line from its present terminus at Greenwood Street and Upland Street to the city limits in Worcester is being considered by this company. Preparations for repair work are being made by this company for relaying its track in Main Street, from Lincoln Square to Chandler Street in Worcester.

Detroit (Mich.) United Railway.—Grading has been begun by this company on the extension south from Almont.

Muskegon-Saginaw Electric Company, Muskegon, Mich.—Within the next few days a surveying party, in charge of Clifford S. Gamble, former city engineer, will begin the work of surveying the proposed interurban route between Muskegon and Saginaw. Fifteen townships voted right-of-way franchises to the company. In addition to the physical survey of the road a survey from a passenger and freight viewpoint will also be made. [June 13, '14.]

Duluth-Superior Traction Company, Duluth, Minn.—Plans for a new route for the extension of the Piedmont Avenue line to Hermantown and Hutchinson roads are being made by this company.

Minneapolis & Northern Railway, Minneapolis, Minn.—This company, which operates an electric railway from Mill City to Anoka, has resumed service again, after a suspension of all operation for two months.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—This company is engaged in laying steel on its new line from Auto Club Junction to Minneapolis Junction, where a connection with the Electric Short Line Railroad, also of Minneapolis, is made. Arrangements have been made with the latter company to operate over its lines into Minneapolis, and it is planned to have this extension complete and ready for service into Minneapolis by May 30, 1915.

St. Paul (Minn.) City Railway.—This company expects to begin work soon laying new track for the St. Clair Street line in St. Paul.

***Canton, Mo.**—Preliminary arrangements are being made to build an electric railway from Keokuk, Ia., crossing the Des Moines River at St. Francisville, Mo., thence to Kahoka, Williamstown, La Belle, to Jefferson City and from Williamstown to Canton. A spur will be built on an old railway dump that extends from Canton to Memphis, Mo. S. J. Dement, Williamstown, and associates are interested.

Kansas City, Lawrence & Topeka Railway, Kansas City, Mo.—Grading has been begun on the line from Bonner Springs to Lawrence, Kan. Work will soon begin on the line from Manhattan to Topeka.

Metropolitan Street Railway, Kansas City, Mo.—This company is reconstructing tracks on Walnut Street under the same plan as adopted on Main Street last fall, temporary tracks being laid between permanent roadbed and the curbing for railway traffic, and other traffic being excluded from the street pending completion of the work. Main Street is now being paved. Plans are being made by this company to begin work at once double tracking through Swope Park to the Zoo, north on Sixty-seventh Street from the Swope Parkway line, in Kansas City.

City Light & Traction Company, Sedalia, Mo.—This company has arranged for the purchase of a quantity of 60-lb. steel rails which will be brought to Sedalia and utilized on the Thirteenth Street line of that company in replacing a large number of light rails now in use on that line.

Binghamton (N. Y.) Railway.—An extension of this railway through Port Dickinson from the present terminus to the north line of Port Dickinson is contemplated by this company.

New York Municipal Railway Corporation, New York, N. Y.—The contract to build the first section of the elevated railroad on Jamaica Avenue through Richmond Hill, from Crescent Avenue to Myrtle Avenue, a portion of the Dual Rapid Transit System, has been awarded by this company to Post & McCord for $750,000. The structure is to be completed inside of a year.

Penn Yan & Lake Shore Railway, Penn Yan, N. Y.—During the next four weeks this company expects to award contracts to build about ½ mile of new track with 7-ft. girder rails in paving in Penn Yan.

Hiawassee Valley Railway, Andrews, N. C.—Work is being rushed by this company on its 35-mile line between Andrews, Hayesville and Hiawassee, Ga. It is planned to have the section of the line from Andrews to Hayesville in operation by July 1. H. S. Kinehew is in charge of the work. [Aug. 1, '14.]

***Vinita (Okla.) Railroad.**—Preliminary arrangements are being made by this company to build an electric railway from Vinita to Centralia and Miami. John R. Rose, Vinita, is interested.

Ohio Electric Railway, Cincinnati, Ohio.—This company and the railroads and viaducts committee of the Columbus City Council have tentatively agreed upon a plan for the construction of a viaduct over the Norfolk & Western Railroad tracks in Columbus. The improvement will cost about $105,000, of which the city is to pay $30,000 and the Norfolk & Western Railroad the remainder.

Ohio Valley Traction Company, Portsmouth, Ohio.—Grading has been begun at Wheelersburg by this company.

***Toledo, Ohio.**—G. T. Wiswell, Chicago, and associates are considering plans to build an electric railway to connect Toledo and Columbus. The proposed route would touch Fostoria, Upper Sandusky and Richwood, and in part would parallel the Hocking Valley Railroad. It is stated that the line will be financed if the right-of-way can be secured.

Wentworth Street Incline Railway, Hamilton, Ont.—Discussing the question of tunnel extensions of the Wentworth Street mountain incline railway, City Engineer A. F. Macallum said he figured the cost of the work, exclusive of structural steel work, at $52,000. [Feb. 20, '15.]

Toronto (Ont.) Railway.—This company and the Municipal Board has ordered the reconstruction of the roadbed on College Street east of Bathurst Street in Toronto. Before the work is begun the city will supply specifications to the board's engineer.

Toronto & York Radial Railway, Toronto, Ont.—This company has withdrawn from the Ontario Legislature its application to double track the lower end of its railway on Yonge Street, Toronto.

Portland, Eugene & Eastern Railway, Portland, Ore.—Plans are being made by this company to repair its tracks on Eighth Avenue west at the same time the city widens the avenue between Charnelton Street and Monroe Street in Eugene.

Irwin-Herminie Traction Company, Irwin, Pa.—Surveys have been completed by this company on the extension from Irwin to Manor.

Middletown & Elizabethtown Street Railway, Middletown, Pa.—This company reports that it has secured right-of-way, but on account of the present financial conditions no definite plans have yet been made when construction will be begun on the proposed electric railway to connect Middletown and Elizabethtown. F. H. Alleman, vice-president. [Jan. 20, '12.]

Pittsburgh (Pa.) Railways.—The lines of this company are to be extended from the Sewickley-Coraopolis Bridge through Sewickley Borough.

Reading Transit & Light Company, Reading, Pa.—Work has been begun by this company on the renewal of its double track on Penn Avenue in Reading.

Johnson & Somerset Street Railway, Somerset, Pa.—Work has been begun by this company on its line between Rockwood and Johnson. A traffic agreement has been entered into under the terms of which this company will have the use of the Johnstown Passenger Street Railway Company's tracks into the city of Johnstown from a point near the Kelso mines. Plans are being made to begin construction on the railway at once.

West Chester (Pa.) Street Railway.—New ties are being laid by this company along its line between Market Street and Chestnut Street in West Chester.

Austin (Tex.) Street Railway.—Plans are being considered by this company to double track its line to Lake Austin and to extend several of its lines in Austin.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Construction work is to be begun at once on the 36-mile line between Brigham City and Wellsville, which, when completed, will give Utah a continuous electric railway between Payson, in the southern part of Utah, and Preston, just over the northern border in Idaho. [April 10, '15.]

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Surveys are being made by this company between Provo and Springville, 6 miles. Grading for the extension from Provo to Springville will be begun at once.

Princeton (W. Va.) Power Company.—Walton & Company, Falls Mills, Va., contractors for this railway from Princeton to Bluefield, 12 miles, have the line constructed as far as the city limits of Bluefield, and plans are being made to begin track laying at once. S. J. Evans, Princeton, president.

Wheeling (W. Va.) Traction Company.—Plans are being made by this company for an extension through Rayland to Dillonvale, Mount Pleasant and Adena.

Janesville & Madison Traction Company, Madison, Wis.—This company reports that it has secured permission to build its line from Madison to a point on the other side of Lake Monona, known as the town hall of Blooming Grove. The company has laid all the ties around the lake and has already put in ½ mile of track. It proposes to extend its line from time to time during the summer, having secured practically all of the right-of-way. The company is in the market for rails and has purchased a large quantity of ties from the Brown Land & Lumber Company at Rhinelander, Wis., and of Howland & Waltz, Minneapolis, Minn., and Butternut, Wis. Arrangements for equipment will be made about Aug. 1. G. Pickhardt, 409 Washington Building, Madison, president. [April 17, '15.]

SHOPS AND BUILDINGS

Humboldt Transit Company, Eureka, Cal.—Announcement has been made by this company that a site for new carhouses and repair shops has been purchased at the corner of J and Harris Streets in Eureka and plans are being made to erect a building thereon.

Glendale & Montrose Railway, Glendale, Cal.—This company reports that it has postponed the erection of its new carhouses pending the decision of a hearing before the California Railroad Commission on April 28 of an application for permission to increase the capital stock of the company. Upon a favorable decision of the commission stock will be sold at the first opportunity for the purpose of erecting the carhouses.

Fort Dodge, Des Moines & Southern Railway, Boone, Ia.—Among the improvements planned by this company will be the enlargement of its passenger station in Boone.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—Plans are being made by this company to enlarge its freight yards at Utica and Mulberry Streets in Waterloo.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—Plans have been completed by this company for a new depot at Olathe to cost about $15,000. A new depot at Forty-first Street and the State line will also be built at a cost of $10,000.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—This company has completed its new freight house on St. Clair Street in Toledo at a cost of $12,000.

Southern Traction Company, Dallas, Tex—This company advises that it plans to erect one-story brick passenger stations in Abbott, Forreston and Milford, Tex. In Corsicana property has been purchased and remodeled for station purposes. The company is at present building a one-story brick structure to be used for passenger and express purposes at Italy, Tex. The building will be 26 ft. x 100 ft.

Texas Traction Company, Dallas, Tex.—This company has completed its new express station in Dallas. No definite plans have been made as yet when construction will be begun on the new passenger station at McKinney.

POWER HOUSES AND SUBSTATIONS

United Railroads of San Francisco, San Francisco, Cal.—This company reports that it has under construction a small substation which it plans to have in operation in the course of sixty days. The initial installation will consist of one 1500-kw, sixty-cycle rotary converter. All of the electrical apparatus has been received in San Francisco. The foundations for the building and the machinery are completed, and nothing remains to be done but to erect the walls and roof.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company will expend approximately $300,000 during the next three months for equipment for its power plant in Waterloo. A 4000-kw Allis-Chalmers turbine is being installed, which will more than double the capacity of the power plant. Three 500-hp Stirling boilers are also being installed, more than doubling the boiler capacity. The old boilers will be removed as rapidly as the new boilers are installed. The new boilers are equipped with automatic stokers and induced draft apparatus. In addition to the turbine and new boilers other new machinery is to be purchased.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—This company has completed its substation at Stone Mountain.

Manufactures and Supplies

ROLLING STOCK

Union Electric Company, Dubuque, Ia., expects to be in the market soon for two semi-steel single-truck cars.

East Liverpool Traction & Light Company, East Liverpool, Ohio, is reported as expecting to purchase two monitor-roof double-truck cars similar to those in operation in Pittsburgh.

New York Municipal Railway, Brooklyn, N. Y., has received recommendations from the Public Service Commission, First District of New York, to order its third lot of 100 subway cars. The contract, it is understood, will be awarded to the American Car & Foundry Company, which received the order for the first 200 cars. Deliveries will be made during the latter part of 1915 and the first part of 1916.

TRADE NOTES

Du Pont Fabrikoid Company, New York, N. Y., has removed its New York sales office from 90 West Street to Room No. 1614, Equitable Building, 120 Broadway.

Philadelphia Holding Company, Philadelphia, Pa., has received an order for radial type trucks for forty-three of the new cars recently ordered by the Binghamton Railway.

Dearborn Chemical Company, Chicago, Ill., has opened an office in Buenos Aires, Argentine, in charge of Edward C. Brown. The office will be located in the Edificio del Banco Anglo Sud-Americano.

Carbo Steel Post Company, Chicago, Ill., manufacturer of transmission poles, has started construction on a new plant in Cambridge, Ohio. The main office of the company is in the Rand-McNally Building, Chicago.

National Tube Company, Pittsburgh, Pa., advises that its exhibit at the Panama-Pacific Exposition is a part of the U. S. Steel Corporation's exhibit which is located in the Mines and Metallurgy building and occupies 44,000 sq. ft., the largest single exhibit at the exposition.

Edwin G. Hatch, whose resignation from the Clark Electric & Manufacturing Company was announced in the ELECTRIC RAILWAY JOURNAL of April 3, will open a new office on May 1 in the Equitable Building, New York, for consulting work in connection with the purchase, etc., of material for transmission lines and power houses. He will also specialize in protection systems for overhead line crossings.

Rooke Automatic Register Company, Providence, R. I., calls attention to the fact that its system of fare collection is used on the "Over Fair Railway" and in the auto trains at the Panama-Pacific Exposition, described on page 754 of the April 17 issue of this paper. These concessions are among the most popular on the grounds, and the use of the Rooke register in collecting fares on them makes one of the most practical exhibits shown at the exposition.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that its Chicago office at 39 South La Salle Street has assumed charge of the sale of Nuttall gears, pinions and trolleys, manufactured by the R. D. Nuttall Company, Pittsburgh, Pa., for the electric railway, mining and industrial fields in the Chicago territory, which includes the southwestern part and upper peninsula of Michigan, northern halves of Indiana and Illinois and all of Wisconsin, Iowa, Minnesota, North Dakota, South Dakota and Nebraska.

Bureau of Safety, Chicago, Ill., formerly a department of the Middle West Utilities Company, which some time after its organization took over the safety work of the Commonwealth Edison Company and the public Service Company of Northern Illinois, both of Chicago and of the Insull group, has recently been incorporated as a separate institution. It will be known as the "Bureau of Safety" and will act in the capacity of counselors in safety work. Charles B. Scott, formerly in charge of this bureau for the Middle West Utilities Company, has been made secretary, treasurer and general manager of the new organization. George Otis Spencer is president and Bernard Flexner is vice-president.

L. S. Brach Supply Company, New York, N. Y., is moving its factory to larger quarters at 129 Sussex Avenue, Newark, N. J. An extensive laboratory for the testing of the company's apparatus has been included in the new factory, besides ground space for the erecting of signals for testing before shipments. Among some of the products that will be manufactured in the Newark plant are: Brach automatic flagman, arresters, hydro-grounds, recorders, switch devices and concrete products. The Solderall Company, a subsidiary of the L. S. Brach Supply Company, will also have its products manufactured in this plant. The company will continue to maintain branch offices at 143 Liberty Street, New York, and Peoples Gas Building, Chicago.

ADVERTISING LITERATURE

Bridgeport Brass Company, Bridgeport, Conn., has issued a sheet on its "phono-electric" wire.

Statistics Bureau, New York, N. Y., has issued a catalog on its materials for the graphic presentation of facts, including maps and pins, co-ordinate paper, curve cards, slide rules, pocket counting machines for transit studies and other articles.

Western Electric Company, New York, N. Y., has issued an advertising sheet describing and illustrating the process used in manufacturing its iron and copper wire. Other sheets recently issued by the company describes its phantom telephone circuit apparatus, its lineman's "Buffalo" grip and its lead covered cable.

General Electric Company, Schenectady, N. Y., has issued Bulletins Nos. 48904 and 48905, which are devoted to the subject of electric arc welding and arc welding apparatus for foundries and large repair shops. Bulletin No. 48905 illustrates and describes both stationary and portable apparatus for electric arc welding. Bulletin No. 48904 takes up the general subject of electric arc welding and describes the three processes by means of which welding may be done. It also refers to the welding equipments, materials, notes the advantages to be derived from this process, and mentions special applications of electric welding.

Simmen Automatic Railway Signal Company, Buffalo, N. Y., has recently issued a booklet entitled "An Analysis of Railroad Accidents" which presents statistics covering the causes of notable collisions and derailments that occurred between July 31, 1901, and March 31, 1914, the compilation being made from Interstate Commerce Commission quarterly accident bulletins. The various causes of accidents are subdivided into two general classes, one covering the wrecks that would have been prevented by a complete signal system, or about 73 per cent of the total. The other class includes only accidents which are not preventable by any signal system. Accidents of the first class are separated into fourteen subdivisions according to the causes, and each one of these subdivisions is briefly discussed, the possibility for eliminating it by the Simmen System of automatic signals being explained in addition. A particularly interesting feature of the booklet is a table arranged in four-year periods which is included in the last two pages. The presentation of the statistics in this manner provides an opportunity for a rather searching study of railroad accidents in general. One very obvious point is that the increase in protected mileage during the period covered by the table has been accompanied by a practically corresponding increase in accidents due to disregard of fixed signals in stop position. Other influences which are less obvious, but of which the effect would probably be reflected in the table, are safety legislation, legal limitation of hours of service, the safety-first movement, and the increases in speed and trainloads which are features of modern railroading.

NEW PUBLICATIONS

Public Utility Economics. A series of ten lectures delivered before the West Side Young Men's Christian Association, New York. 213 pages, illustrated, published by the Forum.

Under this heading have been collected the lectures delivered before the Finance Forum of the West Side Y. M. C. A. in New York during the winter of 1913-1914. Abstracts of these lectures were published in the ELECTRIC RAILWAY JOURNAL at that time. The forum was fortunate in securing addresses from men of such important affairs as were represented in this group, and the collection and preservation of these lectures in bound form is an excellent plan. The chairman of the advisory committee of the Finance Forum is O. B. Willcox, of W. P. Bonbright & Company, New York.

The Adjuster's Manual. By C. H. Harbaugh. The Spectator Company, New York. 408 pages. Leather, $2.50.

This book, which is the second edition of a work first published in 1905, is written with the idea of assisting insurance companies, railways, adjusters and agents in the adjustment of claims resulting from accidents or sickness. The new edition, which is thoroughly revised, contains more than 100 pages of additional information. Among the new features may be mentioned twelve illustrations of the skeleton, muscles and organs of the body, a glossary of medical terms used in accidents and health insurance, 1700 words and explanations, new tables of information and new articles on special diseases. On account of the elimination of technical terms in the discussion of the medical subjects, the book is readily comprehensible.

Money and Banking. By John Thom Holdsworth. D. Appleton & Company, New York. 1914. 435 pages. Cloth, $2, net.

The recent institution of the federal reserve system and the discussions precedent thereto undoubtedly brought home to the mind of the average man how little he knew about the real operations of the national banking system, although this is a subject whose fundamentals should be thoroughly understood by all. For this reason the present book by Mr. Holdsworth, covering the history, principles and practices of money, credit and banking in this country, should be welcomed by all business men. It contains the text and an explanation of the new federal reserve system, and it gives the reader a most lucid and up-to-date account of present practices in money and banking. While intended primarily as a text book, the work is well adapted to the general reader.

Elementary Electricity and Magnetism. By W. S. Franklin and Barry MacNutt. The MacMillan Company, New York, N. Y. 1914. 174 pages. Cloth, $1.25 net.

Advanced Electricity and Magnetism. By the same authors. The MacMillan Company, New York, N. Y. 1915. Cloth, $2 net.

The elementary book while intended, like the other, as a text-book for colleges and technical schools, is written in the simple style which characterizes the writing of these authors. There are numerous illustrations drawn from science and practice.

The advanced text covers the physical theory of the subject and requires a fair knowledge of elementary physics and of mathematics. As the title indicates the treatment goes beyond the realm of experimentation and into theory, but numerous interesting and well selected problems serve to preserve the tangibility of these subjects.

Constant Voltage Transmission. By H. B. Dwight. John Wiley & Son, Inc., New York, N. Y. 1915. 115 pages. Cloth, $1.25 net.

The purpose of this book is to advocate the use of synchronous motors in eliminating variations in voltage in electric power systems. To this end the author shows how the line power factor can be controlled by means of synchronous motors, thus giving control of the voltage, and he summarizes the practical and theoretical aspects of the systems employing overexcited synchronous motors for the purpose. He summarizes the advantages of constant voltage transmission thus: Steady voltage, steadier frequency in small water-power plants, lower total cost where the voltage is less than about 1000 per mile, overloads are better handled, large conductors reduce cost of towers and land, wide spacings and large conductors extend corona limit, increase in economical distance of transmission, better protection due to high reactance, tendency to use sixty cycles, and the method can be gradually adopted. The attendant disadvantages are: Tendency of synchronous machines to drop out of step, possible large accidental variations in voltage, increase in short-circuit current unless reactance is increased, decrease in reserve due to fewer lines, higher total cost for short, high-voltage lines, and lower efficiency.

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WAGES IN WAR TIME

Reports from Europe indicate that the present warfare has already resulted in increased wages for electric railway employees. In Berlin the increase in price of foodstuffs and other necessaries of life has led the Grosse Berliner Strassenbahn to raise wages, at least until peace is secured, while a committee of the London County Council recently recommended a grant of 3*s*. a week for those of its tramway employees who are receiving less than 30*s*. in order to meet "special and temporary conditions." The most interesting point in this connection is the effect of the increases upon rates of fare. The London County Council committee has decided that the higher cost of operation might be met by a general fare increase but that such a policy would involve serious objections, not the least of which would be the imposition of an additional increase in the cost of living on a considerable portion of the community. There is no doubt that present conditions in Europe necessitate a sympathetic financial adjustment between companies or municipalities, employees and passengers. In peace times the efforts of employees to obtain increased wages are made with little or no regard to the ultimate effect upon the riding public. A feeling of confidence is expressed now, however, that employees will be too patriotic to ask for much higher wages. We hope that this confidence will not be misplaced.

INERTIA EFFECT OF MOVING TRAINS

In commenting upon the recent discussion in our communications columns on the inertia effect of moving trains, one of our correspondents expresses the opinion that the subject is purely "academic." He says that on a section of line within which five or six trains are operating, the drop in voltage caused by the starting of another train would be so small and brief that the effect on the trains already in motion would hardly be noticed. We are not in accord with the implied suggestion that "academic" discussions are always without scientific interest, but it is probably true that the actual effect of inertia in smoothing out the load on the power station is small under all existing conditions. As the number of trains on a line is increased, the effect is to reduce the fluctuations in the power station load line, due to the fact that the peaks of the added load are not apt to coincide with those of the previous load, and this smoothing out effect will of course be greater than any so-called inertia effect. However, in the New Haven Railroad experience, which was described by W. S. Murray and was the basis of the discussion referred to, obviously both of these effects were combined. Without any more data than are at present available it would be difficult to say just how much of the result is contributed by each cause. We do not understand that Mr. Murray intended to convey the impression that the inertia influence was the dominating one in improving the load factor.

THE NATIONAL ELECTRICAL SAFETY CODE

During the present week the revised safety rules which have been prepared by the national bureau of standards in consultation with all involved interests have been sent out in revised form preliminary to publication. This leaves only a little more than eight weeks for the study of the rules and the filing of suggestions and criticism. As the operation of this code will vitally affect the electric railway industry, the ELECTRIC RAILWAY JOURNAL will print such constructive suggestions as are received from railway men so that all may realize the full significance of the rules. The rules as they now stand, with introduction and other explanatory matter, would occupy about sixty pages like those in the body of this paper. If printed in the form of the "National Electrical Code" of the National Board of Fire Underwriters, a booklet 3⅜ x 5⅜ in. in size, they would occupy a few more than the 200 pages of that code. It is obvious, therefore, that some study will be required to comprehend the proposed code. The main question to be kept in mind in this study is: Are the rules fair to small as well as large roads, and are they practicable as well as theoretically desirable? We know that the bureau is endeavoring to put the rules in such form as will enable an affirmative answer to be given, and during the past few weeks the results of many conferences have been incorporated. In another column Mr. Tingley presents an interesting communication on the subject. Let us have other points of view also.

SHARING FACTS WITH EMPLOYEES

The Chicago Surface Lines have adopted an excellent plan for acquainting their employees with the principal facts in regard to that system. This plan consists in the distribution among the heads of all the departments and sub-departments of the detailed report on the property recently submitted by President Busby to the board of operation of the company. This report, which is mentioned elsewhere in this issue, is a condensed statement of the operating and financial policies of the company with an account of the operating organization, a list of the officers and heads of the different departments and other data. This method of taking employees into the confidence of the executive officers cannot but be beneficial to both employee and company. With a good understanding of the facts mentioned, and of the interrelation of all the parts of the company and of its function as one unit, each worker in the organization will undoubtedly be better fitted to perform his duties. He will not only have a realization of his relative responsibility in bringing about general betterments but he will have a firmly established basis for a legitimate pride in his occupation as a whole and of his part in it in particular. When we remember that it has not been many years since the distribution of stock to employees was condemned on the ground of permitting improper access to financial information, it becomes more apparent that this voluntary disbursement of information in Chicago is a marked advance in corporation management.

THE ZONE SYSTEM OF FARES

Electric railway managers from abroad who have visited this country in the past to study city railway operation have often commented upon the fortunate circumstance that our lowest nickel coin, 5 cents, just about covered the cost, including profit, of a street railway ride, while the next lower coin, 1 cent, was entirely too small to be considered for that purpose. To this fact they have attributed, to a very large extent, the general use of the single fare for city rides in this country. In the opinion of many of them, had the same conditions prevailed in Great Britain, France and Germany, the uniform fare system might have been in more general use in those countries. But as far as this country is concerned, this condition is now gradually passing. The reduced purchasing power of the nickel and the increasing area of all of our cities are two reasons, not to mention others, which have made 5 cents inadequate as an average fare in many of our large cities. Of these two conditions, certainly the latter is bound to continue, and the average ride to grow in length, so that the question to be solved is to provide some basis of fares which will not only be adequate at present but can satisfactorily be adapted to future conditions.

An examination of the problem shows that there are two possible variables—the fare and the distance—so that to provide for future contingencies the system used should be such that either one or other of these two factors can be changed as may be necessary. Both of these plans, roughly speaking, are now in practical operation in this country. One of them is practically that in use in Cleveland, the other that in Milwaukee. To one or the other of these two methods, that is to say, to vary the unit fare or vary the distance traveled for a standard unit fare, we believe that every urban railway system will have to come, certainly if the tendency toward longer average rides and increased cost in passenger transportation continues.

The advantages of the Milwaukee plan of operation are set forth at length in a paper presented by R. B. Stearns of Milwaukee, at the meeting last week of the New England Street Railway Club. This paper was, in essence, an extension of the paper presented by the same author at the last meeting of the American Electric Railway Association, in which the system employed in Milwaukee was described and some of the results were given. In the paper of last week, published in abstract on another page, Mr. Stearns elaborated the idea of the flexibility of the system and its adaptation to a growing city and variable costs of transportation. In principle the system does not differ from the zone system, as used in Europe, except that the central area is much larger than that generally found in European cities, and the unit or minimum fare is 5 cents. Future flexibility can be obtained by the expansion or contraction of the central or other zone areas, according to the cost of supplying the transportation. Indeed, if conditions should seem to justify such a step, the central zone could be made much smaller and the charge for transportation therein could be made less than 5 cents to meet jitney or other short-haul competition, such a charge corresponding to the "demand charge" for electric lighting or power service.

A number of advantages are claimed by Mr. Stearns for the plan besides its flexibility. One of the most important of these, so far as the community is concerned, is that it is a rational basis for fares, and consequently removes the objection which most electric railways have under the present plan to extensions within the city limits. So long as such an extension means to a company that it must carry passengers a greater distance for no additional fare, there is little incentive to build such an extension. In fact, in most cases, there is every incentive not to do so. But with each part of the system bearing its own proportion of cost and yielding its own proportion of profits, as nearly as can be, transportation facilities can be extended as the need for them develops.

Altogether the zone system has a great many features to recommend it, and the only seeming drawback in the past, the difficulties of collection, seem to have been eliminated in Milwaukee. We believe the Milwaukee experiment is one of the most important steps in the direction of a rational rate of fare which has ever been undertaken in this country. It supplies a basis upon which other companies can work to reform the system of fares in their own cities. If the plan has worked satisfactorily in Milwaukee, it cannot present insuperable difficulties so far as operation is concerned, and there remains only the question of satisfying the public and the authorities of its desirability. Indeed, it is interesting to note that the plan has already been recommended for Boston in the report of William B. Bennett on Boston transportation conditions forming part of the special report on that subject just made by the Massachusetts Commission to the Legislature. We believe that the public has awakened to the necessity of higher electric railway fares and that the only reason which has prevented their more general introduction has been that the railway companies have been unable up to this time to propose any substitute which they considered satisfactory and workable. This is now provided through the plan now in force in Milwaukee.

MOTOR VENTILATION

The history of the electric railway motor since the beginning has been marked by a design struggle forced by two conflicting requirements, namely, that motors must be kept cool and at the same time internally dry and clean. The first motors of Sprague, Thomson and Houston, Westinghouse and others were well ventilated because uninclosed, but they failed on the side of moisture and dirt-proofness. The inclosing of the active parts in cases almost water-tight forced the development of internal air-circulating devices, which complicated the design from the motor standpoint. Parts of the armature had to do double duty, acting as both torque producers and fans, and the whole magnetic circuit had to be broken up to provide flues for air circulation. In the endeavor to bring about intimate contact between active metal and air, even the pole pieces were provided with air ducts in some cases.

With a motor entirely inclosed the possible rate of dissipation of heat depends partly upon the allowable temperature of insulation, for this determines the temperature "head" which drives the heat through the case. The hot air, churning around inside, has the function of keeping all parts as nearly as may be at the same temperature, carrying heat from the copper and iron where it is generated to the steel case which conducts and radiates it. With a given radiating surface area and outside air temperature there is therefore a limit to the rate at which heat can be dissipated through conduction. The advantages of introducing outside air to add heat convection to conduction are so obvious that designers have been at work trying to accomplish this, without subjecting commutator and windings to the effects of grit and moisture, ever since motors were first inclosed. In the early nineties this paper editorially directed attention to the possibilities of ventilation for increasing motor capacity. As early as 1902 C. O. Mailloux, among others, devised plans for piping compressed air into the motor case and distributing it effectively. At about the same time a New Jersey road tried the experiment of ventilating the motors with air piped from a ventilator placed on the front of the car. The results were remarkably satisfactory from the ventilation standpoint. While these piping schemes did not come into general use due to structural difficulties, the principle of admitting outside air into the motors has been tried with varying degrees of success until at present the ventilated motor is in keen competition with the inclosed type, although there seems to be a possibility of equitable division of the field between them.

In comparing ventilated with fully-inclosed motors it must be remembered that both are rated on the basis of a stand test of one hour's duration, during which the continuous-load temperature is not attained, and under conditions of ventilation inferior to those of service. Their heat-absorbing ability is thus more important than their radiating capacity from the rating standpoint. It is possible therefore for two motors to have the same one-hour rating and yet be quite different in continuous capacity. The service conditions, therefore, must determine which is better for a particular case, even from the heating standpoint.

The agitation in favor of ventilated motors is due, of course, to the demand for weight reduction. This is urgent, and the prospects held out by forced ventilation are so tempting that it is not surprising that inventors are active. The ventilated motor with internal fan is inherently adapted to long, high-speed runs where the fan gets in its best work, so that we may look forward to the occupation of that field first. The whole subject, however, is in a state of flux, and predictions would be unsafe and unwise at this time. In the present state of the art, thus depicted, we feel sure that our readers will especially appreciate the article by R. E. Hellmund printed in this issue of the ELECTRIC RAILWAY JOURNAL, in which the subject is analyzed carefully.

DOUBLE LIABILITY FOR STOCKHOLDERS

We thoroughly disapprove of the recommendation made by the committee investigating the public service commissions of New York State that an increased liability should be placed upon public utility stockholders similar to that imposed upon stockholders of state and national banks. So dissimilar are these two forms of business enterprises that it is impossible to see by what stretch of imagination the investigators applied to public utilities the reasons that led to the adoption of the double liability plan by governmentally-controlled banking institutions. The smallness of bank capital stock as compared to the total deposits and other liabilities, the immediate liability of a bank to those whose money it uses, the lack of physical property, the absence of restriction of bank profits and of the necessity for continual new financing—all these combine to make double liability on the part of the stockholders a proper check against mismanagement.

With public utilities, however, the case is different. Capital stock is a large part of the capitalization, and the bonds and other evidences of debt find adequate security not in the liability of stockholders but in the physical property of the utilities. Furthermore, public service commissions now have power to regulate and restrict the return to stockholders. Lastly, public utilities are constantly in need of new capital. Any limitation placed upon stockholders, therefore, is certain to prove detrimental to the industry. With a constant appeal to the public, increased liability in securities must always be accompanied by an increased rate of return. Under commission regulation the rate of return is limited; hence the imposition of double liability would only be reflected in a narrowing popularity for utility shares and a decrease in money acquired for improvements or new enterprises. With profits restricted as at present, the single liability is a quite sufficient penalty for mismanagement. The suggested plan has nothing to commend it—one can only sigh at the vagaries of legislators and wonder what their next move will be.

The Vienna-Pressburg Single-Phase Railway

On the City Sections at Each End, the Cars Are Hauled by 600-Volt D. C. Locomotives; and on the 31.3-Mile Intermediate High-Speed Division by 15,000-Volt A. C. Locomotives

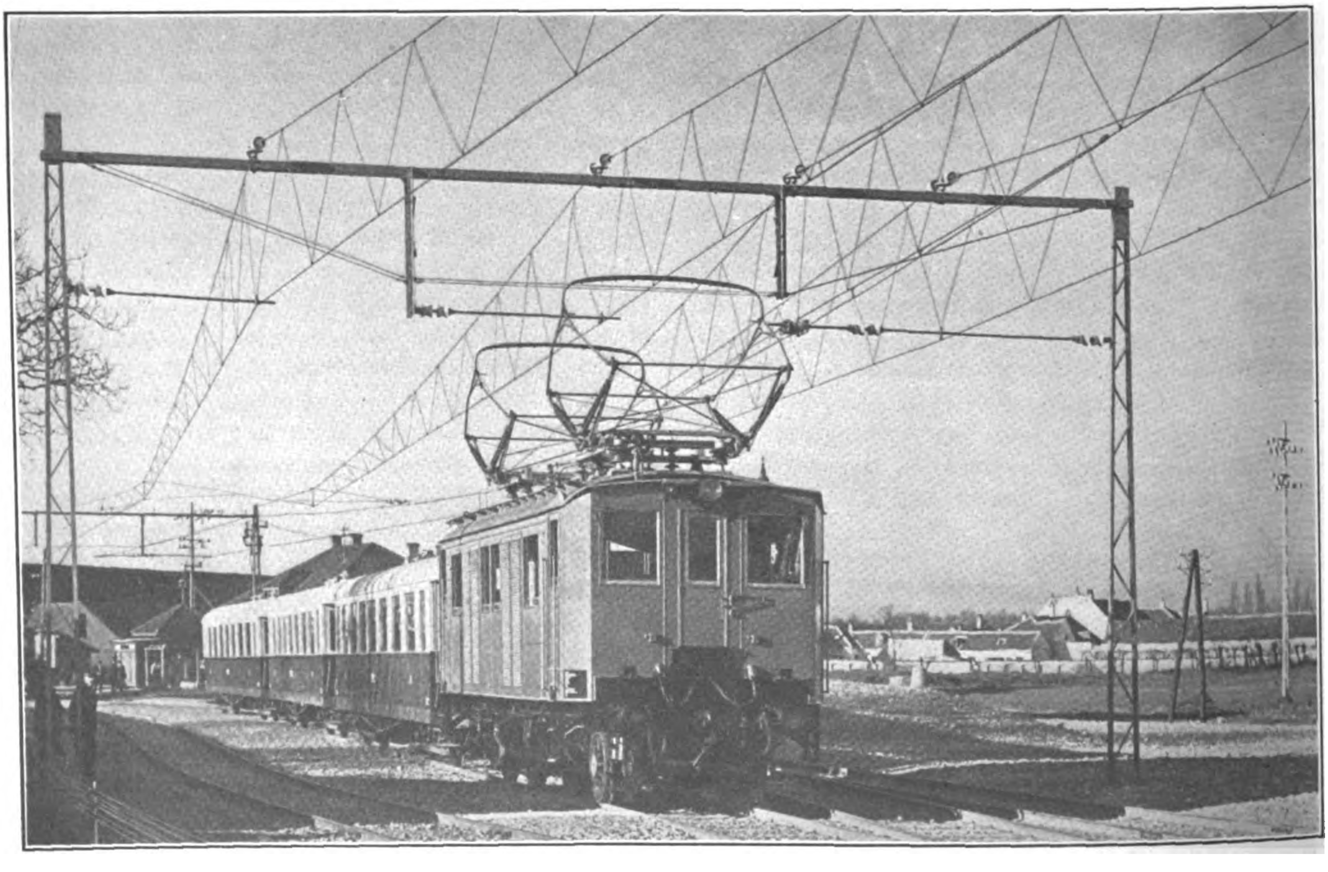
The reliability of a single-phase interurban railway under the extreme traffic conditions imposed by the war is presented in two articles by E. E. Seefehlner, published in three recent issues of *Kraftbetriebe und Bahnen*. During operation for the first six months preceding the war, which began late in July, 1914, it had already been found necessary to increase the rolling stock by 70 per cent. The war caused a change to two-car instead of four-car trains with triple the usual passenger load (186 instead of sixty). Although extra heavy freight traffic also had to be handled at the same time, no trains were appreciably delayed. This abnormal traffic was a big relief for the neighboring steam trunk lines which, of course, were severely taxed by the demands for military transport.

ROUTE

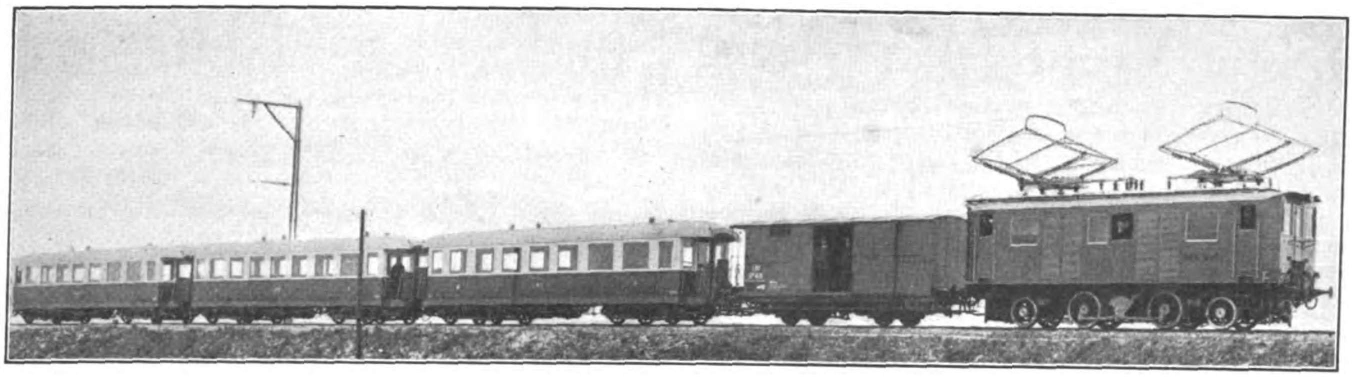
The line is operated between Vienna (Austria) and Pressburg (Hungary), which are about 70 km (43.4 miles) apart. Although earlier railway connections existed between the two cities there was no good through line. The Vienna division of the new route is along the Danube Canal, and while this portion is operated as a street railway the amount of purely city traffic is not enough to prevent good speed. The line crosses the tracks of the Vienna Municipal Tramways at four places, and at two others it is carried below the regular street level to avoid intersections.

Outside Vienna the trains are operated along the public highway to Gross-Schwechat for a distance of 7.75 miles at speeds of 11.2 to 18.6 m.p.h. The locations of the sidings on this section permit a headway of seven and one-half minutes over the well-populated portion. From Gross-Schwechat to Köpcsény, Hungary, a distance of 31.3 miles, the line becomes a trunk railway for operation at speeds of 37.2 to 43.4 m.p.h. This section has six stations and eleven sidings, the latter usually with three tracks or more. On the first 5.3 miles of this section, namely to Reichsstrasse, the same tracks are still used by a local steam railroad, which operates five to six trains a day. Joint operation with steam also exists between Petronell and Hainburg, a distance of 5 miles. After leaving Köpcsény, the line enters the precincts of Pressburg, where it again becomes a street railway.

Both the Vienna and Pressburg sections are operated at 500 to 600 volts direct current, whereas, the right-of-way high-speed section is operated with single phase at 15,000 volts or more. At first a through motor-car service was proposed, but this was found impracticable because the bridge over the Danube at Pressburg is unsafe for axle weights in excess of 6.5 metric tons. The importance of this point may be gaged from the fact that the trailers actually in use seat sixty passengers, are 47.6 ft. long, weigh 16.5 metric tons empty and 22 tons when loaded with 100 passengers. Consequently, only 4 tons would be available for electrical equipment. Motor car operation would also require greater energy consumption. Alternating current at high voltage was chosen for the high-speed line because it was found uneconomical to build a power station midway between the terminals, while it was more or less obligatory to purchase energy from the Vienna Municipal Works station. This plant, although unfavorably located at one



VIENNA-PRESSBURG RAILWAY—OVERHEAD BRIDGE CONSTRUCTION AT FISCHAMEND STATION



VIENNA-PRESSBURG RAILWAY—SINGLE-PHASE LOCOMOTIVE, FREIGHT CAR AND INTERURBAN TRAILERS

end of the line, offered the same low price for either d.c. or a.c. high-tension supply.

Under the system of locomotive operation adopted, it is necessary to change locomotives at Schwechat and Köpcsény. This change involves a loss of time of only two minutes.

CHOICE OF SYSTEM

If direct current had been adopted for the interurban division a prohibitive amount of feeder copper would have been required to meet the abnormally heavy holiday travel characteristic of the pleasure-loving Viennese. On the other hand, the use of 15,000 to 16,500 volt single-phase trolley potential permitted a light and economical overhead line even at 10 per cent line loss.

In the change from a.c. to d.c. two methods are employed: At Köpcsény, where there are but two tracks, a third-rail is used; at Gross-Schwechat, where yard conditions made a third-rail impracticable, storage-battery and overhead lines are used. Because of grades, the d.c. locomotives would require 6 tons of ballast in any event. This weight is supplied in the form of a storage battery, whereby the d.c. locomotive is enabled to haul trains to or from the a.c. track, a gap having been deliberately left between the a.c. and d.c. overhead lines. As the a.c. wire is 23 ft. and the d.c. line 19.7 ft. above the rails, it is impossible for a d.c. locomotive to collect alternating current.

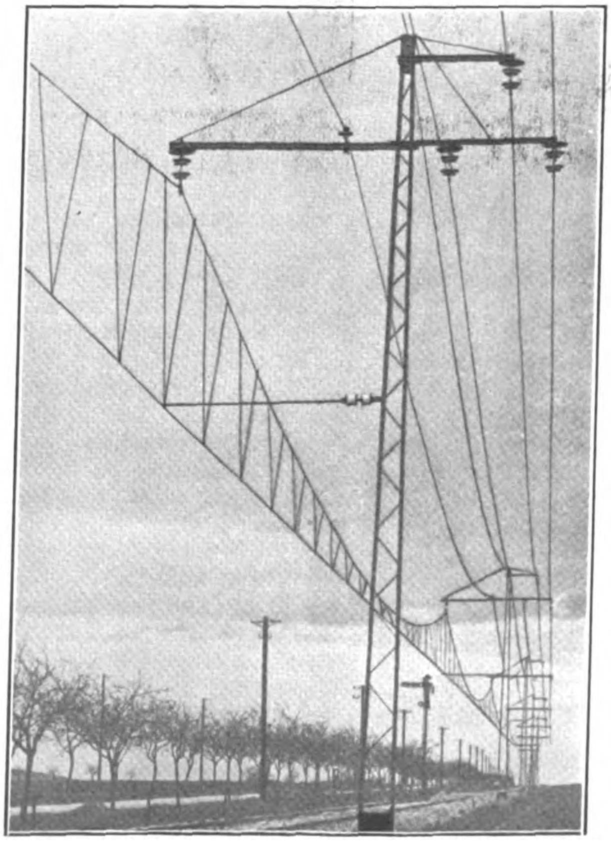
As noted, the holiday peaks are so high that economical motor-car operation was impossible. Therefore trailer operation with two to five-car trains was selected. Further, the use of two distinct classes of locomotives was decided upon in preference to a hybrid a.c.-d.c. equipment. In this respect the engineers followed a fundamental feature of steam railroad work, namely, to supply each division with the equipment most suitable for the conditions of that division.

One d.c. end and the high-speed a.c. section are fed from the Vienna Municipal Works located 3.6 miles from the Vienna terminal; the other d.c. end is fed from the Pressburg Tramways.

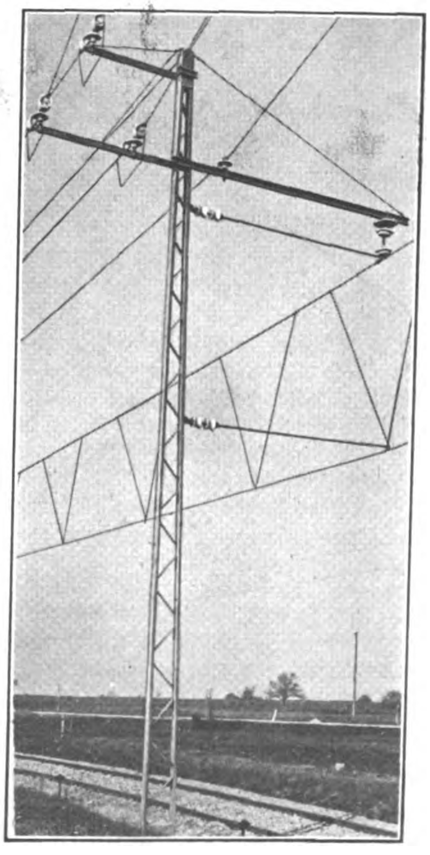
The 600-volt d.c. overhead line in Vienna, 3.6 miles long, includes two figure 8 wires of 80 sq. mm. (about No. 000) cross-section. The 15,000 to 16,500-volt section also has contact wires of the same cross-section. Direct a.c. rail return to the power house is avoided in order to minimize disturbances to near-by weak-current circuits. The grounding wire, which is of 100 sq. mm. (about No. 0000) section, is carried on insulators over the poles and therefore serves also for lightning protection.

The a.c. contact wire alone would assure economical distribution, but a feeder of 50 sq. mm. (about No. 0) section is carried in parallel therewith so that any portion of a contact wire can be cut out without killing the rest of the a.c. division.

The catenary system is that of the A. E. G. Union Company, in which weights for tension takeup are attached to both the catenary and contact wires. Correct alignment is maintained despite the difference in temperature coefficients due to the use of steel for the



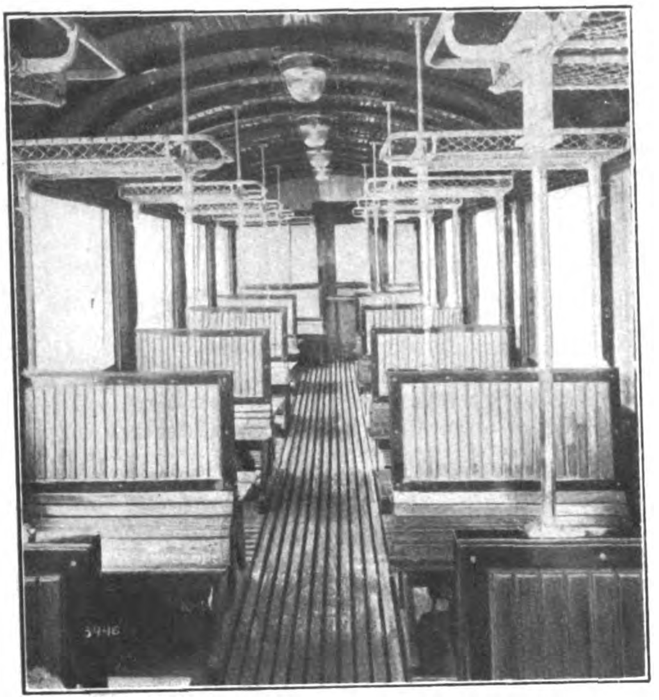
VIENNA-PRESSBURG RAILWAY—CONSTRUCTION ON TANGENTS



VIENNA-PRESSBURG RAILWAY—CURVE CONSTRUCTION catenary and hard-drawn copper for the contact wire. The mutual give-and-take of these two wires, as hereinafter described, would be impossible with the usual vertical hangers. Therefore, diagonal hangers are used. These hangers form the sides of an inverted triangle, whose base is formed by 9.84 ft. of the catenary and whose apex is formed by the junction of the diagonals with the contact wire. The apices are about 16.4 ft. apart. The hangers are rigidly clamped to the catenary, but flexibly connected to the roller from which the contact wire is suspended.

In the event of a change in temperature the roller carrying the contact wire is free to move in an ellipse whose foci are at the junctions of the diagonals and the catenary. Owing to the large distance (9.84 ft.) between the junction points or foci, the arc in which the roller moves is so small that the height of the trolley wire is changed but inappreciably.

The tension takeup weights are located at intervals of approximately 13,280 ft. Within the range of 60 deg. Cent. (—20 to +40) the catenary is elongated only 26.4 in. and the contact wire 40.8 in., a difference of 14.4 in. This extreme condition will cause the contact wire to rise only 1.6 in. at the roller points and but half that distance midway between the rollers. For all practical purposes, therefore, the contact wire is always in the same horizontal plane. The automatic tension takeup weights were calculated on the assumption that the weights of the catenary and contact wires would remain constant. In operation, however, it was found that snow and ice added as much as 2 lb. per yard to both catenary and trolley. In view of this experience the weights have since been anchored to avoid trouble.



VIENNA-PRESSBURG RAILWAY—INTERIOR OF A THIRD-CLASS COMPARTMENT

The catenary is made up of seven-strand sherardized steel cable 8.5 mm. (about No. 0) in diameter and weighing about 0.6 lb. per yard. This catenary is carried over rollers at intervals of 574 ft. on tangents and of 328 ft. or less on curves. The insulators are of the chain suspension type used on the Mittenwald Railway, as described in the ELECTRIC RAILWAY JOURNAL for July 5, 1913.

The catenary is usually carried over a roller hung from two such insulators and in such a way that the suspended structure is free to move in any direction. The insulators have a sherardized shield to throw off rain drip from the brackets or bridges. The transmission and feeder wires are also carried from suspension insulators. However, under certain conditions, as in bridge construction, the insulators are not of the suspension type but are inserted directly in the struts.

WEAK-CURRENT CIRCUITS

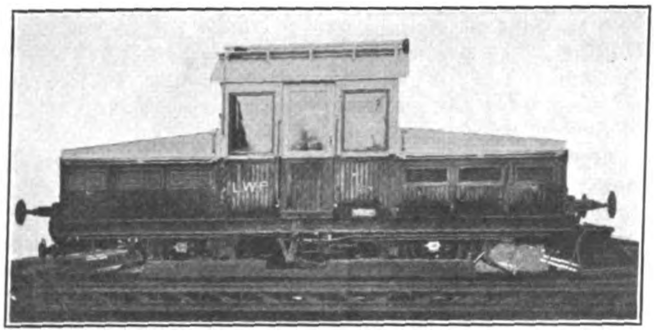
While the high-tension circuits are carried on steel structures exclusively, a separate line of wooden poles is installed alongside the right-of-way to carry two iron telegraph wires and four bronze telephone wires. Some trouble with the telephone was experienced at first because the original insulation of the apparatus was not capable of withstanding tensions as high as 2000 volts static. For a 31-mile high-tension railway the present satisfactory operation is considered all the more remarkable, as some parts of the telephone lines are but 6 ft. from the high-tension wires. This result was not obtained by the use of grounding coils, condensers or similar devices, but rather by the careful transposition of the wires of each circuit and the use of high-grade insulation.

VIENNA-PRESSBURG RAILWAY—INTERIOR OF A CITY MOTOR CAR

No complaints have been made about disturbances to the government telephone and telegraph lines in this vicinity. This condition is credited to the efficiency of the rail return. As protection against lightning a copper wire is carried up every pole; further, all poles and towers are in electrical connection with the rails, and the latter in turn are earthed at different points down to ground water. Only the joints in one rail are fitted with compressed terminal bonds; the other rail, however, is tied in with cross-bonds every 3280 ft. to 6560 ft.

ROLLING STOCK

The d.c. local service at Pressburg is handled with ten single-truck motor cars, each equipped with two 65-hp motors and carrying twenty-eight passengers. The interior fittings of both the city and interurban cars were designed in consultation with an architect. The a.c. trailers include twenty-four double-truck arch-roof



VIENNA-PRESSBURG RAILWAY—LOCOMOTIVE FOR TROLLEY (COLLECTOR NOT SHOWN) AND BATTERY OPERATION

cars. They are 41.6 ft. long, and the nine which have no baggage compartment or toilet can seat forty-three third-class and eighteen second-class passengers, chiefly in back-to-back cross seats.

The through trains between Vienna and Gross-Schwechat are hauled by six d.c. single-truck locomotives of 11.8-ft. wheelbase. These locomotives weigh 24 metric tons each, carry 200 hp in motors, exert a tractive effort of 7260 lb. and haul trailing loads up to 75 tons. In addition to two trolley poles they have a battery with a capacity of 89 amp-hr. at 280 volts. This capacity is ample for a full day's switching service.

Because of operation on both a.c. and d.c. divisions, each prismatic lighting dome carries one lamp for 100-volt d.c. service (operated six in series) and one 20-volt lamp for a.c. or battery service. The switching is so arranged that it is impossible to connect into circuit any but the correct lamps. A storage battery on each car supplies the 20-volt lamps during the short periods of locomotive interchange. The heaters are operated on 600 volts d.c. or 300 volts a.c.

The freight service is handled with three 800-hp (hour rating) 1-C-1 locomotives of Mittenwald type. The passenger service is cared for by seven 750-hp (continuous rating) 1-B-1 locomotives. Direct drive with parallel rods and jackshaft was selected for these machines as the saving in weight through the use of gearing would not have been appreciable for operation at 31 to 43.4 m.p.h. With a weight of 28 metric tons on the drivers, the 1-B-1 locomotive develops a maximum tractive effort of 15,400 lb. at the periphery of the wheels when taking 30 amp at 15,000 volts. The locomotive exerts for each kilovolt-ampere a turning moment torque of 8 mkg (57.8 lb.-ft.)

The mechanical data of the multiple-unit passenger locomotives follow:

Diameter of driving wheels	40.3 in.
Diameter of pony wheels	34 in.
Length over buffers	34.4 ft.
Fixed wheelbase	13.1 ft.
Total wheelbase	19.4 ft.
Pressure per driving axle	14 tons
Weight on drivers	28 tons
Service weight	53.3 tons
Weight of electrical equipment	26.2 tons

The brakes are of the vacuum type, but a compressor is provided for current collectors, sanders and whistles.

The transformer is of the oil-cooled type with a twelve-tap arrangement on the secondary to give 126 to 515 volts. The brush voltage is divided between stator and rotor by means of four taps. During standstill the rotor is short-circuited, full voltage being applied to the stator. Energy is transformed by induction, as in a repulsion motor, until a speed of 11 m.p.h. has been attained, whereupon the short-circuit connection is eliminated and the stator receives only 57 per cent of the total mileage. As the speed continues to increase the stator's proportion of the voltage is reduced to 17.5 per cent, so that only a small portion of the input is now converted to mechanical form inductively. In short, the armature converts the greater part of the input to mechanical energy just as a series d.c. motor does. It is asserted that this motor has answered all commutating demands and, in addition, enjoys the variable speed characteristic not obtainable with the d.c. series motor. Master controllers, taking 300 volts maximum, and contactors with electropneumatic reverser are used.

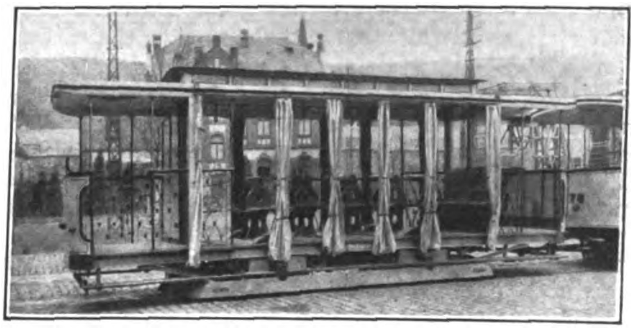
The motor has twenty-four poles with three brushes per holder. Its hour rating is 750 hp at 200 r.p.m. or 24 m.p.h., and its continuous rating 750 hp at 300 r.p.m. or 36.3 m.p.h. At 200 r.p.m. the continuous rating is 530 hp; and finally, at 160 r.p.m. the hour rating is 600 hp. This remarkable range is obtained with an efficiency varying from 84 to 90 per cent and with the great advantage of making up unusual time losses in locomotive interchange. The torque of this motor on an hour basis is 2860 mkg (20,638 lb.-ft.). Exclusive of breakages, which are gradually diminishing, the life of a brush is estimated at 66,960 miles for a wear of 1.2 in. This is based on experiences with maximum loads and runs as high as 6200 miles per month.

All electrical equipment was supplied by the A.E.G.-Union Company, Vienna. The line is operated by the Niederösterreichischen Landesbahnen, Prof. Joseph Sturm, director.

Special Ambulance Cars at Trier, Germany

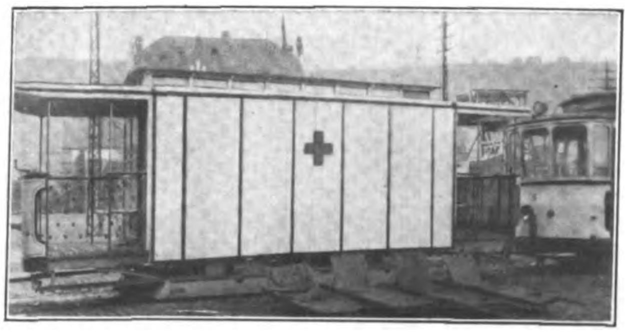
Open-Bench Trailers Converted Into Hospital Cars for War Service

In the Jan. 2 issue of the ELECTRIC RAILWAY JOURNAL a description was presented of some German hospital cars used for wounded soldiers. While these cars were altered but slightly for the war service, the type shown in the accompanying illustration has been quite radically reconstructed. These cars are used on the Trier Tramways, according to data furnished by Eugen Eichel, editor *Elektrische Kraftbetriebe und Bahnen.*

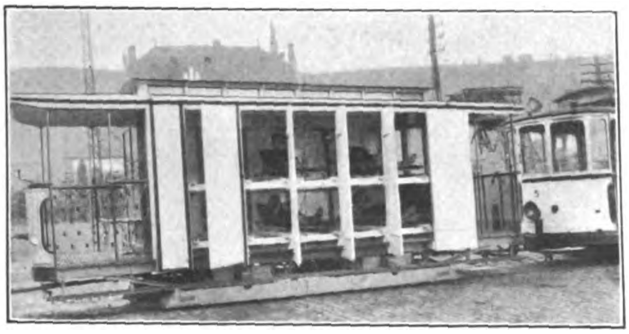


TRIER AMBULANCE CARS—CAR BEFORE CONVERSION

In their original form the cars were open-bench trailers. Following the removal of the benches, the



TRIER AMBULANCE CAR—VIEW OF CAR CLOSED



TRIER AMBULANCE CARS—VIEW OF CAR WHEN OPEN

weather curtains were taken off. The curtain posts were then faced with nailing strips to permit the attachment of five wooden swing doors with a fixed panel at each end, as illustrated. The outer sides of the doors and panels are painted white except for a large red cross on the middle door. The interior is divided into two levels by means of longitudinal beams, across which the channels are placed at the right gage to support the "feet" of the stretchers. The lower pair of longitudinal beams is supported by springs. By this arrangement two levels of five stretchers each are secured. The upper level has clearance enough to permit the patient to sit up.

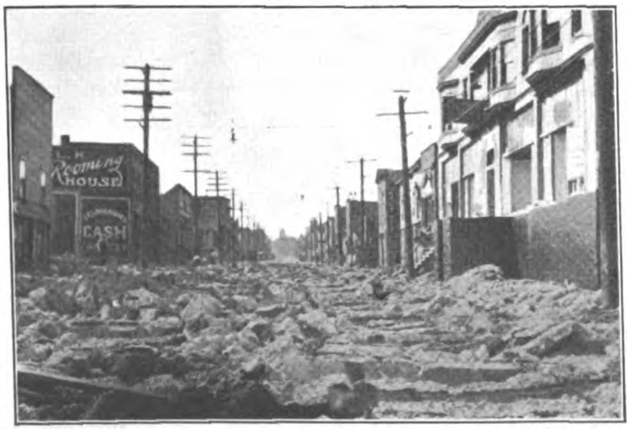
As the bulkhead windows and monitor roof were not altered, the interior of the car is well lighted and ventilated despite the solid side doors. The platforms are available for attendants or slightly wounded soldiers. The cost of converting one car in the manner illustrated, allowing for later salvage value of the material used, was about $62.

Street Grade Changed 19 Ft. on Seattle Line

Operation of Car Lines Must Continue Without Interruption While Grade Is Being Changed

Improvements are now under way in that part of Seattle known as the Fremont and Ballard suburbs, which involve an average fill over the whole district of about 10 ft., with a maximum change in elevation of 19 ft. The Puget Sound Traction, Light & Power Company has car lines on most of the important streets in this district, and is required to pay for the fill on its right-of-way and to maintain operation of cars while the fill is being made.

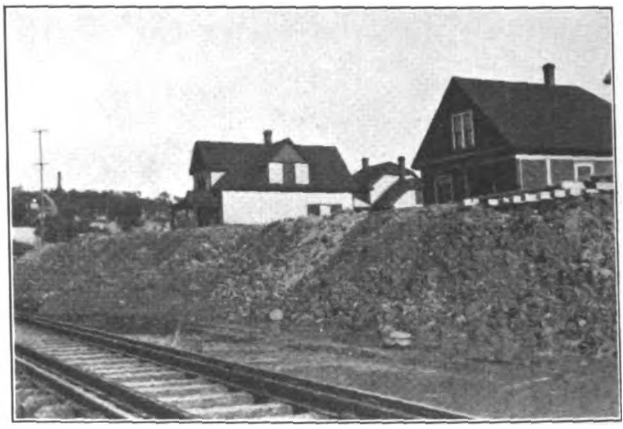
The material for the first 3 ft. of the fill is supplied from hydraulic dredges in the Lake Washington canal, and above this level a dry fill is placed, dirt being handled in side dump cars, hauled by steam locomotives. The total volume of wet fill on the whole improvement, including private property, is estimated at 1,346,683 cu. yd., and the dry fill will amount to about 871,427 cu. yd. Of this total the railway company is responsible for 52,000 cu. yd. at a cost of $87,940.



SEATTLE STREET GRADE—BALLARD AVENUE READY FOR HEAVY FILL

Owing to the height of the new grade above the old, it has been necessary for the railway company to build temporary trestles on several of the streets in order to maintain service, and before the work is completed some 12,900 ft. of track will have been relocated. Pavement on the old grade has to be removed if within 3 ft. of the new grade, and where the fill is more than this specifications permit the old pavement to be left if broken up so as not to hinder future ditching or drainage.

One of the accompanying illustrations shows the condition of Ballard Avenue after the concrete base had been broken up. In this view the building in the right foreground has a new waterproofed foundation wall whose top indicates the height of fill at this point. The other illustration shows both hydraulic and dry fill nearly completed on half the street before the track was removed from the other half.



SEATTLE STREET GRADE—FILL ON HALF OF STREET, SHOWING TEMPORARY TRACK

The change of track grades is under the supervision of George P. James, chief engineer Puget Sound Traction, Light & Power Company.

Rail Statistics

Statistics in regard to the production of rail in the United States have recently been made public by the American Iron & Steel Association, with headquarters at Philadelphia. Table I shows the production of rails by processes in gross tons during the past three years. Girder and high T-rails for electric railways are included in the figures given in this table. For recent years the tonnage of rails of this kind was as follows: In 1911, 205,409; in 1912, 174,004; in 1913, 195,659; in 1914, 136,889 gross tons.

Table II shows the production of rails according to weights and processes during 1914.

TABLE I—PRODUCTION OF RAILS BY PROCESSES IN GROSS TONS

	1914	1913	1912
Open-hearth	1,525,851	2,527,710	2,105,144
Bessemer	323,897	817,591	1,099,926
Rerolled	95,169	155,043	119,390
Electric	178	2,436	3,455
Total	1,945,095	3,502,780	3,327,915

TABLE II—PRODUCTION OF RAILS BY WEIGHT AND PROCESSES, 1914

	Under 50 lbs.		From 50 to 85 lbs.		85 lbs. and over		Total	
Kinds	Gross tons	Per cent	Gross tons	Per cent	Gross tons	Per cent	Gross tons	Per cent
Open-hearth	96,068	40.29	211,414	68.23	1,218,369	87.23	1,525,851	78.45
Bessemer	78,280	32.83	97,063	31.32	148,554	10.63	323,897	16.65
Rerolled	64,061	26.87	1,358	.44	29,750	2.13	95,169	4.89
Electric	14	.01	30	.01	134	.01	178	.01
Total	238,423	100.00	309,865	100.00	1,396,807	100.00	1,945,095	100.00

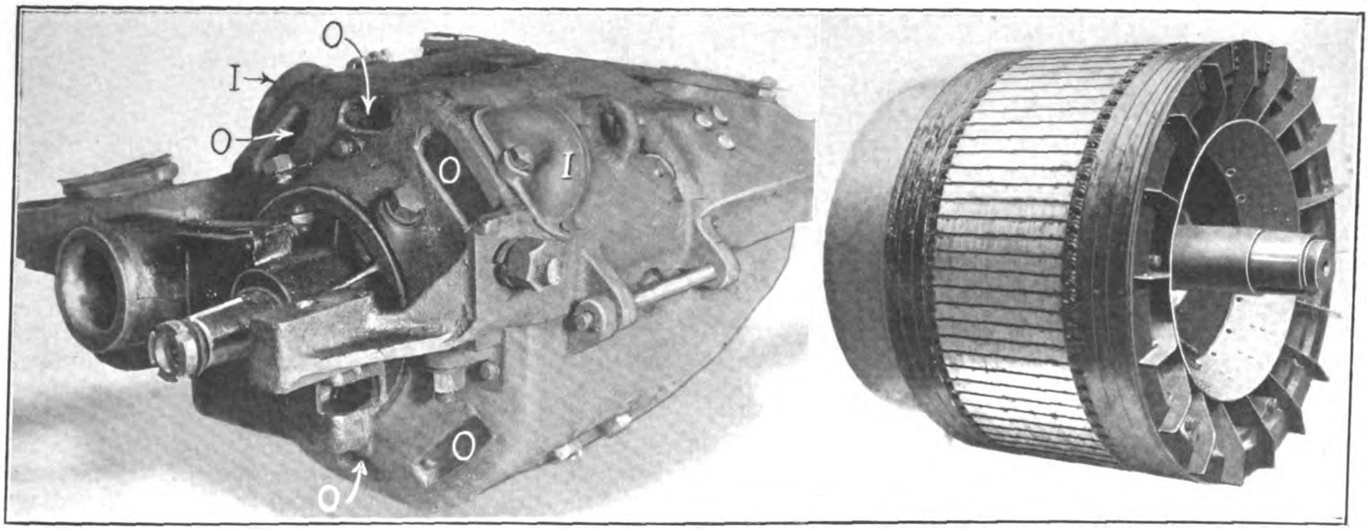
Advantages and Limitations of Railway Motor Ventilation

Self-Ventilated and Inclosed Motors Compared from the Standpoints of Durability, Continuous Output and Overload Capacity, Under Different Operating Conditions

BY RUDOLF E. HELLMUND, ELECTRICAL ENGINEER WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA.

The purpose of this article is, first, to outline briefly the recent progress and present status of the self-ventilated railway motor, and, then, to discuss the advantages and disadvantages of its use in various kinds of service. While it is assumed that the readers of this paper are familiar with the construction of the modern self-ventilated motor, it is believed that they will be interested in a brief description of its development.

Early designs of railway motors plainly indicate that the designers appreciated the desirability of ventilation, as was illustrated in the Westinghouse No. 3 and other motors, which were protected from slush and dirt by solid lower frame halves but were open at the top. These were soon supplanted by inclosed motors, as the insulating materials available in the early days were not able to resist the effects of dirt and dampness. In the inclosed motors, internal air circulation was provided by means of longitudinal core ducts and the fan action of the straight part of the coils beyond the cores.



RAILWAY MOTOR VENTILATION—WESTINGHOUSE NO. 632-SB, SERIES-VENTILATED MOTOR, SHOWING INLET HOODS (I) AND OUTLET HOLES (O)—ARMATURE OF NO. 403 MOTOR, DESIGNED FOR NEW HAVEN RAILROAD

About 1898 internal circulation was improved by the introduction of radial ducts, provided by inserting finger or fan plates between sections of the armature laminations. At first the use of longitudinal air ducts was continued, but later they were replaced by spaces provided between the arms of the armature spider.

About 1902 designers began to provide apertures in the motor casings, adding the "chimney" ventilating effect to that of the fan. About the same time the use of separate fans for driving air through the motors, driven either by auxiliary motors or from the main motor gears, was investigated particularly for use on large motors. This plan was adopted for ventilating some locomotive motors.

Since 1908 the first steps were taken in this country to replace the radial duct fans with a single fan at the rear end of the armature, having about the same duct area. Since that year there has been very rapid progress, resulting in the present satisfactory status of the self-ventilated fan type of motor which was introduced into street car service about 1911.

The several types of self-ventilated motors are briefly defined in the following paragraphs. Before taking these up it may be said that a fan mounted at the rear end of an armature of an inclosed motor, circulating air through longitudinal ducts in the commutator and armature iron and in the space between the field coils, produces about the same quality of circulation as do the radial ducts in the older type of motor. In favor of the use of the fan are the structural advantages due to the elimination of radial ducts and accompanying sharp corners in the slots against which the insulation of the coil rests.

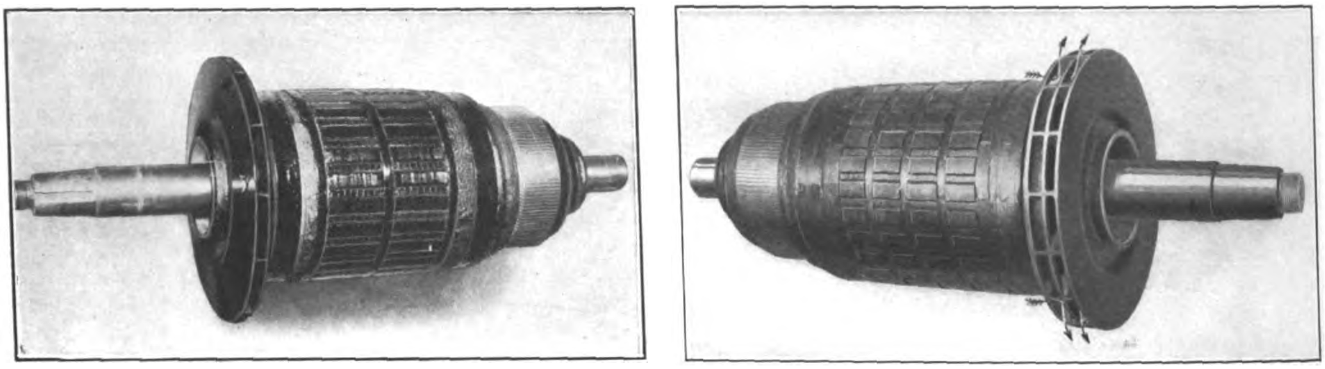
TYPES OF VENTILATED MOTORS

In the armature, (semi)-ventilated, fan-type motor with longitudinal ducts, external air circulates only through the armature, entering the motor through inlet openings at the commutator end, passing through the longitudinal ducts in the commutator and armature, through the fan, and out of the motor through openings on the pinion end. A baffle plate or ring at the pinion end of the armature prevents the heated air from circulating among the field coils. This method of ventilation has been used only in a few cases, because it permits the entrance of dampness and dirt into the motor without giving the full benefit of ventilation. Another plan, somewhat like this, provides a route through openings in the pinion-end housing, through the fan, through the inter-field coil spaces, and over the commutator, with an exit under the cover at the commutator end. The only reason for employing this type would be the absence of room in the armature core for ventilating ducts, in motors of very small armature diameter. It has been used very little.

A more popular plan is that known as series ventilation, in which external air is circulated in succession through the spaces between and around the field coils, and through the armature ducts by a single fan, the inlet being through a hood on the top of the motor and the outlet through holes in the pinion-end housing. The ingoing and outgoing air currents at the pinion end are separated by means of a baffle. An important feature in this type of motor is that the inlet hood should open away from the outlet so as to prevent hot air from reentering the motor casing. By making the fan of as large a diameter as possible, an excellent circulation of air can be secured in this way. Some of the latest motors of this type give fully 15 per cent to 35 per cent higher continuous rating than earlier motors with series ventilation. A still more recent motor, which has shown very promising results, is the reversed, series, fully-ventilated fan type, in which external air is circulated, in succession, first through the armature ducts and second through the spaces between the field coils, the incoming and outgoing air being separated by a baffle at the commutator end housing. This plan brings the cool entering air directly in contact with the armature, and the dust and dampness carried by the incoming air do not come in contact with the motor windings until the air has passed the armature ducts. In addition, the parts of the motor containing the commutator, brush-holders, etc., are under air pressure, so that part of the carbon and copper dust formed by the wear of the brushes and commutator is removed by the outgoing air. Motors of this type can be easily changed to those of the inclosed type if desired.

Another very recent introduction is the armature provided with a double fan much larger in diameter than the armature core. In this scheme, which is known as the parallel ventilation, external air is circulated through the two sections of the fan in parallel streams, one going through the spaces through and around the field coils and one through the armature. One stream of air enters at the commutator end and is drawn by one section of the fan through the ducts in the commutator and armature iron, while another stream is drawn by the second section of the fan through the field coil. Both streams are expelled at the pinion end, and a baffle prevents the hot air from circulating within the motor. Both field coils and armature receive cool air and the parallel ventilation should in most cases, therefore, be more effective than the series ventilation with respect to cooling. There is slight disadvantage, however, in that the air enters at commutator end, so that water and dust settle on the live parts of the motor. Further, as part of the fan is located over the ends of the armature coils it is possible for the wheel splash, etc., coming into the motor through the outlet holes, to come into contact with the insulation, although more recent designs have provided a fan arrangement to overcome this. It is at present impossible to state definitely how important these drawbacks of parallel ventilation will prove in practice. For parallel ventilation the fan diameter must be much larger than the armature diameter to get a reasonably effective depth for the fan blades overhanging the armature winding. The size of the fan is limited by the bore in the end of the housing, which in turn is limited by the distance between gear centers and the space required for the housing flange seat, the car axle bearing, and clearance. In cases where the fan diameter is limited, therefore, parallel ventilation will either not be very effective or it will necessitate the use of a very small armature diameter.

The final type of self-ventilation which will be mentioned is the compound type, a combination of series and parallel ventilation. In this, external air is circulated by the double fan through two routes, as follows: One fan drives air first through the armature and second through the spaces between and around the field coils. The second fan takes additional air through openings in the pinion-end housings and drives it past the field coil. The first fan draws air into the motor through holes in the commutator end housing, and through the ducts in the commutator and the armature core and then blows it out across the field coils through openings near the commutator end. The second fan takes in additional air through openings in the pinion-end housing and drives it out through the same openings at the commutator end. This plan seems to combine the advantages of series and parallel ventilation, and to eliminate their disadvantages.



RAILWAY MOTOR VENTILATION—ARMATURES OF WESTINGHOUSE NO. 323-SV MOTOR FOR SERIES VENTILATION (SINGLE FAN) AND NO. 547-A MOTOR FOR PARALLEL VENTILATION (DOUBLE FAN)

RESULTS OBTAINED AND TO BE EXPECTED FROM VENTILATED MOTORS IN OPERATION

Ventilated motors have proved satisfactory in most localities when they have been cleaned out at regular intervals. When provision has been made in the design for keeping dirt away from the live parts, as in motors provided with compound ventilation, it may be expected that, under normal conditions, ventilated motors will give better results with regard to insulation breakdowns than entirely inclosed motors. This follows because it is difficult to render the latter tight enough to keep out dust and dampness altogether, and because a certain amount of copper dust is originated by the wear of the brushes and the commutator. In inclosed motors it is especially difficult, under certain conditions, to avoid condensation of water inside the case. If this is allowed to remain it may prove harmful. With proper ventilation water condensed within the case will, as a rule, be quickly evaporated. It is, however, impossible to predict that the ventilated motor will be successful under all conditions. For instance, in some localities which are subject to severe snowstorms or other adverse weather conditions, it is quite possible that some trouble will be experienced with ventilated motors. It would therefore seem desirable to install motors which can be closed whenever weather conditions are particularly severe.

The principal advantage of the ventilated motor is the increase in its continuous capacity. The hourly rating is usually only slightly improved by the use of any fan arrangement. This is true because short-time ratings depend more upon the heat-absorbing capacity of the motor than upon the ventilation. Further, even inclosed motors, like those of the radial-duct type, are tested with the covers removed, according to the A. I. E. E. standardization rules, and have, therefore, a certain amount of ventilation during the hour run which affects the nominal horse-power rating.

The following table gives approximate percentages of increase in continuous rating obtained with various types of ventilation over the continuous rating of inclosed motors of the radial-duct type, for ratings on 300 and 400 volts.

INCREASE IN MOTOR RATING IN PER CENT DUE TO VENTILATION

	Up to 55 kw	Over 55 kw
Ventilated motors of the radial-duct type	10 to 20	15 to 35
Armature-(semi)-ventilated, fan-type motor	10 to 25	15 to 35
Field-(semi)-ventilated, fan-type motor	10 to 25	15 to 35
Series-ventilated, fan-type motor (early types)	10 to 30	20 to 40
Series-ventilated, fan-type motor (fan diameter larger than armature diameter), recent types	25 to 55	35 to 80
Parallel-ventilated, fan-type motor	30 to 70	40 to 100
Compound-ventilated, fan-type motor	30 to 70	40 to 100
Forced-ventilation motor	....	50 to 250

At voltages nearer to the rated values the relative gain is much larger because, on one hand, many inclosed motors cannot be run even with light loads on full voltage continuously, while on the other hand the ventilated motors get the maximum benefit of the fans, and comparatively high ratings at the high voltages, because these voltages mean high armature and fan speeds. Since the effect of the fan increases very much with the speed it is even possible that the 600-volt continuous ratings may be higher than those for lower voltages. If, for example, a motor rating is limited by the temperature in the field coils at low voltage the rating will increase with the voltage. If, on the other hand, the motor rating at low voltage is limited by the armature temperature, then higher speed is accompanied by increased losses and it depends upon the relative importance of core and copper losses, and the particular design of ventilation, whether or not the gain in ventilation at higher voltage is greater than the effect of the additional losses. The continuous ratings at higher voltages are not of practical importance, however, because the actual effective average voltage is between 300 and 450 on 600-volt motors.

In actual service the benefit derived from ventilation is not as marked as might appear from the stand-test ratings indicated in the above table. Inclosed motors mounted under a car derive appreciable benefit from the ventilation due to the movement of the car through the air. As a result an inclosed motor has for the same root-mean-square load usually 10 deg. to 20 deg. less temperature rise on the car than on the stand. With a ventilated motor this difference is usually very much smaller because the effect of the cooling outside air is relatively unimportant. In some cases the air currents under the car may interfere with the (internal) ventilating scheme by blowing against the inlet or outlet holes of the motor. For these reasons it may be that a ventilated motor with a continuous rating on the stand 15 per cent higher than that of the same motor inclosed, will in actual service show very little difference in results when operating inclosed and open. This has been found to be the case with the leading motor on the car which receives the maximum benefit from the car motion. The other motors usually show quite a marked difference under similar assumptions, especially motors which are housed in more or less by skirts, or which are located behind the low portions of low-step cars. These motors run much cooler when operated with ventilation.

The schedule speed in actual service is of the greatest importance with respect to the benefit which may be derived from ventilation. In city service the motor stands still much of the time, or runs at slow speed, with the fan practically inactive. The benefit derived from ventilation will thus be small. In high-speed interurban service, with long runs between stops, great benefit will be derived. With a separate blower the ventilation is, of course, independent of speed.

A ventilated motor does not have the same overload capacity as an inclosed motor of the same continuous rating. The ventilated motor is smaller and lighter, so that the inclosed motor has more metal to temporarily absorb heat during an overload of short duration. In the ventilated motor also there is always a chance that some dust may accumulate in the air passages, thus reducing their area and causing increased heating.

The causes which tend to reduce the practical value of self-ventilation in actual operation are at times, and especially in high-speed service, partly or entirely counteracted by the fact that the average speed of the motor, and therefore of the fan, is higher in service than on the stand. Nevertheless it is advisable to choose a ventilated motor with a slightly greater margin of safety in the continuous rating than is necessary in case of an inclosed motor. This is particularly advisable in very low-speed service, especially where short-time overloads, like those caused by operating trailers for one or more trips, are liable to occur. Even with such conservative practice, however, the benefit to be derived by the use of self-ventilated motors of the latest design, and from forced-ventilation motors, is quite appreciable and will permit weight reductions of from 15 per cent to 40 per cent with the former type and of from 30 per cent to 100 per cent with the latter type. Thus the use of ventilated motors can be recommended in all cases except those in which special local conditions would increase the maintenance very much on account of the open nature of the motor.

In conclusion it may be said that among other improvements in ventilation made during the past few years, the most important are the careful shaping and proportioning of the air paths within the motor, the diminution of causes of harmful eddy currents, and the increase of fan diameter.

Jitney in Literature and Movies

The mass of material about the jitney bus contained in the daily newspapers received by the ELECTRIC RAILWAY JOURNAL is simply stupendous. Writers have dealt with the jitney from every angle and it has even been put into verse. Here and there has appeared something striking, but the vast amount of this material has been mediocre. Standing out prominently, however, is an editorial which appeared recently in William Allen White's Emporia *Gazette*, with which Walt Mason gained fame, and the same paper that a number of years ago carried the famous editorial, "What's the Matter with Kansas?" The editorial in the *Gazette* did not deal directly with the jitney, but compared to the jitney the Kansas Legislature, which is indicted as being cheap, disorganized, irresponsible, unreliable, and stupid just like the jitney. On Broadway, New York, a film, "A Jitney Elopement," was recently shown.

Zone Fares in Milwaukee

Discussion of Recent Developments by the New England Street Railway Club—Advantages Set Forth by Mr. Stearns—Comments by New England Managers

About two hundred members and guests of the New England Street Railway Club gathered at the American House, Boston, on April 22 to hear a paper on the "Zone System of Fares in Practice," by R. B. Stearns, vice-president of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis. President Learned occupied the chair and there was a large representation of distinguished guests, including state officials from Massachusetts and elsewhere.

The paper by Mr. Stearns was an extended account of the zone system in Milwaukee brought up to date. In part it was a review of the paper on the same subject presented by him last October before the American Electric Railway Association at Atlantic City and published in the ELECTRIC RAILWAY JOURNAL for Oct. 24, 1914. Additional facts were given, however, based upon the experience with the system since the presentation of the previous paper mentioned. Among other points he said that since Nov. 14, 1914, in conformity with an order of the commission, tickets good for the outer zones and originally sold for 2 cents, have been sold on the cars at the rate of thirty for 50 cents. As a result of this policy the sales within the first four months exceeded 50 per cent on two of the lines and averaged 46.19 per cent of the suburban revenue on all lines. The accompanying chart shows the rapidity with which the public seized this opportunity. In the latter part of his paper Mr. Stearns discussed the application of the zone system to the regulation of fares.

An abstract of Mr. Stearns' paper, so far as it relates to the events of the past six months and his conclusions as to the practical working of the system, follows:

MR. STEARNS' PAPER

The steadily increasing cost of operation has brought forcibly before the traction industry the adjustment of present flat rates of fare for urban service. This has been brought about by the charge for transfers as occurred under the Cleveland plan, by increase in the price of commutation tickets as occurred in Milwaukee, or by increase in the cash fare rate as occurred in the recent case of the Massachusetts Commission and the Middlesex & Boston Street Railway. The zone system presents another solution, namely, the contraction of the limits of the metropolitan area or central zone.

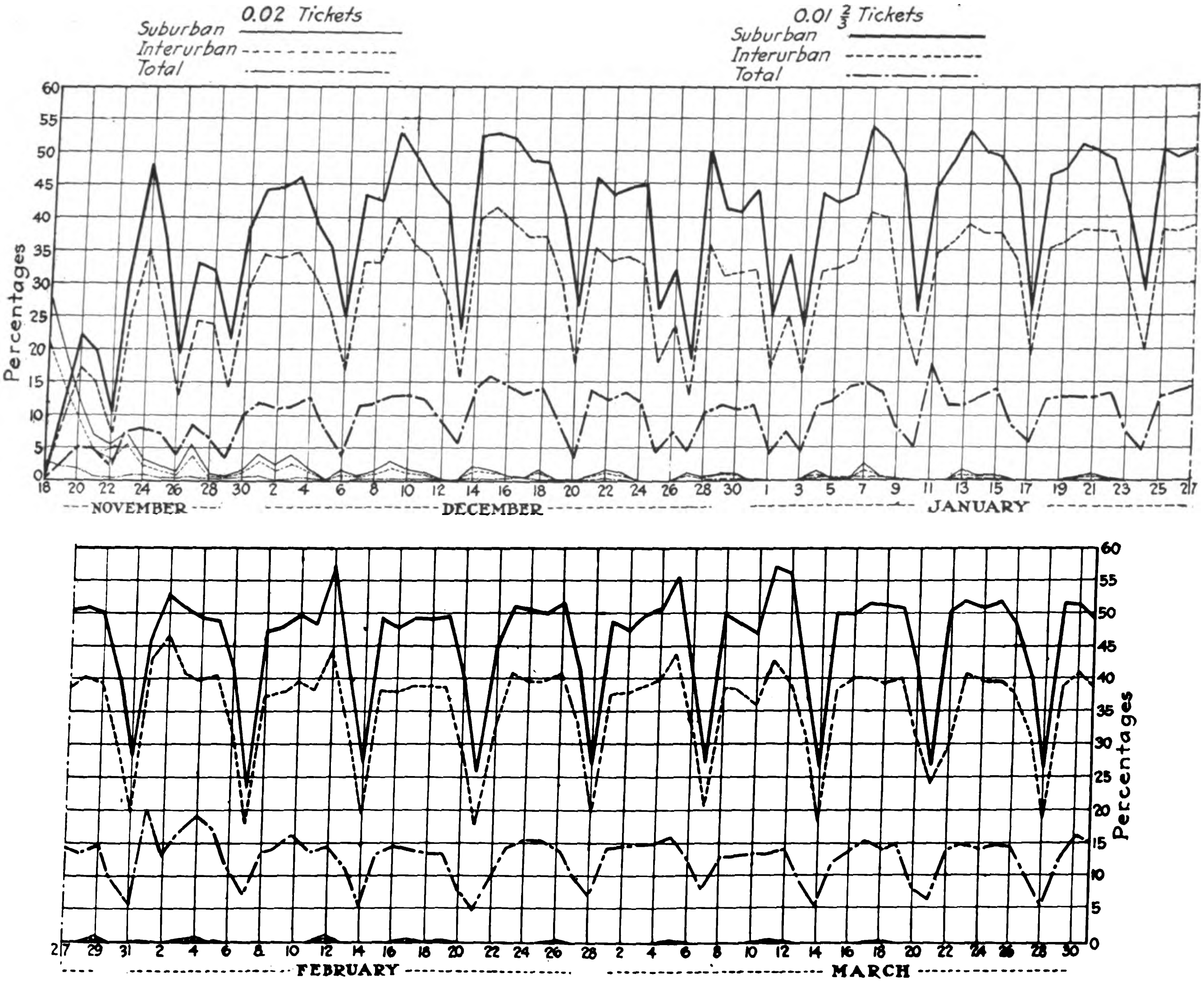
A number of reasons have been advanced why contraction and expansion of zone limits as a means of regulating revenues is more in line with public policy and the best development of the business than increases and decreases of the flat rate, such as that provided for in the Cleveland plan. First, the burden of the increased cost is placed upon the long-haul business, conceded under any system of flat rates to be the least remunerative. Second, charges for short-haul traffic are not raised to a point where competition will be encountered from other forms of conveyance, such as the jitney, and walking. Third, the increase in transportation charges, where such occur, will fall upon the newest and least stable portions of the community and best adapted to change.

Of these reasons the danger of the falling off of short-haul business, due to competition by other conveyances or walking, is the most important. Any decrease in short-haul traffic cannot fail to disproportionately increase the cost of operation as compared with the revenue with the consequent detriment of the character of service. In fact, the bureau of fare research of the American Electric Railway Association in its study of the "Cost of Service of the Jitney Bus" has pointed out:

"If the jitney service survives the experimental stage and finds, as it may, that after being put by laws and ordinances into its proper relation to the community, passengers can be carried from a mile to 2 miles for 5 cents, this short-haul competition will constitute the necessity for, and furnish a valid argument for, a much more serious consideration of the zone system of fares on the part of the electric railways and regulatory bodies than has been given to it in the past. It is obvious that, to the extent that the street railways are deprived of the traffic that costs less than 5 cents per passenger to handle, they cannot continue to carry passengers for 5 cents where the cost is more than 5 cents."

The effect of the contraction of central zone boundaries upon net operating revenues can only be approximately estimated. The contraction of the zone will depend upon an analysis of the costs of operation. Cost of passenger transportation service does not vary directly with the number of passenger-miles, since it contains a fixed element of cost independent of the length of haul of the passengers carried. In its original investigation of the cost of passenger transportation service in Milwaukee, the Wisconsin Railroad Commission pointed out that where the average fare per revenue passenger in the single-fare zone was 4.2631 cents upon the basis of analysis suggested by Frank R. Ford, of the committee of the American Electric Railway Association upon the determination of the proper basis for rates and fares, the expenses of operation, exclusive of return upon the investment assumed to vary with the number of passenger-miles, would be 0.9654 cent per passenger-mile. In other words, according to this basis of analysis, the elimination of 1 mile from the average haul of every passenger would mean a reduction in cost of operation and increase in net earnings of 0.9654 cent. According to its own scheme of analysis the Railroad Commission of Wisconsin determined that a considerably larger portion of the ordinary costs of operation were fixed in their nature and consequently found that the operating expenses which would vary with the passenger-miles would not exceed 0.5412 cent per passenger-mile. In other words, the subtraction of 1 mile from the average haul of each revenue passenger might be expected to decrease operating expenses 0.5412 cent as compared with 0.9654 cent, as disclosed by the Ford basis of analysis. The lower figure is probably more in accord with the facts in the case, since all ordinary operating expenses do not vary with the passenger-mile and experience indicates that where there is a lessening in the number of passenger-miles it is not possible to expect that operating costs will correspondingly decrease. The fixed costs of operation per revenue passenger were found by the commission to amount to 2.096 cents per revenue passenger and the average length of passenger haul within the central or single-fare area was found to be 2.93 miles.

These figures are merely illustrative, as experience has demonstrated that the costs assumed were abnormally low, and the railroad commission has had occasion in the revision of its order based on these costs so to point out. They refer, moreover, to costs based upon the density of traffic as found in the central area and



MILWAUKEE ZONE SYSTEM—SUBURBAN LINES, PER CENT OF 2-CENT AND 1 2/3-CENT TICKETS COLLECTED TO TOTAL REVENUES BY DAYS, SHOWING RAPID DISAPPEARANCE OF 2-CENT TICKETS

must not be confused with the costs in the outlying zones. This is evident from the following table, which indicates the proportionately small investment and operating costs and proportionately higher operating revenues and traffic in the central or single-fare area.

TABLE SHOWING, IN PER CENT, DISTRIBUTION OF INVESTMENT, REVENUE, COSTS, RETURNS AND SERVICE BY ZONES

	Total System	Central Zone	3½ to 4 Mile Zone	4 to 4½ Mile Zone	4½ to 5 Mile Zone	5 to 5½ Mile Zone	5½ Over Zone
Investment in tangible property	100	57.37	2.88	1.86	2.18	1.38	34.33
Revenue passengers	100	84.04	4.07	1.57	.98	.78	8.56
Operating revenue	100	77.56	3.83	1.57	1.06	82	15.16
Operating expenses, including taxes and depreciation	100	75.10	3.76	1.74	1.38	.98	17.04
Surplus available for return	100	84.69	4.04	1.08	.13	.37	9.69
Per cent surplus to investm't	6.73	9.94	9.42	3.90	.39	1.81	1.90
Car-hours operated	100	81.44	4.01	1.65	1.03	.75	11.12
Car-miles operated	100	77.81	3.95	1.72	1.17	.89	14.46
Track-miles	100	34.78	2.31	1.92	2.34	1.61	57.04

The change in limits of the central area will not affect all passengers carried, but merely those long-haul passengers traveling to the outskirts, and the proportionate amount of this long-haul traffic to short-haul traffic must be taken into consideration in estimating any saving which would be effected in any contraction of the zone limits.

It is possible, however, that given a central or metropolitan area sufficiently confined, passengers can be carried at a zone rate approaching 3 cents. Assuming fixed costs at 2.3 cents per passenger irrespective of length of haul and a movement expense of 6 mills per passenger-mile, an average haul of a little over 1 mile would yield operating expenses and return upon the investment at a 3-cent rate. Such a charge would be similar to the demand charge for electric service, with added increments in rate for added zones traversed.

The recognition of these principles of cost in regulation of rates for service would more equitably distribute the benefits of lower rates and lead to better development of short-haul traffic.

THE EFFECT OF THE ZONE SYSTEM ON THE RIDING HABIT

Because of the many factors affecting the riding habit it is impossible to determine at this time the stimulation in riding which has been produced through the operation of the zone system in Milwaukee. This is particularly true since the results during the past year have been influenced by the unusual business depression. While there has been a decrease of approximately 1.6 per cent in the number of rides per capita in the central or metropolitan area, there has been an undoubted increase in the number of rides per capita through suburban zones since the reduction in the unit fare from 5 cents to 2 cents. A smaller central zone at a reduced rate would probably change the stimulation of short-haul business resulting in increased riding.

SUMMARY AND CONCLUSIONS

The following brief conclusions may be drawn from the study which has been made of the zone system of fares as practically applied in Milwaukee.

1. An analysis of the data herein set forth indicates that suburban street railway traffic is not in itself profitable when viewed from the standpoint of the investor, the public service corporation and the regulating commission.

2. The present community development of most American municipalities is such as to prevent in a practical way the installation of a system of fares which will result in reasonable returns upon suburban lines.

3. The future profitableness of suburban lines must lie in the restriction of the allowable ride for a single fare and the gradual application to the extended metropolitan area of a zone system somewhat along lines described herein. No difficulties are encountered in the practical operation of such system and the American public will eventually see the equity of such a plan.

4. The zone system affords an equitable basis of regulation of rates of fare through the contraction or expansion of the metropolitan area.

5. The introduction of smaller units of fare than at present applied to outlying zones has probably increased the riding habit. A smaller metropolitan area with a reduced rate of fare would further increase riding, through the stimulation of short-haul business and through the competition with other means of conveyance, such as the jitney bus, and walking.

DISCUSSION

R. W. Perkins, president Shore Line Electric Railway, Norwich, Conn., said that the passenger-mile is the ideal method of selling transportation, with the rate bearing some fixed relation to the cost of service. In the past the length of the fare zone has too often been fixed on an optimistic basis and with ignorance of the cost. The need of increased revenue is clear, but the practical methods of securing it need extended consideration. The speaker favored the Milwaukee system.

P. F. Sullivan, president Bay State Street Railway, Boston, Mass., spoke of the electric railway financial situation, pointing out that the Milwaukee rate decision of the Wisconsin Railroad Commission, in the speaker's opinion, represents the most valuable contribution to electric railway economics ever promulgated. In this case the value of the property and the cost of doing business were scientifically determined. In this decision the commission decided that depreciation is an operating cost and should be added to the cost of transportation. The board also held that return on capital is not a profit, but a proper element of cost. They determined 6 per cent as a fair return on the investment, figuring 5 per cent on the bonds and 7 per cent on the stock. "If we had that rule established here," said Mr. Sullivan, "we could have a vacation every year instead of one just about the time the funeral begins."

Closing, Mr. Sullivan referred to the Middlesex & Boston rate decision of the Massachusetts Public Service Commission as the index of a constructive policy of street railway regulation. He said that depreciation must be cared for in the future and that dividends paid by depletion of the investment do not represent a proper conduct of affairs. Just how the Middlesex & Boston precedent is to be applied to other cases the speaker did not attempt to discuss, but he averred his belief that the findings in this case throw a most encouraging ray of light upon the trying problems of the street railway.

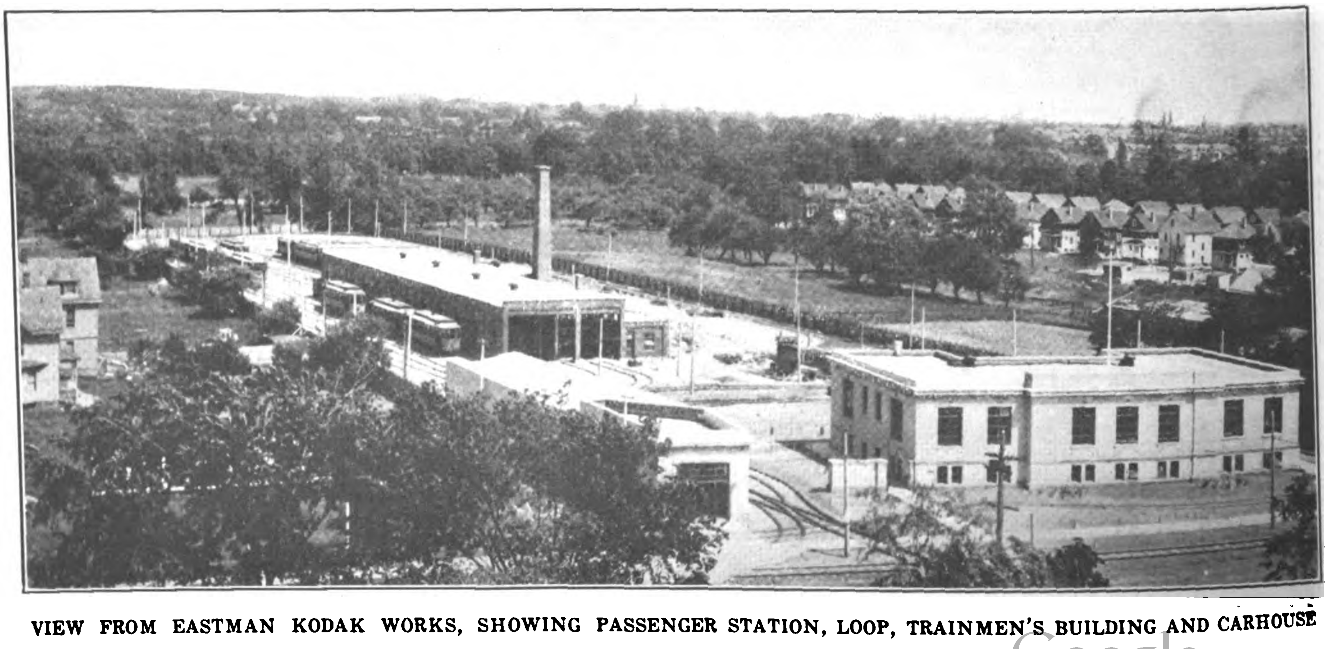
Passenger Handling at the Kodak Works

Opposite the Kodak Park works of the Eastman Kodak Company, the New York State Railways—Rochester Lines—completed during the past year a 205-ft. x 49-ft. carhouse, a 132-ft. x 43-ft. two-story transportation and employees' club building and a 24-ft. x 36-ft. x 20-ft. waiting room and a covered platform 90 ft. long x 15 ft. wide. The last named structure has been used since April, 1914, for the convenient transportation of Eastman employees. The accompanying halftone is a panorama of the entire installation.

Passengers enter the waiting room, deposit fare in two (out of a possible four) Cleveland fare boxes and then proceed to the covered platform where they find cars waiting for them. Transfers are handed out by the regular conductors as the passengers enter. By arrangement with the Eastman company, the female employees leave the works five minutes ahead of the men. Furthermore, the company attends promptly to all complaints about rowdyism and smoking. It also keeps the railway advised concerning increases or decreases in personnel so the service may be adjusted accordingly.

Not only does the railway give this seats-for-all service, but it also keeps the Eastman management informed concerning any unusual delays in traffic. The latter form of co-operation is naturally of value in avoiding arguments with tardy employees.

During the year 1914 the maximum number of passengers handled in the twenty minutes between 5:25 p. m. and 5:45 p. m. was 800. In this interval twenty cars were operated around the loop at this terminal.



VIEW FROM EASTMAN KODAK WORKS, SHOWING PASSENGER STATION, LOOP, TRAINMEN'S BUILDING AND CARHOUSE

Convention of Iowa Association

Operating Problems, the Jitney Bus, Welfare and Safety Were the Principal Topics of Discussion at the Meeting in Keokuk on April 22 and 23

Operating problems which would increase efficiency or result in direct economy were discussed at the twelfth annual convention of the Iowa Street & Interurban Railway Association, held on April 22 and 23, 1915, at Keokuk, Ia. The Thursday session was opened with President R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, Omaha, Neb., presiding, and an address of welcome by Mayor Moorehead of Keokuk. The Mayor remarked that it was eminently fitting that electric railway, light and power associations should hold their conventions at Keokuk, the home of one of the world's greatest hydroelectric developments. He mentioned briefly some of the more important features of the development and stated that while an inspection of this plant was of educational value, it should also suggest other water-power developments in the State of Iowa. Continuing, the Mayor said that he had found it very advantageous to deal in a friendly way with the utilities of Keokuk, since the development of the city depended so largely on everyone's working together. He said that it was easy to deal with these utilities, and he was satisfied that it was a great advantage to all parties concerned.

F. J. Hanlon, secretary and general manager Mason City & Clear Lake Railroad, Mason City, Ia., responded to the Mayor's address of welcome. He said that the close friendly relations existing between the city and the public utilities of Keokuk, and the remarks of the Mayor that it was advantageous so to be had touched a warm spot in the hearts of all the members present. Mr. Hanlon said that it would be a great relief if all utility companies could operate under the same conditions. He mentioned the present jitney bus problem, and stated that it was unfair to the railway companies, which supported the cities in many ways, to allow this piratical form of transportation to operate without proper restriction. He did not believe that cities could have both, and since it had been proved that motor-buses could not operate profitably for a 5-cent fare, it was wrong to encourage the deluded jitney owners. Turning to the importance of the industry, Mr. Hanlon expressed the opinion that extensions to steam roads were at an end in Iowa, and that in the future the State must depend on electric lines for transportation development. It was, therefore, important that the industry, which is still young, should be encouraged, since the growth of the State largely depended upon its future success.

President Leussler confined his annual address to brief remarks concerning the business situation. He said the past year had been an unhappy one for the industry because superimposed upon the slump in business conditions was the European war and the jitney bus problem. The gradual change in conditions for the better, however, furnished a hopeful prospect for the near future.

TIME SCHEDULES

The president then called for the paper by L. L. Sloss, superintendent of transportation Des Moines City Railway, Des Moines, Ia., entitled "Arrangement of Schedules with a View to Providing Service During the Evening Peak." An abstract of this paper was published in these columns last week.

F. V. Skelley, assistant general superintendent Tri-City Railway, Davenport, Ia., led the discussion of this paper. He stated that the preparation of schedules must be left largely to the public to meet traffic demands. They should be adjusted from time to time when complaints are received. Personal supervision is also necessary to obtain most economical operation. He stated that rush-hour schedules for Davenport called for thirty-six regular cars, and, depending upon the season, from eight to thirteen extra cars for a tripper service. In addition to the seasonal service, however, there were a number of special tripper runs to and from large manufacturing plants.

President Leussler remarked that his company operated twice as many cars during the rush hours as it did during the non-rush hours. In closing the discussion Mr. Sloss said that his company had found it difficult to operate rush-hour service to the best advantage owing to congestion in the business district. Rerouting of cars had relieved this somewhat. According to the present plan of operation all outbound cars do not turn back short of the end of the line, while inbound cars are turned back before they reach the congested business district. He had also found that where the schedules were subjected to numerous interruptions in a congested district trainmen became indifferent.

WELFARE OF EMPLOYEES

"Measures for the Welfare of Employees," the second paper on the program, was then read by Maurice A. Welsh, chief special agent Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia. An abstract of this paper appears in another column.

D. D. Bentzinger, superintendent and purchasing agent Burlington Railway & Light Company, Burlington, Ia., led the discussion. He said that he held meetings with his trainmen four times a year to get acquainted and obtain suggestions for improvements in equipment and operation. He had found that these meetings had resulted in his company's gaining the confidence of its men. This condition had also been further improved by the adoption of a policy of never being too busy to listen to employees' suggestions and complaints.

In response to an inquiry, Mr. Welsh stated that his company had a better proposition to offer its employees than was required by the State law. Although of greater scope, no unmerited claims had been received since the employees' organization had been perfected He mentioned several specific instances in which relief had been given by the railroads which would not have been covered by the employers' liability act. Mr. Welsh advised that the policy of the directors was to relieve distress rather than to avoid paying for relief. In response to another inquiry, whether an employee could collect both from the association and under the State law, C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway, advised that the law provided that no other plan could be adopted which did not prescribe greater benefits. Such a plan of compensating employees for injuries and illness, however, must be approved by the industrial commission. Mr. Cass said his company had put its plan before the commission and stated that it provided greater benefits and therefore should have the approval of the commission and take precedence over the law. His company held that the dues of 50 cents a month were of no consequence to the employees, since

98 per cent of the funds of the association were paid out for sickness, therefore the company more than compensated its employees as provided by the law.

President Leussler stated that his company had carried its own employees' liability insurance for the past five years. The disbursements had averaged approximately 34 cents per $100 of payroll, while the liability companies asked for from $1 to $1.25 per $100 of payroll to assume the same responsibility. He said that the employees had an independent organization to which the company contributed annually. President Leussler recalled his company's experience when a tornado struck Omaha and injured several of the employees. He said that the men made up a fund which the management doubled, and the company tripled the original amount. With this fund the injured employees were reimbursed to the amount of 40 per cent of all their losses. In closing, he said that while his company does not maintain a pension system it does pay out some money for that purpose.

SAFETY WORK

Continuing with the program, F. K. George, director of safety United Light & Railways Company, Grand Rapids, Mich., read a paper on safety first. An abstract was published last week. Following the reading Mr. George said that the Tri-City Railway had brought the formation of its safety organization before the public by using the methods employed by A. D. B. Van Zandt, publicity manager of the Detroit United Railway, Detroit, Mich. Pamphlets were issued each week. The first edition of these appeared early in April, and 10,000 copies were printed. These were placed in boxes on the cars of one line, and they were all gone in three days. All cars have now been equipped with boxes for distributing these pamphlets, and 15,000 copies are printed in each edition. All pamphlets have been taken from the boxes at the end of the second day. The company had adopted this method of distributing information, not because the newspapers were unfair to the company but because information could be distributed which newspapers would not accept as news.

C. G. Anderson, assistant general manager Tri-City Railway & Light Company, opened the discussion of this paper with the statement that the companies were operating under two misapprehensions: First, the failure of the public to assume responsibility for its own safety, and second, that the entire burden was placed on the shoulders of the railway. Such a situation was inequitable, and legislative bodies should pass measures which would more equitably distribute the responsibility. Other points brought out in the discussion were that the automobile clubs were doing good work in regulating themselves in some localities. The St. Louis method was cited as an instance where the company invites the public to suggest safety slogans, which were published and credited to the author.

At this point President Leussler appointed a committee on nominations to fill the vacancy on the board of directors made by the expiration of the term of office of C. D. Cass.

RAILWAY CIRCUITS

The Friday session of this association opened with a paper by F. V. Skelley, assistant general superintendent Tri-City Railway & Light Company, Davenport, Ia., entitled "The Investigation and Care of Railway Circuits." This paper appears in abstract on page 794 of last week's issue. C. M. Feist, master mechanic Sioux City Service Company; E. H. Hagensick, superintendent electric lines Omaha & Council Bluffs Street Railway, and H. A. Mann, of the Goldschmidt-Thermit Company, took part in the discussion of this paper. Some stated that good results had been obtained with twin terminal bonds, particularly when they were inspected frequently with a milli-voltmeter. It was also remarked that the method of connecting the jumpers to the rail, and particularly with the 500,000-circ. mil cable type, that the soldered connections were not good, and oxy-acetylene welded bonds had been tested and gave every indication of producing good results. Mr. Hagensick said that jumpers were being connected on the Omaha property by providing a graphite mold in which molten copper was poured to bond the cable to the rail. In response to an inquiry, Mr. Skelley said that his company kept a record of its bond tests in a standard engineer's field book. In this book the readings and the date they were taken were set down, and when bonding work was undertaken the book was turned over for the guidance of the foreman. Mr. Mann spoke of the advantages of the Goldschmidt-Thermit joint with particular reference to high return-circuit conductivity. In response to an inquiry from one of the members, he stated that he did not believe in welding special work because of the difficulties which might be entailed owing to the expansion and contraction of the rest of the track.

THE JITNEY BUS

Following this discussion, E. H. Hagensick, superintendent of electric lines Omaha & Council Bluffs Street Railway, read a paper entitled "The Jitney Bus," prepared by C. I. Palm, of the same company. This paper was published in abstract last week. The discussion of this paper was largely devoted to the unreliability and irresponsibility of the jitney. It was suggested that steps be taken to make people think of the economic problems relating to the transportation business. C. G. Anderson brought out this point and suggested that the public must be taught to think about the ultimate rather than the immediate needs of the community. He mentioned the fact that Des Moines had in preparation an ordinance which would require jitney-bus operators to file a $10,000 indemnity bond. F. J. Hanlon emphasized the importance of advising the public what proportion the railway companies were paying for street pavements. He remarked that statistics from Cedar Rapids and Davenport showed that the street railways were spending for pavements approximately $1,500 a year per car operated. Mr. George dwelt on the increased hazard of operation because the bus drivers generally persist in talking to the passengers. He also called attention to the moral side of jitney-bus operation, stating that it was such in most cities as not to make one want to trust women and children in them. He also cited an instance of a collision between a jitney bus and a street car in which several of the occupants of the bus were killed. In this case the owner of the bus was irresponsible, and the heirs of the occupants killed sued the railway company.

CLOSING BUSINESS AND ENTERTAINMENT

The election of officers, which occurred in the executive meeting following the regular program, resulted as follows: Charles Fahrney, general manager Ottumwa Railway & Light Company, was elected director to succeed C. D. Cass, whose term had expired. In accordance with past custom the 1914 officers were reelected and are: President, R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, Omaha, Neb.; vice-president, Joseph F. Porter, president Tri-City Railway & Light Company, Davenport, Ia.; secretary and treasurer, H. E. Weeks, secretary, Tri-City Railway & Light Company, Davenport, Ia.

A joint entertainment program was arranged for the Iowa Street & Interurban Railway Association and the Iowa Section of the National Electric Light Association, both of which held conventions in Keokuk during the same week. The entertainment program included a reception for the ladies, automobile trips, smokers and theater parties on Tuesday and Wednesday. On Thursday afternoon both associations made a boat trip from Keokuk to Burlington and return. More than 260 members made the 90-mile boat trip and were entertained with music and dancing en route and a dinner at Burlington.

WELFARE MEASURES FOR EMPLOYEES

BY MAURICE A. WELSH, CHIEF SPECIAL AGENT WATERLOO, CEDAR FALLS & NORTHERN RAILWAY, WATERLOO, IA.

During the last few years welfare work has attracted a great deal of attention of railway managers with the result that there are now in effect on various railway properties different arrangements whereby the employer and the employee have merged their interests for the welfare of each other. Some of the forms of welfare that have been used by the Waterloo, Cedar Falls & Northern Railway are described in detail herewith.

On Jan. 15, 1912, the company entered into an arrangement with the train service employees and formed what is now known as the Cedar Valley Road Relief Association. This association is maintained jointly by the company and the employees. The membership fee is 25 cents, and the monthly dues, 25 cents. The company contributes an amount equal to the monthly collection from the members and also gives to the general fund.

The affairs of the association are administered by five directors, three of whom are elected from the ranks of the trainmen, the other two being the general manager and the superintendent of the railway. The board of directors has entire charge of the business coming before the association and its action is final. The association has a permanent "sick committee," whose duty is to visit sick or injured employees and report to the board. The board may take any action that, in its judgment, is merited. The association pays sick benefits of $9 per week for a period not to exceed thirty-six weeks and a benefit of $100 in case of death, and also tries, in various other ways, to relieve distress not only with the employee himself but also in his home.

It is noteworthy that the weekly sick benefit of $9 is in excess of the average benefit mentioned in the 1912 report of the A. E. R. A. committee on welfare of employees, and that the association will pay sick benefits for thirty-six weeks as compared to three or four months, as mentioned in this committee report. The by-laws also provide that when a member employee is absent from duty, by reason of having been quarantined, whether the quarantine is a result of the illness of the member himself, one of his household, or a person at his rooming place, the directors will treat the claim as a sick claim and allow $9 per week during his absence from service.

The workmen's compensation act operative in Iowa includes only injuries. The terms of the relief association are greater than those provided by the compensation act, in that the association pays $9 per week for sickness as well as accident, and the payments date from the day of sickness or injury when the disability extends over a period of one week. A review of the disbursements of the association shows that 98 per cent of the claims paid have been for sickness and 2 per cent for trivial accidents.

Since the State compensation act became effective, the Waterloo, Cedar Falls & Northern Railway elected to come within the provisions of the act. When there is an injury to an employee who has been in the service but a short time, he is paid under the terms of the act. When the injured employee has been with the company for a long time and his service has been worthy, however, his case is handled specially and taken up with the management. In some cases full time has been allowed together with all doctor bills, etc. The compensation act contemplates that the employer will furnish free medical care for the first two weeks following the injury. The company has ignored this two weeks' clause and continues furnishing the medical aid and hospital care until the employee is ready to return to work. Some of the so-called welfare legislation passed by various legislatures, such as the semi-monthly pay-day, etc., must fade into insignificance when compared with the real things voluntarily undertaken by the companies.

This particular law does not interfere with the company, since it was about five years ahead of the legislature on this proposition. Years ago, the track men indicated that they preferred to be paid more frequently than monthly and arrangements were made to pay them weekly. The trainmen for the past several years have been paid semi-monthly.

The workmen's compensation act is beyond question a piece of advanced legislation, for it furnishes insulation between the injured employee and the damage-suit lawyer. The present act is faulty, however, in the arbitrary requirement that employers insure the risk, because it absolutely removes the employer from the employee in settling injury cases. Sometimes, it is true, the interests of all concerned are better served by requiring that the employer insure the risk, for if personal injury accidents occurred to employees of some "wild cat" industry without assets, the injured employee would have a difficult time in recovering damages. At the same time, there are substantial companies which would prefer dealing directly with the men.

The rates offered to railways by insurance companies are confiscatory and prohibitive. The terms of the compensation act provide that the injured employee receive 50 per cent of the wages with a maximum of $10 per week. Compensation payments of no kind, however, begin until the fifteenth day after the injury, and they cover only injuries arising out of or sustained in the course of the employment. Some of the company's interurban motormen, however, work nine hours per day, and a great many of the accidents are such that the disability is less than two weeks' duration. In other words, the insurance companies would carry the risk of the trainmen at a prohibitive rate and would insure them only nine hours per day and with benefits of only $10 per week, while the trainmen can go out into the open market and buy a policy that will insure them for twenty-four hours per day, with much greater benefits and at a rate considerably lower than that offered to the employer.

The annual convention of the Ohio Electric Railway Beneficial Association was held at Zanesville, on April 13. The following officers were elected for the ensuing year: Grand President, F. E. Tomlinson, Newark; grand first vice-president, C. C. Moul, Springfield; grand second vice-president, Henry Baker, Greenville; grand third vice-president, George T. Shirley, Dayton; grand secretary-treasurer, Arthur C. Starkey, Lima; sergeant-at-arms, E. G. Painter, Zanesville; grand chaplain, William Wheeler, Columbus. Chapters from six cities were represented. The next convention of the association will be held in Springfield, Ohio, in October of this year.

"Mixing" as an Asset of Public Utility Business

The Personal Entity in a Corporation Is the Dominating Influence with the Public

BY H. S. COOPER, SECRETARY SOUTHWESTERN GAS & ELECTRICAL ASSOCIATION

Notwithstanding the idea may not be pleasing to their pride of achievement, notoriety, and success in business, it is a fact that the larger public utilities and the holding and operating corporations are nearly always more dependent on the personnel of each local company for their best assets—and, consequently, for their final best profits—than they are on their own prestige in their communities.

The best three assets of a public utility are satisfied customers, a pleased public and contented employees, and the personal element of the local executive cuts a very large proportionate figure in obtaining and retaining all three. While quality of service—which includes the double trinity of safety, convenience and comfort to patrons, public and employees—is a prime requisite for obtaining the trinity of the assets, these are not the whole thing necessary—as has been proved in many cases.

It is a natural instinct of human nature to select, for its likes or dislikes, a distinct human personality out of any impersonal group, to embody the group into that personality and to pin its faith or its doubts to the individual. Very few of us conceive of any corporation or group as such. Nearly always there is a personal entity which has a dominant position and influence with us. This is especially true in commercial life and distinctly so in the matter of those impersonal artificial bodies known as corporations, and its truth is most manifestly shown in those corporations which not only touch us most closely in civic life but whose activities are virtually thrust upon us—the public utilities of water, light, heat, power and transportation.

While, in an impersonal way, the public may have full cognizance of the corporation itself or of the firm, corporation or syndicate controlling its operation, and while it may have its likes and dislikes, its bias towards or its animus against these impersonal groups, its feelings and actions will always be greatly modified by its attitude toward someone who represents to it the personal entity—and that someone is generally the local head or representative.

Except in the very largest cities—and even in some of these, as was instanced with the late Captain McCulloch—this is invariably the case. Many attempts have been made by large corporations and operating firms to prevent or neutralize this effect, but it either has been unavailing or has led to such adverse results that such courses had to be abandoned. Automaton managers have been installed whose every word and action were known to be originated by wires pulled from the home office, the acts of active managers have been discredited, the apparent personnel of the parent company, its names, its doings. its wealth, its success, its overpowering prestige in financial circles have been publicly and locally paraded and acclaimed, but the public—even while granting all this—persists in having a local personal entity to whom, and through whom, it may voice its approbation, complaint or censure and on whom it will place the credit of success or the burden of failure in the relations of the utility.

It is therefore wisdom on the part of any public utility corporation, or those operating such, to select as its chief local representative—executive or administrative—one who has such characteristics as will enable him to be, or become, a favored and favorable representative for it—in other words a "good mixer." Now there is mixing and mixing. There may be on the one hand the exclusive type which concerns itself only with the high and mighty of the locality and, on the other hand, there may be the diffusive type that wastes itself on unimportant and useless general acquaintances of the Tom and Bill style. Neither of these is a perfect asset to the company although, as a rule, the latter is to be preferred to the former, especially in the smaller cities and towns. While all people, especially those immediately involved, deprecate pride or aloofness in such a local representative they also appreciate a certain amount of reserve in familiarity with everyone. In this matter tact is the vital item. To know everyone, to be cordial and interested in each one, to make an individual interest with each one, to avoid useless discussions, partisanship and cliques, to show to each that respect, that cordiality, that affability, that geniality, demanded and approved by them, is the highest type of tactfulness and is that demanded in the local representative.

The company must realize these facts and not only make this trait one of the necessary qualifications of its local representative but it must stand behind him officially and financially in enabling him to have the time and means to do this. Social obligations within reason are very often a part of this duty, as are those connected with membership in commercial, industrial and benevolent organizations, all of which take time and money.

It is not necessary that he be a "j'iner," with every grip and password at his finger's and tongue's end and ready to take on any new responsibility suggested or offered, but in almost every city there are certain organizations, private, public, social and commercial, an active membership in which is often a strong factor in the popularity of the local representative and one which, if properly handled by him, will add greatly to the benefit of his company.

It is not only necessary that he be readily accessible to everyone when in his office—that part goes without saying. Formality, delay, red-tape in this matter are things of the past with a public utility representative, but he must also be accessible outside of it. The local representative who sees his fellow-townsmen only across his office desk is that much of a failure, and he who allows himself or his company so to load him with continual and continuous work or detail that confines him exclusively to that desk or to routine visits over the property is permitting his company to make a grave mistake to which he is a greater or lesser accessory.

Now, it is an acknowledged fact that "too much of a good thing is good for nothing." Both the representative and the company must see to it that the part does not become greater than the whole. A manager should fit his public position as neatly as a fine cork in a smooth-necked bottle, but if it is desired at any time to change corks, it should not necessitate a corkscrew, nor should the fit be such, as in a tightly wedged ground-glass stopper, where it becomes needful to use heat to extract it!

A portion of the precaution necessary for the avoidance of such a condition lies with the company. Without dampening the loyal ardor of its representative it must still retain a reasonable surveillance of his efforts and results, must co-operate with him in that of which his more minute local knowledge and impressions make him the better judge and must guide or counsel or warn in those larger matters which may—or do—affect something beyond the local situation.

The other portion of the problem is a personal one with the local representative, if he forgets that he is only a representative and begins to act as if he were "the whole cheese"; if, instead of the corporational "we" he gets into the habit of the egotistical "I," then it is time for suggestion, guidance, criticism, or something stronger. If this state of mind comes from youth, inexperience or professional ardor, suggestion and guidance are all that are necessary. Many a potentially good manager and loyal representative has been spoiled and lost by the whip or a snaffle-bit and blinders, when all that was needed was a light touch on the reins. It is always as well for the company to be able to discern which is enthusiasm, zeal and ardor, and which is egotism, thoughtlessness or personal aggrandizement before they rigidly limit the local activities of their local representative.

For they must remember that, to the local denizen, his locality is the biggest thing on earth. The map of his country or state may cover a page of the atlas and his city be a mere flyspeck with its name in diamond type, but, in his thought and governing his feelings and actions, that little flyspeck expands until all the pages of the atlas will not contain it. And so it often happens that while the holding company that operates his little city's public utility may be a power among financial powers and that utility one of the least of its holdings, it is not wise for that reason for the company to consider itself the special providence of that community, nor to imagine that it can obtain impersonal loyalty and liking because of its fame or its size. It must have a personal representative, a locally resident human entity, to whom and through whom it can obtain its best local assets, those on which it can depend to prevent loss during times of stress, strain and trouble. Profit may be gross or net, but loss is always that which its figures denote and is always a debit against net profits. Therefore, that which will, in all probability, forefend loss is well worth cultivating, if only as a matter of probability—as insurance.

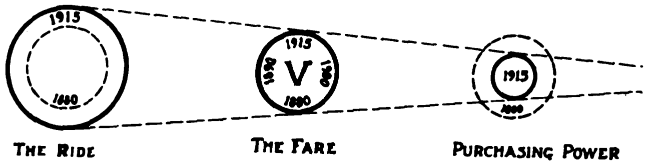
The time should be nearing when the above should be unnecessary to formulate, and the utilities, their owners and operators are getting more and more mindful of its truth, but there are many cases yet—when one travels over the country—where it is seen that the personal element of the local representative has been absolutely neglected in his appointment or hiring, or where it is so limited, conditioned and hampered as to be of no use.

Most private commercial concerns learned this lesson long since. Even when locally owned and operated they acknowledge its value by following its leadings, and to those public utilities whose ownership or operation is foreign, there is added incentive to follow such a course because the local feeling and bias are always in inverse ratio to the size of the company and the distance to its home office. The only antidote or palliative to such is a popular local representative and a tendency on the part of the company to obliterate itself as such as much as possible and localize its holdings, its interests and its management within that locality.

Chilled Capital

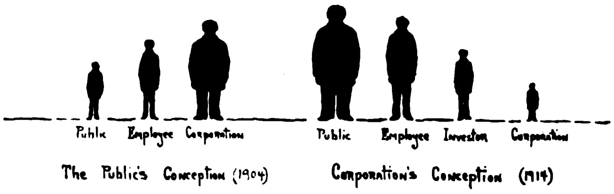
Some of the Causes for Capital Chilling Are Given—Effect on Labor

Under the above caption, used originally by Eugene L. Richards, superintendent of banks State of New York, in a recent address before the New York State Bankers' Association, S. H. Bennett, general auditor Hagerstown & Frederick Railway, has prepared a paper for the benefit of the men of his company. After sketching the place of the electric railway in the economic fabric of the country he says: "The one great reason why growth has ceased is because undeserved attacks have cast a chill upon capital and 'when capital catches cold, labor freezes to death.'"

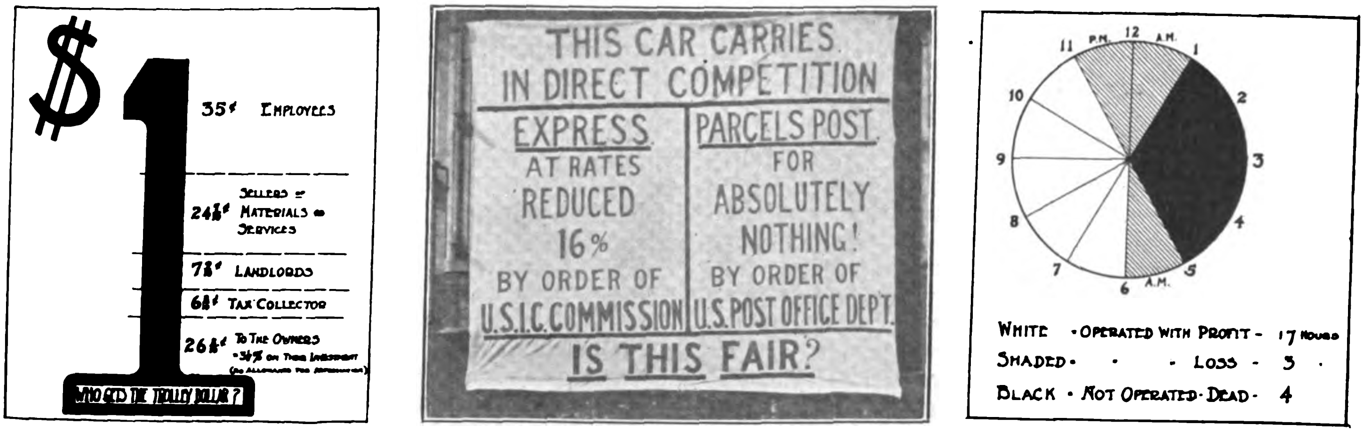


CHILLED CAPITAL—RIDE INCREASES, PURCHASING POWER DECREASES, BUT FARE REMAINS THE SAME

Mr. Bennett enumerates some of the causes of capital chilling as follows: Unfair treatment of the utility by its partner, the public; the difficulty of securing the privilege of charging a reasonable rate of fare; the denial of the privileges of common carriers to electric railways in freight transportation, including that of


Public
Employee
Corporation
Public
Employee
Investor
Corporation
The Public's Conception (1904)
Corporation's Conception (1914)

CHILLED CAPITAL—FROM DIFFERENT VIEWPOINTS



THIS CAR CARRIES
IN DIRECT COMPETITION

EXPRESS	PARCELS POST
AT RATES REDUCED 16% BY ORDER OF U.S.I.C. COMMISSION	FOR ABSOLUTELY NOTHING! BY ORDER OF U.S. POST OFFICE DEPT.

IS THIS FAIR?

CHILLED CAPITAL—GRAPHICAL EXPLANATION FOR THE RELUCTANCE OF CAPITAL TO INVEST IN ELECTRIC RAILWAY SECURITIES operating freight cars for 24 hours daily. He spoke a good word for the holding company which makes economical operation possible, and prescribed publicity as the remedy for present ills.

The self-explanatory illustrations on page 843 were used by Mr. Bennett in reinforcing his statements.

Recommendations of Engineers to New York Constitutional Convention

A committee of engineers representing national and local engineering associations has presented to the constitutional convention now in session at Albany suggestions and principles for consideration in connection with its work. The committee advises: (a) A short ballot, making possible close scrutiny of the qualifications of all candidates and concentrated responsibility of elected officers. (b) Tenure of office for all elected officials, for heads of departments, and for bureau heads, of sufficient duration to attract competent men and to permit them to become increasingly efficient in the discharge of their duties. (c) A continuing policy in the organization and control of all departments, so that appropriations may be spent most economically and work carried on most efficiently. (d) Selection of heads of departments by appointment instead of election by popular vote. (e) Ample opportunity for the proper development of natural resources. (f) Recognition of the value of technical advice through the inclusion of professional engineers in the membership of departments or courts where such advice is essential to the proper conduct of the work or adjudication of the matters involved.

Among other recommendations is one to the effect that "a department of public utilities should be created to be headed by five commissioners appointed by the governor, each to have a ten-year term of office so arranged that a vacancy will be created every two years. Commissioners should be eligible for reappointment. At least two commissioners should be professional engineers in good standing in the profession. Each appointee should have had experience in connection with public utilities which would fit him for the duties of the office. At least two and not more than three commissioners should be residents of New York City.

"This department should regulate and supervise all common carriers, all water supply, irrigation, drainage, gas, power, lighting, heating, intelligence-transmitting and other public utility corporations operating within the limits of New York State, including similar activities on the part of any other State department or political subdivision of the State. This department should be divided into such bureaus as may be essential. Each engineering bureau should be administered by a chief engineer selected with sole regard to his peculiar fitness for the office, and he should have power, subject to the approval of the commissioners, to select and appoint such division engineers as are essential to the proper conduct of his office."

Again it is urged that "in case provision be made in the constitution for the creation of one or more departments or commissions charged with responsibility for regulating, supervising, and inspecting buildings and the equipment thereof, trades, mines, industries or labor, each such department or commission should include in its membership at least one professional engineer in good standing in his profession. Commissioners should be appointed by the governor. Each appointee should have had experience and should possess qualifications fitting him to perform the duties essential to the department or commission."

COMMUNICATIONS

Automatic Registration of Fares

Rooke Automatic Register Company
Providence, R. I., April 26, 1915.

To the Editors:

In your issue of April 10 space is given to an "opening wedge" communication from V. L. Edmunds on the subject "Registration of Fares." Mr. Edmunds has invited "a fair and open discussion of this subject," and the inference is that the Journal supports this invitation.

Mr. Edmunds seems to know intimately the chief factors, both animate and inanimate, bearing on this problem. He very correctly reaches the following conclusions: (a) that optional registration is "a continual temptation"; (b) that when inspection discloses irregularities under this optional registration system, the procedure of "warning" the conductor is ineffective; (c) that when legal convictions are sought in such cases the courts and juries refuse to convict.

The reason for the failure of legal action is that the system of optional registration fails to disclose the conductor's motive, dishonest intent or the fact of actual theft. In brief, the conductor gets the benefit not only of the "reasonable doubt" but also of all the other doubts universally known to attach to his enforced use of tools and methods which unfairly trust him while they also insidiously tempt him.

Mr. Edmunds makes certain recommendations, i.e., (1) that "concerted action be taken to place the stealing of nickels in the same class with other thefts"; and (2) that "state laws be framed prescribing definite methods of collecting fares and that legislators failing to pass such laws be made to understand that they have much to answer for." All this is suggested "if this temptation cannot be overcome in principle."

Mr. Edmunds has expressed no operating opinion. He has merely opened the subject and invited discussion. The writer suggests, however, that we forget our supposed need for new laws or legislative props, return to our operation and carefully consider the field for preventive rather than lock-the-barn-after methods.

The temptation to which Mr. Edmunds refers can be and is being overcome by a score or more of conservatively managed companies at the present time. Optional registration is unnecessary. A collecting-registering system is available which makes it impossible to "bunch" collections, to work substitution schemes between fare values, or deceive inspectors or passengers through the wrongful handling of cash once paid. This has been upheld by the highest state courts as being entirely reasonable, without hardship to the passenger and enforcible. Results where it has been used prove that it establishes a square deal for both the conductor and the company. The honest conductor is protected from unjust slurs and suspicions. The dishonest conductor can make absolutely no move of any kind to cover his dishonest intent. With substitution schemes and "bunching" rendered impossible and with each passenger knowing that his fare is properly audited as paid, the conductor who wishes to appropriate a dollar of the company's money is forced not only to sell out openly to twenty passengers but first actually induce these passengers to participate with him in the fraud. The proof of dishonest intent and actual theft is easily established legally, and explanations, excuses and guesses are eliminated.

The writer submits, therefore, that the remedy for conditions referred to in Mr. Edmunds' article rests with the management. In short, more carhouse and less court-house.

George F. Rooke.

The Brass Band in the Safety Movement

BOSTON ELEVATED RAILWAY COMPANY
BOSTON, MASS., April 26, 1915.

To the Editors:

The "brass band" editorial, appearing in the issue of the ELECTRIC RAILWAY JOURNAL for April 3, was excellent. Our notion is, to carry out your simile, that after the band has passed the orderly and dignified procession should follow, the steady tramp of infantry, well disciplined, alive to orders and determined toward the accomplishment of whatever the purpose of the march may be.

In other words, after the attention of the public is attracted to the safety movement then a determined effort to accomplish the object of the movement should follow. We believe that the words "safety first" cannot be overworked. The continued sight of advertisements, repetition of popular songs of the day, etc., when one has no personal interest in them, become wearisome. Not so with "safety first." These words are similar to any words of warning that call attention to one's personal status and are not apt to be ignored. We use them whenever possible.

It has been the policy of our company, after a safety crusade had been initiated, to follow it up quietly and steadily as far as our ability and means will permit. Frequent communications are sent to the school authorities for the instruction of the children; regular meetings of the employees are held; carelessness on the part of teamsters is reported to their employers, and in a majority of cases the men are dealt with by the employers to better advantage than in a criminal prosecution, by bringing to the employers' personal attention the desirability of safe action on the part of their employees; regular printed and illustrated bulletins, received from a number of safety societies to which the company is a subscriber, are prominently posted for the information of the employees of the company, and those in charge of the employees, as foremen and superintendents, are regularly furnished with information concerning the accident reports of their departments or divisions. Whenever a justifiable text presents itself, paid advertisements are printed in the daily papers. Each accident to an employee that appears to have been preventable is called to the attention of the delinquent authority. Occasional interesting addresses to the employees concerning safe operation of cars are made by one experienced in such matters; and finally, in as orderly a manner as they can be cared for, safety matters receive attention on the way to and in the trenches after the last note of the band has died away.

M. C. BRUSH, Second Vice-President.

National Electrical Safety Code

THE AMERICAN RAILWAYS COMPANY
PHILADELPHIA, PA., April 27, 1915.

To the Editors:

You have published in recent issues an abstract of a statement by Dr. E. B. Rosa, chief physicist of the national bureau of standards and a digest of the proposed safety code which is being prepared by that bureau as applied to electric utilities. The writer has been following this matter rather closely since the issue of Circular No. 49 by the bureau last fall. This matter is one of exceedingly great importance to all utility operators and is worthy of their closest scrutiny.

In no sense do I wish to criticise the most excellent scientific work done by the bureau of standards, but it is done purely from the scientific standpoint and without regard to practicability; it has in mind large and expensive organizations such as are used in government work, and it has proposed rules which would impose grave hardships upon the smaller companies. For example, one rule provides that where two or more men are employed on any job, there must be a foreman who shall be in charge and continuously on the ground. In reply to my objection to this, they suggested that one of the men might be foreman. Everyone who has had anything to do with the employment of labor knows that that man would at once demand increased pay, and it would open up a field of friction in the working force.

Another rule which is theoretically correct but practically, I believe, unnecessary in many cases, and which would certainly militate against good and continuous service, is that which would require the opening of switches when a line is found grounded by means of ground detectors. It does seem to me that it would be better, if the ground does not cause damage or excessive flow of current, to patrol the line immediately, allowing it to remain closed in order to maintain service until the ground can be removed.

These are merely instances showing the tendency of a number of rules. The bureau has, however, shown itself very amenable to reason and suggestion, and the last revision of the rules which came under my observation had been wonderfully bettered over those originally set forth in Circular No. 49.

I do feel that this is a matter in which the industry at large should take an interest and that they should get in touch with the bureau and express their views on the subject very frankly. Their criticism must, of course, be constructive and not merely destructive if it is to be worthy of attention. This is a matter which should be acted on promptly because the question has been pending now for many months, and it will be of little avail to criticise after it has once been authoritatively promulgated.

In this connection we must bear in mind that many of the states now have thoroughly organized departments of labor which are following closely the activities of the United States government and are being largely guided by the rulings of the various more or less scientific bureaus engaged in the investigation of matters affecting labor and business.

C. L. S. TINGLEY, Second Vice-President.

Value of Published Costs

THE W. K. PALMER COMPANY
CONSULTING, DESIGNING AND SUPERVISING ENGINEERS,
919 BALTIMORE AVENUE
KANSAS CITY, MO., April 21, 1915.

To the Editors:

The editorial in the issue of the ELECTRICAL RAILWAY JOURNAL for April 17 on "Publication of Cost Figures" has appealed to the writer, but possibly not in the manner that might be expected, and prompts the following observances.

It is believed that what is most needed by every engineer, and the same statement may be made with almost equal effect as to the operating man, is not greater display of published costs of other people but the acquiring of the ability first, and facility and habit secondly, of determining his own costs more systemmatically and more reliably, for his own particular conditions, and then interpreting these more significantly. This same great "bugaboo" that has been mentioned, of effect of local and varied conditions, instead of being terrifying and causing hesitation in the use of available data, too often is wholly ignored, and any figures put forth by anyone or any institution that may be looked upon as supposed authority are accepted with a degree of blindness which often is as amazing as it is distressing.

Costs, for purposes of present consideration, may be classified as (*a*) costs of construction, and (*b*) costs of operation.

In the course of some years of engineering practice in which it has been the duty of the writer in many cases to review and criticise estimates, data and records of other engineers and institutions, he has become impressed with the general tendency and practice of relying with implicit confidence upon data and figures of others instead of developing by painstaking detail work probable costs for the conditions and requirements of the case in hand, if it is a matter of construction costs, or of analyzing operating conditions independently and fearlessly, if it is a case of studying probable or past operating results.

The persistent use of "average figures," from handbooks, accumulated data, reports of other constructions or properties and articles by current writers is the bane of the engineering practice and the fundamental cause of more disappointments, surprises, troubles and disasters, both constructional and operative, than any other one thing. Apparently the very nature of an "average" is forgotten. The probability of any given case in hand being just the "average" is exceedingly small. Neither can an isolated example be chosen and relied upon unless it is absolutely known that all conditions are the same, and to find such a case is unusual.

Referring to constructional costs, how frequently is a statement something like this found in an engineering estimate: "Take 58,750 cu. yd. at an average of 30 cents a yard," or "Assuming a total capacity of the power station at 3000 kw: 3000 kw at an average of $60 per kw, etc."; or again "Figuring this line at an average cost of $26,000 per mile complete, etc." Likewise, in estimating probable operating expenses, how common are such terms as these: "Assuming an average of 14.7 cents per car-mile for interurban roads for this territory we have, etc.," or "Assuming cost of power to be 1.2 cents per kw-hr. the expense for power will be, etc."

Such estimating is worse than useless. It is misleading and often ruinous. If such unit figures are to be used they should not be "assumed," but developed, determined and verified and their correctness and reliability set forth precedent to the estimating.

Similarly, in matters of determining operative earnings, what a great array of "conventional averages" there is, and arbitrary irrational standards, one characteristic illustration of which is the once prevalent notion that an interurban line to be good and worthy of financing must show a population that will "average" 1200 population per mile, figuring 3 miles on each side of the track. The simple fact seems to be ignored most generally and uniformly that there are two sides to every account and that the real test as to operating conditions is that the charges and credits of operation shall balance in favor of the business and therefore that a necessary high cost of operation may possibly be balanced satisfactorily by a more than average earning, or conversely that the lowest known operating expenses may not mean anything if the corresponding income is not commensurate.

The moral is for engineers and operators and all having to do with costs, first, in the matter of construction estimates, to go back to fundamental unit costs, verified by quotations and actual determinations for the certain conditions of the particular case, and develop therefrom itemized detailed estimates which will then be significant and express to the closest degree of accuracy possible the probable cost of a projected construction; and in the case of operating costs to analyze and compare these and set them down against the gross earnings in a way that will produce a financial statement expressive of the probable or past results, as the case may be, for a given set of operating conditions.

Averages are interesting to figure and to have in hand, afford a general indication and are convenient for "off-hand" estimating of the most approximate character, but dangerous and wholly to be avoided when anything like accurate dependable results are required.

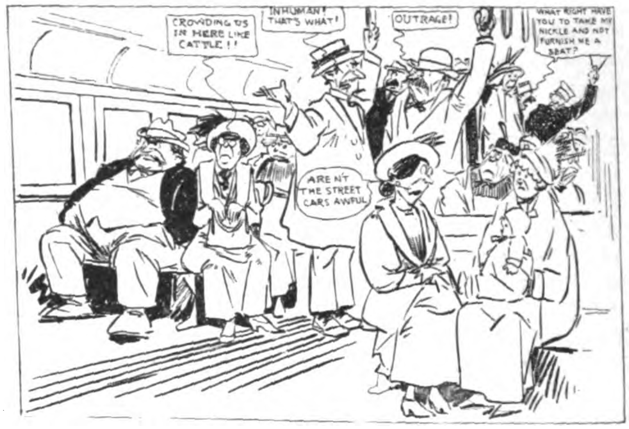
What is most needed is greater self-reliance, with painstaking detailed estimating and less dependence upon general data and the records of others, on the part of engineers and operating managements.

W. K. PALMER.

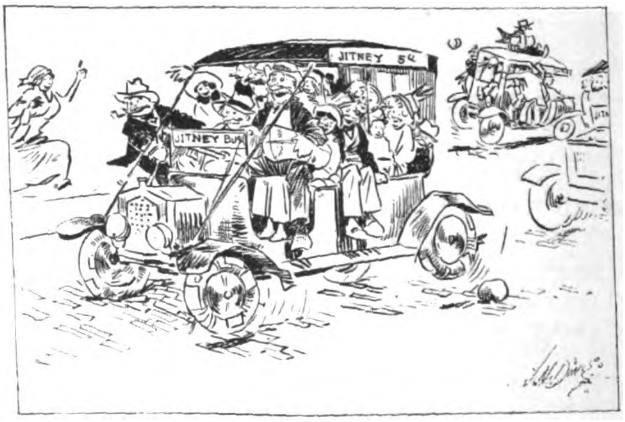
Jitney Cartoons

The jitney has been a favored subject of the newspaper cartoonist, and several sketches of this kind have been reproduced in this paper. Generally the idea conveyed has been the fear felt by railway managers of this new competitor. Sometimes, however, the cartoonist sees the other side and portrays the discomforts of the jitney as compared with the electric car. Such a sketch appeared recently in the Des Moines *Register and Leader* from the pen of J. N. Darling. A reproduction appears herewith. The views carry the general caption "What a Queer Lot We Are Anyway!"

WHAT A QUEER LOT WE ARE ANYWAY!


CROWDING US IN HERE LIKE CATTLE!!
INHUMAN! THAT'S WHAT!
OUTRAGE!
WHAT RIGHT HAVE YOU TO TAKE MY NICKLE AND NOT FURNISH ME A SEAT?
ARE N'T THE STREET CARS AWFUL

We rave like mad if we have to stand up in a street car for four blocks—



But we will ride ten deep in a four-passenger jitney and compliment the driver on his service.

More than one hundred students and instructors in mechanical and electrical engineering of the Ohio State University are to-day closing their annual inspection trip of a week's duration to points of technical interest. They visited Chicago, Milwaukee, Detroit and Gary, following in each an inspection program outlined in an interesting booklet published by the University.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Eliminating Frills to Reduce Paint Cost

BY A. P. LEWIS, SUPERINTENDENT POWER AND SHOPS CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

Because the public did not appreciate its extraordinary refinements in painting cars, the Cleveland, Southwestern & Columbus Railway has decided to eliminate the frills and thereby has been able to make quite a saving. This new policy has been in practice for some time, and the absence of any adverse criticism has induced the company to make the change permanent.

The first step to reduce the cost of repainting cars was taken by eliminating the "piano finish." This was done because the mechanical department believed that it was its own severest critic; in other words, that the public did not appreciate the superior appearance of a car with several coats of varnish and a rubbed finish. Of course, the primary object of applying paint is to protect the wood and steel, but this can be done in a satisfactory manner without resorting to expensive rubbing. The repainting process now employed requires one coat of color surfacer after the body has been prepared to receive it, following which the surfacer is scraped off with a knife. The repainting process is then completed with two coats of varnish. The saving, compared with the painting process formerly used by this company, is 5 gal. of paint at $1.50 per gal. and three days' work with three men at $2.50 each.

Experience has shown that cars treated with the present process will give fifteen months' service, after which they are taken to the paint shop for revarnishing. If the condition of the paint on the car is watched carefully, it is possible to revarnish them twice before repainting is again necessary.

Slotting Commutators in the Motor Shell

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES, SAULT STE. MARIE, MICH.

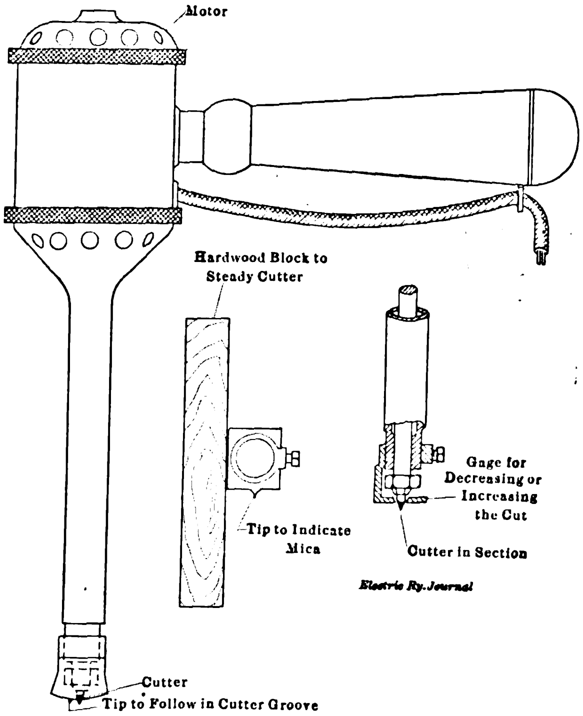
Several methods of undercutting or slotting mica are in use, but it is almost always necessary to remove the armature from the motor shell. For this reason, attention to the mica is often postponed until the bad condition of the commutator leads to burnt-out fields or armature coils, whereupon a costly general overhauling is necessary.

To overcome this trouble the writer has developed the device illustrated. At first he tried several kinds of scrapers but eventually the problem was solved by the use of a home-made motor of ⅛-hp capacity equipped with a suitable centrifugal cutter and a gage adjustable for different cuts.

The work is done as follows: A car with high mica commutator is brought in to a side post located about 8 ft. from the end wall of the shop. On this post a suitable eyebolt is installed for suspending a 5-ton chain fall. The car is secured to the chain fall and is pulled ahead a little at a time according to the progress made in the slotting of the commutator. The operator uses a short piece of hardwood block to guide the cutter along the mica grooves.

When the mica is undercut with this tool, we find that it is not absolutely necessary to sandpaper the commutator. The carbon brushes do the work of sandpaper, judging by the good appearance of the commutators when they come into the shop again.

I would not recommend that the average maintenance man should undertake to build in his own shop a machine of the character described, unless he has the facilities for very accurate work. It takes much time and skill to make the little mechanism go just right. It would be desirable if some manufacturer were to make a device of this kind on a commercial basis.


Motor
Hardwood Block to Steady Cutter
Gage for Decreasing or Increasing the Cut
Tip to Indicate Mica
Cutter in Section
Electric Ry. Journal
Cutter
Tip to Follow in Cutter Groove

PORTABLE COMMUTATOR SLOTTER

Folding Box to Guard the Public Eye Against Welding

BY R. P. WILLIAMS, INSPECTOR OF SPECIAL WORK BROOKLYN RAPID TRANSIT SYSTEM

When the arc welder was first put into service, all that was thought necessary to save the eyes of the passer-by was a three-sided box 2 ft. 6 in. wide with 2 ft. sides; and although it was liberally covered with the notice "Do not watch the flame" some complaints were received of the injurious effects of the flame. These complaints led to a modification of the protecting box as herein described.

Fig. 1 is a front view of the box; Fig. 2 a rear view; Fig. 3 shows the front bevel flap unhooked and thrown back, this being the first move in knocking the box down for shipment; Fig. 4 shows the box completely collapsed and ready for shipment.

The front bevel flap serves two purposes: First, it stiffens the box by making it sufficiently rigid to be handled by one of the helpers; second, it so confines the flame that a person in front cannot see it. The rear flap *A* shades the light from those at the back, and since this flap was added we have not heard of any complaints.

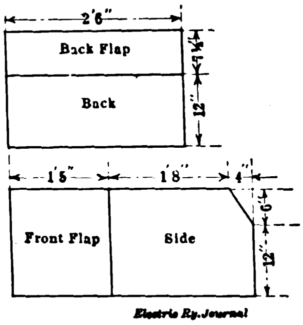
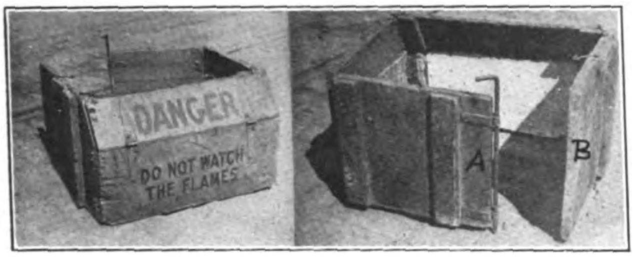
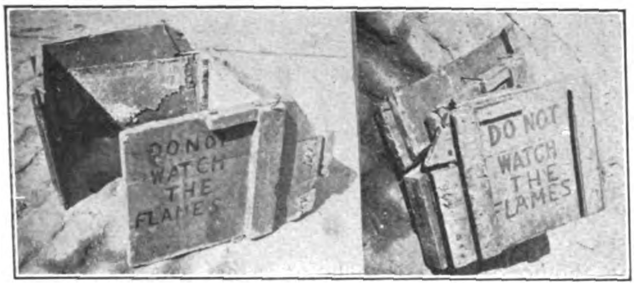


FIG. 5—BOX DIMENSIONS

The anchor bar at the right of flap *A* is used only when the operator is working on an incline and pulls it to behind him. The box is made of wood, lined with asbestos to protect the sides from sparks. A metal box would be dangerous to the operator, for should the electrode touch the sides he might get a serious burn. Usually the operator rests the left arm on top of the flap *A*, the right arm being thrust through the opening between *A* and *B*. Thus the operator's body shuts out all light from the back. By resting the left arm, as already stated, he has always complete, steady control of the electrode.



FIGS. 1 AND 2—FRONT AND REAR OF BOX



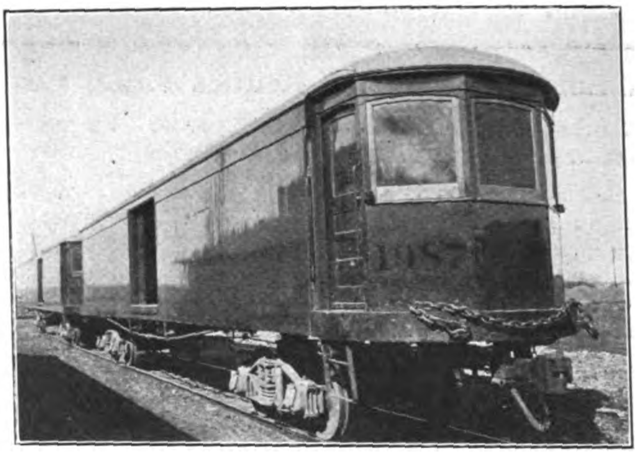
FIGS. 3 AND 4—FRONT BEVEL FLAP UNHOOKED; BOX COLLAPSED FOR SHIPMENT

Fig. 5 gives full dimensions of the box. A little study will determine how to place the hinges to get the knockdown effect.

Locomotive and Trail Cars in Detroit United Freight Service

BY C. L. KELLER, ASSISTANT MASTER MECHANIC DETROIT (MICH.) UNITED RAILWAY

Although the Detroit United Railway is one of the heaviest package freight handling electric roads in this country, it has not until recently engaged in the transportation of bulk freight. A decision by the Railroad Commission of Michigan which was recently sustained by the United States Supreme Court, in which a physical connection was ordered between the tracks of the Detroit United Railway and the Michigan Central Railroad at Oxford, Mich., made the general handling of bulk freight possible. In order to equip itself for switching and transporting steam railroad equipment, as well as for moving freight trains between Detroit and Flint, Mich., a distance of 67 miles, a 50-ton Westinghouse Baldwin electric locomotive has been purchased. Fifteen freight trail cars, comprising ten box cars and five express cars, were also purchased for this purpose. Views of one type of trail car and the 50-ton electric locomotive are shown in the accompanying illustrations.



DETROIT UNITED RAILWAY EXPRESS TRAILER

Owing to franchise restrictions in Detroit the locomotive may not enter the city, but freight is loaded into trail cars and delivered to yards just outside the city limits by means of motor express cars. During the day bulk freight loads are collected at this yard, where they are picked up early in the evening by the locomotive. The 67-mile run between Detroit and Flint is made in less than four hours, hence all freight delivered at the Detroit express terminal during the day reaches Flint the following morning. The locomotive is designed to draw a train of 250 tons over a track with sharp curves and heavy grades at a maximum speed of 22 m.p.h. on level track.

Essentially the locomotive consists of a steel underframe on which is mounted a cab, 16 ft. 6 in. in length, which contains the control apparatus. The underframe is 32 ft. 7 in. long over bumpers and 8 ft. 4 in. wide. This body is mounted on Baldwin trucks equipped with 33-in. rolled-steel wheels with A. E. R. A. treads and flanges. These trucks have a rigid wheelbase of 6 ft. 6 in., and with the 33-in. wheels are adaptable for a minimum radius curve of 35 ft. The distance center

DETROIT UNITED RAILWAY 50-TON FREIGHT LOCOMOTIVE FOR USE OUTSIDE CITY LIMITS to center of trucks is 16 ft., and the over-all wheelbase is 22 ft. 6 in. The locomotive is designed for double-end operation and is equipped with Tomlinson M. C. B. radial drawbars. Mounted on the trucks are four 301-D-6 Westinghouse motors with a nominal rating of 100 hp at 600 volts, 150 amp. These motors are of the tap-field type and are controlled by means of Westinghouse H. L. F. pneumatic control equipment.

Home-Made Saw for Tubing, Commutator Bars, Etc.

BY R. H. PARSONS, ELECTRICAL FOREMAN

A little device herewith illustrated will be found to be a decided time saver in a shop where it is necessary to cut much brass or copper bar or tubing at high speed. As this saw is not intended for heavy work, it can be run from belting at a speed of 1700 r.p.m., which will permit very fast production.

Fig. 1 shows an elevation of the saw. Its right side is used for making the slots for the leads of small commutators, while the saw at the left side is used for tubing, etc. A piece of 6-in. pipe with a base and top constitute the frame on which the saw rests. Fig. 2, the top view of the saw, explains itself.

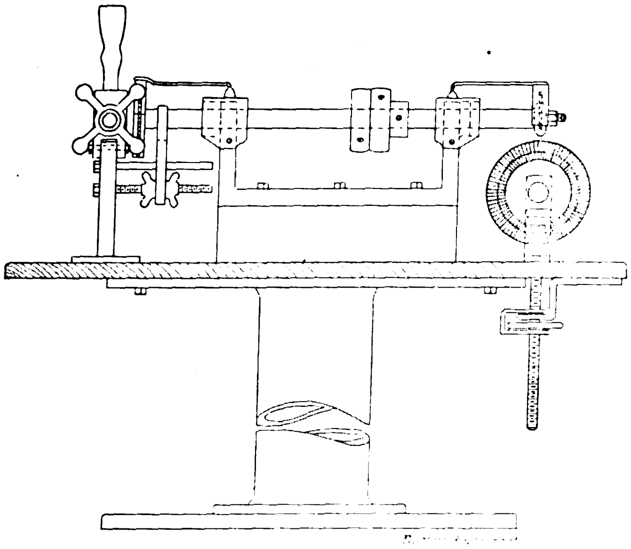
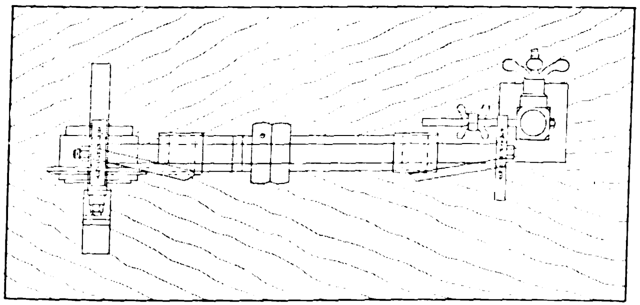


FIG. 1—ELEVATION OF SAWING TOOL

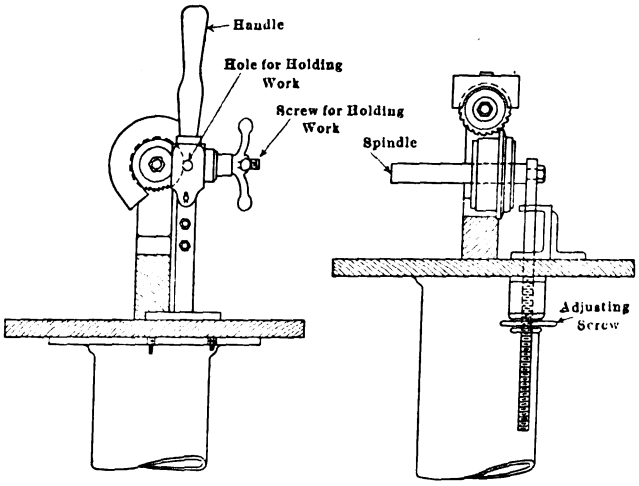
Fig. 3 shows an end view of the saw used for the commutators. It will be found good practice on commutators of small armatures, where the wire is fine and the slots for connections are small, to cut the lead (when stripping an armature) and then run a saw through the slot. This will save time, and prevent the ears of the commutator from being broken by tools in getting out the wires. The commutator, of course, is removed from the shaft and placed on a spindle of the machine, noted in Fig. 4. This spindle is in line with the saw and is adjustable for height so that the slot can be cut to any depth necessary.



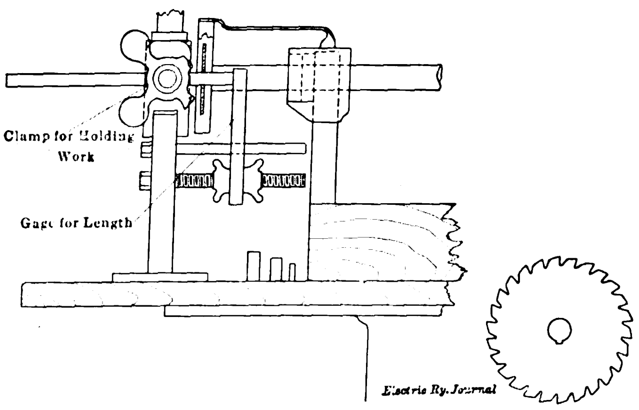
Electric Ry. Journal

FIG. 2—TOP VIEW OF SAWING TOOL

Fig. 5 illustrates the end of the saw used for cutting tubing. The main feature here is the clamp which prevents the tubing from turning or moving. The tubing is placed through the hole until it strikes the length gage, where it is held by tightening the hand nut slightly. Then with the aid of the handle, the tubing can be moved against the saw and quickly cut.



FIGS. 3 AND 4—END ELEVATIONS OF SAWS FOR TUBING AND COMMUTATOR RESPECTIVELY



FIGS. 5 AND 6—DETAIL OF CLAMP AND GAGE FOR TUBE SAWING; OUTLINE OF SAW

It is absolutely necessary that the proper saw be used. For that reason, Fig. 6 is presented to show an outline of the type of saw which will give the best results for such high speeds as 1700 r.p.m. The saw is 3 in. in diameter and 3/32 in. thick, with a very slight set in the teeth.

Trial Trip on New Subway Line

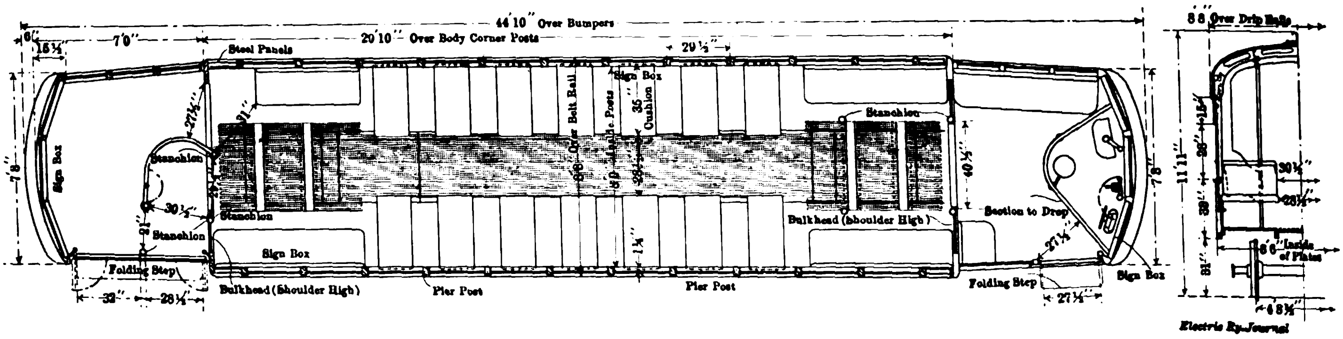
Members of the Public Service Commission for the First District of New York, officers of the New York Municipal Railway Corporation, the Interborough Rapid Transit Company and many city officials and citizens made a test trip on April 2 on the Sea Beach railroad with the new subway cars to be operated under the dual system contracts by the Municipal Railway Corporation, New York.

George W. McNulty, Inc., had the contract for the reconstruction of this line and the work is now about 99 per cent completed.

New Cars for Kansas City

The receivers of the Metropolitan Street Railway, Kansas City, Mo., have placed an order with the American Car Company, St. Louis, Mo., for fifty single-end, double-truck motor cars. These cars will be built according to specifications and designs prepared under the direction of William P. Woods and P. J. Kealy, representing respectively the city and the street railway interests on the board of control. The new equipment will have the following general dimensions:

Length over body corner posts	29 ft. 10 in.
Length over bumpers	44 ft. 10 in.
Width over all at widest point	8 ft. 8 in.
Width of aisle	28½ in.
Center to center of side posts	29½ in.
Height from the top of the rail to the top of the trolley board	11 ft. 6½ in.
Truck centers	19 ft. 7 in.
Diameter of wheels	30 in.
Wheelbase of truck	6 ft.
Truck gage	4 ft. 8½ in.
Step heights:	
Rail to top of first step	13 in.
First step to platform floor	11 in.
Ramp in platform floor	2⅓ in.
Platform floor to body floor	8 in.
Ramp in car-body floor	2½ in.
Height of top of body floor above top of rail	37 in.
Entrance width in the clear	32 in.
Rear exit width in the clear	28½ in.
Front exit width in the clear	27½ in.


44'10" Over Bumpers
20'10" Over Body Corner Posts
7'0"
15½
29½"
Steel Panels
Sign Box
Stanchion
Folding Step
Bulkhead (Shoulder High)
Pier Post
Section to Drop
8'8" Over Drip Rails
Inside of Plates
Electric Ry. Journal

KANSAS CITY CAR—GENERAL ARRANGEMENT OF SINGLE-END, DOUBLE-TRUCK MOTOR CAR

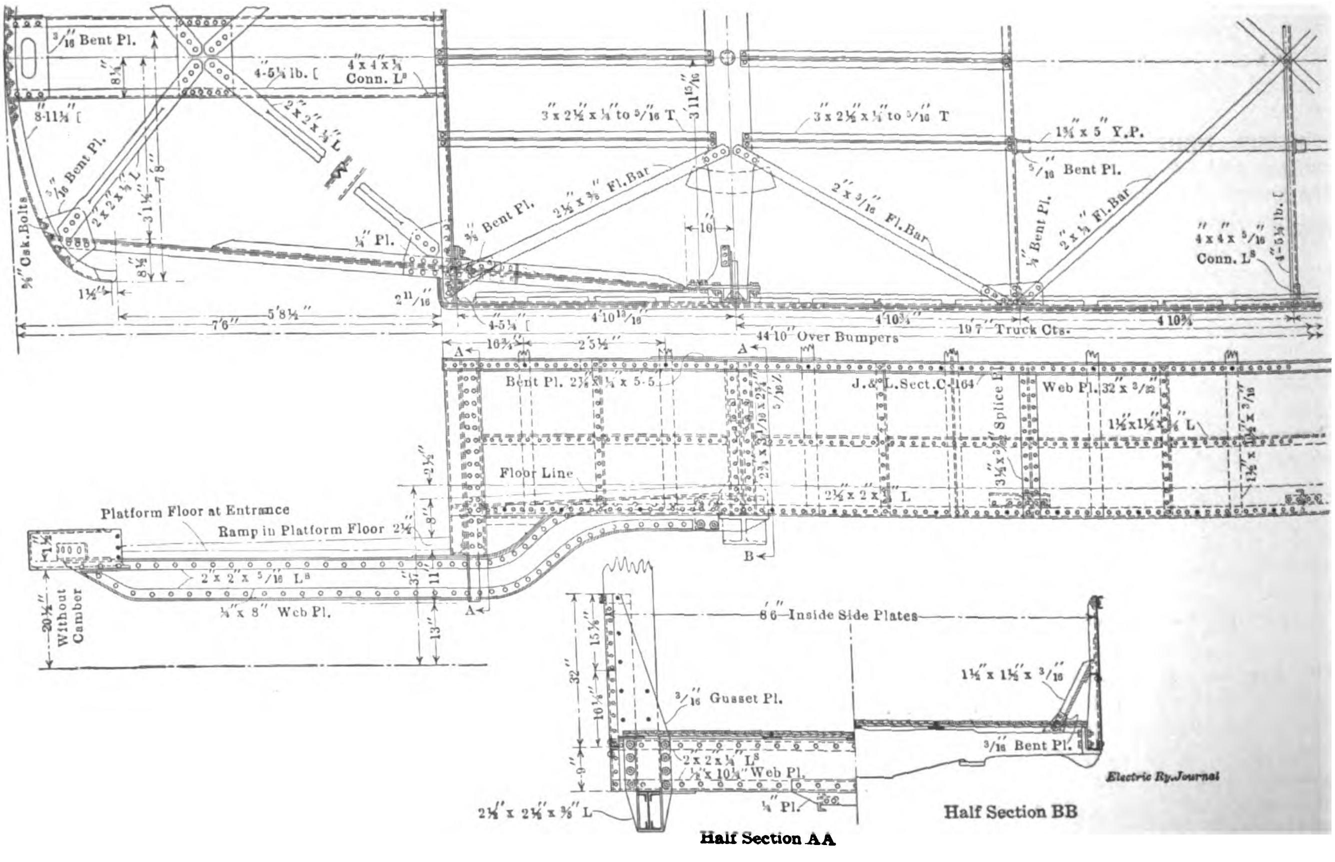
The car has a seating capacity of forty-eight and its estimated weight is 40,000 lb.

The general arrangement of the car will embody a large, roomy platform, wide aisle, wide seat cushions, safety treads set into the small ramps at the ends of the car body and stanchions in the forward end of the car.

The rear doors will fold out and the rear step will be folding, all operated by one lever. The front exit door is to be of sliding type with step folding up. Near the exit doors the passengers on the end seats are to be protected from drafts of cold air by a light-weight bulkhead of shoulder height.

To obtain quick loading, the rear doors are to be opened by one lever, and the hand rail on the rear platform will be shortened to give a space of 21 in. in the clear between the post dividing the entrance and exit doors and the hand rail. As the movement during rush hours is generally in one direction, the arrangement to permit the passengers to use both the rear doors at the same time will make it possible to use the rear platform space most effectively. There will be no grab handles on the exterior of the car, and as the steps are folding the car is practically "hitch proof."

The stanchions in the front end of the car are to be


3/16" Bent Pl.
4x4x¼ Conn. Ls
4-5¼ lb. [
8-11¼ [
2"x2"x¼ L
⅝" Oak Bolts
¼" Pl.
⅜ Bent Pl.
2½x⅜" Fl. Bar
3"x2½"x¼ to 5/16 T
2"x5/16 Fl. Bar
1¾"x5" Y.P.
5/16" Bent Pl.
2"x½" Fl. Bar
44'10" Over Bumpers
19'7" Truck Cts.
Bent Pl. 2½x¾x¼ x 5-5
J.&L. Sect. C-164
Web Pl. 32"x3/32
1½x1½x¼ L
Floor Line
2½x2x¼ L
Platform Floor at Entrance
Ramp in Platform Floor 2¼
2"x2"x5/16 Ls
¼"x8" Web Pl.
20½" Without Camber
8'6" Inside Side Plates
3/16 Gusset Pl.
1¼"x1¼"x3/16
3/16 Bent Pl.
2x2x¼ Ls
¼"x10¼" Web Pl.
2¼"x2¼"x⅜" L
¼" Pl.
Half Section AA
Half Section BB
Electric Ry. Journal

KANSAS CITY CAR—STEEL UNDERFRAME FOR SINGLE-END, DOUBLE-TRUCK MOTOR CAR set out from the seats approximately to the knee line, so that they will in no way compromise the use of the seats behind them.

The car is to be finished in cherry, and will have lower sash of brass, pressed-steel carlines, Agasote headlining, Honeycomb ventilators, sanitary enamel hand straps, aluminum stanchions and hand rails, Consolidated door signal and heaters, with Railway Utility Company's thermostat control. All cables are to be run in conduit. The bell cord will be concealed by running it through a light tubing inside the double ceiling.

The body of the car is to be equipped with fourteen lights in rows of seven on each side of the ceiling. The front platform is to have one light mounted on the hood ceiling, and the rear platform three lights in the ceiling. A light with special reflector will be placed on the outside of the car over the middle of the front exit, and a similar one over the rear step. At night the step lights will burn continuously. The front reflector will be provided with a green lens and the rear reflector with a ruby lens for markers.

Features of the underframe will be deep side plates, 3/32 in. x 32 in., which are bent well around the corner posts, the large 3/16-in. vertical gusset plates between the side plates and the end sills; the platform knees which are straight in plan the entire distance from the bumper to the bolster, with improved knee hangers; the liberal cross-bracing in the platform and body underframe to take centrifugal and trailer strains. The 8-in. channel bumper will be attached with countersunk machine bolts and will be readily removable for straightening in case of accident.

The corner posts will be 10 in. wide across the car and will be firmly anchored in place by through bolts engaging the 3/16-in. gusset plates on the inside and the ends of the side plates, which are bent around the corner posts on the outside.

As the underframe is to be symmetrical about both center lines the car can be readily made double end at any time. At the bolsters the side plates are kept in a vertical position by angle-iron braces between the bolsters and the side-plate stiffeners. The hangers for the knees are to be made of 2½ in. x 2½ in. x ⅜-in. angles with the legs bent double on themselves under the knees. The hangers are to be attached to the built-up end sills by means of ⅝-in. drive fit bolts which engage not only the end sills but the 3/16-in. gusset plates, thus transmitting a large part of the stress directly to the side plates. The bolsters are to be of cast steel. The knees will be of a plate and angle built-up section.

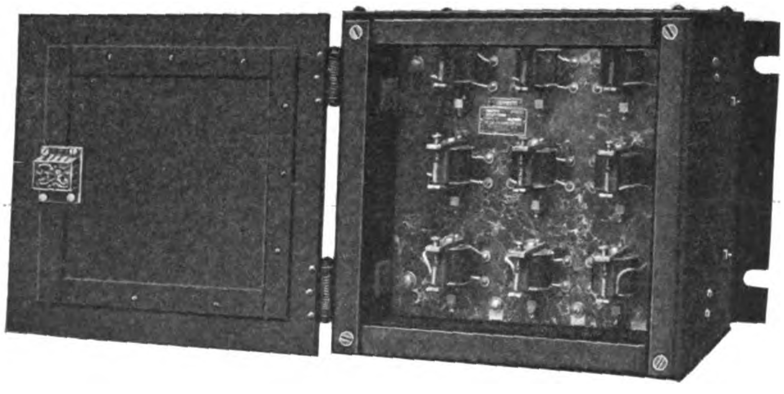
On account of the racking of the roof of the car due to rapid acceleration and braking, and the severe grades existing in Kansas City, a special design of corner construction has been developed, the salient feature of which is the use of blind panels at the corners between the corner posts and the adjacent posts and extending from the belt rail to the letterboard. These are to be of sheet steel riveted directly to the side plates at the bottom and well anchored to the letterboard at the top. On their vertical edges they will have angles through-bolted to the posts. The racking of the roof will thus be transmitted directly to the side frames through the stiff steel panels, thereby permitting light side posts.

APPARATUS

The cars are to be operated single-end with K-type controller and four GE-247 ventilated, inside-hung motors. Straight air brakes with the emergency feature will be installed and a conductor's valve will be mounted under the rear platform with suitable foot-operating plunger. This plunger, while accessible to the conductor, will not be in a position where it could be operated accidentally by a passenger. The trucks will be of the Brill 77-E type, with a graduated spring arrangement to give good riding qualities at all loads.

Regulator for Car-Lighting Circuits

Experiments have been carried on for the past two years on the Milwaukee Northern Railway, between Milwaukee and Sheboygan, to develop a regulator to keep a practically constant voltage on the car-lighting circuit, irrespective of the fluctuations in voltage in the trolley circuit and so secure good car illumination. It was found during these experiments that with a fluctuation in voltage not exceeding 7 per cent in the car-lighting circuit essentially uniform illumination could be had if tungsten lamps are used, and a regulator to comply with these conditions has been developed by the Thomas S. Watson Company of Milwaukee.



VOLTAGE REGULATOR FOR CAR-LIGHTING CIRCUITS

As first arranged, the regulator took care of four lamp circuits in multiple, the regulator being arranged so as to take care of a range of from 450 to 650 volts. With this plan, however, as the headlight was in series with the lamps in the car, if one or more circuits went out, the headlight became dimmed so much as to be unsatisfactory. It was decided, therefore, to adopt a regulator of the constant current type, putting all of the lights in the car and the headlight in series. This allows the use of low-voltage lamps in the car and a low-voltage headlight, all of which are desirable.

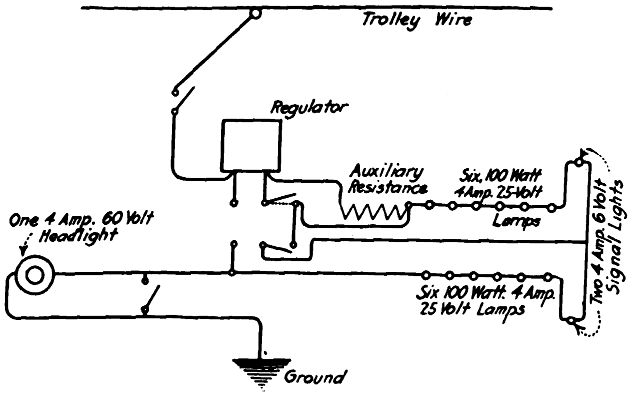

Trolley Wire
Regulator
Auxiliary Resistance
Six, 100 Watt 4 Amp. 25-Volt Lamps
One 4 Amp. 60 Volt Headlight
Two 4 Amp. 6 Volt Signal Lights
Six 100 Watt 4 Amp. 25 Volt Lamps
Ground

DIAGRAM OF CAR-LIGHTING CIRCUITS

With this arrangement, ordinary street series sockets with short-circuiting disks are used to take care of the condition in case one lamp or more should burn out. In addition a third wire is run from the center of the circuit, and single-pole double-throw switches are installed so that either half of the circuit can be short-circuited. With this arrangement, the conductor or motorman can quickly cut out the section containing the burnt-out lamp and keep one-half of the car lighting and the headlight in operation. The burnt-out lamp can then be replaced and switches opened, and all lamps are then in operation again. If a lamp is not available, a short-circuited plug can be placed in the socket of the burnt-out lamp and the rest of the lights can then be used.

One of the accompanying views shows the general construction of the Watson car-lighting regulator, which consists of series-resistance coils and relays to vary the number of coils in circuit. The number of relays varies with the desired voltage range. The coils are all in series with the lamps and no fine wires or shunt coils are used. The first diagram shows the connections with twelve 100-watt, 25-volt lamps in series, with two 4-amp, 6-volt signal lights and one 4-amp, 60-volt headlight, making the maximum voltage across the lighting terminals 372 volts. With this arrangement the voltage can vary from less than 350 to as high as 650 volts, without any noticeable effect on the lighting. It is possible, however, to make other arrangements with the lighting and regulator, with either higher or lower voltage. The diagram on this page shows the optional arrangement with the lamps in multiple.

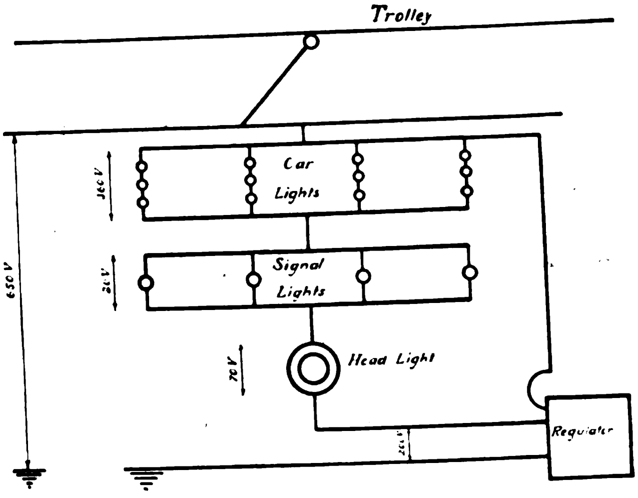


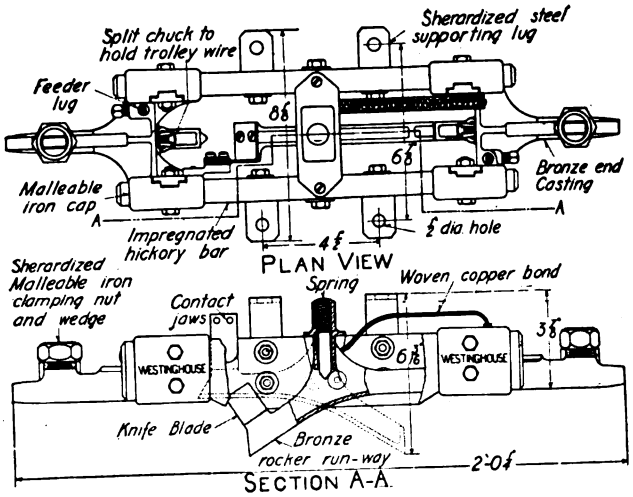
DIAGRAM OF MULTIPLE ARRANGEMENT OF LAMPS

This type of regulator has been in service for over a year without renewal of any of the parts, except the contacts, which are the only parts that wear, but the cost of their renewal is slight.

Automatic Section Insulator

The automatic section insulator of the Westinghouse Electric & Manufacturing Company is inserted in trolley wires where it is desirable to energize a section when the trolley passes onto it and to de-energize it when the trolley passes off. It is used extensively in mining installations where a branch is to be energized only when the locomotive is on that branch. Leakage losses and dangers of contact by persons passing under the trolley wire are thereby averted when the locomotive is not on the branch. Electric railways sometimes use such insulators in the same way.

As illustrated, the circuit is opened and closed by a switch blade mounted on a rocker that the trolley operates. In one position the blade connects with copper contactors. In the other there is no connection. A brass plunger pressing against a steel roller gives a position centering action and prevents the rocker from remaining in an intermediate position. There is no arcing at the switch contact, because the rocker is always energized and the switch connection is always opened or closed while the trolley wheel is on the rocker.



AUTOMATIC SECTION INSULATOR

Side bars of impregnated hickory take the stress. All metal parts are either sherardized or of bronze. Wedges are used to hold the trolley wire and an internally threaded chuck, like that used in the Westinghouse Cleveland splicer, supplements these. A flexible woven-copper bond carries current to the switch blade on the rocker.

Recording Speed Indicator for Railway Trains

An electric tachometer outfit has been prepared by the Holtzer-Cabot Electric Company, Brookline, Mass., for determining the speed of a railway train, or, with changes in equipment, to record permanently the different speeds of a train and the time the speed was recorded.

The outfit consists of a small, specially constructed magneto generator and an indicating device, which is essentially a voltmeter calibrated to indicate the speed of any revolving mechanism in miles per hour. The speed indicator may be placed at any desired distance from the revolving mechanism, and the voltmeter may be of the switchboard type, mounted on a switchboard, or it may be a portable instrument. If desired a recording meter can be furnished.

In cases of railway accidents traceable to non-conformity to time schedule this combination of voltmeter generator and recording meter dispels all doubt as to the actual train speed at the time the accident occurred, because it gives a permanent record of the speeds, stops and delays, and the time of each, during an entire run. When used for this purpose the generator is mounted on the trucks of a car, equipped with a "V"-grooved pulley and driven by a steel spring belt from a "V"-grooved pulley on the axle of the car. The generator is connected by conducting wires to the indicating or recording meter which is mounted on the wall of the car.

The meter is of extra high resistance, with an auxiliary resistance which permits adjustment of the instrument after it is installed and from time to time to meet actual working conditions.

LONDON LETTER

(From Our Regular Correspondent)

The negotiations for the purchase of the tramway system of the Bristol Tramways by the Bristol Corporation have been abandoned. The proposal of the Parliamentary bills committee to oppose the tramway company's bill has therefore been approved without debate. The company is asking Parliament to revive and extend the period of certain rights conferred by earlier statutes, which, not having yet been exercised, would necessarily expire. These lapsing powers would authorize the company to extend the system on the outskirts of Bristol, and the corporation act would oblige the city, if it buys any part of the undertaking, to purchase the whole.

Edinburgh Corporation proposed in the provisional order promoted this year to extend the existing line from the terminus at Craiglockhart to Bedford Barracks, thus affording a short and direct route into the city. Unfortunately the Parliamentary commissioners have refused to sanction this scheme except upon conditions which the corporation feels itself unable to accept. The alternative is the project of the Colinton Tramway, which some time ago obtained Parliamentary powers to construct a passenger line from Slateford to the barracks along the rail track used for the conveyance of building material and stores during the construction of the barracks. As the Colinton Company was first in the field, the Parliamentary commissioners evidently thought that the corporation was not entitled to succeed unless it took over the company's property and interests at a valuation of £9,000, and fulfilled certain obligations in the company's contract with the War Office. The corporation has decided that the conditions do not warrant it proceeding with its plans.

A sub-committee of the tramway committee of Edinburgh Town Council is considering a proposal to experiment with self-propelled cars over the tramway routes in the city. It has been agreed to recommend that a new car be acquired and that a cable car be converted to self-propelled mechanism for experimental purposes.

The Glasgow Corporation tramways department is experimenting with women conductors. Two women conductors made their appearance recently on the Dumbreck and University route, and continued on duty throughout the usual period. They were dressed in a neat navy blue jacket and skirt uniform, and yachtman's cap, with yellow braid. The route between the Hillhead and University district and the suburbs of Pollokshields and Dumbreck is one particularly suitable for the employment of women. James Dalrymple, manager of the tramways, said that the question of employing women was forced upon the department by the large drain on the staff through the war. At present the department is about 300 short of its complement. A short time ago the tramways committee asked Mr. Dalrymple to report on the practicability of working with women conductors. As he did not know any place, in Scotland at least, where women conductors were employed, he decided to experiment on his own account. He accordingly arranged with two women members of his staff to take duty for a week, supplied them with what he thought was a suitable uniform, and asked them to let him know how they got on. It is now reported that the employment of women as conductors on the tramway cars running between the University and Dumbreck has proved so satisfactory that women will be used on a route where the traffic is more varied and where many passengers are handled at the meal hours.

The use of Edison electric battery vans in London is increasing. The Edison Accumulator Company, London, has provided four of these omnibuses to the York Corporation, the last of which has just been put into service. When these vehicles were completed they were sent down to York by road, a distance of about 230 miles. An average speed of 9 m.p.h. was maintained throughout the journey. The omnibuses are single-deck vehicles, and each seats twenty-two passengers. One motor is used, and the transmission to the driving wheels is by chains. The battery consists of sixty-four Edison cells with a capacity of 300 amp-hr. and a working pressure of about 65 volts.

At a meeting of the Hull Corporation tramways committee, the Lord Mayor foreshadowed a reduction in the tram service consequent upon increased expenditure and shortage of men through drivers and conductors enlisting. Owing to war bonuses wages were up £6,000, coal would cost about £2,000 more, and there were other increases. Employees were still enlisting. The committee said that it might be necessary to reduce the service.

The electric tramway line from Colwyn Bay to old Colwyn is now completed and fully equipped, and all the contractors' plant has been removed. The road-widening work, which was necessary to accommodate the tramway traffic with the ordinary traffic of the Abergele Road, is not yet finished in some places, but is being pressed forward. The extension is nearly 2 miles in length, and will serve a considerable population on the route, as well as the residential and industrial population at Old Colwyn and Llysfaen.

An effort is being made to get the treasury to remove its interdict against capital expenditure by municipalities so far as to allow the Manchester Corporation to proceed with the erection of the new electricity generating station at Barton. As the scheme was planned, the first portion of the works, which will cost £135,350, was to have been completed by March, 1916. The electricity committee contends that it is in the public interest that the work should proceed. The committee has been encouraged by the central executive committee of the Employers' Parliamentary Association, which expressed the opinion that "permission should be accorded to the Manchester Corporation, and other corporations similarly situated, by His Majesty's treasury to raise fresh loans for the purpose of the extension of any electricity undertakings, as any refusal to secure permission would hamper, to a very considerable extent, those firms engaged on government contracts which are dependent upon the corporation for their supplies of motive power."

The Metropolitan Electric Tramways and the London United Tramways, both of which are closely associated in the London & Suburban Traction Company, have the same unwelcome tale to tell of reduced traffic owing to the war. In the case of the United company this reduction amounted to £11,658, and in that of the Metropolitan company to £8,510. Owing to the number of employees who as reservists were recalled to the colors, it was found necessary to reduce both services, and further reductions were due to subsequent enlistments. As a result, the Metropolitan company pays an ordinary dividend of 2 per cent, as against 3 per cent, and the United one-half of 1 per cent on its preference shares, as against 1 per cent. Additional shares in both companies have been acquired by the London & Suburban Traction Company, the fortunes of which have also been affected by the war, for it finds itself unable to add anything to the interim dividend at the rate of 1 per cent per annum declared for the first half of the year. Even this is better than the result for 1913, when only the preference dividend was paid.

The congestion of traffic during the busy hours of the day on the London tramways appears to be getting worse. While this may be partly due to the natural growth of the business, it is very largely caused by the decrease which is evidently still going on in the number of motor omnibuses on the streets. The tramway traffic receipts now show increases of from £4,000 to £5,000 a week, as compared with the corresponding weeks of last year. The delivery of a large number of trail cars which the County Council has had on order for a considerable time is shortly to begin. These will be coupled to the electric motor cars which run on the main southern routes, and will serve to reduce the congestion.

The treasury has not yet replied to a letter from the London County Council asking for guidance on the subject of restricting capital expenditure by local authorities during the war, but letters from the department dealing with specific proposals throw light upon the attitude of the government. The treasury has intimated that it cannot, as at present advised, approve Clause 25 of the London County Council bill, which authorizes capital expenditure of £271,900 for tramway purposes. It urges that, as far as possible, all new capital expenditure should be postponed, and that works in progress should be slowed down unless special circumstances exist.

A. C. S.

News of Electric Railways

BAY STATE ARBITRATION

Evidence in Wage Arbitration Case at Boston Concluded on April 23

The presentation of evidence in the Bay State Street Railway wages arbitration case was completed at Boston, Mass., on April 23. Adjournment was taken until May 17 at Ford Hall, Boston, when final arguments will be made by counsel. The hearings began on Dec. 17, 1914, and have covered sixty days of sessions. The record consists of 6146 pages of testimony and 424 exhibits.

In the later hearings P. L. Saltonstall, of the firm of Tucker, Anthony & Company, Boston, a member of the executive committee of the Bay State company, was questioned at considerable length. The witness described the consolidation of the thirty-six street railways comprising the Bay State system and controlled by the Massachusetts Electric Companies as a voluntary association. He stated that the promoters of the enterprise originally expected that these properties would normally show a 5 per cent yearly increase in gross earnings, but in very few years have the results come up to expectations. Operating expenses have increased at a disappointing rate. Each member of the executive committee of the Bay State company receives $1,000 per year. The president of the Massachusetts companies receives $4,000 per year, and practically no other official of the holding company receives more than a nominal compensation for his services. Mr. Saltonstall said that in his opinion the Bay State company cannot grant any increase in wages without curtailing its service and reducing its dividends. The witness said that there has never been a dollar of inflation in the Bay State company's securities. A large percentage of the acquired companies would have gone into the hands of a receiver had there been no consolidation, which insured efficient management, good credit and financial economy. The total expenses of the holding company do not exceed $25,000 per year, and this money comes from dividends on the Bay State stock.

Robert S. Goff, vice-president and general manager of the Bay State company, said that the road was organized on a departmental rather than on an independent divisional basis. This arrangement is believed to be the most economical possible. All reports come to one common center where are department heads who are experts in their lines. Their services are at the disposal of any locality. Formerly the company did not enjoy the uniformity of practice now maintained. Standardization has been effected on a broad scale by departmental organization. Mr. Goff stated that the permanent investment of the company has increased from $8,000,000 in 1900 to $48,000,000 in 1914, the respective investments per mile of track being $36,600 and $49,400. The average permanent investment per mile of track for fifty-two Massachusetts companies, excluding the Boston Elevated Railway, is about $50,500. If the normal 5 per cent growth in receipts had been experienced by the company since 1903 the passenger revenue would have been greater in 1914 by $1,165,000 notwithstanding an increase of 121 miles (14 per cent) in the trackage. Mr. Goff attributed the falling off in the rate of increase largely to adverse business conditions, and said that the jitney bus is making inroads, at least temporarily, in the revenue in Brockton and Fall River. The net income prospects for ten months of the fiscal year 1915 indicate that there will be a total drop of $154,000 compared with a year ago. Of this decrease $80,000 is due to an arbitrary order of the Interstate Commerce Commission requiring the company to set aside a depreciation fund hitherto not carried as such. Hence the company ought to reduce the wages of its employees to the 1912 basis in order to come out even. President P. F. Sullivan also testified that the wages ought to be reduced to at least the 1912 basis rather than increased, in a brief examination.

Mr. Goff also said that in 1914 the company expended 17.63 per cent of its revenue in maintenance, although the Massachusetts Public Service Commission has stated that some well-managed roads in other cities reach 20 per cent. The latter figure should at least be attained, in the speaker's opinion. Wages of motormen and conductors represent 21.9 per cent of the total revenue on the Bay State, compared with 21.7 per cent in all Massachusetts, 19.98 per cent in New England and 18.35 per cent in the United States. Mr. Goff then referred appreciatively to the profit-sharing plan in force at Philadelphia as described by T. E. Mitten before the Federal Trade Commission, and suggested its feasibility of application on the Bay State system as a solution of the wages problem. The Philadelphia company carries about 23 per cent spare men, compared with a range of from 19 per cent in Nashua, N. H., to 98 per cent in Fall River, Mass., on the Bay State system. The witness questioned the justice of uniform wages throughout all operating divisions.

BILLS IN ILLINOIS

A number of bills affecting interurbans or street railways are pending in the Illinois General Assembly. Of interest to the interurbans especially is the effort of the steam railroads to secure a maximum passenger fare rate of 2½ cents a mile instead of 2 cents as now charged. The bill has had a hearing in the House committee on public utilities and is expected to be reported out within the next few days. The interurban lines also are interested in the so-called home rule bills providing for the amendment of the public utilities act in such a way as to give Chicago control of its own utilities through a local commission. All utilities in the State at present are governed by a central State commission. Other bills of interest to electric railways follow:

House Bill No. 55 (Ryan) limiting the hours of employment of motormen, conductors, gripmen, guards and other trainmen to ten hours within twelve consecutive hours during any one day except in cases of extraordinary emergency; pending before the committee on public utilities.

House Bill No. 114 (Walsh) requiring street railways and elevated railways to provide motor cars with devices or mechanical means to clean sleet, rain or snow from motorman's windows; pending before the committee on public utilities.

Senate Bill No. 144 (Roos) prohibiting any unauthorized person except employees of the railroad, station agents, section foremen, etc., from walking, riding or driving upon or along the tracks of any railroad company in the State at any other place than a public or private crossing; pending in committee on railroads.

House Bill No. 25 (Dudgeon) providing that all railroad time-tables must be published in newspapers in cities, villages and incorporated towns of less than 100,000 inhabitants, rates to be fixed by the State Public Utilities commission; pending in the committee on public utilities.

Senate Bill No. 109 (Bailey) and House Bill No. 80 (Merritt) permitting the exchange of newspaper advertising for transportation; pending before the Senate on first reading and also before the House, with favorable recommendations by committees.

House Bill No. 126 (Burns) providing that where any street railway operates lines in any city, town or village under ordinances or grants, the consent of the city may be granted for the construction of mileage on extension or additional lines without a petition of the street railway, provided that the city shall give at least ten days' public notice of its intention to require such construction, the company to pay all damages to owners of property; pending in the public utilities committee.

House Bill No. 78 (Merritt) making it unlawful for any person driving a motor vehicle to cross railroad tracks without first stopping within 50 ft. of the tracks; pending before the committee on roads and bridges.

House Bill No. 553 (Quisenberry) empowering county commissioners of highways to authorize and permit the construction of pole lines and conduits for the transmission of electricity for lighting and power purposes along, upon and across public highways and public and private roads, and legalizes such transmission heretofore given; pending before the public utilities committee.

IMPROVEMENTS AT CEDAR RAPIDS

The Iowa Railway & Light Company, Cedar Rapids, Ia., which has been mentioned as having purchased new boilers and ash-handling equipment, has ordered two Edgemore boilers and Taylor stokers for its Cedar Rapids plant. A contract has also been let to the General Concrete Construction Company, Chicago, Ill., for a 210-ft. concrete stack for the same plant. The railway also plans to operate its 45-mile interurban line at 1200 volts direct current. The new line between Cedar Rapids and Mt. Vernon was built for this voltage and the Cedar Rapids-Iowa City line is being rapidly rebuilt with this end in view. It is planned to complete construction work so that 1200-volt operation may be started early in 1916. The new car equipments designed for the higher voltage were purchased in 1914.

The company has completed a 17-mile 33,000-volt transmission line between Indiantown and Gladsbrook and has taken over the lighting and power contract in the latter place. A 23-mile, 33,000-volt, high-tension line built on Franklin tripod steel poles, has also been completed recently between Perry and Grand Junction, Ia. An 8-mile extension of this line to Paton, Ia., is contemplated. Track and overhead reconstruction scheduled for this year by the Iowa Railway & Light Company includes 1½ miles in Marshalltown, Ia., and three-quarters of a mile in Tama and Toledo, Ia.

OHIO LEGISLATION

Having reconsidered the Ott bill on April 21, it was immediately put to vote in the Senate and defeated. This bill provided for eleven consecutive hours of rest in every twenty-four for motormen and conductors and limited the hours of labor to ten.

The Myers bill, enabling steam and electric roads to join in the construction of union depots and terminals, was passed by the House on April 21 and sent to Governor Willis for his signature.

The Behne bill was recommended for passage on the same day by the public utilities committee of the House. It makes the issue of bonds for the purchase or construction of utility plants subject to a vote of the electors in case they are to be made a lien on the general credit of the municipality. Where issued on a vote of Council they are a lien only on the utility property itself. A majority of two-thirds is required where the question is submitted to the voters, although provision is made for exceptions where laws are enacted relating special cases, such as the proposed municipal loop in Cincinnati.

Governor Willis has before him the Reighard bill, which makes the valuation of public utilities properties by the Public Utilities Commission optional instead of mandatory, as was the case in the law under which the commission has been operating for the last two years. This will not affect the examinations that have already been begun.

INDIANAPOLIS LABOR CONTROVERSY

Attorneys for the union employees of the Indianapolis Traction & Terminal Company, who have been restrained by the Federal Court from attempting to call a strike on the company's lines, on April 23 moved to dismiss the motion which they had filed in the United States Circuit Court asking that the company be enjoined from securing signatures to its individual service contract, apparently on account of the fact that they were totally unable to substantiate any of the charges made. The employees and the Indianapolis Traction & Terminal Company were made joint defendants in a suit for temporary injunction obtained in November in the Federal Court through petition by the Guaranty Trust & Safe Deposit Company, Philadelphia, trustee under the mortgage of the Indianapolis Traction & Terminal Company. The motion for a restraining order filed on April 14 by attorneys for the union asked that the company be compelled to live up to the arbitration agreement, alleging that the company was compelling its employees to sign individual contracts in violation of their interpretation of a decision of the Public Service Commission acting as a board of arbitration appointed to settle disputes arising between the company and its employees.

William Blackman and James A. Smythe, who were sent to Indianapolis by the Department of Labor at the request of the Central Labor Union, arrived on April 23 and conferred with the permanent board of arbitration, composed of Governor Ralston and the members of the Public Service Commission. The Central Labor Union has issued a public statement, protesting against the alleged delay of the board of arbitration in trying the cases of men who have been discharged by the company and refused reinstatement. This so-called "protest" has been made notwithstanding the plain facts that there are now no cases before the board of arbitration which have not been acted upon.

CLEVELAND MATTERS

New Construction and Several Extensions Considered—Earnings for March

At the meeting of the City Council of Cleveland, Ohio, on the evening of April 19 legislation was enacted providing for the appropriation of land that will enable the Cleveland Railway to extend the Superior Avenue line along East 123rd Street to St. Clair Avenue. Mayor Baker declared that the Council was committed to building the line through a resolution adopted a year ago.

The City Council of Lakewood, a suburb of Cleveland, passed the new franchise on April 19. It provides for a 3-cent fare in Lakewood and 5 cents between Lakewood and Cleveland. Interurban cars are to pass through the town without stopping for local traffic.

Peter Witt, street railway commissioner, has espoused the cause of the Cleveland Railway in its refusal to pay taxes on the valuations fixed for 1913 and 1914, because it considered them unfair. The company brought injunction suits against the county treasurer to prevent him from collecting the taxes and demanded that the State tax commission explain its method of valuing the property. So far it has failed to do so. Mr. Witt says the company has a right to know the details of the plans employed by the commission in arriving at the value.

On April 26 the City Council authorized the extension of the Hough Avenue line to East 105th Street. This will require the expenditure of about $15,000. Mr. Witt has submitted his report for 1914. It states that if the increase in business for the last five months had been as great as the first seven months, the earnings of the company would have been $200,000 greater than they were. The 1 cent transfer charge, which went into effect on Sept. 1, 1914, returned $232,719, or an average of $1,907 a day. A total of $2,577,866 was expended for improvements during the year, an increase of $65,576 over 1913.

J. J. Stanley, president of the company, has notified Council that the company will not agree to a reduction of fare from 8 cents to 6 cents for the newly annexed section of Euclid Avenue about the village of Euclid. He says that rate would be below the cost of the service.

The street railway committee of the Council considered the resolution authorizing the Cleveland Railway to enter into a contract with W. I. Thompson & Company for the construction of a new division building at Harvard Avenue and East Fifty-fifth Street at a cost of $99,500. Some of the members wanted bids for contracts sent in sealed envelopes to be opened in the presence of Mr. Witt. According to Mr. Witt his office has authority to check the figures and object if they are too high, but contended that the company had the right to give work to its friends. The resolution was held over for a week.

The report of operation for March presented to the directors of the Cleveland Railway on April 24 shows a net ordinance surplus of $57,859, which increases the interest fund to $376,017. The revenue from transfers was $60,914.

The company has accepted the franchise which was approved by the Lakewood Council recently.

On April 21 the Cuyahoga County Common Pleas Court fixed May 25 as the date for hearing the injunction suits brought against the county treasurer to prevent the collection of about $600,000, claimed to be due the county as taxes. The company claims that the State Tax Commission placed too high a valuation on its property for 1913 and 1914, and it asks that the commission come into court and explain the methods used in arriving at the values announced.

Michigan Commission Bill Fails.—The bill to create a public service commission in Michigan has not been reported out by the ways and means committee of the House.

Minneapolis Enabling Act.—The Minnesota Legislature has passed the bill to enable the Minneapolis Street Railway to agree with the City Council on a renewal of its franchises. The new grant must, however, be submitted to a referendum vote of the electors.

Park Purchases Contemplated.—The railway department of the Southern Public Utilities Company at Charlotte, N. C., expects to purchase two ostriches, a cage of monkeys, merry-go-round, row boats, one or two engines for naphtha launches, 500 chairs, 100 park benches, two skeeball alleys, etc.

Toledo Contempt Case.—The Toledo Newspaper Company and Negley D. Cochran, who were fined some time ago on the charge of contempt of court in connection with the street railway injunction case, applied to the United States District Court on April 23 for an extension of time to May 29 for making a return to a writ of error.

Full-Crew Measure Stands.—The Assembly of New York on April 23 defeated the Spring bill modifying the full-crew law. The vote was sixty-eight to sixty, seventy-six votes being needed for passage. The measure had been passed by the Senate. The Spring bill gave the Public Service Commissions power in a measure to regulate the size of train crews.

Another Health Department Pronunciamento.—The health department of New York has extended its investigation of the overcrowded street car to the subway, and has warned the Interborough Rapid Transit Company against reducing the number of cars or trains below the number operated during the winter, as "a deliberate act tending to create or to aggravate the nuisance."

Court Decision in Fare Case.—The District Court of Appeals in Los Angeles, Cal., has handed down a decision sustaining the right of the company to charge 10-cent fares from the city to Eagle Rock, Glassel and other points in that district. The suit was brought under the old public utilities act of 1878, which provides for a penalty against any street railway where an overcharge is demanded. The court holds that the section was repealed in 1911 by the later public utilities act.

Report on Wooden Cars.—Alfred Craven, chief engineer of the Public Service Commission for the First District of New York, has made a report to the commission upon the proposed use of the 478 wooden cars to be removed from the subway to the elevated railroads. Mr. Craven thinks that they may be used with safety upon the elevated railroads. On motion of Commissioner J. Sergeant Cram the report was referred back to the chief engineer with instructions to make a further report as to whether the operation of such cars would be as safe as the operation of steel cars.

Progress on New York Dual System.—Travis H. Whitney, secretary of the Public Service Commission for the First District of New York, contributed to the New York *Herald* of April 25 an article reviewing the progress to date on the $330,000,000 dual rapid transit system in course of construction in New York. The article was accompanied by a map showing the routes of the lines and with reproductions of portraits of Commissioners McCall, Wood, Cram, Williams and Hayward, Counsel George S. Coleman, Assistant Counsel LeRoy T. Harkness, Mr. Whitney, Assistant Secretary James Blaine Walker and Chief Engineer Alfred Craven.

Maintenance Statute Amended.—The statute relating to the maintenance and repair of street railway tracks of Houston, Tex., has been amended by an ordinance providing that in case any portion of the roadway between tracks and between rails or within 1 ft. outside of the tracks shall become worn and defective, upon notice by the Mayor, street and bridge commissioner or by the city engineer of the conditions, the railway must make the necessary repairs, and upon failure to make such repairs within ten days after notice the city will do the work at the cost and expense of the railway. A penalty of $100 a day is fixed for failure of the railway to do the work after giving notice of the intention to do it.

Meeting of Engineering Committee of Illinois Association.—The engineering committee of the Illinois Electric Railways Association held a meeting at Chicago on April 27. This committee will prepare a report on "Power Economies" and present it in three parts. Sub-committees have been appointed to prepare the following parts: (a) Economies in Direct Current Distribution, John Leisenring, Illinois Traction System, and L. E. Gould, ELECTRIC RAILWAY JOURNAL, (b) Power Economies on the Car, G. T. Seeley, Chicago Elevated Railways, and E. F. Gould, Aurora, Elgin & Chicago Railroad; (c) Economies in the Return Circuit, B. J. Fallon, Chicago Elevated Railways, and W. F. Carr, Chicago, Ottawa & Peoria Railway.

M. O. Resolution Defeated.—The City Council of Toledo, Ohio, sitting as a committee of the whole, defeated the following resolution on the evening of April 26: "Resolved, That this Council believes in municipal ownership and will not grant a franchise to the Toledo Railways & Light Company or any other corporation." Councilman Dotson and others, replying to talks from labor leaders in the lobby, had expressed themselves in favor of municipal ownership if it could be had in proper shape, but they refused to be bound by the resolution introduced by Councilman Kryzaniak. Councilman Mulholland had introduced a similar resolution a week previously. For some reason this resolution of Mr. Mulholland was dropped and the second one was introduced.

Safety-First Convention.—It was decided at the recent meeting of the executive committee of the Safety First Federation of America, held in New York, to hold the safety-first convention in Detroit, Mich., on Sept. 20, 21 and 22, 1915. A committee consisting of Police Commissioner John Gillespie, of Detroit, chairman; Jefferson DeMont Thompson, chairman of the executive committee, and Frederick H. Elliott, executive secretary of the Safety First Federation, was appointed to arrange for the program of the convention and to perfect the preliminary arrangements. This will be the first convention to be conducted under the auspices of the national federation. It is also the intention to have an exhibition of safety-first devices and appliances in connection with it.

Workmen's Compensation in Maine.—Governor Curtis of Maine has signed the workmen's compensation act, which provides in substance that employees totally disabled shall be paid one-half their average weekly wages for 300 weeks, the total sum to be paid not to exceed $3,000. For partial disability workmen are to be paid from $4 to $10 a week, according to a sliding scale. If an employer of more than five workmen comes in under the provisions of this act he cannot be sued for damages by the injured employee. Corporations which maintain liability insurance for their employees are not obliged to come in under the provisions of this law. Employers having five or less employees are not liable to the operations of the act. The measure goes into effect on July 1.

Trial Signals on New York Elevated.—Commissioner J. Sergeant Cram of the Public Service Commission for the First District of New York has given notice of a resolution to require the Interborough Rapid Transit Company to equip its elevated railroads with a system of signals to prevent collisions and permit the operation of its tracks to the maximum capacity. The resolution proposes that the company shall place in operation on some portion of its system a trial installation of such a signal device not later than Oct. 1, 1915, and submit it to a thorough test under actual operating conditions. Not later than June 1, 1916, the results of such tests shall be submitted to the commission for a determination whether the trial system shall be extended to cover all the lines included in the elevated system.

Board to Arbitrate Strike at Wilkes-Barre.—The board of arbitration which has been selected to settle the differences between the Wilkes-Barre Railway and its motormen and conductors has fixed on May 6 at Wilkes-Barre for hearing both sides to the controversy. John Price Jackson, commissioner of the State department of labor and industry, was selected chairman of the board. The other arbitrators are S. D. Warriner, president of the Lehigh Coal & Navigation Company, selected by the street railway, and

Thomas B. Shea, a lawyer of Wilkes-Barre, named by the men. These two recently selected Commissioner Jackson as the third member of the board. When the board meets each side will be asked to outline its case. The board will determine the scope of the proceedings and will then request each side to present its case in full at once. The men, who were on strike for increased wages for about ten days, returned to work pending a decision by the arbitration board.

Boston Transit Bills Signed.—Two bills affecting the Boston (Mass.) Elevated Railway, one of which provides for the tearing down of the elevated structure in Charlestown and the other for an investigation of the crowded conditions at the Dudley Street station, with a view to the establishment of a new elevated station at Dale Street, Roxbury, have been signed by Governor Walsh. The Charlestown bill provides for a tunnel as a substitute for the elevated structure. Under the new act the Supreme Court, upon petition of the city, company or any party at interest, is to appoint three commissioners to decide what damages, if any, the elevated road will sustain over benefits by the tearing down of the road and the construction of a tunnel. The bill also provides that the owners of property abutting on the elevated structure shall be assessed not more than half the betterments which their property derives from the change, and that they shall be given twenty-five years in which to pay this. The Dudley Street station investigation act directs the Public Service Commission to investigate the operation of the elevated and surface cars at the Dudley Street terminal, also to determine the advisability and practicability of requiring the company to issue to each passenger a free transfer ticket enabling persons to leave the station and transfer to other cars going in the same general direction on adjoining thoroughfares. The commission is also directed to investigate and report as to the necessity and practicability of a new elevated station at Dale Street and of the extended use of the present station which is located at Eggleston Square.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Materials Association

The annual convention of the Railway Materials Association will be held at the Hotel Sherman, Chicago, Ill., on May 17, 18 and 19 in conjunction with the Railway Storekeepers' Association. Among other subjects the Railway Storekeepers' Association is preparing to discuss the reclamation of material, and will exhibit slides showing pictures of reclamation machinery, reclamation plants, reclaimed material, etc. All manufacturers or supply houses which have slides pertaining to this subject should forward them to E. C. Curtis, inspector of stores of the Chicago, Burlington & Quincy Railway at Chicago, Ill. The program of entertainment includes a theater party and a dinner and a dance at the Hotel Sherman.

Central Electric Railway Association

The Central Electric Railway Association committee on arrangements announces in a circular issued on April 26 that all arrangements have been completed for the boat trip from Cleveland to Buffalo and return. Meetings of the association will be held on the boat. The *City of Erie* has been chartered and will leave the Cleveland & Buffalo Transit Company's new pier at the foot of Ninth street, Cleveland, Ohio, at 9 a. m., Central time, June 17, 1915. It will cruise over the western end of Lake Erie among the islands and along the northern shore of the lake during the day and night, reaching Buffalo on the morning of June 18. The International Railway and the Niagara Gorge Route have asked the association to be their guests from Buffalo to Niagara Falls and return. Luncheon will be served on the trip to the Falls, and the boat will leave Buffalo on the return trip late in the afternoon of June 18, arriving at Cleveland at 9 o'clock in the morning of June 19. Tickets for the round trip on the ship, including meals and berth for two days, will cost $15. Reservations may be made by sending the money direct to L. G. Parker, 6917 Bessemer Avenue, Cleveland, Ohio.

Financial and Corporate

ANNUAL REPORTS

United Railways & Electric Company

The statement of income, profit and loss of the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1914, follows:

Gross earnings:	
Revenue from transportation	$9,083,555
Revenue from operation other than transportation	120,284
Total	$9,203,839
Operating expenses:	
Maintenance of way and structures	$399,716
Maintenance of equipment	408,211
Traffic expenses	12,563
Conducting transportation	2,727,442
General and miscellaneous	764,507
Total operating expenses	$4,312,439
Net earnings from operation	$4,891,400
Income from other sources	24,721
Total net income	$4,916,121
Fixed charges, etc	$2,964,826
Balance	$1,951,295
Deduction from income—rental account—1½ per cent sinking fund, Maryland Electric Railways 5 per cent bonds	65,501
	$1,885,794
Extinguishment of discount on securities	37,950
	$1,847,844
Interest on income bonds and dividend on preferred stock	560,000
Surplus	$1,287,844
Dividends paid on the common stock in 1914	818,448
Balance carried to the credit of depreciation reserve	$469,394

Notwithstanding the industrial depression resulting from the European war, the company, though feeling its effects during the latter portion of the year, was able to show an actual increase in gross receipts for the fiscal year. Although it failed to obtain the normal increase in gross receipts and largely increased its expenditures, the surplus for the year was but slightly less than that of the previous year. The increase in gross earnings for 1914 was $157,347, or 1.74 per cent, while the increase in operating expenses was $166,008, or 4 per cent, and the increase in fixed charges, $37,358, or 1.28 per cent. The percentage of operating expenses to gross earnings was 46.85 per cent, as compared with 45.83 per cent in 1913. If the charges to depreciation of $469,395, or more than 5 per cent of gross earnings, were included in the operating expenses, the percentage of operating expenses to gross earnings would have been 51.95 per cent.

The average earnings per car-mile were 30.43 cents, an increase of 0.48 cent, and the cost of service (exclusive of depreciation, etc.) 14.26 cents, an increase of 0.53 cent. The number of car-miles run was 30,250,194, an increase of 47,009 miles. The total number of revenue passengers carried was 185,296,350, an increase of 3,115,583. The number of transfers used was 77,102,879, an increase of 2,468,849, about 42 per cent of the paying passengers having made use of the transfer privilege. The average fare per passenger in 1914 was 3.45 cents.

The total amount of taxes and public charges was $1,137,201, an increase of $72,032, or 12.35 per cent of the gross revenue and 23.25 per cent of the net receipts after paying costs of operation. The park tax for the year was $593,813, an increase of $12,828. The total taxes represent the total net earnings (after paying only costs of operation) of one car in slightly more than every four.

During the year the company placed in service eighty-five new double-truck semi-convertible cars of the pay-as-you-enter type. There was expended during the year $461,719 for cars, heaters and substation equipment out of proceeds of Maryland Electric Railways bonds. There was also expended, under the terms of the Maryland Electric Railways mortgage, $6,205 for cables and switching apparatus out of the special sinking fund of that company. The company now operates 404.6 miles of single track. During the year 10.8 miles of single track were reconstructed; 1.4 miles of new track were constructed, and 0 03 mile of track was taken out.

In 1914 the company substantially increased the wages of its motormen, conductors and several classes of employees in other departments and also inaugurated a pension system. On Oct. 1 final payment of $35,000 was made on car trust certificates, series A, and the equipment covered by the trust assigned to the company. The company now has no car trust certificates outstanding.

Chicago Surface Lines

The statement of earnings and expenses of the Chicago (Ill.) Surface Lines for the year ended Jan. 31, 1915, follows:

Earnings:	
Passenger cars	$31,299,201
Chartered cars	5,206
Funeral cars	5,516
Mail cars	71,767
Mail carriers	24,837
Newspaper cars	8,040
Freight earnings	874
Garbage car service	22,492
Advertising	218,744
Rents of buildings, etc	91,712
Sale of power	86,642
Interest on deposits	120,129
Miscellaneous	10,888
Gross earnings	$31,966,048

Expenses:	(Percentage of gross)	
Maintenance of way and structures	2.91	$ 931,408
Maintenance of equipment	4.80	1,533,156
Renewals	8.00	2,557,284
Traffic expenses	0.01	2,110
Operation of power plants	8.70	2,781,907
Operation of cars—trainmen	23.76	7,596,037
Operation of cars—other	3.73	1,190,487
General expenses—damages	3.75	1,198,727
General expenses—other	2.06	658,881
Expenses of B. O. S. E.	0.27	86,205
Taxes	4.23	1,353,073
Total expenses	62.22	$19,889,275
Residue receipts		$12,076,773

Divided:	
Chicago Railways, 59 per cent	$7,125,296
South Side Lines, 41 per cent	4,951,477

The above statement is taken from the report of Leonard A. Busby, president, to the board of operation. This report covers in detail the general and operating organization of the lines and the scope of the work of the various departments. For purposes of information it is to be distributed among all department and sub-department heads of the surface lines.

According to Mr. Busby, during the first six months of the fiscal year, the properties showed a slight increase in receipts, amounting to $101,536, or 0.6 per cent of the gross. For the fiscal year ended Jan. 31, 1914, the properties had showed an increase in gross receipts over the preceding year of more than 7 per cent. The drop in the rate of increase in gross during the first six months of the last fiscal year was largely caused by the fact that under the unification ordinance the companies were required to give a 5-cent fare in the Calumet district in lieu of the former 10-cent fare, and were also required to give free transfers in the downtown district.

Moreover, the beginning of the European war, Aug. 1, 1914, was followed by the closing of, or by a material reduction in the operating forces of, a large number of manufacturing plants in the city. This immediately affected the receipts adversely. During the last six months of the year the gross receipts fell $608,085 below the receipts for the same period during the preceding year. It is stated that not much reliance can be placed upon a substantial improvement until industrial conditions in Chicago change for the better.

The surface lines carry an average of more than 3,000,000 cash, free and transfer passengers per day, or more than 1,100,000,000 passengers a year. They serve a territory of approximately 190 square miles and own 1000 miles of track within the city limits of Chicago. They have more than 2700 double-truck passenger cars in daily use and operate more than 110,000,000 car-miles annually. They employ more than 13,000 men, of which nearly 9000 are trainmen, and pay to these employees each month in wages more than $1,000,000. During the year $4,786,419 was expended for new capital requirements.

INTERBOROUGH-METROPOLITAN READJUSTMENT

Directors Propose Formation of New Corporation to Permit Payment of Dividends—Even Stock Exchange—New Common Stock Without Par Value

Under the terms of a plan published on April 23 by the board of directors, the Interborough-Metropolitan Company, New York, which is the holding company for the Interborough Rapid Transit Company and the New York Railways, is to be consolidated with the Finance & Holding Corporation, a small company organized with common stock having no par value. A new corporation, whose name it is said will be the Interborough Consolidated Corporation, will be formed with a capital stock of $50,000,000. The present Interborough-Metropolitan Company has outstanding $47,740,000 of 5 per cent cumulative preferred stock and $93,262,192 of common stock.

It is officially stated that the purpose of the formation of the new company is to conform the nominal capital of the Interborough-Metropolitan Company "to the present condition of its assets and thus enable the stockholders of the Interborough-Metropolitan Company to participate justly in its recurring annual surplus profits, which under present conditions are not divisible." Referring to the large investment of the Interborough-Metropolitan Company in the Metropolitan Street Railway and the Metropolitan Securities Company and the losses resulting from their bankruptcy and liquidation, the directors state that it has not been generally realized that because of such shrinkage in capital assets the holding corporation could not prudently make distribution of its steadily accruing annual surplus.

Under the proposed plan the new capital stock of $50,000,000 will be represented by certificates of two classes. The present 5 per cent cumulative preferred stock of the Interborough-Metropolitan will be exchanged, share for share, for 6 per cent non-cumulative preferred stock with a par value of $100. Shareholders agreeing to the exchange will surrender all rights to the dividends now accruing on the preferred stock, amounting to between 35 and 40 per cent. Yet by coming in under this plan, according to the announcement of the board of directors, the shareholders will gain the advantage of immediately getting their first 6 per cent dividend on the new shares. There is at least $500,000 more than enough surplus in the treasury now to pay 6 per cent on the present preferred stock.

The new common stock is to be issued in shares without par value, also share for share, or approximately 932,000 shares of common stock without par value. The scaling down of the book capitalization from approximately $141,000,000 to $50,000,000 will in no wise affect the intrinsic value of the common stock, which will be entitled to participation in the profits and assets of the consolidated company to the same extent as if bearing a par value.

In regard to the advantages of the plan the directors say: "The consolidated company will be in possession of stocks and securities the probable earnings of which, in the judgment of the directors, will be sufficient to pay 6 per cent upon the par value of the new preferred stock—which dividend may be paid without delay—and also to leave a further sum for the benefit of the common stock. It is the general opinion also that when the common stock is relieved from the burden of the accumulations upon the existing preferred stock, and the danger of further similar accumulations is removed, it will have immediately a substantial value and will be placed in a situation to participate in a distribution of available surplus earnings."

To complete the proposed readjustment, the consent of two-thirds of both the preferred and the common stock vote must be given to the plan. A meeting of the stockholders has been set for June 30. It is specifically set forth in the plan that it is not the intention of either the proxy committee of the Interborough-Metropolitan preferred stock or the voting trustees of the common stock to vote for the reorganization "until general consent shall have been obtained, at least from the holders of the preferred shares."

Already a strong independent preferred stockholders' committee has been formed which asks preferred shareholders to approve the readjustment plan and give their proxies to the committee for a special meeting on June 1. The members of the committee are A. J. Hemphill, chairman of board of directors Guaranty Trust Company; James S. Alexander, president National Bank of Commerce; Vernon C. Brown, of Vernon C. Brown & Company; J. Horace Harding, of C. D. Barney & Company; A. Barton Hepburn, chairman of Chase National Bank, and D. B. Van Emburg, of Van Emburg & Atterbury.

A special independent committee representing large holdings of the common stock has also issued a circular to common stockholders asking that they consent to the plan. Hope of dividends is held out. The committee consists of Willard V. King, president Columbia Trust Company; Harry Bronner, of Hallgarten & Company; Daniel E. Pomeroy, vice-president Bankers' Trust Company, and Henry Rogers Winthrop, of Harris, Winthrop & Company. Under the voting trust agreement which remains in effect until March, 1916, the common stock can be voted by the five trustees—August Belmont, Edward J. Berwind, Andrew Freedman, Theodore P. Shonts and Cornelius Vanderbilt. Technically the voting trustees could take matters in their own hand and ratify the plan, but this is not their purpose.

It is reported that the Public Service Commission for the First District will try to assume supervision over the readjustment, although the company is not an operating railway.

BERLIN PURCHASES POWER COMPANY

The city of Berlin, Germany, has decided to purchase the Berlin Electrical Works, the system which supplies the German capital with electric light and power. This company is one of the oldest as well as one of the largest of its kind in Europe. Service was begun in 1885 with a station having an annual capacity of 37,000 kw-hr. The output last year was 267,600,000,000 kw-hr. The purchase price agreed upon is $92 per kw. The reason for the purchase by the city is the intention of the latter to establish a low rate for electric power and thus build up an industrial load from small factories which might not otherwise locate in Berlin.

American Public Utilities Company, Grand Rapids, Mich.—The general financial depression reduced the volume of business done by subsidiaries of the American Public Utilities Company, particularly those serving industrial communities, for the eight months ended March 31, 1915. All the subsidiaries except two, however, showed substantial increases in the sale of gas and electricity, the two decreases being 1 per cent and 7 per cent. The earnings figures for the period are: Gross earnings, $1,980,959; operating expenses $1,079,991; net earnings, $900,968; miscellaneous income, $23,169; gross income, $924,137; expenses, $27,172; net income, $896,965; fixed charges, $610,706; dividends, $156,560, and balance $129,699. The American Public Utilities Company controls the Wisconsin-Minnesota Light & Power Company, which controls the electric railways in Eau Claire and Chippewa Falls, Wis., the interurban line between these cities and that between Eau Claire and Altoona, and also the Jackson Light & Traction Company, which operates in Jackson, Miss.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The Barcelona Traction, Light & Power Company has secured the consent of the British treasury and the French government to the underwriting of new securities by existing interests in the company, which will permit of the completion of the second unit of the company's work at Barcelona. The plan involves the creation of £4,000,000 of 7 per cent prior lien bonds, divided into "A" and "B" series, both ranking as charges upon the property and income of the company in priority to the existing 5 per cent bonds. It is understood that the British and French bondholders, with the consent of their respective governments, have agreed to finance the construction of the second unit at Barcelona, and the Canadian bondholders are called to meet for the same purpose. It is hoped that the funds to be obtained by this plan, which will be passed upon at a meeting of bondholders in London on May 11, will enable the company to enter the operating stage upon a more substantial basis. Previous references to this company were made in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1914, and Feb. 27, 1915.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—E. H. Rollins & Son, New York, have purchased $1,150,000 of Birmingham Railway, Light & Power Company two-year 6 per cent notes dated May 1, 1915. The notes are issued to provide a portion of the funds required to retire at maturity $1,500,000 of notes due on July 1. It is reported that the greater part of the issue has already been privately placed and that the unsold balance will shortly be offered for public subscription at 99.50 and interest to yield 6.25 per cent. Bertron, Griscom & Co., New York, have also bought an issue of $640,000 of refunding and extension 6 per cent bonds, due May 1, 1957, but these have not yet been offered for subscription.

Boston (Mass.) Elevated Railway.—The directors of the Boston Elevated Railway have declared a quarterly dividend of 1 per cent, making 2½ per cent for the last half of the year and 5½ for the fiscal year ending June 20. The present disbursement is payable on May 15 to stock of record on May 6. For 1915 the company has paid dividends of $2.50, including the present declaration, which compares with $5 for 1914 and $6 for 1913-1902.

Cape Breton Electric Company, Ltd., Sydney, N. S.—A semi-annual dividend of 1½ per cent has been declared on the $1,125,000 of common stock of the Cape Breton Electric Company, Ltd. This is accompanied by the payment of the regular semi-annual dividend of 3 per cent on the $234,000 of preferred stock, both dividends being payable on May 1 to holders of record on April 22. The common dividend compares with 3 per cent paid semi-annually in 1913 and 1914.

Charlottesville & Albemarle Railway, Charlottesville, Va.—The Munsey Trust Company, Baltimore, is offering at 96 and interest $350,000 of first mortgage 6 per cent gold bonds of the Charlottesville & Albemarle Railway, dated April 1, 1915, and due on April 1, 1943. The bonds are redeemable at 105 and interest at any interest date on sixty days' notice. The total authorized issue is $750,000.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—Hayden, Miller & Company, Cleveland, have sold to private persons at par and interest $200,000 of underlying Cleveland & Elyria Electric Railroad first mortgage bonds, which are extended from May 1, 1915, to August 1, 1920, at 6 per cent.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—The consolidated mortgage bondholders of the Columbus, Delaware & Marion Railway have chosen a committee, consisting of R. W. Bingham, E. Jones, M. Hertenstein, E. H. Turner and J. J. Jennings, to report on June 4 in regard to a plan for the future operation of the company and the advisability of ending the six-year receivership within a reasonable period or of issuing $150,000 of receiver's certificates. Eli M. West, receiver, states that there are claims amounting to about this sum which are superior to the consolidated first mortgage bonds. It is said that the receipts under the receivership have increased from about $308,000 to $480,000 a year.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Columbus Railway, Power & Light Company has applied to the Ohio Public Utilities Commission for authority to sell at 80, or to pledge at 66 2-3 per cent of their par value, $1,900,000 of first and refunding extension sinking fund 5 per cent bonds, dated April 1, 1915. The proceeds of $1,250,000 of the bonds are to pay $1,026,979 of floating debt. The proceeds of $300,000 of bonds are to be used to bring the working capital of the company to $750,000, and the proceeds of the remainder are to be used for extensions and additions to the property. The sale of these bonds will enable the company to pay off its minor debts and also an issue of $600,000 of coupon notes marketed last autumn.

East St. Louis & Suburban Company, East St. Louis, Ill.—The directors of the East St. Louis & Suburban Company have declared a quarterly dividend of three-quarters of 1 per cent on the 5 per cent cumulative preferred stock, payable on May 1 to holders of record on April 22. This compares with the regular payment of 1¼ per cent made to February, 1915. It is said that the reduction has been made necessary by decreased earnings caused by the business depression and increased interest charges on power plant investment made for business that has not materialized on account of the depression.

Front & Union Streets Railway, Wilmington, Del.—Attorney-General Wolcott on April 20 filed an indictment charging that the Front & Union Streets Railway, which is leased by the Interstate Railways to the Wilmington & Philadelphia Traction Company, had failed to file reports for 1913 and 1914. The grand jury returned a true bill. Counsel for the railway state that the section of the corporation law under which companies are required to file with the secretary of state a certified copy of the annual reports to stockholders relates expressly to railways created under that law. The Front & Union Streets Railway was incorporated under a special act passed prior to the passage of the general corporation law and is therefore thought not to be required to file its report.

Kansas City Railway & Light Company, Kansas City, Mo.—The receivers of the Metropolitan Street Railway, the operating subsidiary of the Kansas City Railway & Light Company, have applied to the United States Court to issue certificates to secure funds for necessary maintenance and construction expense in 1915. The amount required is placed at $2,427,865. This week Judge Hook intimated that he might allow interest due on May 1 and May 15 if the reorganization plan soon seems likely of adoption, even if the payment of interest would necessitate receivers' certificates for improvements. He caused Mayor Jost to modify his statement that absolutely no further extension on the time limit for the new franchise would be granted.

Minneapolis & Northern Railway, Minneapolis, Minn.—Judge William E. Hale of the District Court for the Fourth Judicial District on April 12 issued an order setting April 24 for a hearing on the question why the Northern Pacific Railway should not be allowed to intervene and its claim be made a first lien upon the property of the Minneapolis & Northern Railway. A previous order of the court on Feb. 9 delivered the possession of the property to the trustees. Prior references to this case were made in the ELECTRIC RAILWAY JOURNAL of Jan. 2, Jan. 23 and Feb. 20.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company has called a special meeting for May 14 at Portland, Ore., for the purpose of approving a readjustment of the capitalization of the company. Under the proposed plan the present outstanding common stock will be reduced from $25,000,000 to $20,000,000, and there will be authorized $5,000,000 of 6 per cent cumulative first preferred and $5,000,000 of 6 per cent non-cumulative second preferred stocks. Of the new stocks $2,500,000 of each class will be retained in the treasury for future corporate purposes, and $2,500,000 of each issue will be sold to stockholders to raise additional capital on the following terms: Each holder of 100 shares of present capital stock, or smaller holders in proportion, may turn in twenty shares, accompanied by $25 for each share, and will receive ten shares of first preferred and ten shares of second preferred stock. With the completion of the plan the company will have a capitalization of $2,500,000 of first preferred, $2,500,000 of second preferred, and $20,000,000 of common stock, the latter 75 per cent paid up, and the company will have raised $1,250,000 in cash.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has asked the California Railroad Commission for permission to pay a common stock dividend. In announcing the filing of the application the commission stated: "Between Jan. 1, 1914, and April 1, 1915, the Pacific Gas & Electric Company retired $849,500 of bonds through payments into sinking funds. During the remainder of 1915 the company will be further required to retire $1,461,000 of bonds. All of the above payments have been made, or will be made, out of net earnings or surplus profits, and the company wishes to capitalize these payments by the issuance of a common stock dividend. This dividend, it is proposed, shall consist of as many shares of its unissued common capital stock as shall be equal to the amount of net earnings or surplus profits which the board of directors shall determine permanently to capitalize, but not exceeding 6 per cent of the common capital stock now in the hands of the public."

Rock Island Southern Railway, Rock Island, Ill.—A bill has been filed in the Circuit Court at Monmouth, Ill., for an accounting and the appointment of a receiver for the Rock Island Southern Railway, which operates an interurban line between Monmouth and Rock Island and Monmouth and Galesburg. The minority stockholders of this company are the complainants. It is alleged that the line between Monmouth and Rock Island is bankrupt. Hearing on the bill was set for May 3.

San Joaquin Light & Power Corporation, Bakersfield, Col.—The San Joaquin Light & Power Corporation has filed an application with the California Railroad Commission, requesting authority to renew promissory notes in the total sum of $317,260.

Staten Island Midland Railway, New York, N. Y.—The Public Service Commission for the First District of New York recently authorized the Staten Island Midland Railway to issue $135,000 of equipment trust certificates for the acquisition of thirty-two double-truck closed cars. The order certified that the purchase cost of the additional cars was reasonably chargeable to capital, except as to $26,680, representing the amount by which the new cars were deemed to be a replacement of old cars. On evidence from the company that these old cars could be repaired, the commission modified its order to provide that if by May 31 the car bodies and equipment of twenty specified cars were not overhauled and put in first-class operating condition, there should be deducted from the total capital charge the amount at which the old cars were carried on the books, less their scrap value or sales price. The application to the commission for the issuance of these certificates was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 31, 1914.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—The holders of certificates of deposit for the first mortgage 5 per cent bonds of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad have been notified that the bondholders' committee appointed in 1908 has declared a dividend of $90 for each $1,000 bond, payable to all holders on presentation of certificates at the Central Trust Company, New York, on and after April 23.

United Railways of St. Louis, St. Louis, Mo.—The Missouri Public Service Commission has authorized the United Railways of St. Louis to issue $500,000 of 4 per cent bonds, maturing on July 1, 1934, to take up a like amount of Southern Railway 6 per cent bonds falling due on May 1.

Washington-Virginia Railway, Washington, D. C.—The directors of the Washington-Virginia Railway have declared a dividend of 1 per cent on the company's $1,378,300 of common stock, together with the usual semi-annual 2½ per cent dividend on the $1,000,000 of preferred stock, both payable on May 1 to holders of record on April 19. In 1912 and 1913 the company paid common dividends of 4 per cent and in 1914 2½ per cent.

York (Pa.) Railways.—It is reported that the York Railways has arranged to purchase the Merchants' Electric Light, Heat & Power Company and to consolidate this company with the Edison Light & Power Company, which is already owned by the railway.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Maine, quarterly, one-half of 1 per cent, common.

Cape Breton Electric Company, Ltd., Sydney, N. S., $3, preferred; $1.50, common.

Cumberland County Power & Light Company, Portland, Maine, quarterly, 1½ per cent, preferred.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil, quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil, quarterly, 2½ per cent.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Washington-Virginia Railway, Washington, D. C., 2½ per cent, preferred; 1 per cent, common.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	$60,380	*$29,465	$30,915	$17,636	$13,279
1 " " '14	57,347	*28,985	28,362	17,422	10,940
12 " " '15	782,428	*375,208	407,220	209,488	197,732
12 " " '14	771,941	*350,992	420,949	207,684	213,265

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Feb., '15	$77,848	*$54,430	$23,418	$28,941	†$5,523
1 " " '14	88,664	*54,664	34,000	27,208	6,792
12 " " '15	1,056,377	*701,346	355,031	342,837	12,194
12 " " '14	1,208,315	*715,896	492,419	304,803	187,616

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Feb., '15	$248,596	*$149,014	$99,582	$38,727	$60,855
1 " " '14	246,540	*154,066	92,474	40,465	52,009
12 " " '15	3,071,080	*1,873,923	1,197,157	476,085	721,072
12 " " '14	3,001,131	*1,943,853	1,057,278	490,152	567,126

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Feb., '15	$1,140,832	*$594,403	$546,429	$362,301	$184,128
1 " " '14	1,133,879	*603,081	530,798	346,933	183,865
12 " " '15	14,026,762	*7,525,642	6,501,120	4,244,490	2,256,630
12 " " '14	13,804,622	*7,723,520	6,081,102	3,921,202	2,159,900

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Feb., '15	$182,301	$107,797	$74,504	$62,494	$12,010
1 " " '14	168,062	114,456	53,606	63,465	†9,859
12 " " '15	2,537,562	1,450,770	1,086,792	756,881	329,911
12 " " '14	2,377,457	1,351,056	1,026,401	727,867	298,534

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Feb., '15	$187,792	$113,323	$74,469	$61,896	$12,573
1 " " '14	204,411	137,998	66,413	54,921	11,492
12 " " '15	2,581,426	1,564,943	1,016,483	724,108	292,375
12 " " '14	2,724,006	1,652,345	1,071,661	594,020	477,641

GRAND RAPIDS (MICH.) RAILWAY

1m., Feb., '15	$94,889	$63,629	$31,260	$13,679	$17,581
1 " " '14	96,747	62,638	34,109	13,662	20,447
12 " " '15	1,286,852	832,498	454,354	161,921	292,433
12 " " '14	1,302,624	814,911	487,713	164,352	323,361

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m., Feb., '15	$45,960	*$35,105	$10,855	$15,578	†$4,723
1 " " '14	39,554	*36,450	3,104	15,347	†12,243
12 " " '15	687,556	*465,713	221,843	186,888	34,955
12 " " '14	674,106	*439,654	234,452	181,299	53,153

HOUGHTON (MICH.) COUNTY TRACTION COMPANY

1m., Feb., '15	$18,765	*$13,918	$4,848	$5,599	†$751
1 " " '14	20,946	*15,277	5,669	5,595	74
12 " " '15	272,331	*178,326	94,005	37,063	26,942
12 " " '14	293,446	*178,439	115,006	67,355	47,651

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Feb., '15	$48,521	*$34,533	$13,988	$13,517	$472
1 " " '14	56,778	*36,679	20,099	12,861	7,239
12 " " '15	699,213	*465,260	233,953	153,879	80,074
12 " " '14	699,567	*446,182	253,385	147,588	105,796

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Feb., '15	$121,301	*$75,277	$46,023	$27,204	$18,819
1 " " '14	155,976	*94,868	61,107	25,338	35,768
12 " " '15	2,008,002	*1,112,668	895,333	322,405	572,928
12 " " '14	2,161,438	*1,202,767	958,671	287,002	671,669

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Feb., '15	$19,989	*$11,612	$8,377	$7,248	$1,128
1 " " '14	22,287	*14,302	7,985	7,168	816
12 " " '15	259,073	*165,402	93,672	86,922	6,749
12 " " '14	282,923	*181,384	101,539	82,868	18,671

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Feb., '15	$591,692	*$385,442	$206,249	$181,473	$24,777
1 " " '14	691,464	*405,767	285,696	175,510	110,186
12 " " '15	8,268,052	*4,973,698	3,294,354	2,129,059	1,165,295
12 " " '14	8,701,725	*5,001,313	3,700,413	2,079,536	1,620,877

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Feb., '15	$64,995	*$41,826	$23,169	$22,956	$213
1 " " '14	66,654	*43,838	22,816	22,613	203
12 " " '15	839,109	*548,681	290,428	276,071	14,357
12 " " '14	836,699	*555,715	280,984	272,791	8,193

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Feb., '15	$169,450	*$101,726	$67,724	$41,712	$26,012
1 " " '14	173,144	*122,030	51,114	43,919	7,195
12 " " '15	2,233,329	*1,314,551	918,778	495,336	423,442
12 " " '14	2,210,900	*1,372,447	838,453	478,216	360,237

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Feb., '15	$2,027,911	*$1,182,265	$845,645	$812,925	$32,720
1 " " '14	1,949,518	*1,187,591	761,927	802,945	†41,018
9 " " '15	17,805,207	*10,345,666	7,459,541	7,285,440	174,101
9 " " '14	17,971,593	*10,622,574	7,352,020	7,204,019	148,000

PORTLAND (MAINE) RAILROAD

1m., Feb., '15	$67,673	*$48,568	$19,105	$24,603	†$5,498
1 " " '14	64,123	*50,027	14,096	22,713	†8,617
12 " " '15	1,049,602	*645,170	404,432	251,802	152,630
12 " " '14	1,036,612	*676,314	360,298	206,308	153,990

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*Includes taxes. †Deficits.

Traffic and Transportation

THE JITNEY BUS

The Jitney Down East—Experience in Connecticut—New York, Rhode Island and Iowa Bills Before State Governors

The jitney has made its appearance in many of the large cities and important towns in Connecticut. In Bridgeport the Bridgeport Jitney Bus Company, Inc., has been organized with a capital of $50,000 to operate large buses. The large bus has also made its appearance in Hartford, where a vehicle of the double-deck kind has been placed in operation. For the most part, however, the cars in service in Connecticut are of the touring-car type and many of them are Fords. The question of regulation has come up, and a bill is pending before the General Assembly to regulate the jitney. A feature of the bill is a requirement for a $3,000 bond for each jitney. The measure also includes a variety of regulations tending to put the jitney on a par with the electric railway as a public carrier.

The Connecticut Company, operating in New Haven, Hartford, Meriden, Bridgeport, Waterbury and other cities, published recently in the daily papers an advertisement outlining its attitude as regards the jitney. It discussed, first, the question of the general public; second, the question of the employees of the street railways, and, third, the matter of equity to the street railways. The company said that electric railway fare limits have been extended beyond profitable distances and their justification has been the compensating effects on the general results of the short haul passenger on rush-hour riding. If this short-haul riding is to be taken away from the street railway to any considerable degree a reduction in service must inevitably follow and contraction of fare limits must also result. The average length of ride given by the jitneys in New Haven at present, as contrasted with the distance to the first fare limits of the electric railways, is 56 per cent, in Waterbury 45 per cent, Meriden 41 per cent, Hartford 55 per cent. These are the relative distances to a radial point out from the center of the cities which are given by the jitneys as compared with the trolley, whereas by transfer or direct route this distance can usually be doubled in riding from one side of the city to another in electric cars so that as a matter of fact, if passengers desire to take the ride, the jitney, instead of giving 50 per cent of the trolley ride, is giving one-quarter. The company said that in general the jitney is actually doing the work of a common carrier without the regulation and supervision of any authorities except the Public Utilities Commission passing upon the methods of operation and qualification of bus operators and paying to the State or municipality much less than the average owner of a private automobile. The company went into the details of the payments made by it to the State. In conclusion the company said:

"The constantly increasing cost of material, the higher rate of wages and the added burdens imposed by the General Assembly and the Public Utilities Commission on one hand, and the granting of universal transfers, extending of city fare limits and elimination of fare zones, on the other, have rendered the net revenue to electric railway companies so small that the managements of the companies in the last few years have been obliged to refrain from building extensions which have been requested and earnestly urged by the communities which they serve."

The Board of City Commissioners of Dallas, Tex., on April 21 passed an ordinance requiring a bond of $2,500 of jitney drivers for the protection of passengers and public. It was the intention to take no final action on the ordinance until the decision of the Court of Criminal Appeals in the case appealed from Fort Worth, testing the constitutionality of the ordinance of that city regulating the jitneys, but the large number of accidents, cumulating in a head-on collision on April 20, made prompt action on the bond feature imperative. The report of the committee of the whole to the board providing for passage of the ordinance follows in part:

"We attach hereto an amended ordinance prepared by the City Attorney requiring a bond in the sum of $2,500 for each jitney or other automobile engaged in carrying passengers for hire. This bond may be executed by an approved surety company or by two personal sureties. We have deemed it fair and just to require bonds from all automobiles carrying passengers for hire and not from jitneys alone. We file with the city secretary ordinances and letters from various city officials over the country pertaining to the regulation of the jitney buses in different cities. Some cities require jitney buses to take out franchises the same as other public carriers. Many cities require them to run on fixed routes and on regular schedules for certain hours of the day, and it has been suggested that the city ordinance of Dallas should also require them to give transfers and to transport school children for half fare. Inasmuch as this is the first ordinance regulating the jitney in Dallas, we have omitted all these provisions from the attached ordinance, and deem it sufficient to start the regulation by merely requiring a bond. This bond will protect the public and passengers against loss occasioned by the negligence of the operator of the jitney when this negligence has been established in a court of competent jurisdiction. We have further provided that the ordinance shall not take effect for thirty days, so as to give the operators or owners of jitney buses and other automobiles engaged in carrying passengers for hire ample time to prepare their bonds. We further appreciate the fact that the new administration will assume charge of the city government on May 1, and this will enable them to amend the ordinance before it goes into operation if they deem it insufficient. We recommend that the ordinance be finally passed."

The matter of regulating the jitney was taken up before the Councils of Pomeroy and Middleport, Ohio, which constitute the congested zone of the Ohio River Electric Railway & Power Company and regulatory ordinances have been passed in both towns. The ordinances were drawn by authority of section 3632 of the general code of Ohio, giving councils the power to control, regulate and license vehicular traffic, using the public streets, alleys or highways. This power has been sustained by the Supreme Court of Ohio in the action of Marmet vs. the State, Hill vs. the city of Cincinnati, Hayman vs. the city of Cincinnati, Fernberg vs. the city of Cincinnati, and Hammerly vs. the city of Cincinnati, reported on page sixty-three, volume 45, of the Ohio State Reports. The license fees provided in the ordinance follow: For motor bus with a seating capacity of five or fewer persons, including the driver, $15 a year; for each motor bus with a seating capacity of seven or fewer, but more than five persons, including the driver, $25 a year; for each motor bus capable of seating more than seven passengers, including the driver, $50 a year. It is unlawful under the ordinance to drive or operate any motor bus upon or along any street unless there is in force a valid license as prescribed in the ordinance. In order to insure the safety of the public it has been made unlawful for any person to operate a motor bus or to obtain a permit therefor until he has filed a bond in the sum of $5,000 with private individuals as security or with a reliable and responsible surety company.

The signature of Mayor Buschemeyer of Louisville, Ky., to the jitney ordinance makes that measure, passed by the General Council and providing for regulation of the jitney bus in the city, effective as soon as it is duly published. The Mayor stated that he would give the operators and owners of the automobiles in the passenger traffic service a reasonable length of time to prepare to abide by the law, the terms of which provide principally that graduated licenses be paid, varying according to the carrying capacity of the vehicle and that cars be represented by a bond of $5,000 deposited at the city hall.

City officials of Nashville, Tenn., are working out a system for numbering the cards used on jitney cars which are licensed to operate. The plan provides for additional number plates, bearing conspicuous figures, to be carried just above the State license plate, so as to enable the city to exercise thorough supervision. The ordinance required the jitney driver to obtain his license in the office of the Mayor, pay a tax of $15 a quarter and to present certificates showing that these provisions have been complied with, together with a bond of $5,000 to the city commissioner before he will receive his number plate.

Governor Whitman of New York will hold a public hearing on May 6 on the Thompson jitney bill. The provisions of this measure have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

On the last day of the session of the Legislature of Rhode Island, a bill was passed dealing with the jitney. Few restrictions are imposed upon cities and towns by the new law. Commenting on the law the Providence *Journal* said editorially:

"The Legislature wisely left practically all of the details of regulation to the city and town councils. Rules which work well in one community may easily be inadequate in another. The problems of Exchange Place and Dorrance Street, Providence, are different from those in the Pawtuxet Valley. One great merit of the State law is in its broad provision for the exercise of discretion, particularly at this time, when the jitney is a novelty and experience has not altogether demonstrated the best methods of dealing with it."

The Frailey bill to regulate the jitney referred to in the ELECTRIC RAILWAY JOURNAL of April 17, page 775, has passed both houses of the Legislature of Iowa and is now before the Governor for his signature. The bill is broad in its scope and applies to all motor vehicles operated on the streets and engaged in carrying passengers for hire. City councils are empowered to require the operation of jitney buses over reasonable routes and upon reasonable schedules. Owners of jitneys may be required to file a proper indemnity bond for the protection of the city or public against damages resulting from negligence. In short, the measure empowers the city councils to regulate jitney traffic by requiring license fees and fixing streets and routes upon which the jitney is to operate.

The Board of Control of Toronto, Ont., on April 20 approved the following resolution of Mayor Church:

"That the City Solicitor prepare a draft by-law regarding the regulation of jitneys in Toronto, empowering the city to fix the route, speed, number of passengers and fares, also empowering the city to require each applicant for a license to deposit a bond as security for damages, and further increasing the fees for such licenses. The solicitor is also to report what power the city has to regulate jitneys and what legislation, if any, is necessary on the subject." In addition the chief of police has been asked for a report as to the regulations of the jitney relative to traffic.

The Paducah (Ky.) Traction Company has announced reduced service, effective immediately, with prospects of still further reduction "should present business conditions prevail for any length of time." Details of the enforced inferior service were presented to the city in display advertisements carried in the local papers, which began with the following paragraph:

"Owing to the large decreases in the earnings of this company it has been deemed advisable to attempt to meet these decreases, in part at least, by a reduction in expenses, consisting of changes in schedules and the removal of some conductors."

The reduction includes the adoption of the twenty-minute schedule, instead of the ten-minute schedule on the Third Street line, and adoption of the one-man prepay system on the Third Street, Guthrie Avenue and cemetery lines, which means doing away with conductors and reversion to the system in effect some years ago. The jitneys are doing a large business and as yet have been subjected to no restrictions and call for and deliver passengers to any destinations, just as the customary taxicab, making, however, only a 5-cent charge.

The Tucson (Ariz.) Rapid Transit Company has applied to the State Corporation Commission for permission to operate cars with only one employee. The company contends that the operation of its system in Tucson never has paid and that its credits and resources are being taxed to the utmost by the current expenses. The new motor bus ordinance in Tucson has gone into effect, but it will probably come before the court.

Following the passage of an ordinance by the City Council of Muskogee, Okla., regulating and requiring bonds of the jitneys, the Muskogee Traction Company has reinstated service on the lines which had been abandoned on account of the jitneys.

HEARING ON FARE INCREASE

The Massachusetts Public Service Commission gave a hearing on April 14 upon the proposed fare increase on the Blue Hill Street Railway from the present 6-cent basis to an 8-cent unit. A. Stuart Pratt, district manager of the Stone & Webster Management Association, Boston, Mass., represented the company. The proposed schedule offers seven tickets for 50 cents and ten tickets for 40 cents for pupils entitled to half-rate transportation. No change is proposed in the fare limits on the road, which has 18.5 miles of equivalent main line single track. The line runs from Mattapan Square, Boston, through Milton and Canton to Stoughton.

Mr. Pratt stated that the present 6-cent fare unit was adopted in January, 1908. In the six years ended Dec. 31, 1914, the assets decreased from $749,174 to $712,947. The Blue Hill construction cost was $22,192 per mile compared with $23,098 in fifty-one other Massachusetts street railways, excluding the Boston Elevated; its equipment cost was $7,416 per mile against $7,732 for the other roads; other permanent property cost $6,122 compared with $8,254 per mile elsewhere, giving a comparative total cost per mile of $35,730 for the Blue Hill and $39,084 for the others. Unit operating results were as follows:

Per Mile	Blue Hill	51 Other Mass. Roads
Gross earnings	$4,925	$8,068
Expenses	3,532	5,523
Net earnings	1,493	2,545

The percentage of maintenance to gross earnings has increased from 9.25 in 1909 to 25.5 in 1914. Assuming that 25 per cent of the gross earnings should be set apart for maintenance and depreciation there was at the end of 1914 a cumulative uncared-for maintenance and depreciation account of $117,766 (figured from 1899, when the road began to operate) and a cumulative maintenance, depreciation and deficit account of $154,536. Since the inauguration of the 6-cent fare in 1908 the cumulative deficit had decreased from $70,454 to $36,770, but the increased depreciation and maintenance requirements have brought the company to a lower financial ebb than before.

In 1907, the last year of the 5-cent fare unit, the gross earnings were $89,946, operating expenses and taxes were $76,098, and net earnings, $13,847. In 1908 the 6-cent fare went into effect and the results were: gross, $95,567; operation and taxes, $75,615; net, $19,951. In 1914 the gross earnings were only $94,790, operating expenses and taxes being $68,411, and net, $26,379. For the last four years of the 5-cent fare the average net earnings were $14,484, and for the seven years of the 6-cent fare unit they were $26,822. Assuming that 25 per cent of the gross earnings had been set aside for depreciation and maintenance (the Massachusetts commission suggested 20 per cent in discussing the Middlesex & Boston case), the average return upon the investment represented in stock, bonds and notes was 0.92 per cent, or $6,545 for the four years prior to the 6-cent fare and 2.22 per cent under the 6-cent fare. No dividends have ever been declared by the company. There had been no material growth in the territory for many years and the company had been adversely affected by reduced rate tickets on the New Haven system between Stoughton and Canton. The average local rate of fare on the main line was 1.13 cents per mile and the through fare for 12.7 miles was 1.4 cents per mile.

Mr. Pratt said that the Stone & Webster Management Association received about $1,700 a year for administering the affairs of the Blue Hill company. The company substituted light single-truck cars a few years ago for the former double-truck equipment, with substantial reductions in operating expenses, although the seating capacity was about the same in each case. The road was willing to establish a shorter zone system on the 6-cent basis, if the board desires. With an 8-cent fare the rate per mile on the through service averages about 1.89 cents. Twenty-six and one-half per cent of the traffic was handled between 5:30 and 7:30 a.m. and between 4:30 and 6:30 p.m. Relative to lower fares for workingmen in the rush hours, Mr. Pratt said that there was an apparent loss of $4,000 per year for every cent of fare reduction in the four rush hours of the day. The hearing was closed.

New Bedford & Onset Fares.—The Massachusetts Public Service Commission will give a hearing at Boston on May 5 upon the petition of the New Bedford & Onset Street Railway for authority to increase its fares from 5 cents to 6 cents. The company proposes to sell tickets in books at the rate of twenty for $1, and desires to increase the rate charged scholars from 2.5 cents to 3 cents. The official notice in regard to the increase was published in the ELECTRIC RAILWAY JOURNAL of April 24, page 819.

Spring Entertainment.—More than 500 employees of the Washington Railway & Electric Company, Washington, D. C., assembled on April 20 at Odd Fellows Hall at the annual spring meeting. William F. Ham, vice-president of the company, told of the growing popularity of the line, which he attributed largely to the division superintendents, conductors, motormen, inspectors, starters and depot clerks who are thrown into direct personal contact with the traveling public. Clarence P. King, president of the company, outlining the growth of the company and praising its employees, predicted that at an early date the transportation facilities of Washington will be enlarged. John S. Barbour, general attorney, made a short address. An attractive vaudeville bill was presented.

Service Order Case Before Court.—Decision on an order to show cause why the State Public Service Commission of Washington should not be permanently enjoined from enforcing a recent mandate directing the Puget Sound Traction, Light & Power Company, Seattle, to make extensive service changes on its Alki, Fauntleroy and Ballard Beach lines has been taken under advisement by three judges sitting en banc in the Federal Court. The temporary restraining order will remain in force until the decision is handed down. The commission's order sought to compel the company to operate the Alki and Fauntleroy cars around the Virginia Street loop and also to provide practically every passenger with a seat on these lines. It further directed it to discontinue the shuttle service on the Ballard Beach route. Argument in the case was heard by Circuit Judge W. B. Gilbert, Portland, and District Judges F. S. Rudkin, Spokane, and Jeremiah Neterer, Seattle.

First House Under St. Louis Loan Plan.—A mail car motorman in the employ of the United Railways, St. Louis, Mo., has completed negotiations with the Savings & Loan Association affiliated with the company for the building of the first home under the auspices of the association. The plans, specifications and description of the house were drawn by Martin Arhelger, superintendent of the United Railways building department. The approximate cost of the building is $2,500. A loan from the association of $2,400, or enough to build such a house, would require that a member be the owner of twelve shares of stock upon which $1 a month a share must be paid, or $12 plus 6 per cent interest per annum upon the loan, which amounts to $12 a month. Adding to this about $4.50 a month for taxes, water license and insurance, would aggregate $28.50 a month. The $12 a month paid into the association as dues each month together with the dividends earned thereon will be applied to the stock and when this value reaches $2,400 it will equal the loan and the debt will be cleared.

Increase in Service Ordered.—Upon the report of Commissioner William Hayward the Public Service Commission for the First District of New York has adopted an order after rehearing directing the New York & Queens County Railway to increase its service. Some time ago the commission adopted an order directing the company to make certain increases in service which would require the acquisition of fifty-eight or sixty additional cars. The company leased twenty additional cars which were placed in service, and then applied to the commission for a rehearing and modification of the order. The rehearing was held by Commissioner Hayward, who reported the original order with modifications only as to the time in which the company must comply. This time is extended to Oct. 1, 1915, but meanwhile the company must operate as many open cars as the largest number of closed cars operated last March after the addition of the twenty new cars to the service. The company has ten days in which to notify the commission whether it will accept the order.

Personal Mention

Mr. J. C. Marquardt has been appointed general superintendent of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.

Mr. Martin Evans has resigned as superintendent of transportation of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.

Mr. Elmer Veley, who has been master mechanic of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., for a number of years, has resigned to engage in a private business.

Mr. J. P. Verner, superintendent of the Brantford (Ont.) Municipal Railway System since it was taken over by the municipality, has resigned. Mr. Verner was previously manager of the company that controlled the system.

Mr. J. V. Sullivan, formerly general supervisor of the Chicago (Ill.) Railways and a member of President Leonard A. Busby's personal staff since the unification of that company and the Chicago City Railway, has been appointed statistician of the executive department of the Chicago Surface Lines.

Mr. James O. Carr, of Schenectady, N. Y., nominated by Governor Whitman of New York to succeed Mr. Martin S. Decker as a member of the New York Public Service Commission of the Second District, has been confirmed. Mr. Carr has been one of the attorneys for the General Electric Company, stationed at Schenectady.

Mr. E. F. Winslow, formerly assistant superintendent of the railway department of the Iowa Railway & Light Company, Cedar Rapids, Ia., has been appointed superintendent of this company's Cedar Rapids-Iowa City and Cedar Rapids-Mt. Vernon lines. Mr. J. D. Wardle, formerly superintendent of the railway department and chief engineer, will continue in the latter capacity, in which he is engaged in an extensive construction program.

Mr. Henry D. Capitain, the newly appointed chairman of the local transportation committee of the Chicago City Council, has served on this committee for more than four years. He was born in England in 1862 and was educated in the schools of England and Germany. He came to Chicago in 1879. His first important political position was that of alderman of the Chicago City Council. Mr. Capitain has large private business interests, being president of the Western Leather Manufacturing Company, Chicago. His record as a member of the local transportation committee has gained for him the confidence of both the public and railway companies. The properties with which the local transportation committee deals include the Chicago Surface Lines, operating about 900 miles of line, and the Chicago Elevated Railways, controlling about 200 miles of line.

H. D. CAPITAIN

Mr. Calvert Townley, assistant to the president of the Westinghouse Electric & Manufacturing Company, returned to New York on April 19 after a tour through South America on behalf of his company's affairs in that part of the world. He sailed from New York on Oct. 14, going to Liverpool and, after a few days in London, re-embarked for Rio de Janeiro, Brazil. His travels in South America took him successively through Brazil, Uruguay, Argentina, Chile, Bolivia, Peru, the Isthmus of Panama, Colombia and Venezuela, and included therefore every country on that continent except Paraguay, Ecuador and the Guianas. He returned to the United States via the islands of Curaçoa and Porto Rico. The entire trip lasted six months and five days. Mr. Townley thinks that in the future American manufacturers must expect to have to meet in South America just as keen competition as in the past and that the interference with trade between South America and Europe caused by the war is only temporary, but affords an opportunity to get started and make much more rapid progress than would be possible under normal conditions.

OBITUARY

J. Benson Foraker, son of former United States Senator J. B. Foraker, of Ohio, died in New York on April 24. Mr. Foraker was born in Norwood, a suburb of Cincinnati, forty-four years ago. He entered Wesleyan University at Delaware, Ohio, and later attended Cornell University, of which he was an alumnus of 1893. He entered the Cincinnati Law School as a member of the class of 1895 and became an associate of his father in the active work of the profession and remained with him until 1898. In that year President McKinley appointed him Assistant Adjutant-General on the staff of Major-General James F. Wade, for service in the Spanish-American war. In 1901, when the Cincinnati Traction Company was organized, Mr. Foraker was elected vice-president of the company. Later on he became a director of the Cincinnati Gas & Electric Company and of the United States Lithograph Company. About eighteen months ago ill health compelled him to resign the vice-presidency of the Cincinnati Traction Company.

Herbert John Somerset, who had lived in Canada for the last three years, died in Toronto on April 11 after an illness of three weeks. Mr. Somerset was born in St. Catharines, Can., in 1870. He was graduated from the Worcester Polytechnic Institute in 1891 with the degree of B. Sc. in mechanical engineering. The following year he took an expert course with the Canadian General Electric Company at Peterboro. In 1894 he received an appointment with the Winnipeg (Man.) Electric Street Railway, and served with that company until 1899, part of the time as general manager. He then went to Australia and for the next thirteen years was manager, engineer and local director of the Perth Electric Tramways, Ltd. During this time he was also consulting engineer for the Calgoorlie Tramways, Ltd., Calgoorlie Power & Light Company, and the North Melbourne Tramway & Lighting Company, Ltd. After successfully negotiating the sale of the Perth tramways to the government of West Australia for his London directors, Mr. Somerset spent a few months in London and then returned to Canada. He is survived by a widow and two daughters.

LIVE STOCK SHIPMENTS ON INTERURBAN

The freight traffic of the Louisville & Interurban Railway has been seriously interfered with by the quarantine regulations which have been in effect as a result of an epidemic of the foot and mouth disease. Where the lines of the Louisville & Interurban Railway cross the county line, as they do to Lagrange and to Shelbyville, there is some freedom of incoming shipments and cattle shippers have shown preference for the electric line in view of the more rapid service. A recent order establishing an inspection station in South Louisville, however, ostensibly required that this stock, after being received at the Brook and Green Street station, be driven through the streets to that point. A precedent was created the other day by the visit of an inspector of the federal service to the traction depot, whence the stock is taken to the stockyards in disinfected wagons, and it is presumed that this system will prevail hereafter. One order threatened the interest of the railway because it has no line running into the yards, but the authorities modified the ruling when R. H. Wyatt, general freight agent of the company, insisted that there was no real difference between a disinfected steam railroad car and a disinfected wagon which was loaded from a disinfected electric railway car. According to Mr. Wyatt the restrictions placed on all this character of business have been growing more and more involved, and the company never accepts a shipment of live stock for Louisville with any assurance that the shipment can ever be delivered to consignee. One day recently, before the ruling was modified, the company had a carload of cattle on its hands which technically it could not unload, could not return to point of origin and could not keep on its car. Finally the officials permitted the company to unload the shipment.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Georgia Electric Company, Atlanta, Ga.**—Chartered in Georgia to build electric railways and other public utilities in Georgia. Capital stock, $5,000. Incorporators: B. O. Bittick and W. M. Bennett.

***Petersburg & James River Railway, Petersburg, Va.**—Incorporated in Virginia to build an 11-mile electric railway from Petersburg to City Point. Headquarters: Petersburg. Capital stock, $25,000. J. Walter Long, 801 Real Estate Trust Building, Washington, D. C., president; B. B. Wilson, vice-president, and Bestor R. Walters, Washington, D. C., secretary and treasurer.

FRANCHISES

Corona, Cal.—The Pacific Electric Railway has received a franchise from the City Council to extend its lines in Corona.

Fresno, Cal.—The Fresno Interurban Railway has received a franchise from the Council for a double track line from Belmont Avenue and Fresno Avenue along Belmont, Valeria. Merced and L Avenues to the southeastern city limits of Fresno. Work on this line will be begun at once.

Lynn, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has received a fifty-year franchise from the Council for an extension in Lynn.

Riverside, Cal.—The Southern Pacific Company has asked the Council for an abandonment of its franchise rights on Market Street, Riverside, with the idea of turning the entire rights over to the Pacific Electric Company under the parallel franchise recently granted the latter company.

Methuen, Mass.—The Bay State Street Railway has asked the Council for a franchise to alter, relocate and extend some of its tracks in Methuen.

Mayville, N. Y.—The Columbus & Mayville Railroad has asked the Council for a franchise in Mayville. C. P. Northup, Corry, Pa., president. [Feb. 6, '15.]

Poland, N. Y.—The Town Board of Poland, Chautauqua County, has authorized the town superintendent of highways to sign the franchise for the Hamburg-Falconer Electric Railway. This is the first franchise secured for this proposed line, which will connect Jamestown and Buffalo. Work must be started within one year from the date the franchise is secured for the entire distance. [April 29, '13.]

Durham, N. C.—The Durham Traction Company has asked the Council for a franchise for an extension on Holloway Street in Durham.

***Linnton, Ore.**—O. M. Clark, Richard Shepard and J. B. Holbrook, Linnton, have asked the County Commissioners for a franchise to operate an electric railway between Nicolai Street and the northern limits of Linnton and to extend it to Portland. This is part of a plan to build an electric railway, financed by residents of Linnton and points between Linnton and Portland, to be operated over the right-of-way given up by the United Railways on April 1.

Dallas, Tex.—A petition asking extension of the Dallas Northwestern Traction Company and Dallas Southwestern Traction Company franchises for a period of six months was filed with the Board of Commissioners recently by E. P. Turner and S. P. Cochran, present holders of the franchises. The franchises cover contemplated interurban lines to Denton on the north and Glen Rose on the south. Financial conditions have been such that the holders of the franchises have been unable to finance operations, but they expect within the next six months to sell bonds which will insure the construction of 20 miles of interurban line. This would be completed under the terms of the extension by May 10, 1916. [Feb. 27, '15.]

Petersburg, Va.—The Petersburg & Appomattox Railway has received a franchise from the Council in Petersburg. This is part of a plan to build a 12-mile line between Petersburg and City Point. T. M. Wortham, Richmond, Va., president. [March 27, '15.]

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company is asked to consider plans to extend its Monroe Street loop east to Fourth Street, and thence south to Washington, and to build a new line down Fourth Street from Roosevelt Street, thus abandoning its entire line on First Street in Phoenix.

Columbus, Ark.—Plans are being made to resume work on the proposed electric railway between Columbus and Washington, Ark. About 4½ miles of grading have been completed and are now ready for rails. Work was suspended last fall on account of financial conditions. Rufus S. Stout, Pine Bluff, promoter.

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company announces that it has appropriated $60,000 to rebuild several of its lines in Fort Smith. The line from the carhouse to Electric Park will be repaired first. The grade will be reduced and the adjoining road raised. The present track will be used again. The North Thirteenth Street line will be rebuilt, as will a portion of the Grand Avenue line. New track will be used on the former. The entire system between Fort Smith and Arkoma, Okla., will be rebuilt and new track will be used.

Jacksonville & Florida Railway, Jacksonville, Fla.—Preliminary arrangements are being made by this company for its proposed interurban line between Jacksonville and Middleburg. The company owns water power which will develop 10,000 hp, enabling it to generate current sufficient to not only operate its trains but to provide light for all the surrounding towns. Sayville H. Thorpe, Jacksonville, is interested. [Feb. 27, '15.]

***Aurora, Midland & Western Railway, Aurora, Ill.**—This company has been organized to finance a new electric interurban railway to connect Aurora, Mendota, Somonauk, Sandwich, Plano, Bristol and Meriden.

Centralia (Ill.) Traction Company.—This company has extended its line 1 mile in Wamac.

Kankakee-Lafayette Electric Railway, Kankakee, Ill.—Preliminary arrangements are being made by this company to build the proposed electric railway to connect Kankakee and Lafayette. O. L. Brown, general manager. [Jan. 30, '15.]

La Salle (Ill.) Railway.—Surveys are being made and right-of-way secured by this company for its electric and steam line between Oglesby and La Salle. J. B. McCoffrey, La Salle, president; J. H. Ellis, Chicago, vice-president; B. M. McDonald, Chicago, secretary, and R. W. Thompson, La Salle, treasurer. [May 2, '14.]

Moline, Rock Island & Eastern Traction Company, Moline, Ill.—During the next few weeks this company expects to repave and double track its line on Seventeenth Avenue between First Street and Seventh Street in the city of East Moline.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—This company has begun construction on the first section of its proposed line. The work is being done along the route from Peoria to Banner in Fulton County and is under the direction of Webster Bushnell, chief engineer. The route of the first section of the line extends from Peoria to Hollis over the Peoria Terminal tracks and from Hollis to Banner through Orchard Mines, Mapleton and Kingston Mines. The second section of the line extends from Banner to Lewistown and a branch is to extend from Banner to Canton, a few miles away. Terminals on the main line will be at Astoria, Rushville, Mt. Sterling, Columbus and Quincy. Instructions to begin work were issued on April 21 following a meeting of the board of directors. Stock in the company is finding a ready sale. [March 13, '15.]

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—This company has under construction 8½ miles of track rehabilitations and extensions in Cedar Rapids. This track is all being laid with 70-lb. 7-in. T-rail on wooden ties with a 6-in. tamped ballast foundation. Reconstructions and extensions of the overhead trolley lines also form a part of this year's construction schedule.

Union Electric Company, Dubuque, Ia.—Plans are being made by this company to rebuild 2 miles of track, including overhead and special work. This work has been undertaken on account of repaving and extensions in Dubuque.

Arkansas Valley Interurban Railway Company, Wichita, Kans.—Orders for materials are being placed by this company to build its extension from Halstead to Hutchinson.

Brandon (Man.) Municipal Railway.—The City Council contemplates laying new tracks on Thirteenth Street, Fourteenth Street and College Street in Brandon, to cost about $14,000. All material is in stock. R. E. Speakman, engineer.

***Transcona, Man.**—Plans are being made to construct an electric line from the corner of Oxford Street and Regent Street, Transcona, to the western limits of the town, to connect with the Winnipeg Street Railway on Talbot Avenue, Elmwood. W. J. Christie, Union Bank Building, Winnipeg, is interested.

Battle Creek, Coldwater & Southern Railway, Coldwater, Mich.—This company advises that it expects soon to close a contract to build its line between Battle Creek, Coldwater and Girard. T. A. Hilton, president. [Nov. 14, '14.]

Muskegon, Casanovia & Saginaw Interurban Railway, Muskegon, Mich.—Surveys are being made by this company for its 92-mile line between Muskegon and Ithaca. James L. Smith, secretary. [April 17, '15.]

Saginaw-Bay City Railway, Saginaw, Mich.—During the next two weeks this company expects to award contracts to double track about 1 mile of its line in Saginaw.

Electric Short Line Railway, Minneapolis, Minn.—A contract has been signed by this company and the city of Park Rapids assuring the extension of this line to Park Rapids, thereby making that city its northern terminal.

United Railways Company, St. Louis, Mo.—Plans are being contemplated by this company for an extension of its lines in the northwestern section of St. Louis in the Walnut Park District.

Brooklyn, N. Y.—Bids are desired until May 18 by the Public Service Commission, First District, 154 Nassau Street, New York, N. Y., for the construction of Section No. 2 of Route No. 49, being a part of the Culver Rapid Transit Railroad, a three-track elevated railroad in Brooklyn, beginning at a point in Gravesend Avenue, about 525 feet south of Bay Parkway and extending southerly over Gravesend Avenue and Shell Road to a point about 525 ft. south of Avenue X.

Corona, N. Y.—Right-of-way between Corona and Lakeville for a new electric railway to be built by interests connected with the New York Central Railroad, is understood to have been secured, and it is believed that contracts for that portion of the line in Queen's Borough will be let soon. The Lakeville Holding & Development Company is said to be interested.

Orange County Traction Company, Newburgh, N. Y.—This company is rebuilding its track on the Newburgh and Cohecton Turnpike, using 107-lb. Lorain Trilby rail. Creosoted ties and single 4/0 Ohio pin-driven bonds are being used. Track will be concreted in, also concrete pavement, one course, reinforced with No. 7 American Steel & Wire Company's mesh about 2-in. from top.

New York, N. Y.—The Public Service Commission, First District, has awarded two rapid transit contracts during the last week. One was for Section No. 4 of Routes Nos. 4 and 36, for the construction of that part of the Broadway subway in Manhattan lying in Seventh Avenue, between Fifty-first and Fifty-ninth Streets. This went to the Litchfield Construction Company, the lowest bidder, for $1,937,509. The other was for the construction of Section No. 2 of Route No. 12, that part of the Eastern Parkway subway in Brooklyn lying between Prospect Park Plaza and a point about 600 ft. east of Nostrand Avenue. This award was made to the Inter-Continental Construction Corporation, the lowest bidder, for $2,744,263.

Hocking - Sunday Creek Traction Company, Nelsonville, Ohio.—This company is now building a 7-mile line from Chauncey, Ohio, to Athens, Ohio, and plans to have this branch in operation about May 15.

***Niagara Falls, Ont.**—The Department of Public Works has under consideration plans, drawings and specifications for a sight-seeing electric railway, which a private corporation wishes to construct across the Whirlpool Rapids.

Toronto (Ont.) Railway.—Plans are being made by this company to rebuild its line on College Street from Bathurst Street westward, in Toronto.

Portland & Oregon City Railway, Portland, Ore.—Track has been laid by this company through Milwaukie from the south side to Witte's Park on the north side. From Milwaukie toward Portland considerable grading has been done. Toward the southeast the line has been graded to and beyond Clackamas Station, nearly to Baker's Bridge across the Clackamas River, the terminus of the line for this year.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being considered by this company for the extension of one of its lines out of Portland, either the Mount Hood, Cazadero or Boring lines beyond Sandy for a distance of 8 miles.

Butler & Grove City Railway, Grove City, Pa.—Material has been received and plans are being made to begin work at once by this company on its line between Grove City and Slippery Rock. Eventually this line will extend from Grove City to Conneaut Lake via Sandy Lake.

Hanover & McSherrystown Street Railway, Hanover, Pa.—During the next thirty days this company expects to buy 41,000 ft. of 7-ft. girder rails to rebuild some of its track in Hanover.

Hershey (Pa.) Transit Company.—It is reported that this company plans to begin work about May 15 on its extension from Hershey to Jonestown.

Johnstown & Somerset Street Railway, Johnstown, Pa.—Surveys are being made by this company for its proposed line between Johnstown and Rockwood. It is the intention of this new company to connect its system with that of the Johnstown Traction Company at Kelso, about 5 miles south of Johnstown, and to enter Johnstown over these lines. The traffic agreement with the Johnstown Traction Company, however, has not been signed. [March 27, '15.]

Beaver Valley Traction Company, New Brighton, Pa.—During the next few weeks this company plans to rebuild 3600 ft. of new track in New Brighton.

Scranton & Binghamton Traction Company, Scranton, Pa.—This company is operating its line from Binghamton and Scranton as far as Brooklyn, Pa., and grading has been completed to within 3 miles of Montrose. It is expected to have the line in operation to Montrose this summer.

Sioux Falls (S. D.) Traction System.—This company reports that it expects to pave about 2 miles of track this season, part of which is already contracted for.

***Bristol, Tenn.**—An electric railroad from Bristol to Kingsport, to connect at that point with the Carolina, Clinchfield & Ohio Railway and a new electric line to be built from Kingsport to Newport is being promoted. The construction of the electric line from Newport to Kingsport is already assured.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company is rebuilding 3000 ft. of track on Yale Avenue and has completed double tracking the Fountain City line, which doubles that line except for a short distance in Knoxville. Shopwork is nearly completed on the open cars.

Dallas (Texas) Southwestern Traction Company.—This company will enter Dallas over the proposed Commerce Street viaduct which will bridge the numerous tracks of the Union Terminal Company on the east bank of the Trinity River, if negotiations which were begun April 21 are successful. Plans for the viaduct have already been drawn, but if the electric line uses this entrance to Dallas new plans for heavier construction will have to be made. The officials of the traction company have proposed to the railroad committee of the Chamber of Commerce and City Commissioners that the traction company pay the increased cost of heavier construction for the use of the viaduct.

***Marfa, Tex.**—B. Q. Musgrave, Fort Worth, and associates are making plans to build an 18-mile electric interurban railway from Marfa to Fort Davis.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Work will be begun at once by this company on its Brigham-Wellsville extension a distance of 35 miles. [April 10, '15.]

Ogden Rapid Transit Company, Ogden, Utah.—An extension of this company's line from Idlewild in Ogden Canyon to Huntsville will be built at once by the Utah Construction Company.

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company has placed in operation its line to Preston.

Morgantown & Wheeling Railway, Morgantown, W. Va.—Grading has been completed by this company from Morgantown to Blacksville, via Cassville, Core and Pemtress, 24 miles, and track has been laid for half the distance. Bridges are being erected along the line.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—During the next eight weeks this company will award contracts to build an extension of about ½ mile in the city of Sheboygan.

Janesville & Madison Traction Company, Madison, Wis.—The Wisconsin Railroad Commission has issued an order authorizing this company, which proposes to build an interurban line from Madison to Janesville, to issue $22,000 in bonds. The revenue from these bonds and from the $8,000 of stock which the company was last week authorized to issue, will be used to build that part of the line extending from Madison to the town hall in Blooming Grove, 2½ miles. [April 24, '15.]

SHOPS AND BUILDINGS

Tri-City Railway, Davenport, Ia.—Plans are being made by this company to build a new carhouse in Davenport.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to build a new depot on Commonwealth Avenue and Beacon Street in Boston. The structure will be of brick and concrete construction.

Boston & Worcester Street Railway, Worcester, Mass.—Official announcement of the proposed concentration of its entire operating force in Framingham has been made by this company. A new carhouse will be built in Framingham to replace the one burned about three months ago in Westboro. A machine shop and foundry will also be erected and repair shops and paint shops of the company will be built in Framingham. The new carhouse will have a capacity of twenty-four cars and will be of brick and concrete. The machine, repair and paint shops will be of similar construction. The carhouse in Wellesley will be used only for storage.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—Plans are being made by this company to build a new passenger station in Richfield Springs. The structure will have a frontage of 63 ft. and will be about the depth of the present quarters. It will contain the offices of the company and also the offices of the Colliers' Heat, Light & Power Company, and a restaurant.

Hudson Valley Railway, Glens Falls, N. Y.—Work will be begun at once by this company on the construction of its new passenger station in Saratoga Springs. It is estimated to cost about $25,000.

Niagara Gorge Railroad, Niagara Falls, N. Y.—This company has completed its new carhouse in Niagara Falls.

Slate Belt Electric Street Railway, Penn Argyl, Pa.—Preliminary arrangements are being made by this company to build a new carhouse and repair shop in Wind Gap, Pa. Work will be begun about July 1.

POWER HOUSES AND SUBSTATIONS

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company has awarded a contract for one 500-kw motor generator with 700-kva motor for its power house in Fort Smith.

San Joaquin Light & Power Company, Bakersfield, Cal.—Plans are being made by this company to construct a new hydroelectric power plant at Merced Falls. The power line from Merced Falls to Merced will be raised from 30,000 volts to 60,000 volts. This plant will supply Merced County, mines of Mariposa County and gold dredgers working on the Merced Falls.

Joliet & Eastern Traction Company, Joliet, Ill. — During the next ten weeks this company plans to award contracts to build a new power plant with an initial installation of 1000 kw.

Columbus, Delaware & Marion Electric Railway, Cincinnati, Ohio.—A new substation will be erected in the near future by this company at Bellefontaine and Davids Streets in Marion.

Manufactures and Supplies

ROLLING STOCK

Dayton (Ohio) Street Railway expects to purchase within the next two weeks one snow sweeper.

Saginaw-Bay City Railway, Saginaw, Mich., has ordered one work car from the St. Louis Car Company.

Cincinnati & Columbus Traction Company, Norwood, Ohio, is in the market for two center-dump ballast cars.

Chicago & Interurban Traction Company, Chicago, Ill., expects to be in the market shortly for four interurban car bodies.

Michigan Railway, Kalamazoo, Mich., has ordered eight 50-ft. all-steel freight trailers from the St. Louis Car Company.

Columbus Railway & Light Company, Columbus, Ohio, expects to purchase a car designed especially for street cleaning purposes.

Jackson Light & Traction Company, Jackson, Miss., is in the market for five very light single-truck double-end one-man cars, including small wheels and motors.

Union Traction Company, Coffeyville, Kan., has ordered one locomotive baggage car from the St. Louis Car Company, to be equipped with St. Louis No. 61 trucks.

Beaumont (Tex.) Traction Company is reported as having been authorized by the Beaumont City Council to replace seven of its cars with seven new single-truck cars.

Anniston Electric & Gas Company, Anniston, Ala., has ordered, through the Phoenix Construction Company, New York, two 21-ft. thirty-two-passenger steel car bodies from the Southern Car Company, to be equipped with Brill 21-E single trucks.

Carolina Power & Light Company, Raleigh, N. C., has ordered, through the Phoenix Construction Company, New York, three 21-ft. thirty-two-passenger steel car bodies from the Southern Car Company, to be equipped with Brill 21-E single trucks.

Huntsville Railway, Light & Power Company, Huntsville, Ala., has ordered through the Phoenix Construction Company, New York, four 16-ft. twenty-four-passenger steel car bodies from the Southern Car Company, to be equipped with Brill 74-M2 single trucks.

Ogden, Logan & Idaho Railway, Ogden, Utah, is having built by The J. G. Brill Company twelve large all-steel interurban cars. Two of this type were built a year ago. These twelve cars have been on option for a year. This railway company is in the market for six 64-ft. steel trailer coaches of a design which later, if desired, would be suitable for motor operation.

New York & Queens County Railway, New York, N. Y., has been instructed by the Public Service Commission, First District of New York, to contract by June 1, 1915, for additional car equipment for its various lines in order to provide this equipment not later than Oct. 1, 1915. The railway company is further instructed to notify the commission by May 4 whether the terms of this order are accepted.

Manhattan & Queens Traction Corporation, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of April 10 as considering the purchase of ten new cars, has assigned the purchasing agency of these cars to H. L. Doherty & Company, New York. Bids have been received from the carbuilders. Though the actual type, as to center or end entrance, has not yet been decided, the cars will be considerably lighter than those now in operation on the line.

TRADE NOTES

Western Electric Company, New York, N. Y., has located its distributing house in Kansas City in new quarters at 608-610 Wyandotte street, opposite the old building which served as its headquarters for the past ten years.

Esterline Company, Indianapolis, Ind., has received an order from the city of Regina, Regina, Sask., for 28 SE-95 "Golden Glow" headlights to be used on the cars of the municipal railway. This order was placed through Dawson & Company of Winnipeg.

Curtain Supply Company, Chicago, Ill., has received an order to equip with ring fixtures and Rex all-metal rollers the Pantasote curtains of the 478 car bodies recently ordered by the Interborough Rapid Transit Company, New York, from the Pullman Company.

Mark D. Batchelder, president of the Mark D. Batchelder Company, Peoria, Ill., has resigned to become president of the Traction Advertising Company, also of Peoria. Mr. Batchelder organized this new company and will continue to engage in handling car advertising.

Ohio Brass Company, Mansfield, Ohio, has received an order for the catenary construction of the Kansas City, Kaw Valley & Western Railway's new 23-mile extension, and another order for 12 miles of d.c. bracket construction line material from the St. Tammany-New Orleans Railway & Ferry Company, Mandeville, La.

Johnson Fare Box Company, Chicago, Ill., has received an order from the United Railways of St. Louis for 160 fare boxes for immediate delivery. Additional orders have also been received from the Jacksonville (Fla.) Traction Company, Houston (Tex.) Electric Company and Puget Sound Traction, Light & Power Company, Seattle, Wash.

Western Electric Company, New York, N. Y., has shipped to the Greek government three boatloads of telephone poles. The shipments were made in forty-five carloads from the concentration yard of this company at Toledo, Ohio, and consisted of 15,000 4-in. top, 20 ft., and 2000 5-in. top, 25 ft. northern cedar poles. The entire shipment weighed 2,000,000 lb.

H. McL. Harding, consulting engineer, New York, has moved his office from 17 Battery Place to 52 Vanderbilt Avenue at the corner of East Forty-fifth street. Mr. Harding for many years was connected with the electric railway industry and recently has been giving his attention to terminal equipment and freight-handling machinery as well as location designs and plans for marine and railway terminals.

Hart Manufacturing Company, Hartford, Conn., manufacturer of "Diamond H" products, including push button switches, rotary flush and rotary surface switches, remote control switches, automatic door switches, ground clamps, etc., has removed its New York office to Room 1034, 30 Church Street, the Hudson Terminal Building, with the old telephone number Cortland 487. Frank E. Watts is district manager of the company at New York.

Joseph Dixon Crucible Company, Jersey City, N. J., at its annual meeting on April 19 elected the following directors: George T. Smith, Robert E. Jennings, George E. Long, E. L. Young, William G. Bumsted, J. H. Schermerhorn and Harry Dailey. The officers elected by the board of directors are: president, George T. Smith; vice-president, George E. Long; treasurer, J. H. Schermerhorn; secretary, Harry Dailey; assistant secretary and assistant treasurer, Albert Norris.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received orders for portable meters from a number of electric railways in Illinois, which are purchasing this material in compliance with orders from the Illinois State Utilities Commission. The Illinois Traction System ordered nineteen Type U graphic voltmeters, twenty portable standard watt-hour meters, nineteen portable voltmeters, together with a number of other miscellaneous portable instruments of the laboratory type. The Southern Illinois Light & Power Company, Hillsborough, Ill., has also ordered eight portable graphic voltmeters and two ammeters of the same type, four portable wattmeters, two portable voltmeters and ammeters, two portable current transformers, and two each of the switchboard type graphic voltmeters and voltmeters, together with a varied assortment of other types of laboratory instruments. This manufacturing company has also received an order from the Chicago & Milwaukee Electric Railroad for fifteen quadruple equipments of Type No. 557-A, 140-hp motors with double-end Type "HLF" control. These equipments are to be placed in high-speed passenger express service between Chicago and Milwaukee. The cars will be arranged for train operation.

ADVERTISING LITERATURE

Union Spring & Manufacturing Company, Pittsburgh, Pa., has removed its Pittsburgh office from the Oliver Building to the First National Bank Building.

E. W. Clark & Company, Philadelphia, have issued loose-leaf sheets, to be bound with their periodical financial statements, describing the location, mileage, physical property, inter-corporate relations, franchises and population of territory served for the different electric railways in which the company is interested. The capitalization of each company is also stated.

Transmission Engineering Company, Pittsburgh, Pa., has issued a folder describing its electrical steel work and outdoor substations for all voltages and capacities. The folder contains a number of illustrations of structures of various designs, applied to differing demands of local conditions, built by this company for high-voltage transmission, distribution and substation work.

American Creosoting Company, New York, N. Y., has issued a bulletin describing its Brownie wood block for pavements in city streets and for interior work, as heavy traffic floors in machine shops. This flooring is especially recommended because of its durability. The wear, coming on the end of the grain of the wood, is said merely to compress and harden the surface. In addition, wood blocks are clean, waterproof, sanitary and warm under foot. Unlike cement floors, they furnish a warm and resilient footing for workmen. This company is also prepared to take orders for creosote ties in any quantity.

Harvey Fisk & Sons, New York, have prepared a valuable 46-page illustrated pamphlet concerning the property, operations and finances of the Hudson & Manhattan Railroad. Among other matters the text covers such subjects as the route, the strategic location of the terminal, the capacity of the tunnels, the provision for safe operation and the welfare work of the company. Copies of the latest financial statements are included, and the securities of the company as well as the amortization bonds and franchises are lucidly described. Well-chosen halftones show the construction of the tubes, the safety devices used and the special features of the Hudson Terminal building, while the connecting subway lines in New York City and the connecting steam railroad and trolley lines in New Jersey are indicated on maps. In short, the pamphlet will be found to contain a reply to almost any question that can be raised by investors about the affairs of this company.

Lord Manufacturing Company, New York, N. Y., has issued a catalog covering the following hand power brakes: Giant perfected brake, Lord differential staffless brake, Giant brake and Sterling safety brake. The publication will be of special interest to the electric railway trade by reason of the section devoted to data pertaining to the determination of the proper braking pressure through the hand power brake. There are numerous illustrations of both common incorrect as well as correct carbody and foundation truck rigging, followed with a valuable discussion leading up to formulas which accompany each illustration showing how to determine the percentage of braking pressure on practically every type of electric car equipment. This publication being the combination of a catalog and a manual on hand brake equipment, prepared in simple and practical form, should form a convenient, ready reference to car equipment engineers, superintendents of equipment, master mechanics and car foremen.

Simmen Automatic Railway Signal Company, Buffalo, N. Y., has issued an interestingly compiled catalog which contains a general description of its signaling system. This system, several installations of which are described in the catalog, embodies the following fundamental units: (a) continuous cab signals; (b) central control of these signals by interlocking signal control levers; (c) automatic recording of train movement; (d) a novel method of combining dispatching and signaling in one system; (e) automatic open switch protection. The equipment for each motive power unit in this system consists of the signal lamp, a relay, a portable storage battery and a contact shoe mounted on the truck in such a way that it makes a contact with, and is raised by short third-rail or ramps, placed at convenient signal points along the tracks. These third-rails are connected to the dispatcher's office into line wires and signal control switches. The installations shown in the catalog includes those of the Toronto & York Radial Railway, Indianapolis & Cincinnati Traction Company, Mesaba Railway and the New York Municipal Railway.

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TECHNICAL EDUCATORS AND THE CONVENTION

It will be remembered that last year an incident of the Atlantic City convention of the railway association was an attempt to bring leading instructors and railway men together for mutual benefit. As far as it went the result was satisfactory, and there was manifest a desire that more should be done along the same line. While no plans for the current year have been announced it will be necessary for teachers to make their plans for attending the convention within the next few weeks before the governing boards adjourn for the summer. The date of the convention, Oct. 4 to 8, fits in well with that of the International Engineering Congress, Sept. 20 to 25, the intervening gap being available for studying the exposition exhibits. If plans are made early it should be possible to have a large delegation of teachers on hand. There are big problems with which they should become familiar and which have even more bearing on the future careers of their students than, say, the heating of a rotary converter armature coil, located *n* slots from a tap point, when carrying full load with 95 per cent power factor, leading current.

INCREASED SPEED WITH LESS POWER

Certain elaboration seems to be desirable with regard to our recent comment on the vital importance of faster schedules, in which it was said that power consumption per car-mile would be reduced as schedule speed was increased. Higher speed accompanied by lower power consumption admittedly constitutes an apparent paradox because most available records on the use of energy by cars and trains deal only with factors such as rolling friction, wind resistance and the like, to the practical exclusion of the number of stops per mile. As a matter of fact the latter is of far more importance in urban service than all the other factors added together, and our statement that fewer kilowatt-hours are required with faster schedules is predicated on the condition that the increased speed was to be attained by cutting out stops. To recognize the importance of this factor it is only necessary to recollect that a free-running car at 20 m.p.h. uses less than 50 watt-hours per ton-mile, while in city service with numerous stops a schedule speed of only 10 m.p.h. involves the use of about three times as much power. Without going into details each stop necessitates an expenditure of energy of the order of 6 watt-hours per ton, or if a saving of five stops per mile is effected, the power consumption will be reduced some 20 per cent even though the speed will increase about 20 per cent at the same time.

MOTOR-BUS COSTS IN ENGLAND

So many references to the alleged low cost of bus operation in England have appeared of late in connection with the introduction of the bus *vs.* tram controversy into this country that some startling statements to the contrary which were published recently in the proceedings of the London Institution of Civil Engineers possess considerable interest. These covered actual working costs given out by three British municipalities which had undertaken bus operation and then had discontinued it, the figures being respectively 32 cents, 25.4 cents and 28.8 cents per bus-mile—about twice the cost for tramcars in England. Authentic figures lower than these were stated not to be available, the London bus company being "loath to divulge details on account of the competition which exists." This is most unfortunate. Rumors of low operating costs have been so frequent as to have acquired the dignity of the truth in the minds of practically everyone in this country, and statements indicating that the auto-bus may not be much cheaper to operate in London than here come as a distinct surprise. When, in addition, it is stated before the Institution that vast amounts of capital have been lost in motor-bus exploitation in England, and that still larger amounts are in contemplation "without any cost figures to which responsible parties would affix their names," it seems that conditions on the two sides of the Atlantic are much the same after all. The main difference is that England has followed this *ignis fatuus* longer than we have and has wasted more money in doing so.

NEW YORK CONSTITUTIONAL CONVENTION

The members of the constitutional convention now in session at Albany, N. Y., have received from a committee representing local members of several national societies and local societies of engineers copies of a pamphlet making certain well-considered but novel suggestions. Some of these were mentioned in a brief abstract of the pamphlet printed in this journal last week. The substance of the matter is that the engineers of the State, acting as a specially qualified group of citizens, after careful consideration offer a constructive program for the conducting of those parts of the State's activities which have to do with public works and public utilities. These men are by the nature of their work forced to realize keenly the shortcomings of the present system which result largely from the constant shifting of the personnel of administrative offices and regulatory bodies. They form a distinctive and highly intelligent class well qualified to speak and entitled to a respectful hearing from public servants. The case is the same as if the physicians of the State should speak as a group on matters affecting public health, or the lawyers on its court machinery. What the engineers want to secure is competence in high places. In no other way can public works be economically constructed and maintained and public utilities secure consistent and reasonable treatment. Since the last constitutional revision twenty years ago great progress has been made in public-utility regulation and in State engineering work. Sufficient experience has been accumulated to show the necessity for removing these from direct and indirect political control. Incessant "investigations" have demonstrated the precariousness of tenure of office and have greatly reduced the attractiveness of many State posts to the class of men who would make the best public officers. The electric railways and other utilities of the State are greatly concerned in this matter as they touch State authority at many points and have a vital interest in removing these offices as far from politics as possible. Through their local delegates to the convention they can and should exert an influence commensurate with the magnitude of their concern in the outcome.

FINAL ARTICLE ON N. Y. M. CAR

In this issue we complete the series of articles on the new New York Municipal car of the Brooklyn Rapid Transit System, begun about a year ago. Altogether six installments have been published, descriptive respectively of the general design; body; truck, brake rigging and draft gear; motors, control, conduit and collectors; lighting, and brakes and auxiliaries, the last considered in the present article. So much progress has been made during the past few years in the design of cars, particularly for rapid transit service, that we believe this series of articles has put in form easily accessible to others a great deal of information which they will find of practical use for any study which they may make of rolling stock for their own needs. As a rule, freedom in car design is hampered by the necessity of complying with rigid limitations imposed by the track location. In this case, the clearances provided in the new subway system as well as on the existing Brooklyn elevated system were so great that the principal limitation became one of weight, and this the designers were able to attack so successfully as to secure a final weight for a motor car of only 315 lb. per passenger, based on a carrying capacity per car of 270 passengers. The operating features of the car seem to have been as carefully studied out as those of structural strength combined with minimum weight. Rapid loading and unloading is provided by three sets of double side doors under the control of one trainman, and rapid acceleration, retardation and passage over the road by the use of ventilated motors of high capacity on each car, the clasp brake and a control system which automatically keeps the speed below the maximum allowed by operating conditions at different points. Finally, the comfort of passengers is cared for by scientifically designed seats and a system of illumination based on modern principles made possible by the white enameled finish of the interior of the car.

BY-PATHS IN WAGES ARBITRATION

Attention has been called in these columns to the thoroughness with which the evidence of the Bay State Street Railway in the pending wages arbitration at Boston was prepared, and some hint of this was given in concrete form in the issue of April 10 in connection with the report of Professor Richey's testimony on the cost of living then published. One of the things which impresses one who scans the material presented by the company is the number of by-paths traversed in the case and the immense amount of special investigation conducted on the system in order to furnish the arbitration board with the latest and most accurate data possible. Hearsay evidence was tabooed, and the facts brought out with so much skill by the company's officials are the result of costly analysis by competent men who went straight to the source of information for their material.

Thus, the figures and plots showing the variation in the cost of living in the cities and towns of the sixteen divisions operated were derived from information secured at considerable expense by men who went personally into these places, consulted with local superintendents as to reliable merchants, and then interviewed tradesmen upon the present and former cost of foodstuffs, clothing, etc. In the compilation of data bearing on rents one of the largest real estate firms in Boston was retained to investigate these costs in territory in which railway employees could have their homes, and in this way authentic information, assembled by specialists, was brought to the hearing room.

Going still deeper into the economic conditions governing its employees, the company determined the amount of taxable property held by car service men or their wives to be more than $1,000,000. Even though such property might in part be mortgaged, it was felt that such a total, representing 425 employees, showed that the company's service had been unduly attacked by the union representatives as deadening to ambition and tending to force the men into hopeless poverty! Relative to the enjoyments of life participated in by the men when off duty, the company introduced quotations from the union magazine to neutralize the testimony of individual employees called to the stand by the union to convince the board that pleasure and the blue uniformed man seldom met. Even a census of the number of children and the former occupations of the men was presented, and the comparisons of their wages and permanency of employment with other occupations in Massachusetts were most illuminating.

Counsel for the men naturally elaborated upon the multiplicity of duties assigned to the modern motorman and conductor, and with the detailing of these, with an immense amount of repetition, the expenses of both the men and the company were forced to wearisome limits. A very large part of the Bay State service is rendered in suburban or country districts, and to offset the contention that street railway work is as laborious on such lines as in the city, the company introduced evidence by a number of employees from other roads in Massachusetts and Maine stoutly affirming that country operation is easier even where a man runs on a single track. Evidence submitted showed that in the last five years there were fifty times as many rear-end collisions on double track as head-end collisions on single track on the Bay State system. Another new line of attack which graphically supported the justice of the graduated scale was the diagram showing the relation between reprimands, accidents and years of service. This diagram was shown in the ELECTRIC RAILWAY JOURNAL of April 10, page 709.

To mention one more of the by-paths which the company followed in turning its affairs inside out at the hearings, one of the nearly 500 exhibits filed described the organization of the department of maintenance of way, and that of the department of motive power and machinery, including lines, power stations, carhouses, etc., with a summary of the duties of numerous officials, both of high and subordinate ranks. Their purpose was to show that every official of these departments has specific duties of a superior character and that the company was not spending money needlessly for executive supervision. The company deserves congratulation upon its treatment of the problems involved in a way which demonstrates that electric railway practice is a profession in every sense of the word.

CIRCULARIZING PROPOSED RAILWAYS

We are occasionally the recipients of letters from consulting engineers, supply men and others interested in new electric railway construction, which inclose for our explanation circular literature previously addressed to proposed railways reported in the JOURNAL, but returned unclaimed to the sender because of incorrect or insufficient address. In most cases of this kind the address on the unclaimed letter has been simply the name and supposed local headquarters of the proposed line but not the name of the promoters interested. The letter probably failed of delivery because the line was in an embryonic state and its name was therefore unknown to the local postmaster. Some other letters, called to our attention, were addressed to individuals in large cities, without their house or street address.

While many of the notes published on proposed lines do not mention the names of the officers directly concerned, owing to lack of available information, they are often followed in later issues with details of personnel, including the name of the officer most valuable to the manufacturer—the man in charge of purchases. We suggest, therefore, that circularizers make a point of constantly keeping their "field" cards of proposed roads strictly up to date by searching the current "Construction News" columns carefully for the names of proper addressees connected with these roads but not mentioned in the preliminary scanty report. The superscription of each letter of solicitation should be based on the very latest information obtainable at that time and should, so far as possible, bear the name of the officer most likely to supervise the awarding of contracts.

If these precautions are taken we believe that solicitors will be repaid for their trouble by a noticeable saving in "dead" postage, stationery and stenographic labor, and above all by the transformation of many apparently chimerical railways into real prospects. More careful circularizing would also save the financial promoter of a line, who can hardly tell a motor from a controller, the nuisance of forwarding to his equipment engineer a flood of misdirected technical correspondence and advertising literature.

FLANGE-BEARING SPECIAL WORK

The satisfactory results obtained by the few electric railways that have installed flange-bearing special work, especially at obtuse and right-angled crossings, have led some companies to adopt this practice as standard and have caused others to give similar action serious consideration. Our observations are that there is much to be gained by the practice. In both the solid manganese and insert special work the first evidences of wear appear at the intersections of the running rails. The use of flange bearings delays the wear at these crucial points and proportionately lengthens the life of the installation. Manifestly if the impact blows struck by wheels at the intersecting flangeways could be eliminated, the life of special work would be materially increased and, in fact, would approach more nearly that of the rail.

Some engineers have been inclined to look on this practice with considerable apprehension because they believed that it affected the safety of operation. Experience in Kansas City, Mo., and elsewhere has demonstrated that even with chilled-iron wheels this belief was unwarranted. With rolled-steel wheels in the flange-bearing special work, the slight wear on the flanges certainly will not be as rapid as that on the treads which tends to make the flanges deep. Moreover no hazards are introduced as regards the safety of operation, since rolled-steel wheel flanges do not chip.

The general use of the welder in making track repairs offers a means of prolonging the life of the flange-bearing throatway floors of special work. It is quite a simple task to deposit new metal on the floor of the groove to replace that worn out by passing wheel flanges. As long as this worn-out metal may be restored in this manner, special work may be kept flange-bearing indefinitely. Added importance is given to the more general use of flange-bearing special work when one considers the relatively small investment in car wheels as compared with that in the special work installations in large cities. To our way of thinking, experience has shown that the practice is perfectly safe, and it is certainly an economic measure which should warrant more general adoption. This practice is particularly applicable to solid manganese steel frogs and crossings since no difficulty is experienced in providing gentle approaches in the grooved floors. Flange bearings may also be provided in the various types of insert special work and in these it can more easily be maintained since the materials employed lend themselves more readily to welding.

The New York Municipal Car—Brakes and Auxiliaries

Unusually Severe Conditions Are Set for the Air Brakes, in Which the Braking Pressure Is Varied According to the Load—The Low-Voltage Coupler Greatly Simplifies Train Operation, Including Automatic Change of Marker and Tail-Lights—Pneumatically Operated Doors with Spring Shock Absorbers, Automatic Speed Control, Buzzer Train Signals and Correct Posture Seating are Other Features

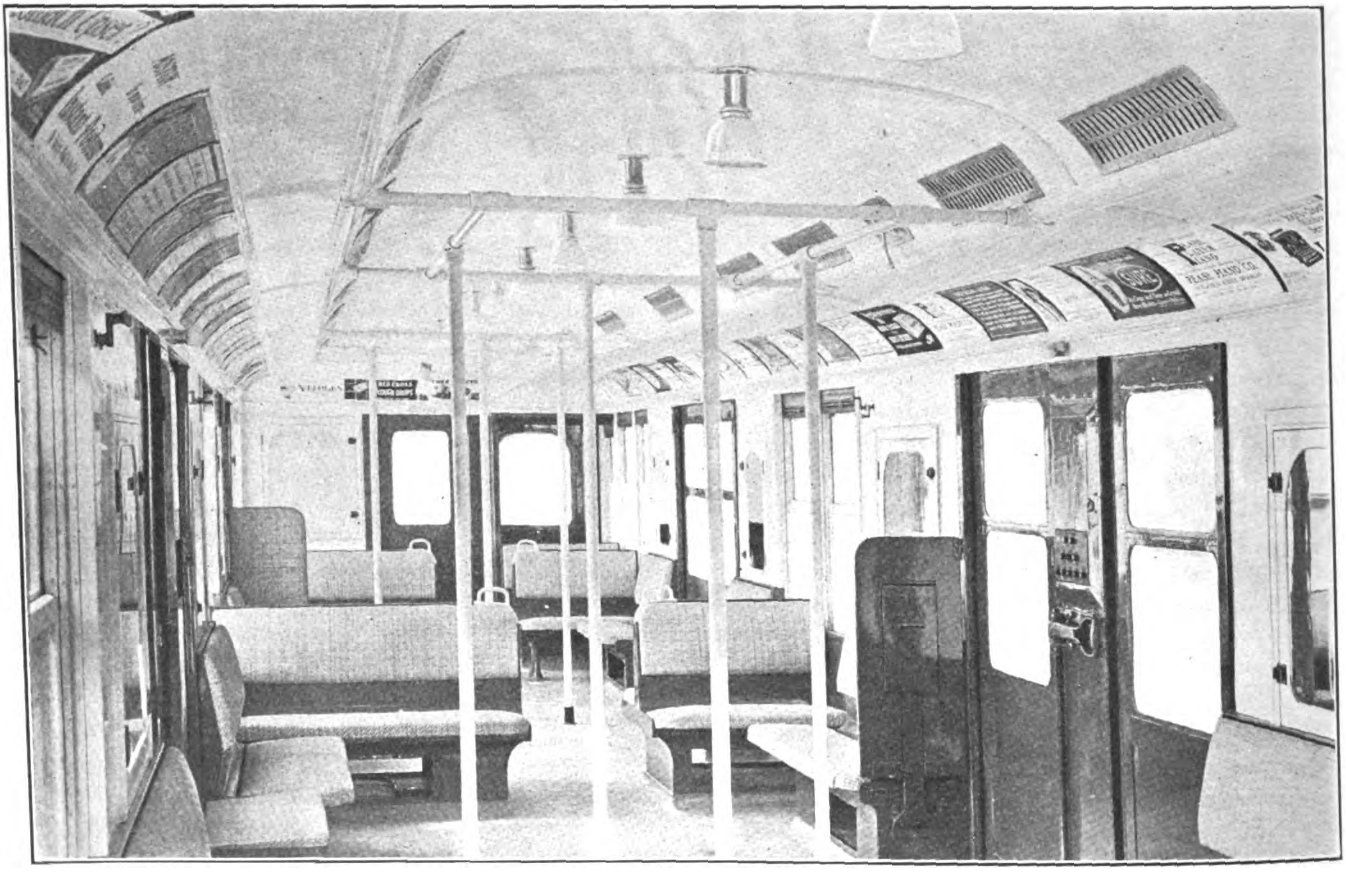
In this article, which concludes the series* on the multi-side-door car of the New York Municipal Railway Corporation, are described the braking equipment with its empty-and-load brake mechanism, the low voltage coupler, the interoperation of control, door, train light and train signal circuits, the automatic speed control, the heaters, signs and other auxiliaries.

AIR BRAKES

The air brakes are of Westinghouse automatic type AMUE with electropneumatic control and graduated release. Further, they embody the features of rapid recharge after each brake application and of auxiliary reservoir recharge without releasing the brakes. Emergency application of the brakes is obtained instantaneously and simultaneously on all of the cars of a train from the opening of the motorman's brake valve, the conductor's valve, or rapid reduction of brake-pipe pressure from any other cause. The brake-pipe pressure is 70 lb., and full service application gives 50 lb. brake-cylinder pressure with a fully loaded train. The electromagnet valves of the brake system are operated from the 32-volt storage battery on each car.

As noted in the article of Dec. 26, 1914, all wheels of each truck are fitted with clasp brakes, two shoes per wheel. With 50 lb. air pressure in the brake cylinder, the foundation and truck brake rigging, which is designed for a leverage ratio of 12:1, delivers a combined pressure on each pair of brakeshoes equal to 90 per cent of the weight on each trailer wheel and 110 per cent of the weight on each motor wheel.

The air brakes are to be operated under the local and express run conditions already detailed in the article of March 13, 1915. Broadly speaking, local trains are to make a schedule speed of 15 m.p.h. between terminals of local service and express trains are to make a schedule speed of 25 m.p.h. between terminals of express service. Some trains will operate in local service entirely and others in mixed local and express service. The trains will vary from two to eight cars, weighing 120,000 lb. each when fully loaded. The average lengths of stop for local and express service respectively will be twenty and thirty seconds. The average lay-over at terminals will be three minutes.



N. Y. M. CAR—INTERIOR SHOWING THE GENERAL SEATING ARRANGEMENT AND VIEW OF SEAT FOLDED UP ALONGSIDE ONE OF THE ACTIVE DOORS; EMERGENCY LAMPS SHOWN OVER DOORS

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*For the preceding articles in this series, see ELECTRIC RAILWAY JOURNAL as follows: "Design," June 6, 1914; "Body," June 13, 1914; "Trucks, Brake Rigging and Draft Gear," Dec. 26, 1914; "Motors, Control, Conduit and Collectors," March 13, 1915, and "Lighting," March 27, 1915.

One important requirement is that the air brake shall be capable of making full emergency application after, or superimposed upon, ten possible applications with an average interval of 430 ft. when the train is descending inclines over the East River bridges.

On straight, level, clean and dry rail with trains of two to eight cars using cast-iron brakeshoes and with a brake-cylinder pressure of 50 lb. for service and the maximum obtainable for emergencies the following rates of retardation are specified.

Service Stop—From an initial speed of 50 m.p.h. the average rate of retardation during a service stop must not be less than 2 m.p.h.p.s., provided the product of the efficiency of the brake rigging and the average coefficient of friction of the brakeshoes throughout the stop, expressed in percentage, is not less than 9.5 per cent. The period of retardation includes the time from the instant full service pressure is obtained in the brake cylinder to the instant of stop.

Emergency Stop—From an initial speed of 50 m.p.h. the guaranteed average rate of retardation during an emergency stop must not be less than 3 m.p.h.p.s., provided the product of the efficiency of the brake rigging and the average coefficient of friction of the brakeshoes throughout the stop, expressed in percentages, is not less than 9.5 per cent. Here the period of retardation includes the period from the instant the brake-valve handle is moved to emergency position to the instant of stop.

Full emergency pressure is applied automatically whenever the brake-pipe pressure is reduced below a predetermined point, whether through leakage or other causes. While possessing maximum sensitiveness to increases in brake-pipe pressure for the purpose of obtaining release, the brake is free from the tendency to "creep on" due to slight fluctuation in brake-pipe pressure. Any failure in service of the electric control of the brake system in service or emergency application results in the automatic application of the brakes, without further manipulation of the brake valve by the motorman.

CHARACTERISTICS OF BRAKING APPARATUS

The D-2-F motor-driven compressor has a displacement capacity of 25 cu. ft. per minute at 600 volts. Its motor will operate the compressor at a minimum line voltage of 300 and a main reservoir pressure of 100 lb., and it will also operate satisfactorily on line voltages ranging from 300 minimum to 750 maximum. The compressor was subjected to a preliminary voltage test of 3000 a.c. for one minute, between windings and ground, while the commutator had to stand a voltage test of 200 a.c. between adjacent bars for one minute.

The compressor motor has ample capacity to operate for three hours continuously with 100-lb. air pressure in the main reservoir, on an average line voltage of 550, with a maximum temperature rise in the motor windings of 65 deg. Cent. above the surrounding atmosphere. Furthermore, the compressor must be capable of supplying the 1¾ cu. ft. of free air per car which the pneumatic door devices take at each station stop. It must also be capable of supplying the air for the chime air whistles.

One complete synchronizing system is furnished with each set of air-brake apparatus. This system is so designed that the first governor to cut in, after depletion of the main reservoir pressure, will close all compressor switches in the train simultaneously.

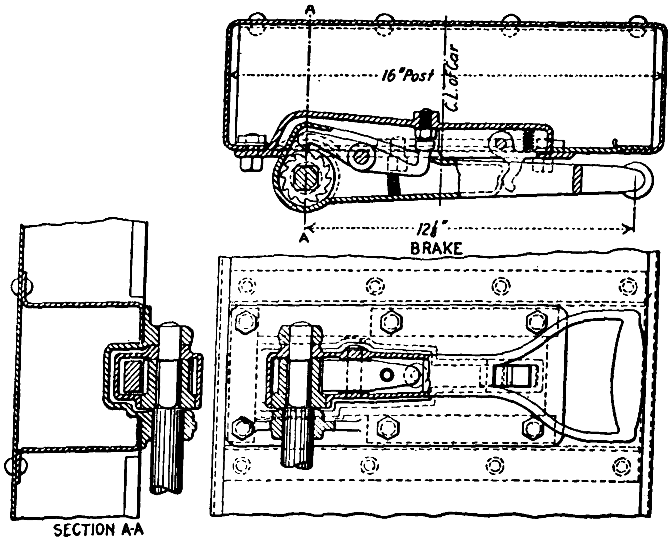
The compressor switch opens the motor circuit at a normal maximum of 750 volts, and is capable of opening, without injury, the compressor motor circuit during such current surges as may be caused by crossing gaps in the third-rail.

The governor cuts in and cuts out on a variation of 10 per cent of the main reservoir pressure, and its quick action is not influenced by a slow rate of depletion of the main reservoir pressure. Failure of any governor on the train to cut in does not affect the operation of the compressor switches on any of the cars in the train.

The emergency-valve (deadman's handle) feature in the motorman's cab has already been described in the article relating to motors and control. It is proper to add here that each car is equipped with the usual conductor's valve placed in the deck sill near the middle of the car.

Moreover the speed control equipment hereinafter described is so interconnected with the brakes that if a motorman disobeys a signal the brakes will apply automatically.

In addition to the usual gages, cocks, valves and other air-brake fittings, including American Type J automatic slack adjuster, there is installed the empty-and-load brake attachment described hereinafter.



N. Y. M. CAR—DETAILS OF HAND BRAKE

All reservoirs are made of steel plate enameled inside to prevent corrosion and oxidation. They were tested by a hydraulic pressure of 200 lb. per square inch followed by an air pressure of 160 lb. per square inch.

All pipe used in connection with the air brakes is of iron lap-welded "Sherarduct." The fittings are of malleable iron, each tested under water with air pressure of 250 lb. per square inch. All pipe joints are made with shellac cut in alcohol, and the installation, when completed, was tested with a pressure of 125 lb. per square inch, at which pressure it had to be free from leakage. All unions are of rough brass with ground joints.

An individual spiral-shaft hand brake, especially designed by the railway, is available for contingencies. The ratio of this brake is 4:1, and it is operated by means of a ratchet handle. A drawing of the brake is presented in an accompanying illustration.

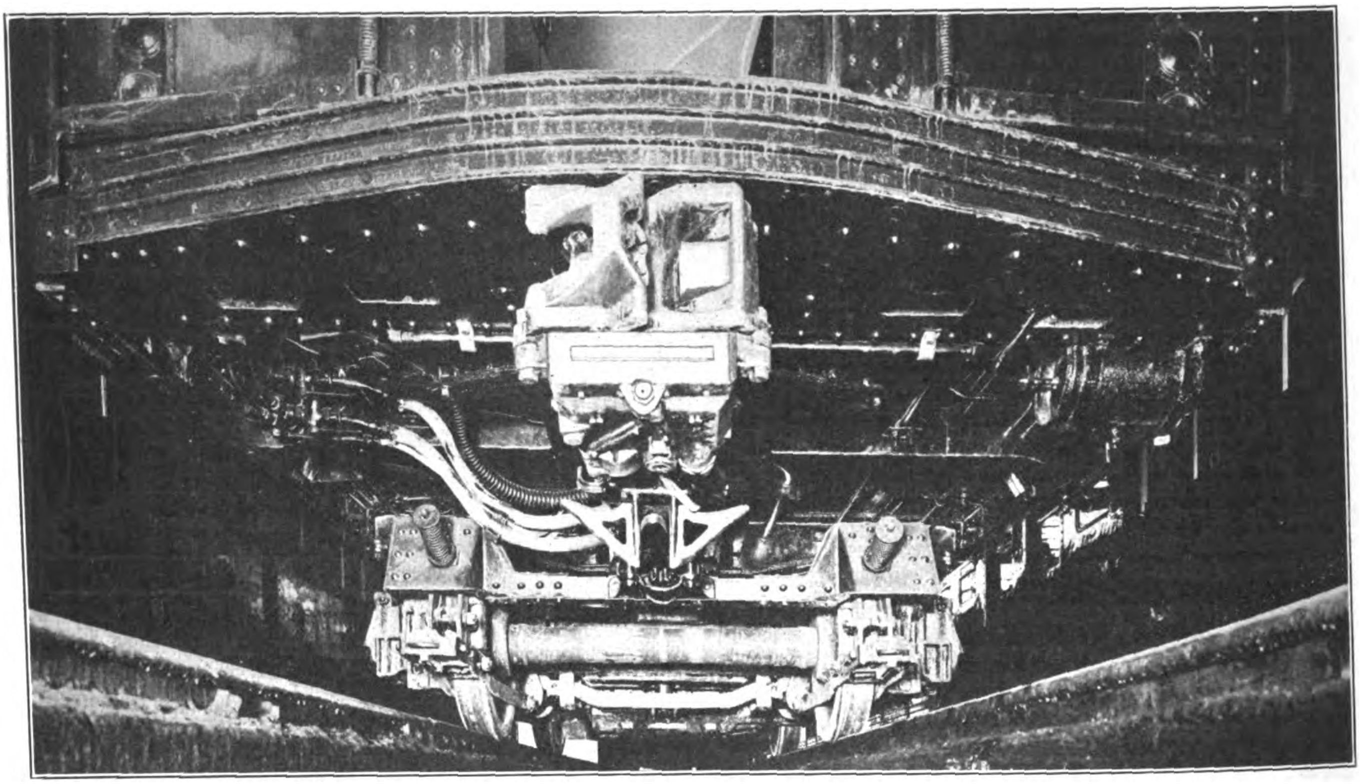
EMPTY-AND-LOAD BRAKE ATTACHMENT

The object of the empty-and-load brake mechanism is to vary the braking power, as applied through the brakeshoes, in accordance with the variations in the live weight of the car. These variations are made when the doors are open; in other words, they occur only during the period of passenger interchange. The functions of this mechanism are carried out as follows:

When the doors of a car are opened, interlocks on the door-operating mechanism are in such position that an electropneumatic valve on the car body is energized from the storage battery. The action of this valve permits air to enter a vertical cylinder, which is mounted on the truck truss plank, and to push the piston of this cylinder outward and upward.

As the passenger load on the car increases, the movement of the elliptic springs on the truck tends to force this piston backward. This movement in turn actuates a vertical rack and pinion which are mounted on the body bolster. Any movement of the vertical rack is transmitted to a horizontal rack which in turn causes a connecting pullrod to vary the capacity of the auxiliary reservoir.

In this way the brake-cylinder pressure at full load is increased between 35 per cent to 40 per cent, with a 20-lb. reduction in the brake pipe. In case of an emergency application the braking power is increased practically 42 per cent. In short, the most efficient rate of retardation is maintained for any degree of loading.



N. Y. M. CAR—LOW-VOLTAGE AUTOMATIC COUPLER AS INSTALLED

The empty-and-load brake mechanism is also tied in with the selective acceleration feature of the multiple-unit control. This is accomplished by means of an extra winding on the limit switch whose modification of current input to the motors is controlled from a switch operated in connection with the empty-and-load brake mechanism.

A full appreciation of the great value of this improvement is obtained only when one considers the effect of a 40 per cent increase in the total weight, by means of the live load, upon the stopping distance of multiple unit trains as heretofore braked. The weight of the empty train determines the maximum braking power that can then be applied to it, and under the old conditions an increase of 40 per cent in weight meant lengthening all the stopping distances obtainable with the empty train by about 40 per cent when the same train was loaded. With the empty-and-load brake attachment, all trains can be stopped in the same minimum distances, irrespective of loading. The acceleration also is maintained at a uniform maximum for any given grade condition, irrespective of loading.

These important factors, together with the shorter spacing of block signals involved, permit a remarkable increase in train capacity on any rapid transit railway.

AUTOMATIC CAR, AIR AND ELECTRIC COUPLERS AND JUNCTION BOXES

In place of the usual loose-fitting car couplers, double sets of air hose and train-line receptacles with removable jumper connections, the Westinghouse combined car, air and electric coupler was adopted for the following reasons:

1. Less time needed to couple and uncouple the cars.
2. Less hazard in coupling cars.
3. Freedom from possible accidents due to dragging jumpers.
4. Superior contact for train-line connections.
5. Saving in the cost of coupling cars.
6. Simpler installation, because one-half of the train-line terminals are eliminated.
7. No extra provision for housing in the cars or at the terminal for detached jumpers.
8. Simple and safe automatic operation of auxiliary contacts at the end of the train for marker and signal purposes.
9. Greater facility in cutting the train line to locate trouble, thus minimizing possible delays.
10. Material reduction in cost of maintenance.
11. Because there is no wear between car coupler faces, this expense in maintenance is eliminated.

Perhaps the most important feature of the automatic electric coupler is that only one operation is required, namely, that of throwing the coupling valve in the motorman's cab. On the contrary, with the preceding jumper system fully sixteen operations were necessary and only a few of this large number were due to safety gates, chains and other non-train-line devices.

When the motorman throws the coupling valve the main control, the speed control, the air brakes, the signal lights (including the extinguishing of marker and tail-lights between cars), the buzzers, and all other train-line auxiliary circuits are in normal service.

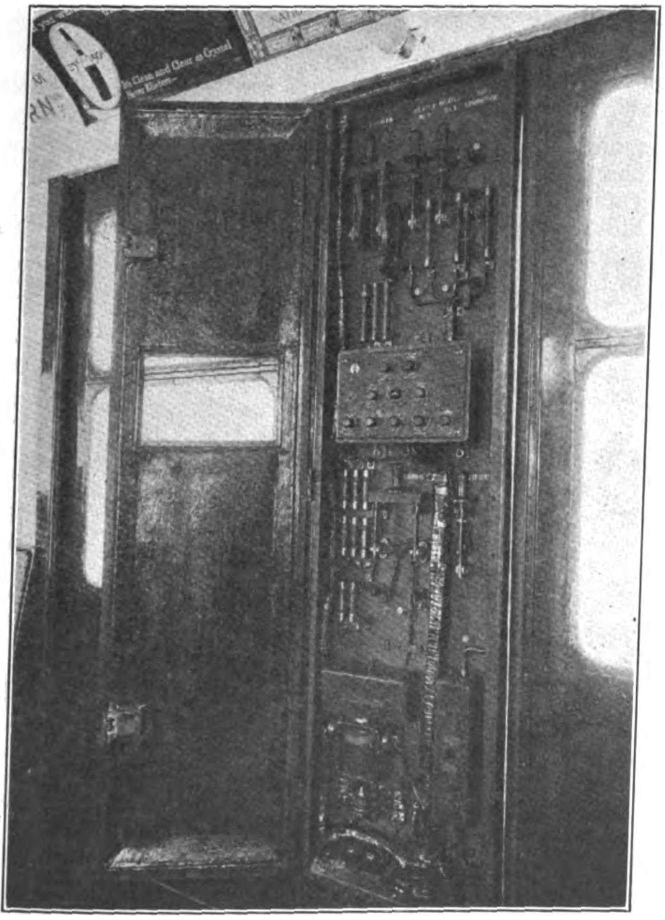
All of the foregoing advantages are made practicable by the fundamental fact that the car coupler, to which the air and electric connections are attached, is of the absolutely tight-lock type. When two of these coupler heads have been united the two parts become as one piece, so that when in service a thin coating of brakeshoe dust extends across the two, there is no crack to indicate the line of juncture.

One junction box near each end of the car and one at the center of the control box with terminal studs are provided to form the train-line connection between the automatic couplers, the master controller, the control box and the brake and auxiliary apparatus.

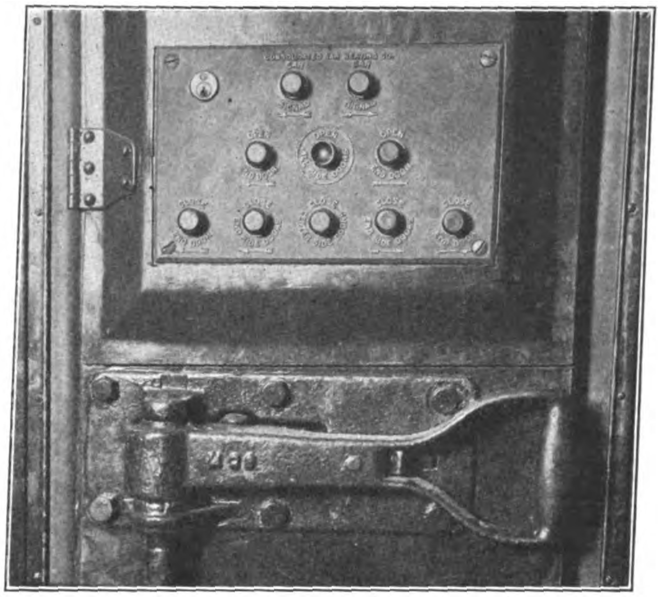
At the end junction boxes are outlets for all train-line wires, including the main control, speed control, brake, marker and tail-light and signal circuits. At the central junction box separate outlets are provided for the control circuits, the brake circuits and the battery supply connections. Each terminal clip is marked with the number of the wire to which it is to be connected, and the terminal board is usually marked with the train-line numbers on each stud.

DOOR OPERATION

As stated in the earlier articles the New York Municipal car has three pairs of sliding doors on each side and a single door at each end. One operator stationed on either side of the car midway between the two middle doors, is able, by means of the push-button board illustrated, to operate all doors on the side nearer to him, and, also to operate both end doors from the same position. He can also operate the doors on the opposite side of the car by manipulating the buttons on the opposite panel. In all, each car has fourteen door engines and eight electropneumatic valves.



N. Y. M. CAR—VIEW OF PANEL BOARD FOR AUXILIARY CIRCUITS



N. Y. M. CAR—PUSH-BUTTON BOARD FOR DOOR CONTROL; HAND BRAKE BELOW

All engine valves are equipped with an attachment for opening or closing their respective doors by hand from the inside of the car. The respective valves are also equipped with an attachment for opening and closing from the outside the two end doors and each pair of middle doors, by means of properly-protected push buttons outside the car.

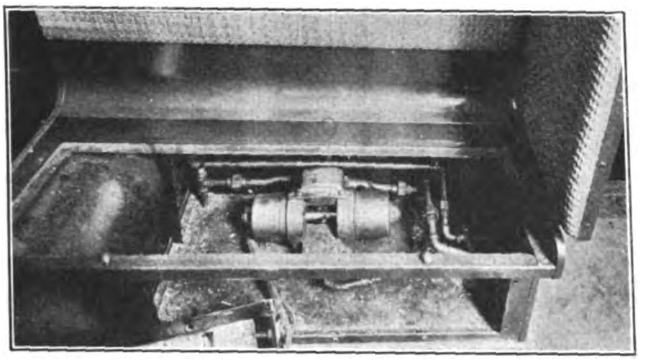
The doors will operate at main reservoir pressures of 80 lb. minimum to 100 lb. maximum. It was specified that all door mechanism must be capable of making 300,000 strokes in service between applications of lubricant. The wear of operating parts during these periods must not cause valves or piston packing to leak. The variation in the time of door opening and closing between applications of lubricant must not be more than 10 per cent with an air pressure of 100 lb. per square inch in the main reservoir with atmospheric temperature ranging from zero to 90 deg. Fahr.

The door-operating mechanism, which was built by the Consolidated Car Heating Company, embodies some valuable improvements to meet the New York Municipal requirements. Probably the most important of these requirements was that relating to the time of the door-operating cycle.

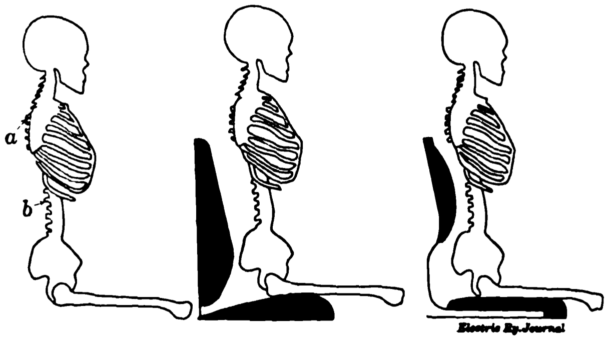
The railway company felt that in a service with the short station stops specified a rapid yet absolutely safe door mechanism was essential. It therefore specified that all door engines should be capable of opening the doors in one and one-half seconds from the time that the operator pushes the button. This speed, however, is too high for door closing; consequently the time allowed for closing is two seconds. Thus by adding one-half second to the period of closing the entering passenger is not subjected to severe shock should he come in contact with the door. Still further to insure non-injurious closing a spring has been interposed between the piston and the door whereby the door is operated with a cushioning effect in addition to employing the usual rubber cushion at the edge of the door.

On the whole, this door-operating mechanism is a notable improvement over earlier designs.

At one of each pair of side doors is a folding seat



N. Y. M. CAR—DOOR-CONTROL MECHANISM UNDER SEAT



N. Y. M. CAR—THE HUMAN BODY AND THE CAR SEAT

Fig. 1—The natural curve of the backbone. The proper points where a seat should give support are at the lower part of the shoulder (a) and the small of the back (b). Fig. 2—The prevailing style of street car and Pullman car seat, which, being padded at the wrong place, pushes the pelvis out and affords no support for the back. Fig. 3—The new "correct posture" seat which allows an opening for the lowest part of the back and is made to fit the natural curves of the human spine.

which is so connected to a three-way cock in the air feed to the door engine, that when the seat is in use the respective door engine is cut out of action. Thus it is impossible to open the door until the seat is folded up to clear the door.

Buzzer and Door-Signal Circuits—Emergency Lighting

A buzzer-signal circuit replaces the slow and obstructive bell cord. The buzzer push buttons are mounted just above and on the same panel as the door-control buttons. This signal circuit is so wired that the guard who pushes his buzzer button transmits the signal no further than to the buzzers in the forward cab of his own car and the rear cab of the car ahead. In this manner the signal is transmitted ahead from car to car. The wiring is so arranged that it is impossible to skip a car. This circuit, which is fed from the storage battery, is closed by means of interlocks mounted in the door pockets, the interlocks being operated by means of attachments on the doors themselves.

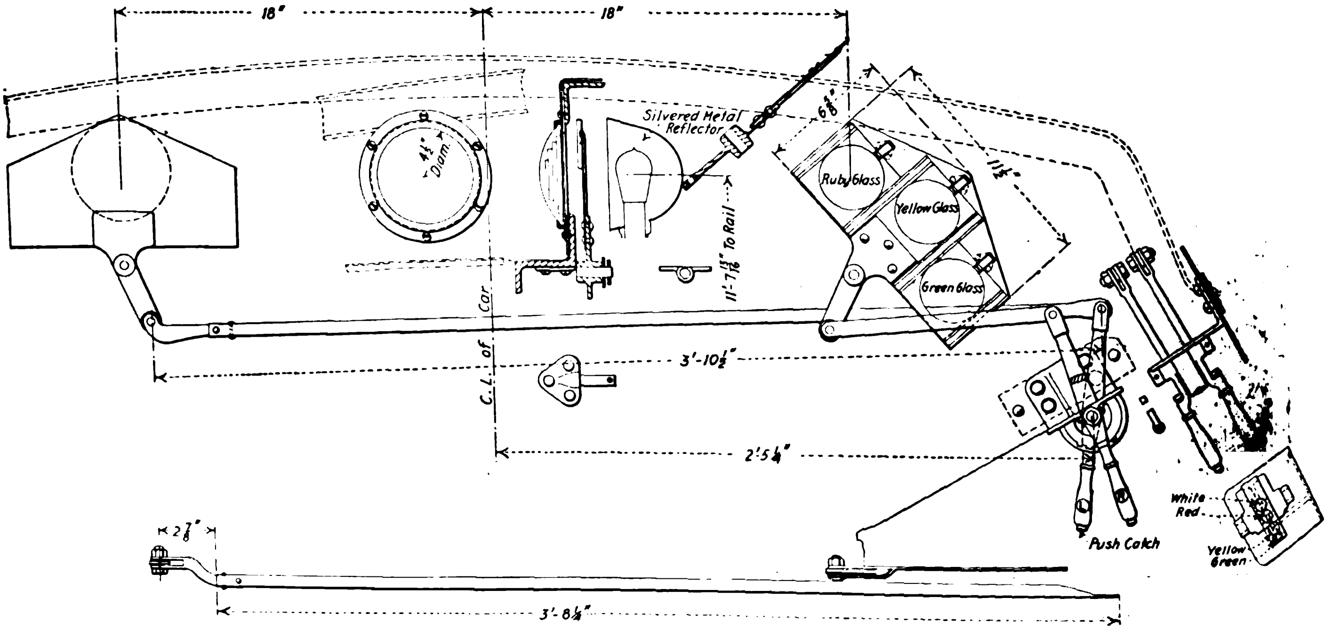
The motorman depends upon the buzzer circuit only at such times as the light signal in the operating master controller is out of order. These lights burn only when all the doors in the train are closed. The light signal consists of two lamps of 6-volt automobile type, and as but one is in use at a time the possibility of total failure is very remote. The second lamp goes automatically into circuit when the first one burns out.

The circuit for the signal lights is so connected through the reverse drum of the master controller that the signal is displayed only in that master controller which is in the operating position, thereby avoiding waste of energy and unnecessary indications.

Between each pair of doors is mounted one 10-watt, 34-volt frosted-bulb tungsten lamp. The positive circuit of these lamps is connected to one blade of a double-pole, single-throw lighting switch. The negative side is connected to contacts on the voltage relay which is always energized when power is on the line. In the energized position the relay disconnects the negative side of the emergency lighting circuit. Therefore, when normal lighting is in service the main lighting switch will be in the closed position. On any failure of the traction circuit the voltage relay drops and the negative side of the emergency lighting circuit is completed to the storage battery.

Marker and Tail-Lights

The marker and tail-lights are interconnected with the control circuit in such a way that when the motorman changes train ends his tail-lights automatically change from white to red as soon as he throws the reverse handle to the center position; vice versa, the red lights turn to white on throwing the handle to the operating position. Should the train be broken up en route in any way, the tail-lights will go red at the point of



N. Y. M. CAR—MARKER LAMP LAYOUT AND OPERATING MECHANISM breaking. This is accomplished by combinations in the automatic coupler and control as previously stated.

The two marker lights provided in each hood of the car have stationary white semaphore lenses. Colored disks of the Railway Signal Association standard colors are arranged inside of the hood, connected so that any desired color may be placed between the lamps and lens. The marker lights on each side of the hood are operated independently.

The tail-lights consist of one white and one ruby 4-in. diameter 2¾-in. focal length semaphore lens as per the Railway Signal Association standard colors in each set. They are lighted from the storage battery by incandescent lamps placed behind each lens. The lenses are held permanently in place by pressed steel retainers riveted to or pressed in the end sheet with removable retainer rings.

HEATER CIRCUITS—SIGNS

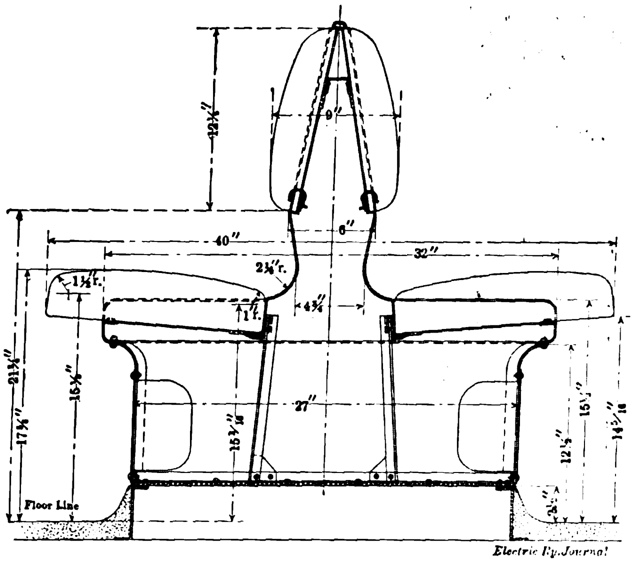
The heating equipment per car totals 21 kw capacity divided among thirty heaters with two coils per heater. All coils are interchangeable. The three-point system is used, twenty coils being in series on each point. Piping and wiring connections for thermostatic control have been installed in view of the possible later use of thermostats.

Destination signs are displayed in every car in the windows alongside the central pair of side doors. These signs are of double curtain type, as furnished by the Electric Service Supplies Company.

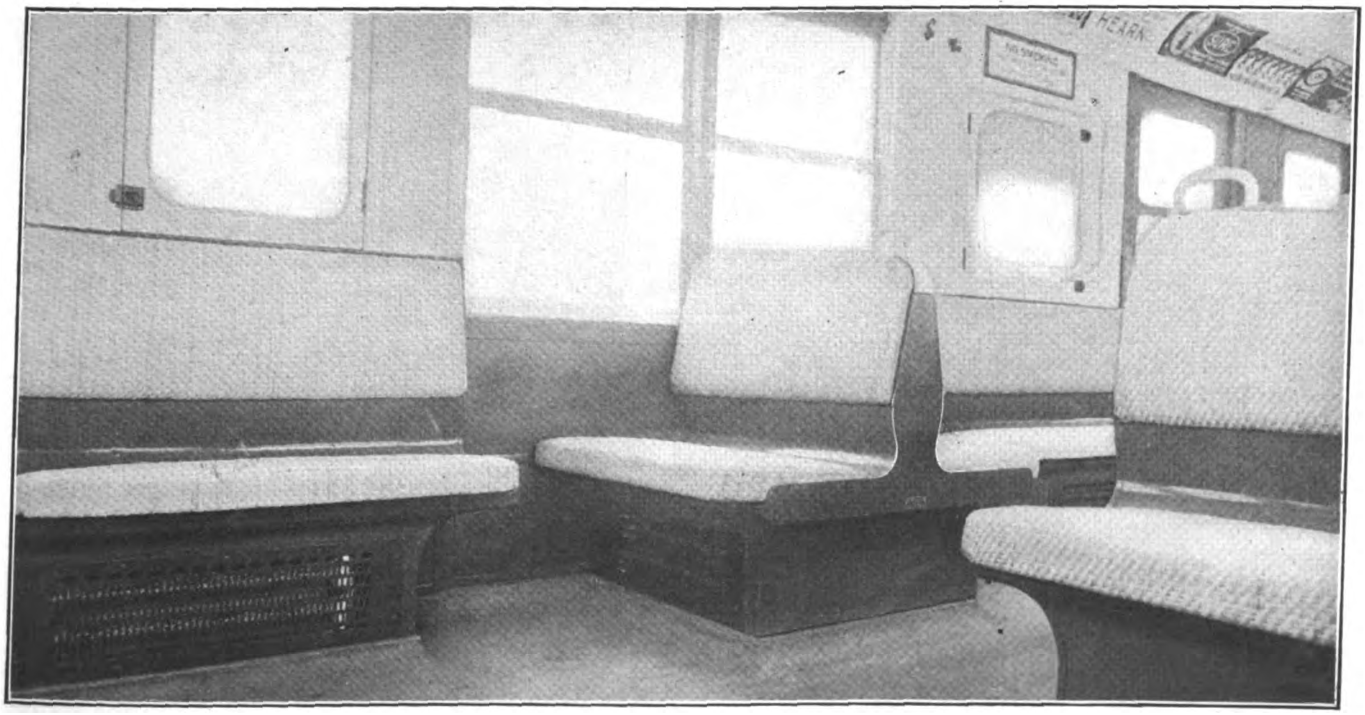
CORRECT POSTURE SEATING

In concluding the description of this car it is fitting to add some details on the radically different type of rattan car seating. From the first the engineers of of the company had planned a seat which would not only be of the transverse type where practicable but which would also permit a more comfortable bodily position than previous designs. With the assistance of the American Posture League, an organization of experts on hygiene and anatomy, the design was improved still further by certain modifications in the angularity of the back and in the height of the seat cushion. In the seat as finally adopted, the distance from the highest point of the unoccupied seat cushion to the floor is 17⅝ in. The league's ideal figure of 17¼ in. is approximated when the seat is depressed by the weight of the passenger. This height, as compared with the usual one of 18 in., permits good footing for all but very small children.

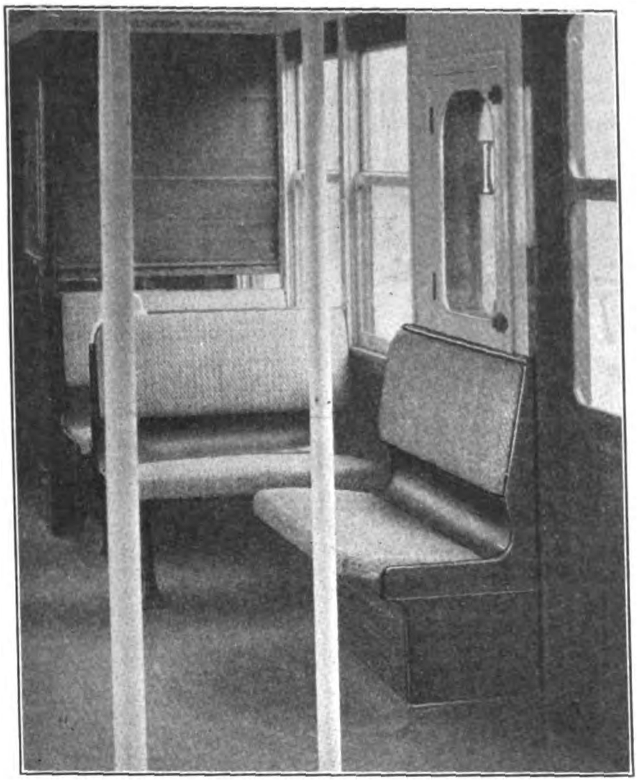
A still more important feature is that the back is so shaped that the rattan section begins at a height of about 5 in. above an inwardly curved metal section which forms the base. As shown in the several accompanying halftones and drawings, this formation of the back allows the lower part to fit the natural curve of the human spine, while the upper part gives a proper support for the back. The result is to place the passenger in the most restful position. Since his body is properly balanced he is also less likely to be disturbed by any sudden lurching of the car. The league has affixed its approval plate to the seats in the New York Municipal car, and will gladly co-operate with other railways to achieve



N. Y. M. CAR—DETAILED DIMENSIONS OF CORRECT POSTURE CROSS-SEAT



N. Y. M. CAR—VIEWS SHOWING CORRECT POSTURE SEATING OF DIFFERENT TYPES



N. Y. M. CAR—CORRECT POSTURE LONGITUDINAL AND CROSS-SEATS

scientific seat design. The seats are of the Hale & Kilburn Company's manufacture.

SPEED-CONTROL SIGNAL SYSTEM

In lieu of the usual signal system employing fixed signals and automatic stop devices placed at certain intervals along the track, each car is equipped with a cab signal system so designed as to give the motorman necessary information as to when to apply the brakes, when to resume normal speed, the permissible speed, the available braking distance, and such other information as is necessary properly to control the train. In addition to the signals, each car will be equipped with a speed-control system which automatically applies the brakes if the motorman fails to obey the cab-signal indications. Also, the system is arranged so as to enforce obedience to fixed interlocking signals by automatically applying the emergency brakes if a train should attempt to pass such signals in the stop position.

Cab signals, one of which is shown in an accompanying halftone, are located in both ends of each motor car and are so arranged that their indications are visible only in the cab from which the train is being operated and controlled. Cab-signal indications are given by two lights as follows: A green light indicating "proceed" when the next two blocks ahead are clear; and a yellow light indicating "caution" when the next block ahead is clear and the second block ahead is occupied or is governed by an interlocked signal indicating "stop," or when the train is on a down grade or curve or when it has some other fixed hazard.

The audible signal, provided in each motorman's cab, is so designed and interconnected with the speed-control mechanism, that it sounds sufficiently long in advance of the automatic speed-control application of the brakes to permit the motorman to control his train so as to avoid the automatic application of the brakes. An indication is given in each motorman's cab to show the maximum allowable speed and the distance within which, succeeding the giving of a caution signal, the speed of the train must be reduced to the prescribed minimum to avoid the automatic application of the brakes.

The speed-control apparatus is so arranged that when a train runs into an unsignaled section of track a distinctive indication is displayed in the motorman's cab, and the cab signals and speed-control equipment are automatically put out of service and automatically return to service when the train again enters the signaled section of track.

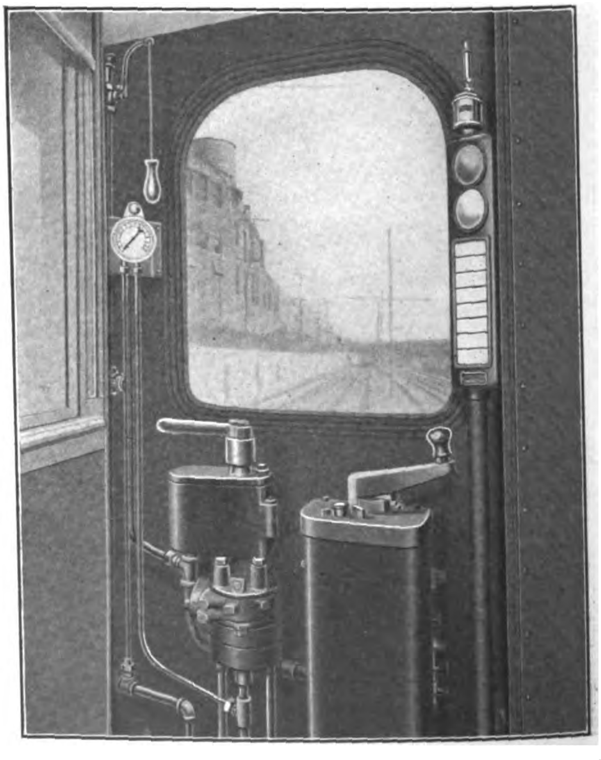
The speed-control equipment does not interfere with the operation of the train so long as the motorman runs his train according to the indications of the cab signal, but, if the motorman fails to obey the "caution" signal, the speed-control apparatus enforces obedience by automatically applying the brakes, but only when and if the speed of the train, at any point, exceeds that prescribed by the predetermined braking curve.

When a train, running at a speed not exceeding the prescribed minimum, approaches a clear block, its speed-control apparatus is, prior to entering the block, automatically reset in such a manner as to permit the train to accelerate. If a clear block is succeeded by an occupied block, the train is permitted to accelerate, slowing down should the speed thus acquired exceed that established by the predetermined braking curve. If a clear block is succeeded by another clear block, the train is permitted to attain normal speed.

Suitable means are provided whereby, in the event of its failure, the speed-control mechanism on any car can be safely cut out of service in such manner as not to interfere with the operation of the speed-control apparatus on the remaining cars of the train.

The speed-control and cab-signal equipment is actuated by means of ramps located adjacent to the tracks at such points as provide the required track capacity and facility of operation.

The cab signals are block signals and indicate the condition of the blocks in advance; at crossings, junctions, terminals, etc., fixed signals, which are of the light type, are used to indicate the route set up. The indications of interlocking signals are given by one light as follows:



N. Y. M. CAR—VIEW OF CAB SIGNAL AS INSTALLED

HOME SIGNALS

Indication	Aspect
Proceed on same track	One green light
Proceed on diverging light	One yellow light
Stop	One red light

The speed-control apparatus on each car is arranged so as to enforce obedience to the interlocking home signals by automatically applying the emergency brakes if a train should attempt to pass such signals in the stop position.

An accompanying drawing shows speed and braking curves for a typical block, which in this case is 1200 ft. in length. The emergency braking curve *A* represents the distance within which, succeeding an emergency application, a train is brought to stop before reaching the end of the block. The design of the speed-control system enforces obedience to this curve by automatically applying the brakes in case the speed of the train, at any point, exceeds that indicated by this curve. The automatic application of the brakes takes place at varying distances from the end of the block, depending upon the speed, this being one of the essential features of the system. The usual system employs automatic stops with an overlap, the length of which is always based on maximum speed, and failure to obey a stop indication would cause an emergency application at the same point, regardless of speed. This requires that trains must be spaced apart a distance equal to the length of the overlap, which is usually a full block or more, whereas in the speed-control system trains can close up, provided always that the speed has been reduced to a point within the braking curve. In the speed-control system greater facility is provided, owing to the fact that trains can close up instead of being spaced a full block apart.

Curve *B* is the normal braking curve and represents the retardation which results from a service application of the brakes. Curve *C* is the audible-signal curve. The audible signal is given sufficiently in advance of the service-braking curve so as to avoid an emergency application if the motorman obeys the audible indication and applies the brakes. This curve is an important factor in facilitating traffic in the case of a train entering the block at less than normal speed as follows:

If a train enters an unoccupied block at low speed it can accelerate, as shown by curve *D*, until the curve intersects audible-signal curve *C*, at which point, if the brakes are promptly applied, curve *D* merges into curve *B* and an emergency stop is avoided.

Curve *E* shows a train proceeding at less than maximum speed, in which case the audible signal is given at the intersection of the speed line and curve *C*. If the brakes are promptly applied an emergency stop is avoided as in the preceding case.

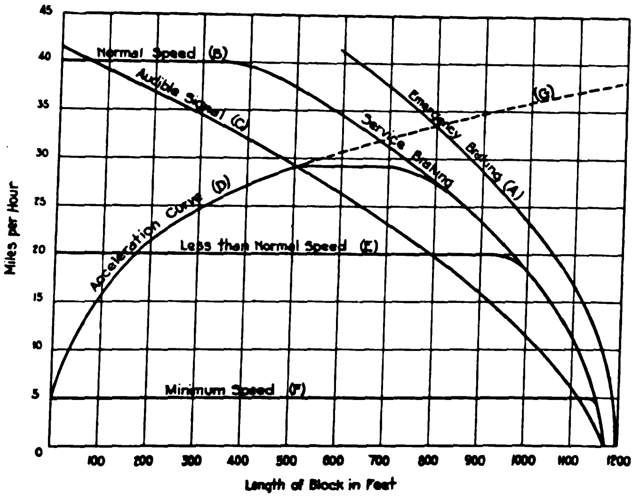
A train can enter an occupied block, as shown by curve *F*, but cannot exceed the prescribed minimum speed. Curve *G* is a continuation of curve *D* and shows the acceleration attained if the block in advance is clear.

If two blocks in advance are clear, in which case the cab signal would show a green light, a train entering the block shown in the diagram mentioned could proceed at normal speed without interference from the speed-control apparatus. If the block in advance was clear but the second block in advance was occupied, the cab signal would show a yellow or "caution" indication and, if the motorman does not apply the brakes, an automatic emergency application of the brakes occurs, bringing the train to a stop before reaching the end of the block.

OPERATION OF SPEED-CONTROL SYSTEM

The diagram on page 880 shows the principles of the signal system. At one end of the track circuit a transformer, *T*, supplies electric energy which flows through the track circuit and, when the block is unoccupied, energizes track relay *R*, and its front contact closes a circuit from battery, *B*, or some other source of electric energy. Hence when a car is at a ramp, as in this case, current flows through the ramp, through the contact shoe *S*, and then through the car relay *C*, causing its armature to pick up, and back to the common return by way of the car axle and one of the track rails. In this condition current from the battery *D* flows through and energizes the green light *G* of the cab signal, which gives the "proceed" indication. Energy from battery *D* also flows through and energizes magnet *E*.

After the train has passed an energized ramp a retaining circuit is established by way of contact *A*, so that current from the battery *D* energizes the car relay *C* and the green light or "proceed" signal continues until the next ramp is reached.



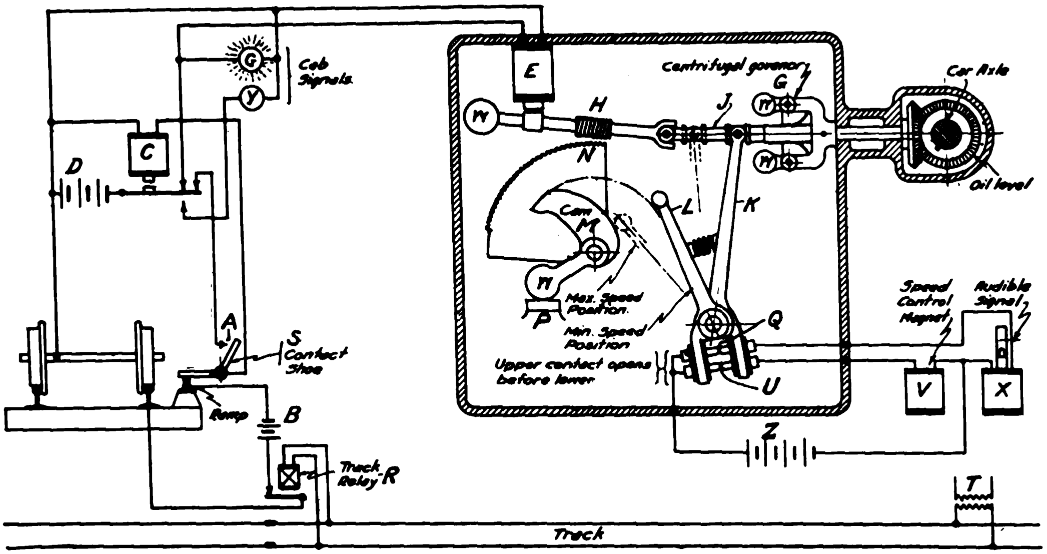
N. Y. M. CAR—TYPICAL SPEED AND BRAKING CURVES FOR SPEED CONTROL

If the track circuit was occupied, track relay *R* would be de-energized, and as a result the ramp, also the car relay *C* and the magnet *E* would be de-energized. In this condition current from the battery *D* flows through and energizes the yellow light *Y* of the cab signal to give the "caution" indication.

Magnet *E* controls the speed-control apparatus, which operates in the following manner: The rotating motion of the car wheels is transmitted by means of the bevel gears shown in the drawing, to shaft *J*, on which is mounted a centrifugal device or governor which is so arranged and connected that, as the speed increases, the arms *K* and *L* are moved to the left. The worm *H* is driven through the medium of shaft *J* and is held out of engagement with the worm sector *N* by the attraction of the magnet *E*. When the magnet *E* is de-energized, the worm *H* engages with the worm sector *N*, causing the cam *M* to move forward against the action of gravity. The shape, speed and general arrangement of cam *M* are such that if the speed of the train is not reduced, succeeding the giving of a caution indication, the surface of cam *M*, coming in contact with the lever *L*, opens the contact *Q* and the audible signal warns the motorman to apply the brakes.

If the motorman promptly applies the brakes arm *L* moves to the right, away from the cam *M*, thus preventing the opening of the contact *U* and the consequent application of the brakes. If, however, the motorman fails to obey the audible signal, the contact *U* opens and an emergency application of the brakes occur.

Upon reaching the next energized ramp the magnet *E* is energized, which disengages the worm *H* and the



N. Y. M. CAR—DIAGRAM SHOWING OPERATION OF SPEED-CONTROL SYSTEM

sector *N*, and cam *M* is restored to its normal position by the action of gravity, thus restoring the speed-control system to the normal condition which allows the train to accelerate. If the next ramp is de-energized, the train may proceed through the block only at minimum speed, which minimum speed is determined by the maximum radius of the cam.

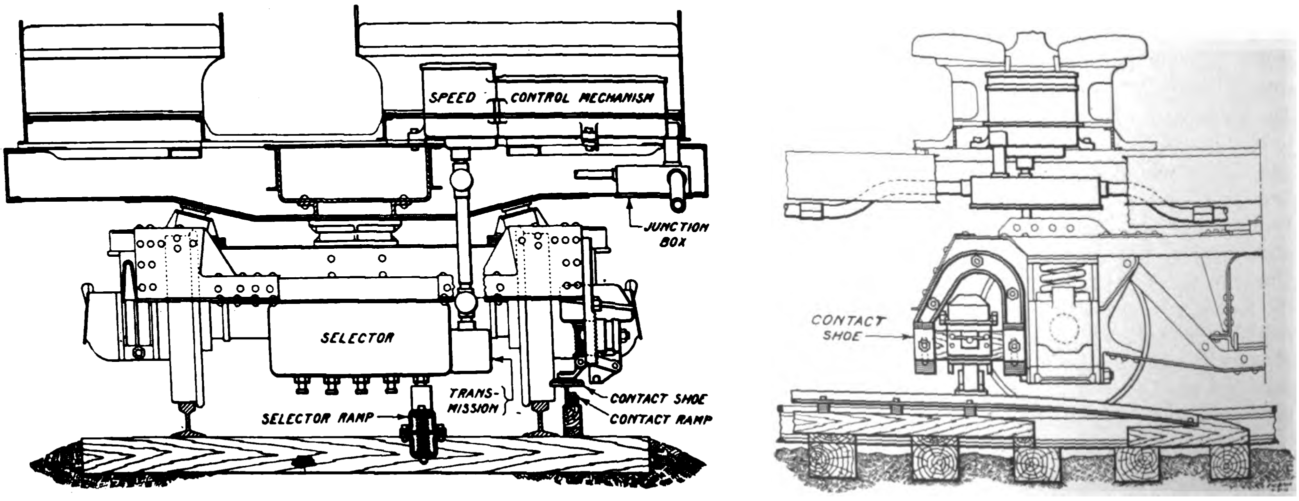
The selector, shown at the left of the drawing below, in its proper position on the car, sets up the various "block combinations" and indicates the same to the motorman. Combinations are set up by selector ramps, in the center of the track, which lift up one or more of the tappets shown on the lower part of the selector. When lifted by the selector ramps the tappets latch up and are so held until a new combination is set up, at which time the former combination is knocked down by the center tappet. Complete information is given in the cab as to the point at which speed reduction must take place, in order that a lower speed combination may not be set up prematurely and apply the brakes. For example, if the change is to be from a combination of 50 m.p.h. and 1600 ft. braking distance to a combination of 20 m.p.h. and 400 ft. braking distance, first, a "caution" signal is given to the motorman so as to allow him to reduce speed, and, after the speed is properly reduced, the new combination becomes effective, and a "proceed" signal is given, provided that conditions in advance are proper. If the motorman fails to obey the indications shown in the cab, an automatic application of the brakes occurs.

The speed-control mechanism in proper position on the car is also shown in the cut. The operation of this mechanism is described in connection with the simplified diagram. The drawing of the speed-control mechanism shows the contact shoe in the proper position on the car, also the ramp. The contact shoe is of the lifting rotary type, in which the disk contacts with a ramp. The disk, which is inexpensive and easily replaced, travels over the ramp with a scrubbing movement which maintains a smooth contacting surface. The lifting of the contact shoe opens a circuit which de-energizes the car relay, if current is not flowing through the ramp, as described in connection with the simplified diagram.

The cab-signal and speed-control system requires comparatively a small amount of simple, substantial and efficient apparatus, and affords maximum traffic capacity consistent with safety. The system is being installed by the General Railway Signal Company, Rochester, N. Y., under the Simmen patents for speed control.

The Jitney as a Subject for Many Writers

The jitney has been juggled on the point of many pens since its advent. Elbert Hubbard, Walt Mason, Dr. Frank Crane, William Marion Reedy, he of the bright and shining St. Louis *Mirror*, and other celebrities have had their fling at the new pirate of transportation, and a famous moving-picture scenario writer has even coupled up dear Charlie Chaplin with the jitney in "The Jitney Elopement." Now comes none other than Hugh S. Fullerton, who writes about the jitney in the *American Magazine*. Mr. Fullerton is presumably the same gentleman who got baseball into the magazines a few years ago. As an expert on the inside game he writes entertainingly about the jitney, but not quite so entertainingly as he talks about roundhouse curves and when to give the pitcher the gate.



N. Y. M. CAR—SPEED-CONTROL SELECTOR; CONTACT SHOE AND SPEED-CONTROL MECHANISM

Investment Required per Passenger

Appraisals Are Expensive and Time-Consuming—New Unit Suggested as Basis for Comparison of Railway Investments—Some Examples are Given

BY D. J. M'GRATH, RESEARCH ASSISTANT MASSACHUSETTS INSTITUTE OF TECHNOLOGY

The relation of the capitalization of public utilities to the fair value of the property is one of the most vexing problems that has to be dealt with in analyses of rates and fares. Whether the problem under consideration is a specific case or a rate problem in the abstract, the doubt frequently exists as to whether the capital liabilities fairly represent the value upon which a return should be paid. In the street railway business we meet with this question as frequently, at least, as in any branch of public service enterprise.

To make a complete appraisal of a large street railway system is expensive and time-consuming. It would appear desirable, then, to have some standard method of comparison of the capitalization, cash investment in, or valuation of, street railway properties by which could quickly be formed a fair judgment as to the reasonableness of the amount of stock and bonds upon which the company is paying interest and dividends.

The two methods of comparison in most common use are based upon the "per mile of track" and the "per dollar of gross annual revenue" units.

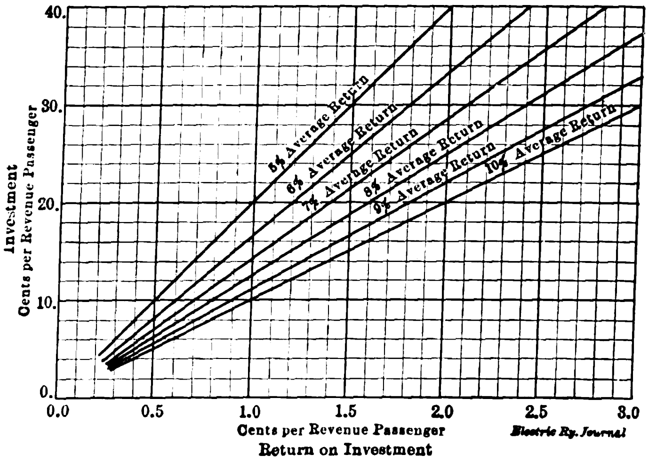
Neither one of these two methods has been found very satisfactory. The property value per mile of track in a city system doing a moderate amount of business can scarcely be compared with the corresponding figure for another system with a higher density of traffic for the same track mileage, because the amounts of equipment required will be quite different. On the basis of "dollars investment per dollar of gross revenue," the comparison is more satisfactory, but this method fails under differences in rate of fare. The result of dividing the total investment by the gross annual revenue varies directly with the fare rate, consequently where we have, as in different cities of this country, rates varying from 3 cents to 6 cents, this method cannot be used generally.

In the investigations of the Electrical Engineering Research Laboratory of the Massachusetts Institute of Technology on the street railway fare problem, appraisals being beyond the financial resources available, it has become necessary to try to establish some method of standardizing and comparing street railway investments and securities. It was desired to fix a standard, or set of standards, of investment for given kinds of service and conditions, so that the face value of securities issued by any company might be compared on a unit basis with a standard investment for a similar system. The unit "per dollar of gross revenue" was used to some extent at first, but the most satisfactory and fundamentally basic unit seems now to be the "revenue passenger."

The total investment of the standard system, or the value thereof, and the securities outstanding of the system to be compared, are divided by the respective numbers of revenue passengers carried in the corresponding year, and the quotient is expressed in cents.

Even this unit shows considerable variation for different properties, but the divergences are not so extreme as those experienced with the other forms of comparative units. It seems to be the most logical and fundamental unit for comparative purposes, and such variations as occur may be more readily explained.

It may be thought that the basis should more properly be "per total passenger," *i. e.*, dividing the investment by the sum of revenue and transfer passengers combined. However, the use of transfers is widely different in various cities and depends upon local conditions and the system of operation. By using this method, it would probably appear that the company giving the largest ratio of transfers had the lowest investment per passenger, which would certainly be misleading. The general proposition in American city street railway practice is that the operating company undertakes to transport the passenger from any given point to any other point within a certain territory for one fare, and it is not necessarily the passenger's fault that he may have to transfer one or more times to reach this point. The economical operation of the system makes it impossible to run direct cars from any given point of origination to all possible points of destination within the territory of the single fare. Therefore, the transfer system may be as essential to the company as it is convenient for the passengers, for without it every small group of people using certain odd routes would be demanding direct cars. The transfer ratio in American cities ranges all the way from nothing up to an estimated ratio of more than 60 per cent in the case of the Boston Elevated Railway. Consequently the "revenue passenger" has been chosen as the fundamental unit.



RETURN ON INVESTMENT PER REVENUE PASSENGER FOR VARYING INVESTMENTS AND VARIOUS RATES OF RETURN

As standards of reference we may take properties which have been recently valued by competent engineers or commissions and any others where we have satisfactory reason for believing that the capitalization has been honest and conservative.

As examples of the former we have the surface systems in the city of Chicago, appraised by a special board; the Los Angeles City Railway, appraised by the Board of Public Utilities of that city; the Manchester (N. H.) Street Railway Company, appraised for the New Hampshire Public Service Commission by the firm of Sloan, Huddle, Feustel & Freeman, and many other appraisals made in past years. Properties coming under the classification of known honest and conservative capitalization are the street railways in the State of

Massachusetts, all of which have been under the supervision of the Massachusetts Railroad Commission (now the Public Service Commission) for many years. In these companies all issues of stocks and bonds must represent bona fide cash investment, their sale being permitted only after the authority of the commission has been granted. Consequently it is believed that a fair valuation of any Massachusetts street railway should compare favorably with the securities plus the premiums paid in. The only discrepancy which might be found would probably be due to a certain amount of depreciation and deterioration which may not have been provided for by reserves from earnings. Considering the difficulties which any of these companies has experienced in trying to pay a return upon their stock, it is not surprising to find that depreciation reserves have sometimes been neglected.

The accompanying table gives the results of finding the capitalization, total investment or appraised value per revenue passenger of some street railway systems which come under one or the other of the classes mentioned before. These figures are only approximate, as no useful result is accomplished by carrying them out to several decimal places. Moreover, there are necessarily some variations from year to year. The data for the figures presented here are all from recent, if not the latest, public reports. The investment in roads operated under lease is included.

SOME TYPICAL EXAMPLES OF INVESTMENT, OR VALUE, PER REVENUE PASSENGER TRANSPORTED

Name	Total Stocks and Bonds, in Cents (Approx.)	Total Cash Investment,[1] in Cents (Approx.)	Total Appraised Value, in Cents (Approx.)
Boston Elevated Railway Company (Massachusetts)	....	32[2]	....
Bay State Street Railway Company, (Massachusetts)	....	27	....
Worcester Consolidated Street Railway Company (Massachusetts)	....	21	....
Springfield Street Railway Company, (Massachusetts)	....	17	....
Union Street Railway Company (Massachusetts)	....	14	....
Holyoke Street Railway Company (Massachusetts)	....	17	....
Chicago City Railway & Southern Street Railway	....	....	22[3]
Chicago Railways Company	....	....	22[3]
Manchester (N. H.) Street Railway Company	13[4]	13	13[4]
Los Angeles Railway Corporation Los Angeles City Railway Company	....	....	17[5]

[1] Total cash investment for Massachusetts companies includes premiums (+) and discounts (—).

[2] Includes West End and other leased property, city of Boston tunnels and subways.

[3] Valued in 1907. Subsequent additions to property have been under Board of Supervising Engineers.

[4] New Hampshire Public Service Commission has recently placed value approximately equal to the capitalization. This company has no investment in power plant.

[5] Valued by Board of Public Utilities in 1913. Value approximately equal to bonded indebtedness. No investment in power plant.

Of course, there is found to be considerable variation even in the results obtained by this method. But these results we believe to be more fundamental in their derivation than with either of the other methods proposed. The variations which appear in the above table are due to basic conditions which have determined the size of the investment necessary to perform the required service.

Let us take, for instance, the case of Boston with a total investment per revenue passenger of more than 30 cents. On the basis of the standard 5-cent unit of fare, the ratio of this investment to gross revenue is more than six to one. In spite of this rather high ratio, there has never been, so far as we are aware, any claim that this company has been capitalized in any way but a conservative and honest manner. Indeed, under Massachusetts laws, it is difficult to see how it could have been guilty of over-capitalization. The large investment here is due in part to the expensive subways, tunnels and elevated lines which provide rapid transit in the more congested parts of the city and along the main lines of traffic, with unrestricted free transferring from surface to rapid transit and vice versa. Part of this investment has been borne by the city of Boston, but as the company pays a rental which covers the interest and depreciation, the financial result to the company is the same as though it had made the whole investment itself. Therefore, the total investment, both company and city, is included in the figure given above.

Although it is difficult to present absolute proof of the statement, it seems only reasonable to assume that part of the high investment in Boston is due to the long hauls given for a single 5-cent fare. From the center of the city, the lines run six to eight miles or more into the outlying suburbs, all within the one-fare limit.

Turning to the other extreme, as for instance the company operating in the city of Manchester, N. H., with its relatively low investment per revenue passenger carried, we find that it is operating within a much more restricted single fare area, and that it has no expensive construction in subways or elevated systems. Moreover, this particular company has no investment in a power plant, all its electric energy being purchased at a fixed rate per kilowatt-hour from the electric company. This expense is of course wholly charged into the operating expenses of the street railway.

Where a street railway company having characteristics similar to the examples given in the preceding table is found to possess a capitalization which figures out considerably higher than these examples on a per passenger basis, particular reasons are looked for. It may be that the company in question had heavy construction expenses due to local difficulties, existing systems may have been purchased at a high market value, a company may have built and equipped itself ahead of the actual needs of the community and the business done has not yet caught up with the plant available. The possibilities of "watered stock" or inefficient management would, of course, be considered in any such investigation.

Let us now consider the interest requirements of street railway investments, reduced to the same unit basis, the revenue passenger. It is not within the scope of this article to discuss the percentage that constitutes a fair rate of return. The courts and commissions have had more or less to say upon that subject, and the rate of return must necessarily be governed to some extent by the interest rates demanded by new capital. To leave this point perfectly open we will assume that the average rate of return on the total investment may be anywhere between 5 per cent and 10 per cent per annum.

Taking an average rate of 6 per cent as an example, if the total investment is 10 cents per revenue passenger transported, then 0.6 cent must be contributed by each passenger toward the interest and dividends on the securities. If the investment is 20 cents, 1.2 cents must be contributed from each fare; if 30 cents, 1.8 cents. It is simply a straight line function for any given average rate per cent, as shown in the diagram on the previous page.

It will be noticed that the calculations so far involved in this discussion of investment and return on investment are quite independent of the rate of fare in use. This would seem to be an important consideration when we are analyzing the factors which must be considered in determining the proper rate of fare.

Men outside of the street railway business are usually greatly surprised to find that such a large portion of each fare collected must go to pay interest and dividends at a perfectly fair rate on an honest amount of capital securities. The fact that the cash investment in the property and business of a street railway company is necessarily much higher in respect to the gross annual revenue than in ordinary mercantile propositions is not yet appreciated by the general public. This point was clearly brought out by Professor Dugald C. Jackson of the Massachusetts Institute of Technology in his address at the Philadelphia convention of the National Electric Light Association, June 3, 1914, when he said:

"* * * Instead of earning gross annual revenue equal to or exceeding the capital investment, a public service company must ordinarily put out and expend a sum of money in establishing its plant and business, which is not less than four or five times, and is sometimes as much as twelve times, the gross annual revenue that it may expect to receive. This at once multiplies the proportion of the revenue which must go to the investors in case a reasonable return is paid on the investment.

"* * * This being the case, the average man may as a matter of his own business experience honestly believe that he is being unfairly treated by an electric utility company when such may be far from the fact, and the only way to convince him and his associates, composing the public, of the truth of the matter, is to present the facts in such a manner that the individuals may measure them by means within the reasonable scope of their own experience. * * *"

When a street railway company, financed and doing business in an honest manner, desires to demonstrate to the public the necessary and reasonable return demanded by its capital investment, it would appear that the unit most easily appreciated and understood by the average man would be the "per revenue passenger" one.

Commercial and Industrial Conditions in Canada

Consul-General John G. Foster of the United States at Ottawa has reported at length to the bureau of foreign and domestic commerce of the Department of Commerce on commercial and industrial conditions in Canada. His report was published as a supplement to *Commerce Reports* of recent date. In reviewing railroad conditions Mr. Foster said in part:

"Transportation lines have felt the effect of the general depression and of the war. The falling off in building operations affected shipments of material for building purposes, and the slackness in manufacturing had its effect in reducing shipments of coal and of raw and finished material. Lake and canal traffic was fair. Ocean transportation at the outbreak of the war practically ceased on the St. Lawrence and Atlantic, and many vessels were tied up for some time in river and ocean ports.

"Railway and transportation statistics are not yet fully available, but it is estimated that the earnings of railways will show a decrease of approximately 5 per cent as compared with those of the previous year. Statistics of traffic through the canals at Sault Ste. Marie for 1914 show the total amount of freight locked through was 55,369,934 tons in 18,717 vessels. Although twice as many vessels passed through the American side, the amount of tonnage through the Canadian lock and the American locks was about the same, 27,771,467 being carried through the latter and 27,598,467 through the Canadian route. Less coal was shipped west than in 1913.

"Electric railway track laid during 1914 was approximately 36.73 miles, compared with 164 miles in 1913."

Ruling on Accident Reports

The Interstate Commerce Commission Declares Reports on Accidents in City Service Need Not Be Filed

A decision in the hearing held by the Interstate Commerce Commission Dec. 18, 1914, in regard to the filing of reports on all accidents occurring on electric railways engaged in interstate commerce, has just been published. A report of this hearing was printed on page 1389 of the ELECTRIC RAILWAY JOURNAL for Dec. 26, 1914. The principal address for the electric railways was presented by J. T. Beasley, general counsel Terre Haute, Indianapolis & Eastern Traction Company. The conclusion reached is that railway companies which provide both street car and other intrastate service should restrict the scope of their monthly report of accidents so as to include only accidents resulting from the operation of cars engaged in interstate commerce.

In its decision the commission touches upon the history of the interurban electric railways and the class of business which they do, as developed at the hearings, particularly the Indiana lines, the Detroit system and the Bay State Street Railway, which were represented at the hearing and later filed briefs. Taking these as typical of the lines in each of these sections of the country, the decision says that it was shown that their interstate business and operations are of comparatively little importance. But the commission then quoted cases to show that to bring carriers under the interstate commerce law the extent of their participation in interstate traffic is not very material if they are regularly engaged in the transportation of interstate traffic (Johnson vs. Southern Railway Co., 196 U. S., 1; United States vs. C. & N. W. R. R. Co., 157 Fed., 342). The commission also held that the actual physical location of a railway line cannot be accepted as the ruling consideration; nor does it seem to be open to question that traffic crossing a state line is interstate traffic, although in the Council Bluffs case the court has held that certain traffic, though admittedly interstate, is not such as Congress intended to make subject to the interstate act.

Continuing, the commission said that almost from the beginning it had required annual reports of finances and operations or monthly reports of accidents from electric railways that were understood to be engaged in interstate commerce, as well as from steam roads similarly engaged, and it believes that electric railways engaged in interstate transportation are subject to its jurisdiction. In this connection it points out that electric lines have from time to time requested the commission to take jurisdiction over them with respect to various matters arising from the application of the interstate commerce law. The reports concludes as follows:

"The authority for the requirement of monthly reports of accidents is based on a special law separate and distinct from the one generally spoken of as the act to regulate commerce. The general application of this law to electric railways as a class naturally follows from the commission's broad interpretation of the term 'railroad,' which is found in the accident law as well as in the act to regulate commerce.

"In cases such as some of those which have been described at length in this proceeding, in which there is a clear distinction between lines operated in purely city service and those operated to a greater or lesser extent in interurban and interstate service, it does not seem necessary or proper to require reports of all accidents. A consideration of the decisions of the Supreme Court in the Employers' Liability cases, 207 U. S., 463, and in B. & O. R. R. Co. vs. I. C. C., 221 U. S., 612, would seem to lead to the conclusion that in such cases the filing of reports covering the accidents that occur in connection with the operation of cars, other than purely city cars, carrying interstate passengers, freight or express will answer the requirements of the accident-report law. Moreover, it does not appear that the promotion of the safety of operation of the railway lines over which interstate commerce moves or any other of the purposes of the accident law will in any degree be subverted by such a restriction, while, on the other hand, the requirement of reports of all accidents occurring on all the lines and in all the operations of carriers such as those whose cases have been here described will result in the accumulation of an enormous amount of data prepared at the expenditure of much time and money by the reporting companies, and perhaps in some cases duplicating returns made to state commissions or other more local regulating bodies, without any commensurate advantage."

Jitney Operation in Dallas, Tex.

Statistics Showing Number of Cars in Operation and Average Earnings Per Car

A report dealing with the jitney bus situation as it existed in Dallas, Tex., up to March 24, 1915, has recently been compiled by the Dallas Consolidated Electric Street Railway Company and an abstract of it is given in the following paragraphs:

On Jan. 7, three jitneys began service in Dallas, the drivers being former deputy sheriffs and constables whose term of office had ceased about Dec. 1 and who were therefore without employment, although they owned Ford cars. In February the jitneys began to increase rapidly. Unemployed men and even women, boys and girls, who had second-hand automobiles, began running them in the jitney service. Other unemployed persons without automobiles rented cars or operated automobiles in jitney service on a per diem basis. Second-hand automobile dealers were quick to grasp the opportunity, advertising in the Dallas papers extensively, and buying up old automobiles not only in Dallas but in the country for miles around. Since then the jitneys have continued to increase rapidly, and up to March 24 a maximum of 292 were in service on the same day.

The following table shows the number of jitneys operating in Dallas at ten-day intervals from their inception to the latter part of March:

Date	No. of Jitneys	Date	No. of Jitneys
Jan. 1	0	Feb. 20	156
Jan. 11	3	March 2	204
Jan. 21	7	March 12	251
Jan. 31	25	March 22	259
Feb. 10	98		
Maximum day, March 13			292

During February the street congestion became marked in the rush hours, and despite the efforts of the traffic policemen blockades began to occur. The accidents during the month rose from an average of less than one per day to slightly more than five per day.

During February the street railway inspectors reported the license numbers of 536 different automobiles in jitney service. A record was kept of the days each of these cars operated, and this record shows that 160 of them operated for only one day. While this record may not be accurate, owing to errors made by the inspectors in taking down the car numbers, undoubtedly many automobile owners, reading in the newspapers of the exaggerated reports of the earnings of some of the drivers, conceived the idea of "trying it out," but the results of one day convinced them that the jitney service was unprofitable. To reach a conservative conclusion the 160 jitneys reported to have operated only one day may be left out of consideration. On such a basis the number of jitneys operated in February were 376, of which number 167 operated five days or less, only fifty-four operated in excess of fourteen days and only eleven operated more than twenty-one days. The 376 jitneys operated a total of 2975 days in February, an average of a little less than eight days per jitney. Since the jitney service increased rapidly between the first and last of February, these figures do not mean a great deal except in comparing the total number of jitneys operated, 376, with the maximum number operated on any one day in the month, which was 184. Observation seems also to indicate that fully 50 per cent of all the cars in service operate less than a total of four hours a day. These 50 per cent operate between 7:30 a.m. and 9 a.m. and between 5 p.m. and 7 p.m. The other 50 per cent operate anywhere from four to fifteen hours a day.

EARNINGS

While there were only three or four of the jitneys operating, the drivers were questioned as to their daily earnings. One man said he averaged about $4 a day. The others said they were barely making a living and that the only reason they continued was because there was nothing else to do at the time. Several weeks later one of these men who had secured regular employment, in discussing his jitney experience, said he would much prefer a regular $60-a-month job to operating his automobile in jitney service.

On Jan. 29 and again on Feb. 5, before the buses became so numerous, fairly complete checks were made by the street railway companies' inspectors. The results of these checks are summarized in the following tables:

	Jan. 29, 1915			Feb. 5, 1915		
Route	No. of Jitneys	No. of Trips	No. of Pass.	No. of Jitneys	No. of Trips	No. of Pass.
Ervay	6	241	769	22	858	2,261
Bryan	3	101	292	9	347	998
Fair Park	8	129	287	13	261	651
Harwood	3	72	155	4	123	346
Oak Lawn	2	2	7	9	146	411
Average number of passengers per trip			2.8			2.7
Average number of passengers per jitney			68.7			61.8
Average earnings per jitney			$3.43			$4.09

Of all the jitneys operated on the two days checked, the earnings of only two exceeded $10. From the number of trips made by these two cars it is apparent that both were operated from fifteen to eighteen hours. On Jan. 29 only seven of the drivers earned more than $5 and on Feb. 5 only twenty-one out of fifty-seven earned in excess of $5. Twenty-two of the fifty-seven cars operated on Feb. 5 made less than twenty single trips. In its Feb. 11 issue, the Dallas *Dispatch* published some figures compiled by Claude Hamilton, organizer of the Dallas Transit Association, who claimed to have received complete reports from sixty-eight of the 103 jitney drivers on the results of their operation on Feb. 10. These sixty-eight drivers, according to his figures, carried a total of 8063 passengers. The average earnings per man were $4.88 for the day. The maximum amount reported by one man was $11.90 and the minimum $2.30. The weather conditions on Feb. 10 were quite pleasant and the temperature 63 deg. These figures therefore check fairly well with those obtained by the electric railways inspectors.

The Society for the Promotion of Engineering Education has announced the program of the annual meeting to be held in Ames, Iowa, from June 22 to 25. The program consists largely of committee reports dealing with all phases of educational activity in this field.

Telephone Dispatching in City Service

The Author Describes the System Used in Rochester, N. Y., Whereby the Service Is Adjusted to Meet the Exigencies of Operation, and Outlines Numerous Cases in Which Centralized Control of Car Movements Proves to Be Advantageous

BY ELMER E. STRONG, SUPERINTENDENT OF TRANSPORTATION NEW YORK STATE RAILWAYS, ROCHESTER LINES

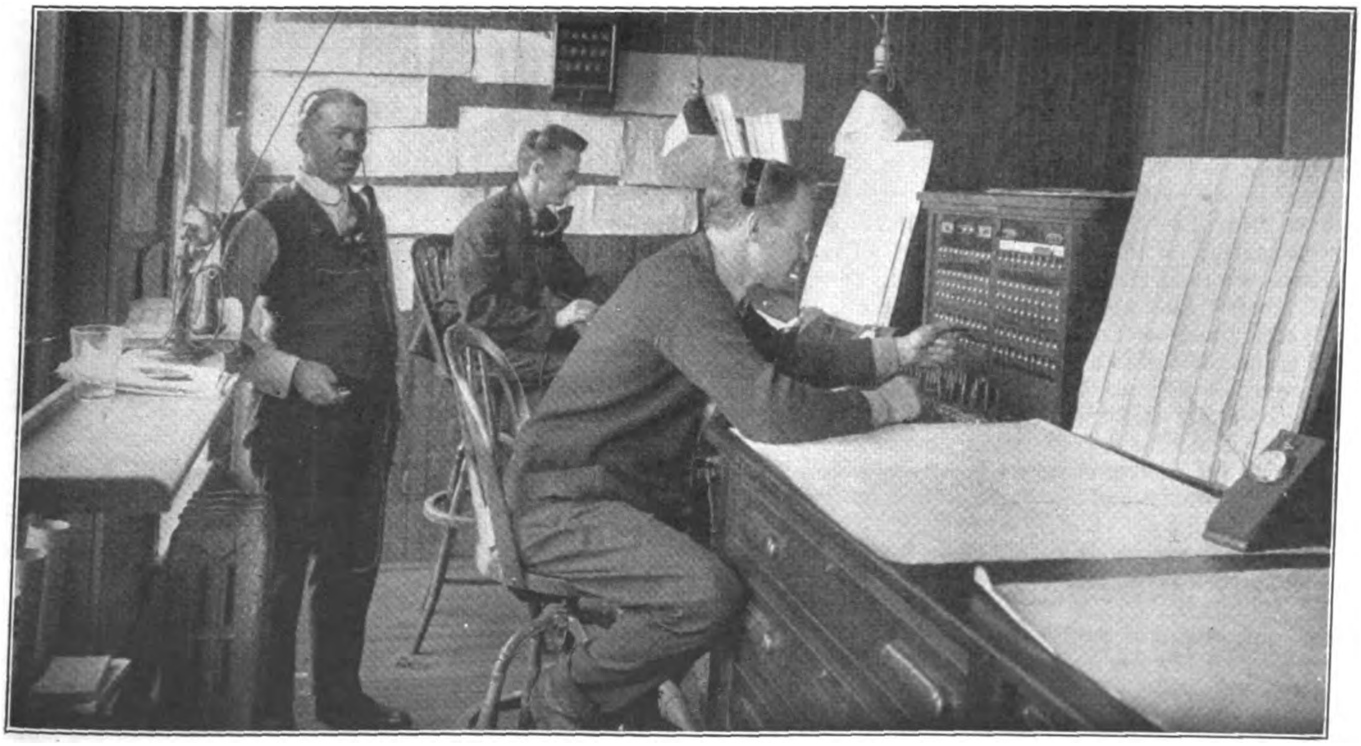
One of the most troublesome questions that confronts the average transportation department head is how to keep in such close touch with the operation as a whole that he may know immediately when an interruption occurs at any point, and knowing of it may be able to readjust the service quickly and with the least inconvenience to the public.

It is a safe venture to state that most superintendents desire a larger supervisory force than their companies feel able to maintain, as a thoughtful superintendent must realize how small a percentage of his trains and his men are under actual supervision at any time. The superintendent of a factory, shop or mercantile establishment may have a thousand employees performing their duties under the personal supervision of a very few foremen, but a thousand trainmen under an equal number of foremen or supervisors get but little individual attention. A supervisor or inspector cannot be more than human; he can be at only one place at a time; he cannot foretell when or where an interruption in service will occur, nor can he, after hearing of trouble at any point, instantly set himself at that point. It is rarely his good fortune to be in the immediate vicinity when a fire breaks out, a derailment occurs, a trolley wire falls, a car becomes crippled or a vehicle stalls on the track. If he is attending properly to his duties he is as likely to be at some far-distant point on the lines.

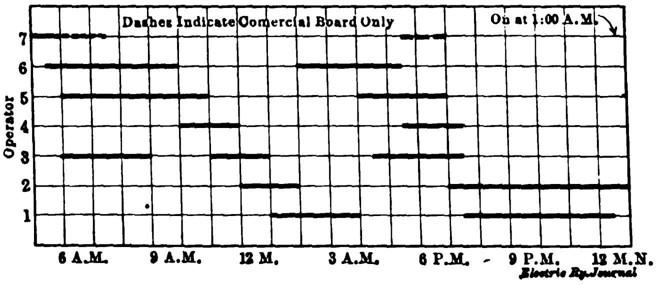
The rules require that the conductor of the first car in a blockade shall call the company's telephone operator and state the facts. It then becomes the duty of the operator to find an inspector; next the duty of the inspector to reach the scene of trouble as soon as possible. In the meantime, more cars are becoming blocked and operation is coming to a standstill.

It was with a sense of dissatisfaction with this sort of procedure, and with a consciousness of how little information came to light promptly enough to be of use, together with the fact that much even of the prompt information was unusable because there was no means of reaching the crews, that the New York State Railways, Rochester Lines, sought a means whereby immediate knowledge of general operating conditions could be centralized. Organization and operation as carried on in the transportation departments of several companies were studied for the purpose of learning what had been accomplished in other cities. Among the properties visited was that of the Denver Tramways Company where a telephone dispatching system had been in use for many years, and had proved a marked success. The system there, however, had grown up with the road and there was some question as to whether such a system could be introduced on a property of equal size on which dispatching had never been used. Therefore, in order to give it a trial, arrangements were made with a local telephone company to install a small board in one of the railway offices, and pole telephones at the termini of four of the heaviest lines.

Inspectors who had previously been in charge of these lines, and who knew their peculiarities, were assigned to duty on the board. Each of these men, after a brief experience, declared that he could control the lines much better and more easily from the board than when sta-



ROCHESTER DISPATCHING—INTERIOR VIEW OF DISPATCHER'S OFFICE SHOWING SWITCHBOARD



ROCHESTER DISPATCHING—CHART SHOWING DISPATCHERS' HOURS AT SWITCHBOARD

tioned on the street. The system remained in experimental stages for nearly a year and a great deal of data were accumulated, analyzed and studied. Finally the management determined to make a permanent installation of telephones embracing all of the city and suburban lines.

The switchboard for the Rochester telephone system is 15 ft. in length and is provided with ample filing drawers for preserving dispatchers' records. It consists of three turrets, the middle one being the master turret, from which connections can be made with central lines, with the company's commercial lines, with the street phones in the center of the city, or with any of the dispatching phones at line terminals. The turret on the right is so constructed that the dispatcher operating it can take over any dispatching line by pulling out plugs under the respective jacks. By pushing in plugs, the corresponding lines are thrown over to the left turret. Thus, any combination of lines or all lines may be operated from any turret. During the day the commercial and central lines are operated from a board in a separate room in order to avoid noise and confusion, but at night these are switched over to the dispatcher's board.

On the fourteen lines in Rochester during rush hours there are in operation as many as 360 cars, twenty-five of which are trailers, so that there are no less than 330 trains. These are under the direction of three dispatchers, each of whom, during the busiest periods, receives as many as eight calls per minute. Between the morning and evening rush hours, when the number of trains does not exceed 140, two men easily handle the fourteen lines. After the morning rush, two men receive all commercial calls in addition to the dispatching, and after 12:30 a. m. only one man is on duty. The accompanying diagram shows the hours to which dispatchers are assigned.

For several years all cars in operation have been known as trains, metal train number cards 4 in. x 8 in. being carried on the front and rear of all trains. The scheme of numbering trains is such that those on Lake and Monroe Avenues, for example, are numbered 100, 101, etc.; those on Main and West Streets, 200, 201, etc., and so on for the fourteen lines. The time-table shows the schedule of each train in a column by itself. Instead of using this schedule, which is prepared by the schedule department from traffic checks, the dispatcher makes a list of trains in the order in which they are due at terminals, and shows the scheduled leaving time opposite each.

Motormen are under strict orders to call the dispatcher from each terminal, giving the name of the terminal and the number of his train. The former would not be necessary on most routes as nearly all have individual lines, but a few have extensions over which only a part of the trains run. In such cases, the two phones are on the same line, hence it is necessary for the motormen to call, for example, "Lake 122," or "Charlotte 115." The dispatcher answers by giving the time of departure, which under normal conditions is the same as that shown on the schedule posted in the station. The dispatcher makes a written record of each train as it is reported on the dispatcher's sheet. If reported at or before its scheduled time, the scheduled time is recorded; if late, the actual time of report is entered followed by — 1, — 2, etc., to indicate the number of minutes late. Hence, under ordinary conditions, the operation with the dispatching system is the same as before its inauguration, but there is the positive knowledge that trains are running according to schedule, as well as a written, detailed record of the fact for future reference.

The real value of the system reveals itself when interruptions occur from any cause. This is the very time that the former method of operation failed. When a train is several minutes late and, owing to traffic conditions, it is improbable that it will recover its place, the dispatcher calls the station and orders out an extra, or "fill-in," to run on the late train's time and the latter is turned. The turning of this train, however, does not inconvenience the public, as the crew is instructed before leaving the terminal to carry a sign indicating that the train will not run through to the opposite terminal, but that it is a "short car." Inspectors, as a rule, are inclined to remain near to the center of the city as interruptions are more likely to occur there, and if they do occur, they are of more serious consequence than elsewhere. For that reason, if a train is delayed in an outlying section, the inspector may have no knowledge of it until his trains cease to come, and it is then too late to get out cars to fill the gap. Necessarily he must turn some trains in order to put them on time. He is obliged to change a sign after the train has received passengers, and those who desire to ride beyond the turning point are irritated at having to change cars in order to reach their destination. There is some merit in a passenger's argument that if he boards a car signed for a certain destination, the car should take him to that destination unless it becomes a physical impossibility. In addition the old method allowed the gap in the service to be carried from terminal to terminal, while the new method allows it to be carried only from the initial terminal to the center of the city.

In the event of an interruption at any point, it is the duty of the motorman of the first car in the block to

ROCHESTER DISPATCHING—TYPICAL TELEPHONE AT END OF A LINE notify the dispatcher from the nearest available telephone, thus giving the maximum time to rearrange the service. At points where interruptions are likely to occur, such as at canal lift bridges and railroad crossings, pole phones have been provided. If a train is held at a canal bridge for instance, the dispatcher, knowing the number of the delayed train, can space back its leaders. For example, assume that train No. 208 is due at terminal at 2 p. m.; 209 at 2:05 p. m.; 210 at 2:10 p. m., etc., and suppose that No. 210 is held six minutes when running toward that terminal. The dispatcher would order 208 to leave at 2:02 p. m.; 209 at 2:09 p. m., and 210 being six minutes late would leave at 2:16 p. m. The following train 211 is immediately behind so that 210 may turn without leaving the gap. It will be noted that all this has been accomplished by giving a seven-minute headway instead of a five-minute headway for a few minutes. Without the telephones there would have been five-minute headways until a gap of eleven minutes occurred. This would be plainly noticeable to patrons, while a change in the headway from five minutes to seven minutes for a few trains is not likely to be observed.

It sometimes occurs that a car is derailed near the end of a line. In such a case the dispatcher orders the conductor to go back to the nearest cross-over to alternate cars on either track from that point to the terminal, until the derailed car can be replaced on track. Frequently, when there is trouble on any one line, the dispatchers use pull-in cars from any or all other lines to keep up service until the trouble can be cleared. In like manner, pull-in cars from all lines are sent to care for extraordinary travel, such as that for a ball game or a circus.

During snow storms, or when rail conditions are such that it is impossible to make schedule time, the dispatcher may disregard his model schedule and give more running time with increased headway. This insures regularity of service at the expense of cars being less frequent, but on the whole is far more desirable.

The system proves of considerable advantage in cases of power interruptions. After a delay from this cause some motormen are able to get over the road more rapidly than others, and thus cause bunching of cars. In this event the trains are spaced on scheduled headway so that regular service is restored immediately, although no trains are on time. The latter condition, however, is of no interest at all to patrons. In order to put trains on time, different methods are used, depending upon conditions. The first of these methods is, after spacing cars as described above, to order each crew to change cars with whatever crew is running on their time. This causes some inconvenience on account of the necessity of taking register readings, removing train number cards, etc., and is not done during the busy hours of the day. Instead, all trains are allowed to run behind schedule until the rush is over, at which time pull-in cars are available to assist in getting trains on time. In fact, it is possible, when all trains on a line are, say, eight minutes late, to have one crew turn back each car, putting each one nearly on time. A method of restoring trains to schedule which is used mostly after serious interruptions, such as are caused by parades which necessitate stubbing from a point near the center of the line to the terminals, is to order alternate trains at each terminal to run to the opposite end of the line, the other trains turning so as to take their places on regular schedule. As soon as the through trains report again, they are ordered to turn, while the trains already on time make the through run. In this way all trains are running on time within about an hour, no matter how seriously they were disarranged at the beginning.

With the dispatching system the number of inspectors has been reduced so that the increase in the number of dispatchers is about offset. Although the inspection force has been curtailed, the remaining inspectors have many duties to perform, but they may give more time to that variety of inspection that makes for a better disciplined force of trainmen. Line terminals must be checked frequently for the purpose of ascertaining that each crew leaves at the designated time, as the dispatcher has no means of insuring this. An automatic headway recorder would be a valuable adjunct to the telephone.

Besides the actual operation of cars, for which the dispatching system was installed, many other uses have been discovered. Not least among these "by products," as they may be termed, is the operation of snow plows and sweepers during severe storms. With some twenty pieces of equipment, each assigned to keep definite portions of the line clear of snow, it was difficult, under old conditions, to keep all under close supervision and occasionally a plow would be disabled for some time before the fact became known, the consequence being the partial blocking of the lines assigned to that plow. The satisfaction in knowing, through frequent reports from the crew of each plow that it is progressing over its route can scarcely be estimated, and in case of any plow becoming disabled, those on other routes are dispatched to divide its territory.

Delays to traffic, caused by crippled cars, have become less frequent, for the reason that motormen report defective conditions before they become serious because of the conveniently located telephones. In like manner, reports of minor defects in track or overhead are made. The expense of changing cars is reduced by replacing defective cars with cars that would otherwise be turned in at the carhouse.

Reports of accidents are made to dispatchers as soon as a crew reaches a terminal, and if the claim department wishes to interview the crew at once, they are immediately relieved. When unforeseen conditions arise on any line, the dispatcher is immediately notified, and through him the necessary orders reach the crews. Otherwise it would be necessary to detail a man to the specific task of informing each crew as they passed him. This proves valuable in the event of broken rails, excavations near track and similar conditions.

Another use of the system has been that of locating property which passengers have left on cars. This, although not an essential point, is one which is much to the liking of patrons. On several occasions individuals have expressed surprise that lost property can be returned so promptly. It is even becoming a frequent occurrence for patrons who board cars at terminals to ask dispatchers such questions as, "At what time does the first morning car leave this point?" or "What time must I take a car here to get a train on ——— Railroad at 5:15 a. m.?"

Looking back over a year's operation with the dispatching system, it may be said not only that it has kept its promises in full but that it has given service that was not thought of in the beginning, and there is no reason to believe that all uses of the system have yet been discovered.

The national bureau of standards is preparing a circular on the subject of the standards for electric service which can be required by public service commissions or city officials from electric light and power companies. The circular covers the subject of the quality and safety of service, the accuracy of measurement by the instruments employed, and certain other public relations questions.

The Auto-Bus in London

Exclusive Short-Haul Privileges, Avoidance of Peak Traffic, High Fares and Low Taxes Make Local Success of Bus Operation

In the report of a discussion on motor vehicles which took place before the (London) Institution of Civil Engineers, recently published in pamphlet form, H. H. Gordon contributed some illuminating data regarding the causes of success of the auto-bus under the conditions peculiar to the city of London. He stated that, except in the central area of the city where traffic was continuous from morning to night and from which tramways were excluded, the real problem of London traffic was how to care for the peak loads which were very pronounced. At Blackfriars Bridge, for example 9000 passengers were conveyed by the tramways in the hour of busiest rush which was in the morning, but only 700 passengers were handled during the hour of least traffic. During the five hours from 11 a. m. to 4 p. m. the average was only 1000 passengers per hour. A large part of this peak load occurs before 8 o'clock in the morning or during the period when workingmen's fares, which permit a ride of about 5½ miles for 2 cents, are in force. The motor omnibuses, however, begin to operate each day only after the hour when this reduced rate has ceased. As the morning rush in London is 50 per cent greater than the evening rush, the motor omnibuses are thus enabled to escape the severe peak in the load.

Bus fares seem also to vary depending upon whether there is tramway competition. Thus, a passenger traveling by motor omnibus along a tramway route could travel on an average of 2 miles for 2 cents, but where there was no tramway, although it was alleged that the motor omnibus was the cheaper vehicle, a passenger could travel only 1½ miles for 2 cents. A passenger in the center of London traveling from Charing Cross to Oxford Circus, which is probably the most profitable traffic center in the world, could travel only 1 mile for the 2-cent minimum fare. On the longer runs a passenger on a motor omnibus traveling along a tramway route could go 6¾ miles for 6 cents, but if he happened to be off the tramway route he could go only 4½ miles.

The relative public burdens borne by the London tramways and motor omnibuses constitute an important reason for the success of the London buses. It has been testified formally that the contribution made by each tramway vehicle in London toward the public funds amounts to $1,000 per year, and also that the contribution made by the motor-omnibus company toward public burdens amounts to less than $200 per annum per omnibus. If motor omnibuses paid taxes proportionall to the tramways it would mean an additional charge on them of $3,000,000, but inasmuch as the London General Omnibus Company's total profit for the year is only about $1,500,000 it would not continue long to run in London if such public burdens were imposed on it.

In conclusion Mr. Gordon said it was undoubtedly true that motor omnibuses in London had been a great success, but it was equally true that they had been a great failure in every other European city. Summed up the reasons are, first of all, a monopoly of the best traffic area in the world is reserved in London for motor omnibuses. The streets are paved in a manner that is unequaled anywhere. The buses have absolute independence to run when and where and how they like. They are not restricted as to fares, and in many other ways they enjoy advantages which are not granted elsewhere. In addition the buses are relieved of a large part of the taxation which is normally imposed on transportation utilities, notwithstanding the fact that actual experience in London has shown the effect of the heavy motor traffic to be quite as deleterious to the granite blocks used for the city paving as to macadamized roads. In fact, the life of the granite under bus traffic is no longer than the life of soft wood paving. In 1908-1909, in connection with certain reconstruction work at Putney Bridge, the whole street paving was repaired, but during 1913 it had been found necessary to reconstruct that paving entirely, and even the granite then installed is giving way at the present time under the intense traffic imposed upon it.

Comments on Insulating Tape

George E. Austin Outlines His Experiences in Its Manufacture, Sale and Use

At the annual convention of the Mechanical Rubber Company at Cleveland, George E. Austin presented a paper in which he outlined his experiences in the manufacture, selling and use of insulating tape. He stated that some twenty-five years ago tape sold at prices ranging between 40 cents and 75 cents per pound, and that this price gave the manufacturer a chance to produce a good article at a reasonable profit. At the present time, notwithstanding the higher average cost of the raw material, friction tape is sold as low as 15 cents a pound and rubber tape at 25 cents a pound so that it is difficult for the manufacturer to supply a really good and efficient product.

However, there is a growing tendency among large consumers to call for a higher quality of tape, especially where it is used for insulating purposes, and where the cost of replacing the tape, irrespective of the damage due to its failure, is a hundredfold more expensive than the cost of the material.

Mr. Austin opposed the use of many different grades of tape and advocated the establishment of but three or four standard qualities. He referred to the existing lack of standardization in testing methods but stated that the only really practical test was that obtained under normal working conditions. The present tendency to call for a large yardage of tape to the pound was unwise, as this was obtained only by cutting down the friction which takes away the insulating and adhesive properties.

Where the material is to be used for outdoor work such as line construction on a railway, there is need for a sticky tape and one that will not absorb moisture. For armature or interior work a dryer tape is preferable so long as the breakdown tests meet the requirements. Climatic conditions affect the efficiency of friction tape materially, as tape which is frozen in course of transit loses its adhesion until warmth is applied.

The matter of pinholes in tape is important. When the material is wrapped several times around the work so that one layer covers the other the punctures are partly eliminated, but where a single wrapping only is used, pinholes make the tape inefficient. This condition should immediately be called to the notice of the factory as it is often caused by failure properly to spread the friction on the cloth as well as by using a compound which adheres poorly and falls away from the fabric when it unrolls. It is desirable that tape should be wrapped in wax paper or tinfoil and put in cartons for shipment.

Formerly it was usual to guarantee a friction tape against drying out for one year. But in general this is an impossible requirement, although all grades of tape should retain their adhesiveness for about six months, if left in original packages and properly stored.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

H. G. McConnaughy Expresses Optimism Regarding Convention—Washington Section Entertains National Officers—Power Distribution Committee Assembles Results of Fruitful Year's Work

MANUFACTURERS' ASSOCIATION

E. H. Baker, president of the Manufacturers' Association, and H. G. McConnaughy, secretary, recently returned from San Francisco, where they went to arrange for convention meeting places and transportation. The results of their work will appear in circulars regarding the tours, which will be issued next week, and others regarding hotels, etc., which will follow in a few weeks.

The meetings will be held in the Inside Inn, a commodious hotel located centrally in the exposition grounds, opposite the Baker Street entrance. The hotel faces the Musical Concourse and is near the Horticultural Building. It was designed to accommodate conventions, a large ballroom providing ample space for the general sessions. The registration headquarters will also be at this hotel, but there will be no "official" hotel. Tentative plans for a reception to be held at the St. Francis Hotel on the evening of Monday, Oct. 4, were also made.

Mr. McConnaughy states that hotel prices and those of food and all other goods are normal and that there is no tendency in any direction to take advantage of the people who visit the coast. Contracts were made two years ago for hotel reservations, but it will be necessary for the committee to know well in advance who will attend. The train equipment for all special de luxe tours was fortunately secured eight months ago and will be the finest that will go across the continent this year. The tours have been planned so that the association can visit the properties of the member companies in the cities through which the several trains pass, and as it is the first opportunity that the association has had to do this, the companies are making preparations to show some real hospitality.

In response to an inquiry as to his impressions of the trip, Mr. McConnaughy said that "the exposition as a whole is the most beautiful and wonderful ever built and is worth the price and the time to see the grounds and the lighting effects alone, to say nothing of the buildings both at San Francisco and San Diego." En route he was impressed by the hydraulic power development and wonderful transmission lines, the latter being visible over the mountains for miles from the train. He also noted the special equipment and rolling stock of the railway companies of the West.

The member companies throughout the West will extend a welcome that will linger long in the memory of all those who make this trip.

AMERICAN ASSOCIATION EDUCATIONAL COMMITTEE

The International Correspondence Schools are enrolling members in the several courses under the arrangement made with the association through its educational committee. As each student enrolls the employer and the committee are notified and the notification is acknowledged direct to the student by the committee. As each pamphlet in the course is completed, the committee is notified of the grade secured and the date of completion, and a complete record of the work of each student is kept in the association office. The students are making excellent progress in the preliminary shop calculation section of the course, a number passing the examinations with high averages. The committee is assisting the schools in the revision of the instruction pamphlet on steam turbines so that, when students take up this work, the treatment will be up to date. At the appropriate parts of the courses students will be furnished with sections of the engineering manual so that their studies may be related to the engineering work of the association.

COMMITTEE ON ELECTROLYSIS

The Engineering Association committee on electrolysis met in New York on April 28, those in attendance being as follows: A. S. Richey, Worcester, Mass.; G. W. Palmer, Jr., Boston, Mass., and C. B. Martin, New York, representing E. B. Katté. In accordance with the assignment made to it by the executive committee all that this committee could do was to consider the subject with reference to the forthcoming report of the national joint committee on electrolysis. This report is now in the hands of the publishing committee, of which Mr. Katté is chairman.

COMMITTEE ON POWER DISTRIBUTION

The Engineering Association committee on power distribution met in New York on April 29 and 30. Those in attendance were A. S. Richey, Worcester, Mass., chairman; E. J. Blair, Chicago, Ill.; D. E. Crouse, Annapolis, Md.; C. R. Harte, New Haven, Conn.; G. W. Palmer, Jr., Boston, Mass.; R. H. Rice, Chicago, Ill., and Gaylord Thompson, Trenton, N. J. Condensed minutes of the meeting will be printed on this page next week. One of the most interesting reports presented was that of the sub-committee on poles, which was the result of several meetings. One was held at Rochester, N. Y., on March 26 and 27, attended by Messrs. Cadle, Thompson and Rice. Here experimental poles, made under the committee specifications and design, were tested and the results were compared with the formula published in last year's report. Samples of the standard New York State Railway poles were also tested. The results of the tests were discussed on the spot. At Cleveland on April 26 Messrs. Cadle and Rice inspected the Cleveland Railway pole, its use and manufacture. At Wheeling, W. Va., on April 27 Mr. Rice visited the plant of the Electric Railway Equipment Company and tested standard and special steel poles which had been manufactured for test purposes. At New York on April 28 Messrs. Thompson and Rice worked out a report, for presentation on the following day, based on the results of the previous meetings.

WASHINGTON SECTION

An audience of about 100 members and guests of the Washington Railway & Electric Company section greeted C. Loomis Allen, E. B. Burritt, Charles C. Peirce, R. D. Simms and J. H. Hanna, the speakers at the April meeting.

Mr. Allen spoke on the subject of co-operation. After outlining the individualistic conditions of living in the pioneer days, he traced briefly the growth of the co-operative spirit with the opportunity for initiative and enterprise. This led naturally into the subject of public relations and the part which employees must play in them if the railway managements are to be successful. Street railway employees are part of a city's life and an intelligent factor in a community. They have an opportunity to defend their employers when the latter are unjustly assailed.

Mr. Peirce, representing the Manufacturers' Association, said that the best measures of a good town are its street railways and other utilities. The criticism of these utilities is on the decrease, due to improvements made in the service even in the face of higher operating costs. Fares must be increased in view of increased overhead charges.

Mr. Burritt, representing the American Association, spoke briefly regarding his former connection with the Washington Railway & Electric Company and the pleasant friendships formed during that period. Mr. Simms, treasurer of the Capital Traction Company, complimented the motormen who had submitted papers in the competition which closed recently, and of which Mr. Hanna, of the same company, acted as judge. The latter stated that, while he had looked forward to the task as a heavy one, it turned out otherwise. He had read all of the forty papers at least twice, with pleasure and profit.

The topic of the papers referred to was "How to Prevent Accidents, Insure Comfort to Passengers, and Save Power." The prize winners were W. D. Valentine, J. N. Malloy and S. F. Frye.

Appointment of Jury on Awards

The International Jury for the Electrical Exhibits, San Francisco Exposition, Organizes

Following are the members of the international jury of awards of the Panama-Pacific International Exposition appointed to pass on all electrical exhibits: Nominated by the chief of the department of machinery—Dr. Carl Hering, consulting engineer, Philadelphia; Prof. C. M. Jansky, University of Wisconsin, Madison; William H. Onken, Jr., *Electrical World*, New York; Cecil P. Poole, consulting engineer, Atlanta, Ga. Nominated by the chief of the department of transportation—Dean George A. Damon, Throop College of Technology, Pasadena, Cal.; A. H. Babcock, electrical engineer Southern Pacific Railroad Company, San Francisco. Nominated by the chief of the department of manufactures—Prof. V. Karapetoff, Cornell University, Ithaca, N. Y.; Prof. H. J. Ryan, Stanford University, Palo Alto, Cal.; Guy Bayley, chief of electricity Panama-Pacific International Exposition. Nominated by the chief of the department of liberal arts—A. J. Halloran, *Journal of Electricity, Power and Gas*, San Francisco; Charles A. Rolfe, president Southwest Home Telephone Company, Redlands, Cal.; Dr. Frank Wolff, bureau of standards, Washington. Electrical groups of all departments—Italy, Vite Capastini. Professor Ryan has been chosen chairman of the group, Vite Capastini vice-chairman and A. J. Halloran secretary.

The group jury has twenty days to pass on exhibits and will report to a department jury composed of the chairmen and vice-chairmen of each group jury of the respective departments. Each department jury must begin work within five days after notice by the chief of the department and will submit findings to the director of exhibits, who will certify these to the superior jury. The latter will determine finally and fully the awards to be made. This superior jury will convene on June 3, and will report within fifteen days, and as soon as practicable thereafter formal public announcement of the awards will be made. There will be six classes of diplomas—the grand prize, medal of honor, gold medal, silver medal, bronze medal and honorable mention without medal.

COMMUNICATIONS

Zone System of Fares

BOSTON ELEVATED RAILWAY COMPANY
BOSTON, MASS., May 3, 1915.

To the Editors:

In response to your request for an expression of opinion relative to the so-called Milwaukee zone system of fares, I am free to say that the subject is one of much importance. Any method of increasing net earnings so as to provide for requirements deserves careful study. Beyond expressing my interest in the zone system as an attempt to substitute a graduated charge for the 5-cent fare, I do not feel prepared to speak. We are naturally greatly interested in seeing how the plan works out in practice.

There are many questions to be considered before one would be warranted in concluding that this method should be adopted on a system as complex as the Boston Elevated Railway. Last year our company carried a total of about 613,000,000 passengers, but only 343,000,000 of these contributed to our revenue. More than 270,000,000 free transfer passengers were carried on the system. The extension of free transfer privileges within late years has reduced the average fare per passenger carried to less than 3 cents. Here is a source of lost revenue which may be studied with perhaps as much advantage as the application of the zone system. Increased fixed charges in one form or another and increased wages are other elements in the problem of affording capital its just return. The practical application of the zone system implies many difficulties on such a closely articulated group of rapid transit and surface lines as we have in Boston. Doubtless zone fares can be put into successful practice here if it appears that this method is acceptable to the public and desirable for the company, but at present an unqualified approval of such a plan cannot be given for a system as large and complex as this. The paper of Mr. Stearns on the application of zone fares in Milwaukee before the April 22 meeting of the New England Street Railway Club is a valuable contribution to the subject.

WILLIAM A. BANCROFT, President.

Mating Gears and Pinions

THE SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
DALLAS, TEX., April 27, 1915.

To the Editors:

Referring to the article on page 803 of your issue of April 24 in regard to "Working Ordinary and Hard Gears and Pinions Together," it would seem to the writer that there must have been other factors in the operation of this car to account for differences in the results obtained with the gearing in the two cases. While the wear of the No. 1 pinion and gear is abnormal, the lack of wear on the No. 2 pinion and gear is also abnormal for the mileage given. It would be as well, in cases of this character, if factors other than the mere difference of hardness between the gears were carefully observed. In this case, lack of proper lubrication on the gear-train of No. 1 might easily account for the abnormal wear, as also might the fact that the No. 1 motor, either in armature or fields, has had such characteristics that it did a great deal more work than the No. 2 motor. This last condition is one that may often be observed where the input of current to each motor on the same car is not frequently tested, and this last condition would account not only for the excessive wear on the No. 1 gear-train, but for the lack of normal wear on the No. 2 gear-train.

I think your readers would like to hear from Mr. McAloney further in regard to the other factors which might have caused, or partly caused, the extraordinary difference in wear between the gear-trains on the same car.

H. S. COOPER, Secretary.

R. D. NUTTALL COMPANY
PITTSBURGH, PA., April 28, 1915.

To the Editors:

We are much interested in the experiment of Mr. McAloney on mating hard gears and soft pinions, appearing in the issue of the ELECTRIC RAILWAY JOURNAL of April 24. This experiment had already been brought to our attention.

The proper combinations for new equipments can be determined very readily, but when it is necessary to install new pinions with several different grades of partially worn gears, care must be exercised to select the grade of pinion that will wear most satisfactorily with the different gears or vice versa.

We can corroborate Mr. McAloney's experience, having conducted several similar tests with the same results.

In searching for an explanation of this peculiar result it is reasonable to assume that the harder surface of the gear starts to wear the face of the pinion tooth, the resultant grit mixing in the gear grease and acting as an abrasive between the teeth, and as the harder surface of the gear begins to wear this grit imbeds itself in the face of the pinion tooth, accelerating the wear. It would be interesting to know if the face of the pinion teeth were rough, which would be necessary to bear out the theory.

W. H. PHILLIPS, Metallurgist.

Self-Ventilated Railway Motors

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y., May 4, 1915.

To the Editors:

The article in the issue of the ELECTRIC RAILWAY JOURNAL for May 1 on the subject of ventilated railway motors by R. E. Hellmund, of the Westinghouse Electric & Manufacturing Company, is full of interest, and indicates that the idea of efficient ventilation is being generally accepted for the various reasons set forth in his article. This is particularly gratifying to us as we have advocated for a number of years the general adoption of motors designed for positive self-ventilation with external air. We had faith in the scheme from the first and are pleased to say that the results of ventilation obtained with more than 15,000 motors of various sizes have been in every way satisfactory.

The general idea of ventilating a railway motor is quite old, but only in recent years has a thoroughly effective and efficient design of ventilation been worked out. The first railway motors of early days did not have inclosing magnet frames. The armature and field coils were almost completely exposed. This construction gave fairly good ventilation but also a lot of trouble from burned-out armatures and field coils and from various mechanical failures. A long step in advance was taken with the advent of the closed motor, even though ventilation was largely destroyed. Efforts to improve the ventilation of closed motors naturally followed.

As early as 1893 the General Electric Company made d.c. railway motor armatures with round, longitudinal holes and radial ventilating ducts in the core, and in 1906 a.c. motors were made with longitudinal ducts the full length of the armature, including the commutator. It was not an uncommon practice, when closed motors ran too hot in service, to partly or wholly remove frame covers or to use special covers to allow some circulation of external air through the motor. This method of ventilation, however, was not altogether effective or generally satisfactory.

One of the early G.E. self-ventilated street car motors, with positive circulation of external air, employed the series-ventilation plan with a fan at the pinion end, and an intake pipe extending out from the motor frame on the truck as far as the side of the car. It was thought that there might be some objection to taking air adjacent to the motor on account of the dust, and that the cleaner air at the side of the car would do less damage to the motor. After operating motors for some time in this way and noting that the interior of the motors accumulated practically no dust or dirt, the intake pipes were removed and the less clean air adjacent to the motors was allowed to circulate through them. After continued operation under this condition the motors appeared to be cleaner than the old types of closed motors in which the copper and carbon dust were all deposited inside the motor.

An experiment was made of setting up such a motor out of doors and directing a stream of water onto it from a hose, the stream at times being directed into the openings through the frame and frameheads. The fan blades acted to throw the water away from the armature, and while the interior of the motor at the pinion end was wetted to some extent, absolutely no damage resulted. There could be no accumulation of water in the motor since it drained off through holes in the bottom of the frame.

Under actual service conditions we have known self-ventilated motors to operate over tracks which were flooded with from 1 ft. to 2 ft. of water without the motors being damaged in any way. In the operation of such motors nothing whatever has occurred which would indicate that exceptional trouble will be experienced from water or snow. Ventilated motors have proved fully as reliable as closed motors, if indeed they are not more reliable. With very dirty streets there may be some accumulation of dust in the motor, but this can readily be blown out with compressed air. We know of no instance where dust or dirt has accumulated sufficiently to cause trouble.

The GE-203-A self-ventilated motor which employed the series-ventilation plan was first exhibited by the General Electric Company at the electric railway convention at Atlantic City in the fall of 1911. The motor attracted a great deal of attention, but there was some skepticism, which since has almost completely disappeared, as to whether the motor could be successfully operated with openings through the magnet frame. After their years of operating closed motors it was somewhat difficult to convince operating men that it was practicable to circulate air taken from the outside of the magnet frame through the motor. The large increase in service capacity secured by such ventilation was not thoroughly appreciated.

One of the early tests which was conducted to show the value of self-ventilated motors was undertaken with four motors on the Fonda, Johnstown & Gloversville Railroad between Schenectady and Gloversville, N. Y. This road runs large heavy cars, and for a number of years the cars have been equipped with four motors which weigh about 4200 lb. each. Four self-ventilated, field-control motors weighing about 2150 lb. each were substituted in place of the heavier motors and run in regular service for about two and one-half years. After an all-day service the temperature rise of the light self-ventilated motors was approximately the same as the temperature of the heavy motors of the non-ventilated type.

The ventilated motors were geared for the same maximum speed as the heavy motors. They were not favored in any way and performed identically the same service as the heavier motors. After operating 166,025 car-miles the motors were in splendid condition, thoroughly demonstrating that the light, self-ventilated motors would perform the service with entire success. The gear and pinion teeth showed but slight wear, the average wear in thickness for the pinions being 0.0457 in. and for the gears 0.0250 in. This is of special interest since the gears were untreated cast steel and the pinions were G.E. grade "F."

While the effectiveness of ventilation is especially pronounced in interurban service, where car speeds are high, in city service with low car speeds there is a partial offset due to the use of higher gear ratios and correspondingly higher armature speeds for a given car speed. The effectiveness of ventilation is a function of armature speed rather than car speed.

In some of the early investigations to determine the effectiveness of self-ventilation with longitudinal passages through the armature, temperature-exploring coils, wound with very fine wire, were placed in various locations in the armature windings, the rise in temperature of a particular spot being determined by the rise in resistance of the exploring coil. With motors ventilated in the ordinary way the hottest spot in the armature is usually under the windings between the armature and the commutator. With longitudinal ventilation it was found that the temperature under the lower part of the windings, between the core-head insulation and the windings, was as low as, or even lower than, the temperatures obtained directly under the head dressing, showing that the air passing through the armature was even more effective in removing heat than the air passing over the exterior surface of the armature. This was also found to be the case in that part of the coils lying in the core slots.

Longitudinal ventilation is particularly effective in the core, since with the multiplicity of air passages a large surface is exposed for radiation, and heat which is generated in the core and windings is conducted much more effectively throughout the core in a radial direction than in a transverse direction. Heat traveling in a transverse direction has to pass from one lamina to another through the insulation on the laminæ and the small air spaces between them caused by unevenness of surface. Investigations have shown that the heat can be conducted radially through the laminæ fully twenty-five times more effectively than in a transverse direction across the laminæ.

It may be of some interest to relate developments which led up to parallel ventilation. The first motors were designed with series ventilation. To make series ventilation most effective a large diameter of fan was required. With the increased diameter of fan it was observed that the outside surface of the fan, above the armature-core diameter and adjacent to the core, although turned reasonably smooth, tended at high velocity to drive back the air entering the motor frame at the pinion end. It occurred to the writer to make a virtue of the evil by placing radial fan blades on the surface in question, thus securing parallel ventilation and a larger volume of air, with the intake at the commutator end of the motor. This gave two parallel independent cool streams of air passing over field coils and through the armature. The effectiveness of this arrangement was found to be very pronounced.

EDWARD D. PRIEST,
Engineer Railway Motor Department.

Recent Manganese Steel Crossings

UNITED RAILWAYS COMPANY OF ST. LOUIS
ST. LOUIS, MO., April 17, 1915.

To the Editors:

Referring to the article published in your April 10, 1915, issue entitled, "Recent Solid Manganese Steel Crossings," and to the other articles published during the past year in regard to solid manganese and hard center special work, I believe it is to be expected that these failures will result in improvements in design and in foundry practice which will greatly increase its life. It is but a few years since this type of special work was adopted to any great extent and comparatively a few months since the failure of the first installations.

If, in the past year or two, solid manganese special work manufacturers have succeeded in improving the quality of metal at the intersection of the running rails to such an extent that the new pieces no longer fail at this place, it is very good evidence that they have been to a certain degree successful with their changes in design or in their foundry practice. We all hope that it will be but a short time before the manufacturers of solid manganese special work find the design and method of manufacture of special work pieces which will make it more uniform and increase the maximum life. We also hope that the study of failures of hard center special work by the manufacturers will result in great improvements in that type of special work.

C. L. HAWKINS, Engineer Maintenance of Way.

NEW YORK STATE RAILWAYS
SYRACUSE, N. Y., April 19, 1915.

To the Editors:

I was very much interested in reading the article in the April 10, 1915, issue of the ELECTRIC RAILWAY JOURNAL regarding the wear on manganese steel frogs. I have not noticed on our solid special work that the frog points are wearing much better than formerly. If the shifting of the webs farther from the frog points has a tendency to provide better metal at the points of heavy wear, it certainly is a very important step in the manufacture of manganese frogs. I believe, however, there is still a question as to whether this is so from the fact that manganese steel centers in hard center work spall off, notwithstanding that these centers have no supporting webs and are generally flat on the bottom, especially in machine bearing work. I believe that while the design of the sections used probably has considerable to do with obtaining sound metal at the points of heavy wear, the main difficulty is in the manufacture of the metal and in the heat treatment. This would seem to be borne out by the fact that special work in the same layouts, of the same design and under the same traffic, generally does not wear the same; some of the pieces spall off and some do not. It would also be interesting to note, in the frogs mentioned in the article which have been in service for three and one-half years, whether the absence of spalling at the frog points was not in a great measure due to the flange bearing, and if at the present time these frogs are still flange bearing, thus relieving the intersecting corners from the wheel blows. It would also be interesting to note, in general, under different densities of traffic, how long the solid frogs remain flange bearing. I am inclined to believe that if the flange bearing is effective for say only three years, during the fourth year when the corners get the full pound, they would probably start to spall and wear more rapidly than in the previous three years.

E. P. ROUNDEY,
Engineer Maintenance of Way.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

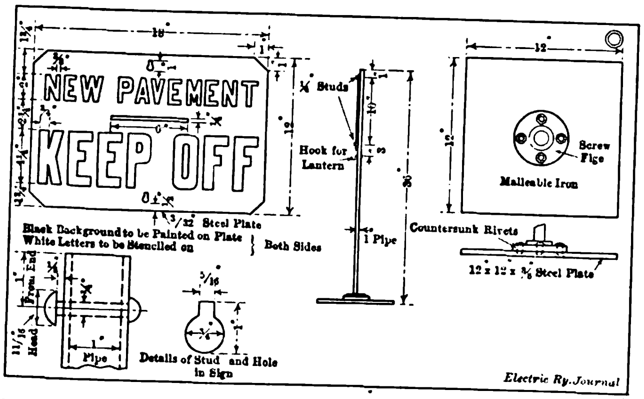
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Warning Signs to Protect Paving Work in Tracks Under Traffic

BY R. C. CRAM, ASSISTANT ENGINEER WAY AND STRUCTURE
BROOKLYN RAPID TRANSIT SYSTEM

The protection of new pavement in tracks in congested city streets is a rather serious problem, partly because car service is usually resumed immediately following the track work and the tracks cannot be effectively barricaded against teamsters during the repavement. This is especially true where team traffic is allowed on some parts of the street at all times. Watchmen are usually provided but there is a persistent tendency upon the part of teamsters to follow the tracks and to disregard the average watchman.

As a rule, there is comparatively little trouble from teaming on fresh pavement laid in the first track completed, because this can be protected by the materials along the 2-ft. strips and the space made by the opening which need not be restored immediately. Openings can be left ahead of the new pavement also, thus quite effectually preventing teams from getting on it.



ASSEMBLY AND DETAILS OF WARNING SIGN TO TEAMSTERS

It is with the protection of the paving in the devil strip and second track that most of the trouble is experienced. These areas are usually laid at the same time and promptly afford a place upon which teamsters can turn out in avoiding teams and cars, especially when the latter are operating on single track against traffic.

To assist in the protection of new pavements under these conditions a page has been taken from the police department traffic signs, which have the respect of teamsters. "New Pavement" signs, as shown in the accompanying figure, have been put into service with such good results, after a season's trial, that their use is to be continued. These signs are designed to be placed about 30 ft. apart in the devil strip. They will clear cars when carefully set. It will be noted that they are quite light in construction with detachable sign plates. They were made light largely to avoid possible car derailment troubles in case they came in contact with car equipment. There is no record of derailment due to the signs, although in the course of rebuilding 15 miles of single track, about twenty-seven out of fifty-five used during six months were partially destroyed in various ways. The signs cost about $1.10 each, exclusive of painting and lettering.

Brightening of Blackened Solder Shows Bearing Wear

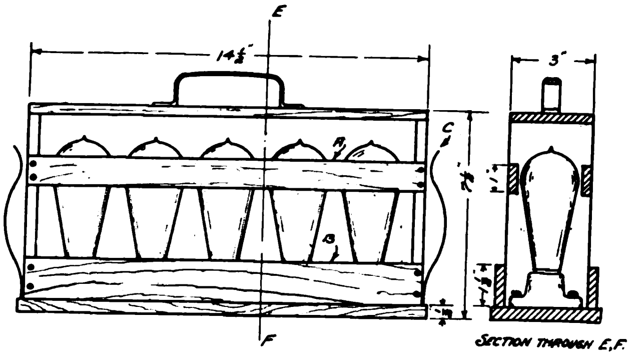
BY A. P. LEWIS, SUPERINTENDENT POWER AND SHOPS
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

An unusual method of testing armature clearance has been adopted by the mechanical department of the Cleveland, Southwestern & Columbus Railway. At the time an armature is repaired small globules of solder are dropped on the bands at several points around its circumference. These globules project approximately 1/16 in. beyond the armature core clearance line. When the daily visual inspection of motors is made through the openings provided in the shells, the armature clearance is checked by observing the condition of the solder globules. If the clearance is scant bright spots will be noted on the projecting globules, which, of course, had left the shop blackened with insulating paint. Naturally, these indications of wear on the solder call for the early renewal of the bearings.

Since the inspection plate openings are limited, it is possible that one of these tell-tale globules will not come to view at every inspection, but it is quite certain to appear often enough to satisfy the purpose.

Improved Portable Lamp Bank Holder

BY G. B. TANIS



PORTABLE LAMP BANK PROTECTED AGAINST BREAKAGE AND GROUNDING

The portable lamp bank generally used in the substations of electric railways consists of five lamps connected in series and mounted on a wooden board. As the lamps are exposed they are easily broken. The positive terminal also often comes in contact with some grounded metal, thereby causing a short-circuit.

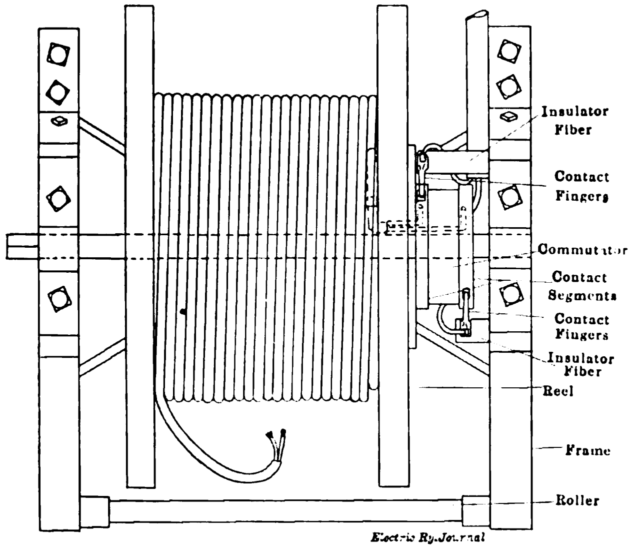
The accompanying illustration shows how these troubles have been readily overcome by placing the lamp bank in a portable wooden cage. The slat *A* protects the bulb from breakage and also strengthens the sides. While the slat shuts out some light the lamp bank is seldom used for lighting purposes, but rather for miscellaneous testing. The board shown at *B* prevents the wire and terminals from coming in contact with any undesired object. The leads, which should be about 10 ft. long, when not in use can be wrapped around the cage and fastened under the clips *C*.

Power Reel for Cars, Trucks, Etc.

BY R. H. PARSONS, ELECTRICAL FOREMAN

In many instances it is necessary to operate cars or trucks in parts of buildings or yards where power is not available; for example, on an upper floor equipped with a transfer table but without trolley wires or channel rails, or in shops where the cars are jacked up and the trucks moved elsewhere for overhauling.

The following paragraphs describe a reel whose conductor is made alive, embodying such construction that the wire can be fed out as the car or truck leaves the transfer table or elevator, and which can be wound up as the vehicle is drawn in. In this way loose cable is prevented from sliding around the floor, and time is saved in handling the equipment.



Electric Ry. Journal

FIG. 1—TOP VIEW OF REEL

The reel is a simple drum of the style furnished by wire companies to transport cable. It is fitted with a dummy commutator which is turned from dry, hard wood and fastened to the side of the reel. This commutator has two full circle segments, placed about 5 in. apart, and to these segments the wires from the inside of the drum are connected. On the segments rest two controller-like fingers which conduct the current from the source to the reel. The segments on the commutator, acting like collectors on a generator, are in contact in any fixed or moving position of the drum because both the commutator and drum turn on a common shaft. The reel and commutator are fastened to the shaft with ordinary pipe flanges, which are pinned to the shaft and held to the reel with wooden screws. The end of the shaft is finished square to permit a crank to be used for winding up the cable.

The whole outfit is set on a frame of ½-in. x 2½-in. iron, with the bearings forged as a part of the frame. Neither the speed nor the weight of the reel demand micrometer fitting bearings, the main point being to add a little oil once in a while.

On the side of the reel from which the cable is drawn are placed two brackets (attached to the frame) and a wooden roller over which the cable runs when it is drawn out. The roller is shown connected to a transfer table, but it can be just as readily connected to the main trolley of the shop.

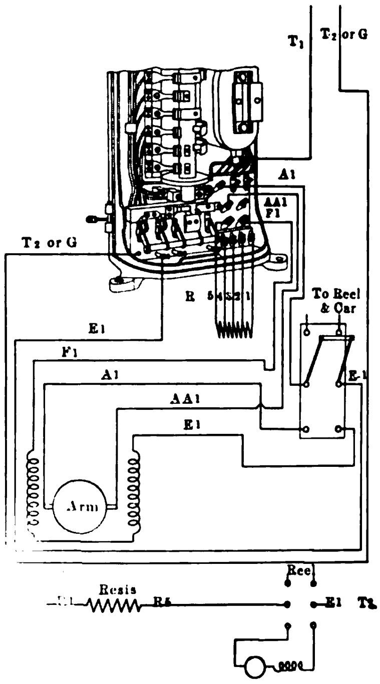
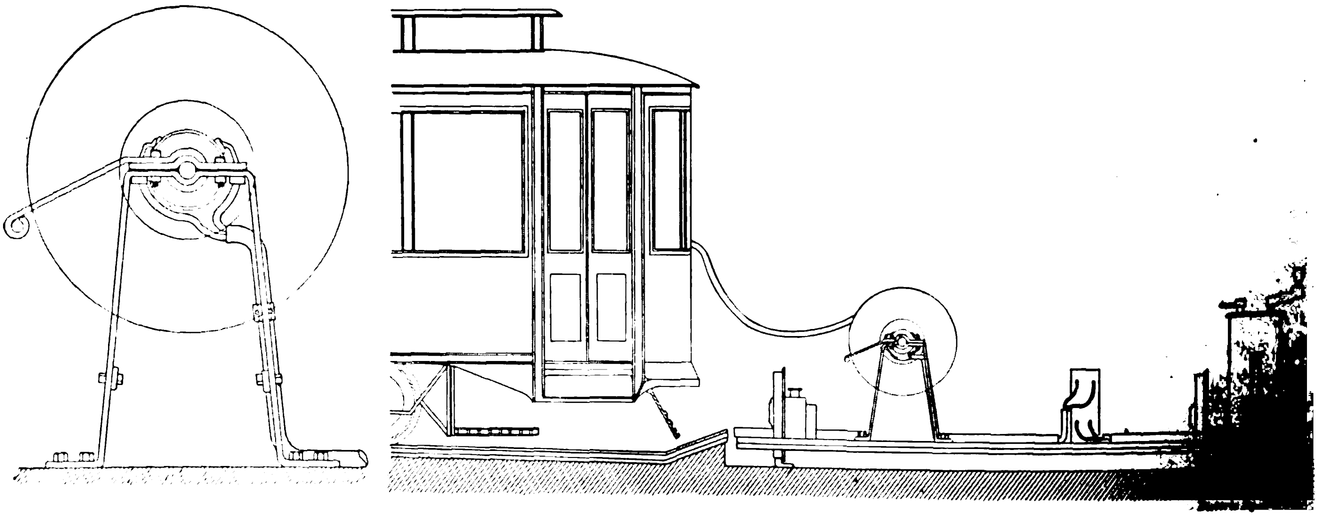


FIG. 4—WIRING CONNECTIONS TO A K-8 CONTROLLER

Connection direct to the trolley would be in order if only fully-equipped cars were used. In that case cable connections could be made to the controllers of the car, and the resistors of the car would protect the motors. However, a controller and resistors are necessary when trucks with motors only are handled, or cars on which the motors are not connected to the car wiring. By the use of a double-throw, double-pole switch the controller and resistors of the transfer table may be utilized, thus combining the feature of convenience with safety: first, by making it impossible to move the transfer table when current is supplied to the car;



FIGS. 2 AND 3—SIDE VIEW OF REEL; GENERAL ASSEMBLY WHEN TRANSFER TABLE CONNECTION IS USED

second, by making it impossible to run the car when the motor of the transfer table is energized.

The accompanying wiring diagram shows the connections, which are so arranged that with the double-throw switch in one position, the motor of the transfer table receives energy through its proper resistance steps; while in the other position of the switch the same controller and resistors are used to supply energy to the motor of the truck through the reel and cable.

As but two leads are run from the reel to the motor on the truck to be moved, it is necessary to tie an armature and a field lead of the motor together and the leads from the reel must be connected to the other armature and field leads of the motor.

In conclusion, it may be noted that as this device permits very little dragging of the cable over the floor, the liability of fire from short-circuited wires is greatly reduced.

Track Work by Contractor or Way Department?

BY S. GAUSMANN, BROOKLYN, N. Y.

Many arguments may be advanced both for and against contract work in the laying of surface track. Some roads consider contract letting more economical, while others believe that future maintenance is appreciably increased if the track work is done by outsiders.

The principal reason usually offered in favor of contract work, and one advanced by contractors, is that a contractor can do the work cheaper because he has not so large an organization to maintain as the railway. However, in practice it will be found that in proportion to the work to be done the fixed charges of the railway are no greater and certainly no more than those of a contractor. Of course, for small roads with no efficient track organization, the laying of track by contract is economical and advisable; but this cannot be said of roads that have a competent track organization of this character, unless the head of that department is hampered in one way or another by the executive.

A railway organization which undertakes construction in addition to maintenance work is at times limited by the necessity of employing for construction work men who are not the most competent for the purpose. For example, on some properties a number of the men may be partly superannuated, being kept on the payroll for lighter service, while on others men may be retained because of political conditions. On the other hand, a contractor is freer to go out in the open market to pick the men best suited to the job in hand. Moreover, since the term of employment is indefinite he will usually pay the men a higher rate than a railway which plans to keep men on the payroll the greater part of the year.

With such restrictions it is difficult to retain a competent force, especially if the men are obliged to work with contractors' men, who often receive better wages.

Furthermore, when it would be advantageous to employ, say, fifty or more men on a job, no more than twenty-five may be available because the remainder of the force is required elsewhere. An insufficient number of men on a track job simply increases the amounts to be paid corporation inspectors, watchmen and others, to say nothing of delaying the car traffic by holding back the work.

A contractor does not have to contend with such conditions. He employs as many men as he can work on the job efficiently; he pays them such rates as they are entitled to get because of the character of the work and their ability; and he keeps them busy each day for whatever number of hours he thinks will bring the best results.

I do not mean that the head of the way department should be the sole judge of expenditures, but he should be permitted to pay rates consistent with the work the men do and to add something for long and able service. Where a system of this kind is in vogue under a capable head track work can be done for less by the company forces than by the contractor.

Many contractors who bid on track work fail to take all the conditions into consideration, although the specifications may be plain enough, with the result that their bids are less than the department estimate. Such bids give the general manager a wrong opinion of his own way organization. The proof that the bid was too low will come when the same contractors bid on a similar piece of work. Then their bids will exceed the department estimate. Even an experienced contractor seemingly may underbid an efficient way organization, but in reality he is likely to be higher because the railway is still obliged to pay for municipal inspection and also to furnish its own inspectors to check the contractor. The latter charge, of course, is absent when the company does the work itself.

Another disadvantage of letting out work, which may be overlooked because it is indeterminate, is that other jobs will cost more because nothing must be done to delay the contractor. This means that the company forces often must neglect and delay their own work to satisfy the wants of the contractor in order to forestall his demands for "extras" because of alleged delays and interference.

New Track Construction by Contract

While the reconstruction of track by contract is not good policy, there are various reasons why it is advisable to employ contractors on entirely new work. The contractor, for example, has better means for disposing of excavated material and for handling paving, as mentioned later.

Many points must be watched closely where track work is done by contract, especially when a contractor realizes that he is losing money. The men selected to inspect his operations should thoroughly understand each step of the work. They should not be employed simply because they can read and apparently comprehend the specifications, as the latter are too often so finely drawn that it is not always practicable to obey them to the letter. In such cases an experienced man with sound common sense is worth more than a bookish, inexperienced one.

Inspectors should also follow closely the protection of the street, especially at night. This precaution usually receives the least attention from contractors, insufficient lights and few watchmen being the rule. While this feature might appear to be fully covered by accident and liability insurance, many cases of injuries to pedestrians, etc., will not come up until long after the contractor has been released of his obligations. Then the company will have to defend these actions or else spend money in litigation to place the responsibility where it belongs.

Another important point to cover is to make the contractor responsible for all operations instead of having a certain part cared for by company forces. For example, if a contractor is competent to do track work generally he should be competent to take care of such special operations as compromise connections to old track or special work. Exceptions usually prove unsatisfactory to all concerned and are especially costly to the company when it is obliged to shift men to meet the contractor's wants, even though its men may be on work of more importance. If the company men do not come immediately the contractor has another plausible claim for "extras."

The important operation of tamping is one generally slighted by the contractor, either intentionally or because he lacks competent men. Unless followed closely the contractor considers that "once over" is enough, and even this process is carried on an insufficient distance ahead of the concreting. This plan may be satisfactory in some soils when done thoroughly and by well-drilled men, but the contractor's tampers rarely are men of that type.

Careless tamping will sometimes develop immediately after the paving is completed. While the contractor can be obliged to remove and do the work a second time, the result even then may be a loss of cement and other materials. Matters are still worse if the poor work does not show itself within a year or two, for by that time there is no chance for redress.

Kinds of Work Done Cheapest by Contract

A company that does its own work will find that a few operations usually can be done cheaper by contract, particularly the delivery of material and the disposal of refuse material and paving. Much depends, however, on the nearness of the supply yard or dump to the job, whether or not cars are available and what departmental charges are made for the use of cars.

A reasonable price for disposing of the excavated material can usually be obtained from some contractor, as he may be able to reach with wagons a near-by dump that is not accessible to cars; or else the contractor has some fill close by where he can use the material to advantage.

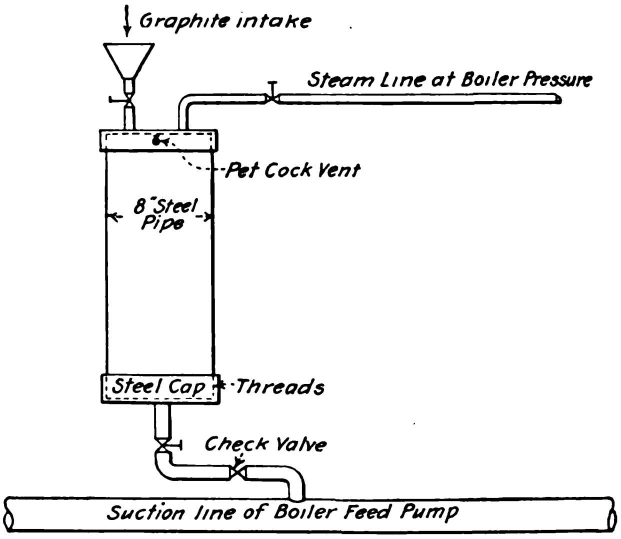
More definite prices also can be obtained by contract for paving work, either with or without material, for a contractor will do such work on a straight yardage basis at a cost lower than that attainable by a railway.

Fallacies in Lowest Bid and Percentage Basis

In awarding any contracts for track work the ability of the bidder rather than the amount of the bid should receive more consideration. The lowest bidder, for example, may be the one who has had no experience whatever in this line, so that his work would require much more rigid and costlier inspection. Again, under no consideration should contract work be done on a percentage basis. This is a very expensive method, unless a limit is set on the cost per foot. While the percentage contractor would do better work, his charge would exceed what the company would spend to do the same job equally well with its own forces. From a cost standpoint the most satisfactory results are obtained by fixing the price at so much "per foot of single track."

Dispensing with the Unsightly Copper Oil Can

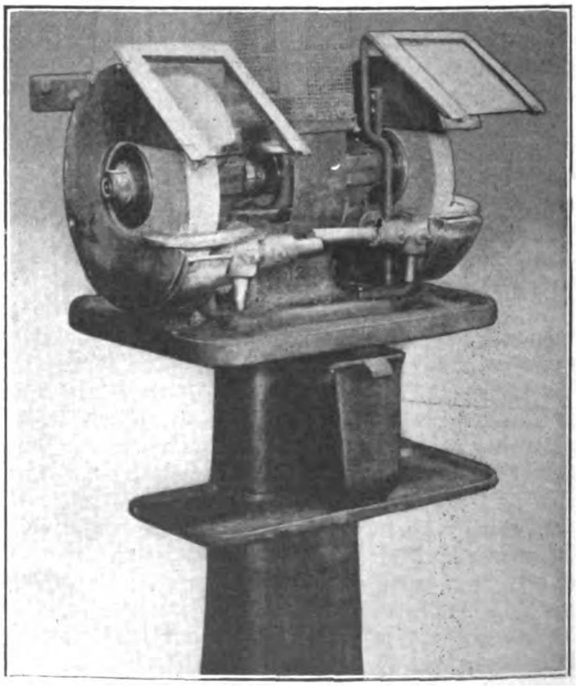
Cylinder lubricators on the engine-driven auxiliaries in the combination lighting and railway power plant of the Terre Haute, Indianapolis & Eastern Traction Company at Terre Haute, Ind., are all fed from a central oiling system. There are in the station seventeen duplex pumps, three single-acting pumps, four dry-vacuum pumps and four circulating pumps. On none of these units does the visitor to the station see a cylinder oil can. Instead, however, he will observe small, neatly-installed pipe lines leading from an oil header to each cylinder lubricator or sight-feed oil dropper. Tracing the oil header back to its origin, there will be found a home-made 5-gal. steel tank which, at all times except when it is being filled, is kept under 110-lb. pressure by live steam. The arrangement of the piping at the tank is shown in the accompanying sketch. H. E. Smith, chief engineer at the plant, designed the oil system to reduce the waste of oil and the inconvenience of filling such a large number of lubricators. According to his statement, the apparatus has not only proved entirely successful from the standpoints of economy and convenience, but has aided greatly in keeping the station auxiliaries "looking spick and span."



LAYOUT FOR DISPENSING WITH OIL CAN

Goggles on the Grinder Instead of on the Man

It is one thing to give shopmen protective devices and another thing for the men to make use of them. Thus the New York State Railways, Syracuse Lines, ordered the operators at the emery wheels to wear safety goggles, but the goggles were found hanging on the wall more often than on an operator's nose. Some thought was given to the matter with the result that the goggles, so to speak, were attached to the tool. These "goggles," as the accompanying halftone shows, are

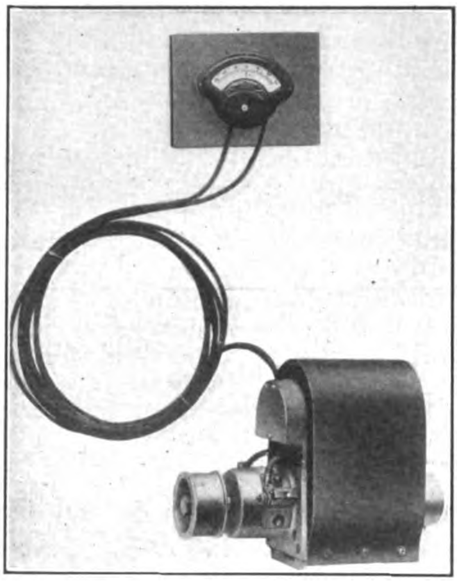


EMERY WHEEL GRINDER WITH PLATE-GLASS WINDOWS nothing more than rectangular pieces of framed plate glass. These are installed on the tool in such a way that they serve as windows, through which the operator can see in safety the progress of grinding.

An Electrical Speed Indicator

The Esterline Company, Indianapolis, Ind., has placed on the market a new electrical speed indicator, consisting of a specially-constructed magneto-type generator and a high-grade electrical indicating instrument. The generator is so constructed that the voltage developed by it is directly proportional to the speed at which the armature is driven, and a voltmeter connected to the terminals of the generator indicates, therefore, the true speed of the device to which the generator is coupled. This device has the advantage that the indicating instrument can be located a long distance from the generator and can be placed where it is not affected by vibration, heat, etc.

The generator is designed especially for speed-indicating purposes. The armature rotates on ball bearings of large size, and both bearings are fully housed in dust-tight, oil-containing compartments, so that they will run for months without lubrication or attention. The compartment wall on the commutator end prevents oil from the bearing getting on the commutator and keeps worn particles of the commutator and brushes from getting into the bearing.



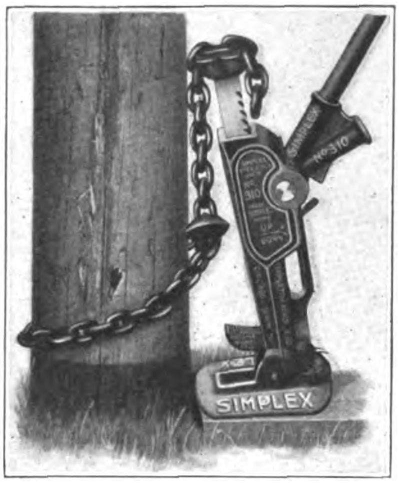
ELECTRIC SPEED-INDICATOR—BELTED FORM OF GENERATOR COMPLETE WITH LEADS AND METER

The electrical instruments have D'Arsonval movements mounted in cases that sheathe them against magnetic fields. They are absolutely dead beat, and the moving elements are purposely made light in weight so that they are not affected by vibration. Each instrument has a zero adjusting device. The instruments can be furnished calibrated to read in any one of the number of different ranges of speed, for revolutions per minute, miles per hour, etc. The makers state that tests of the instruments, extending over a period of one year, show that they are very permanent in the calibration and accurate in their indications.

The rugged construction of the generators enables them to be mounted where there is excessive vibration, such as on steam locomotives, street railway cars, steamships, printing presses and moving machinery, and they can be driven either by direct connection to shafts or by means of belts or silent chains. In consequence the new device is applicable to the measuring of speed of any rotating or moving body to which the generator can be applied, and it has, in fact, been successfully adapted to many industrial uses.

A New Type of Emergency Jack

An industrial emergency jack embodying several entirely new features to give it the flexibility necessary for lifting and pushing at the various angles, has just been put on the market by Templeton Kenly & Company, Ltd., 1020 South Central Avenue, Chicago, Ill. This is known as Emergency Jack No. 310 and is shown in the accompanying illustration. It is built for 15 tons capacity but has an ample factor of safety and is so constructed that it may lift or push at any angle between 30 deg. and 90 deg. from the horizontal. By releasing the dog which normally holds the frame rigidly in a vertical position on the base, the head of the jack may be revolved to any angle within 60 deg. from the vertical. This head is pivoted on the base which has machine-fitted vertical lips so that the frame fits snugly, and the base, instead of the trunnion, takes the thrust. A cold-rolled steel pin holds the base and frame in position and serves as the pivot. To provide ease in lifting or pushing at the various angles the jack is made with two handle sockets, one to be used when the jack is in the fixed vertical position and the other in the extreme angular position. These sockets are supported on heavy trunnion bearings at the fulcrum point.



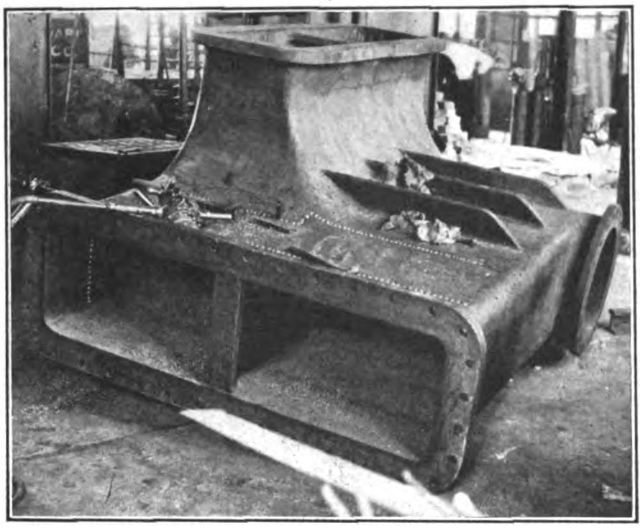
EMERGENCY JACK

A recessed chain cap is another feature which gives the jack flexibility under various working conditions. The function of this is shown in the accompanying illustration. It provides also for a heavy detachable shoe which is employed to lift loads that cannot be handled by the cap or by the foot at the base of the rack bar. The flexibility given by the pivoted base and the recessed cap increases the jack's utility in pulling or straightening trolley poles, in wrecking, in pushing obstructions from the track, or in setting heavy machines or boilers, and, in addition, the jack may be employed as a combined crane and jack. The standard equipment includes 5 ft. of heavy chain and a 5-ft. lever bar and car mover combined. It is interesting to note that the Simplex jacks, of which this is one, recently were awarded the gold medal by the American Museum of Safety.

The chief engineer of the Public Service Commission for the First District of New York has been authorized to invite bids for the reconstruction of station platform edges in the Fourth Avenue subway, Brooklyn, so as to provide for the operation of the new steel cars purchased by the New York Municipal Railway Corporation. These cars are wider than the old subway cars, and thefore a considerable amount of reconstruction in the platform is necessary for their accommodation.

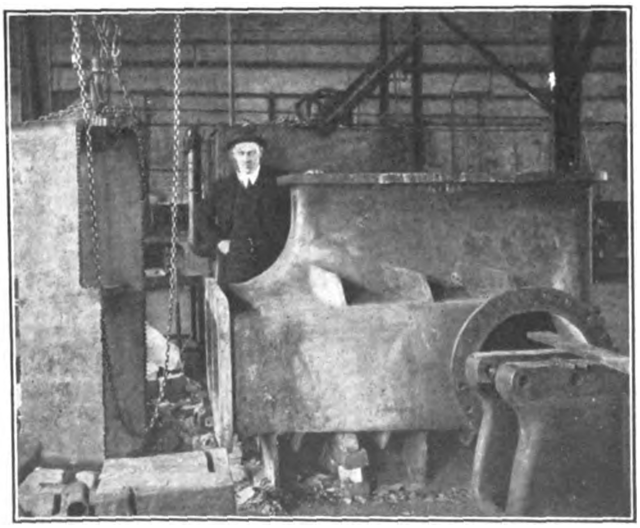
An Unusual Oxy-Acetylene Weld

Recently the Oxweld Acetylene Company of Chicago had occasion to make a weld on a 7600-lb. casting which served as a connection between the exhaust outlet of a steam turbine and the inlet of its condenser. Owing to changes in the plant in which this was to be used it was necessary either to shorten the casting 18 in. or else to obtain an entirely new one, and it was decided to accept the former alternative by removing a section from the casting and welding the flange in place again, although to make a weld on so large a casting it was necessary to ship it to the Oxweld Company's shop in Chicago.



CASTING PARTIALLY CUT BY DRILLING

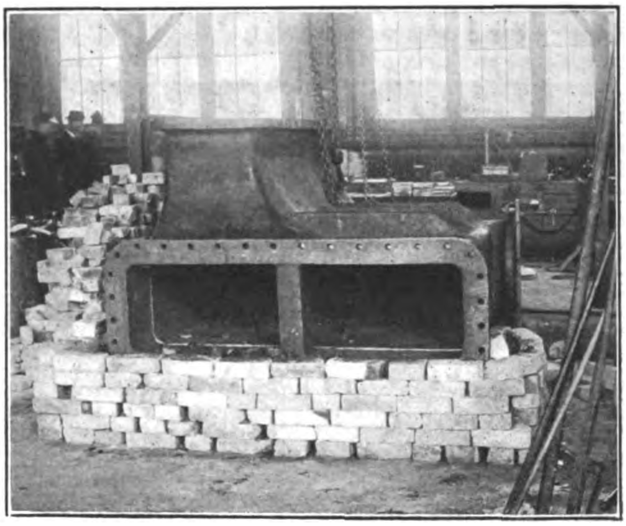
In one of the accompanying illustrations the casting is shown with the 18-in. section partially cut out by drilling. An electric hand drill was used for this operation because it is impossible to cut cast-iron with the oxy-acetylene cutting flame. After the section had been removed and the flange moved up against the main casting to close the 18-in. gap, a temporary furnace of brick was constructed partially around the casting. During the welding operation a charcoal fire was maintained in this to preheat the metal, and the heat was continued until the weld was finished. The furnace and the work were covered with asbestos sheets which were removed only to expose that portion actually being welded in order to maintain the casting at a uniform temperature.



VIEW SHOWING FINISHED WELD AND SECTION THAT WAS REMOVED

Probably the greatest difficulty experienced with a weld of this size is to overcome distortion, but this method of preheating and retaining the temperature in the casting solved the problem. Four men worked continuously at the welding process, completing it in thirty-six hours.

The success attending this job is indicated by the smoothness of the welded portion shown in the illustration of the completed weld, no attempt having been made to finish the work before it was photographed. In fact, it was practically impossible to distinguish the line of the weld around the body of the casting. It is roughly estimated that the value of the casting was $300, and to have procured a new one would have taken at least twenty-five days. The time actually required to cut the casting was three days. The welding took one and one-half days more, and transportation to and from the plant consumed one week.



CASTING IN TEMPORARY REHEATING FURNACE

Minor Economies on Small Roads

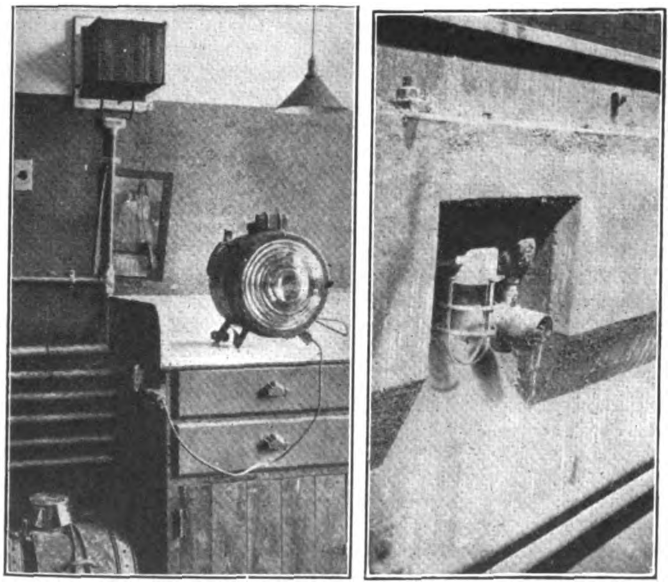
Strictly speaking there are no minor economies in electric railroading, in view of the small units into which income is subdivided. Among the lesser methods of saving money on the line, in the shop and carhouse, however, are many which are the result of experience, and they all count in the net earnings. Thus one company operating about six cars normally, and twenty-one on pleasant Sundays and holidays, totaling seventeen days yearly as a maximum, generates its own electric power in a 350-kw unit in the former case, and buys extra power from an adjoining system when the peaks come. Fixed charges are much lessened in this way, and if the purchased power should cost a little more than it would if generated in the local plant, the yearly balance is in favor of this plan, for to equip a small road with a power station based on the extremes of seventeen days each year, when reliable service can be purchased without undue expense, would be unwise.

On the same road a dual system of carshop lighting is in vogue. The power station contains a 187-kw, belted generator, but even this machine would be run very inefficiently to supply the night lighting required after car service ceases. Energy is purchased, therefore, from a local central station system at a total cost of about $2 per month, and about twenty outlets in shop and pits are wired for this service with multiple incandescent lamps, the ordinary lighting being by the usual groups of five lamps in series off the trolley circuit. The scheme is far more economical than an attempt to supply the shop lighting from the power house of the railway. Incidentally it permits the heating of the carhouse offices by means of a luminous electric radiator in chilly weather. By locating this heater some 10 ft. below the pits, the company was able to get along without the use of steam traps in returning condensation to the boiler. Thus a carshop 150 ft. by 60 ft. in size is heated even in cold weather from a 35-hp boiler delivering steam at a pressure of a pound or two per square inch, compared with 10 lb. or 12 lb. which would have been necessary had a trap been used. The difference in coal consumption is considerable.

Shop Kinks at Holyoke

The recently completed carhouse and repair shop of the Holyoke (Mass.) Street Railway has been provided with a number of handy equipments for saving time and labor, among them being a well-arranged bench for the repair and cleaning of electric headlights which is shown in an accompanying illustration. The work is done on a galvanized-iron shelf on top of a tool and supply cupboard 3 ft. 2 in. high, 4 ft. long, and 2 ft. 2 in. wide. A permanent resistance is mounted against the shop wall on an asbestos-covered panel, the wiring being in conduit. The positive lead for a headlight test is carried to a receptacle at the side of the bench and a plug connection is provided for the lamp undergoing inspection. The metal cover of the bench is grounded and a lower shelf at the right (not shown in the photograph) facilitates cleaning. The drawers are provided with sheet copper partitions and furnish convenient storage for coils, carbons, globes and other parts.

In the carhouse pits the lighting is supplemented by a receptacle and switch, making it unnecessary for the usual recessed lamp to be unscrewed and laid aside when the maintenance force or the car inspectors desire to use a portable lamp underneath the car body. As illustrated, each recess lighting unit consists of a 16-cp incandescent lamp, and a snap switch in series with it, a receptacle wired in conduit being connected on a shunt around both. When the switch is closed the fixed lamp is thrown in circuit, and when it is opened the fixed lamp is cut out, the usual series circuit then being shunted through the receptacle, plug and portable lamp. A metal guard protects the snap switch from oil and mechanical damage.



HEADLIGHT TEST BENCH; SWITCH FOR FIXED OR PORTABLE LAMPS IN PIT

To facilitate locating early morning cars, there is provided an assignment board in the new carhouse which gives the car number, time out, the bay and track location for each run, as illustrated. Both regular and extra cars are listed, the latter with the names of conductors responsible for the starting of each trip. In a large carhouse with seven bays and three long tracks per bay it is a decided convenience to be able to proceed to the exact location of the car without consulting a starter as soon as a crew reports for work. The board is supported on 1⅛-in. x 3/16-in. strap-iron brackets and is carried about 6 ft. 6 in. above the carhouse floor.

LINE
Springfield
Northampton
Highlands
EXTRA'S
LINE
LINE

BOARD FOR LOCATING ASSIGNED CARS IN CARHOUSE; CABINETS FOR SMALL STOCK

A departure from the usual stockroom facilities also is found in the provision of 549 metal drawers specially designed for the storage of small fittings. These drawers are mounted in tiers as illustrated, a standard group of eighty-one 3½-in. x 6-in. x 3¾-in. boxes occupying a space only 3 ft. long, 4 ft. high and 6 in. deep. Each box is provided with a metal handle of ½-in. radius, spot-welded to the front, and a card carried in a clip rack at the front gives the title of material in each case. Each drawer also carries within a 3-in. x 5½-in. stock card, on which is kept an accurate record at all times of the material received and issued, with the dates.

Accident Record of the Louisville (Ky.) Railway

The accident blue-print of the Louisville (Ky.) Railway for March of this year showed the following as to miles covered per accident report on the first seven lines of the system: Oak Street, 10,969; Twelfth and Fifteenth Streets, 4554; President Street, 3320; Sixth Street, 3183; Portland and Shelby Streets, 3053; Broadway, 2740; Seventh and Brook Streets, 2553. Comparisons of the information reports on several of the lines show mileage on Oak Street increased this year from 6042 to 10,969, for each report; the Portland and Shelby line compares as 1736 to 3053. Ten lines showed improvement for March of this year over March, 1914. Eight of the lines showed less favorable records this year than last, the discrepancy in this direction being sufficient to make the average for the eighteen lines 2623 miles per information report in March, 1914, against 2465 miles for the same month this year.

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Indiana.—Crossings Over Interurban Right-of-Way.

Where a conveyance of a right-of-way to an interurban railway company required it to establish a crossing for wagons at or near a crossing at the foot of a hill, the covenant does not obligate the railway company to establish a crossing different from that which landowners are authorized to demand under Burns' Ann. St. 1914, Sec. 5711, and hence such covenant will not be specifically inforced—the statute giving the landowner a plain, adequate remedy at law in case of the railway company's refusal. (Indiana Union Traction Co. et al. v. Seisler, 106 Northeastern Rep., 911.)

Iowa.—Statutory Signals at Crossings Applying to Steam Railroads Must be Given by Interurban Cars.

Under Code Sup. 1907, Sec. 2033b, the words "railway," "railway company," "railway corporation," "railroad," "railroad company" and "railroad corporation" include "interurban railways." Hence interurban cars, when approaching highway crossings, must give the statutory signals. (Landis v. Interurban Ry. Co., 147 Northwestern Rep., 319.)

Maine.—Freight Is Not Additional Servitude, but Turnout Is.

For a street railway authorized to carry freight to transport it in ordinary railroad cars imposes no additional servitude on the highway.

A street railway, though authorized to use a street for the purpose of carrying persons and property, is not authorized to construct a turnout in the street to use for switching cars, for the public rights in the street are paramount. (Percy v. Lewiston, A. & W. St. Ry., 93 Atlantic Rep., 43.)

Massachusetts.—Right of Husband to Consequential Damages.

Unless the wife herself can recover for personal injuries suffered, the husband cannot recover for his consequential damages. (Jackson v. Boston Elevated Ry. Co., 105 Northeastern Rep., 379.)

Washington.—Abandonment of Parallel Line Cannot Be Enjoined.

The abandonment of an electric railway line closely parallel to a new line adequate to handle all business could not be enjoined on the ground that persons accessible to both roads would thereby be deprived of competitive service, though there had been no legal consent to the abandonment, as the purpose of the public service commission law (Laws 1911, Chap. 117) is to require adequate and safe service at a reasonable price and without discrimination, and its whole theory is opposed to the idea that the public will be better served by two parallel lines where one road will amply suffice. (Day et al. v Tacoma Ry. & Power Co., 141 Pacific Rep., 347.)

LIABILITY FOR NEGLIGENCE.

Alabama.—Duty to Passengers—Degree of Care Required.

The law is correctly stated by a charge that a carrier of passengers, by street car, owes to its passengers the duty to exercise the highest degree of care, skill and diligence known to very careful, skilful and diligent persons engaged in like business, consistent with the practical operation thereof. (Birmingham Ry., Light & Power Co. v. Scisson, 66 Southern Rep., 2.)

Arkansas.—Injury to Passenger Rising Before Car Stops.

Failure of a street car passenger to comply with a notice to passengers to remain seated until the car stops is insufficient to charge the passenger, injured as the result of the alleged negligent operation of the car, with contributory negligence as a matter of law, but such omission being only of fact, which, considered with other facts, should be considered in determining the issue of contributory negligence. Robinson v. Little Rock Ry. & Electric Co., 168 Southwestern Rep., 1126.)

Kentucky.—Injury to Passenger Rising Before Car Stops.

Conductors on street cars are under a duty to exercise care to protect passengers from dangers arising from the passengers' negligence or thoughtlessness and must not knowingly permit them to be injured, if by the exercise of ordinary care they can prevent it. Where an elderly woman passenger, after signaling for the car to stop, left her seat, and went to the rear end of the car, passing immediately by the conductor, who knew the car was in motion, it was his duty, if he knew that she intended to get off, to warn her of the danger or to try to prevent her alighting. (Paducah Traction Co. v. Tolar, 171 Southwestern Rep., 1009.)

Maryland.—Look-and-Listen Rule Applicable to Automobiles—Warning Signs Not Always Necessary.

Since the development of automobiles, the look-and-listen rule is peculiarly applicable, and plaintiff, who ran his automobile at a speed of 10 m.p.h. onto a crossing of a suburban line, though he could not see approaching cars and was unable to hear them because of the noise of his own machine, is guilty of negligence barring recovery.

Though an electric railroad did not comply with Code Pub. Civ. Laws, Art. 23, Sec 280, requiring signs at crossings, a traveler injured in a collision cannot recover on that ground where he knew of the presence of the road. (Glick v. Cumberland & W. Electric Ry. Co., 92 Atlantic Rep., 778.)

Massachusetts.—Negligence May Be Imputed to Child Six Years Old.

Where plaintiff's intestate, a boy nearly six years old, started to run across a well-lighted street with a rapidly approaching street car in plain sight, well lighted, and so near that it struck him when he reached the middle of the track, resulting in his death, and there was no evidence that he looked or listened or exercised any care at all for his own safety, a directed verdict for defendant was proper, for even a boy of his age must use such care as he is capable of. (Kyle v. Boston Elevated Ry. Co., 102 Northeastern Rep. 310.)

Massachusetts.—Injuries to Passenger Stepping from Platform Into Car.

The action of the conductor in giving the starting signal when a robust, healthy woman thirty-seven years old had her left foot on the floor of the body of the car, resting her weight on it and was in the act of raising her right foot from the vestibule floor, was not actionable negligence, though he placed his hand on her back, and where the movement of the starting of the car was only the ordinary movement, she may not recover for injuries by falling. (Saunders v. Boston Elevated Ry. Co., 103 Northeastern Rep., 780.)

New York.—Passengers, Before Ejectment, Must Have Opportunity to Pay Fare.

A street car passenger, offering an invalid transfer and ejected before having a reasonable opportunity to pay his fare, may recover for his ejection. (Zuckerman v. New York Rys. Co., 148 New York Sup., 82.)

Pennsylvania.—Tort by Servant.

Where one of defendant's servants, a strike breaker, was struck by a stone thrown by an unknown person, and he got off the car on which he was riding, but on which car he had not been assigned to duty, with a revolver in his hand, and fired on young men walking along the street and hit plaintiff, defendant was not liable, there being no evidence that he was in defendant's employ as a special police officer, or that the revolver had been given him by defendant. (Christian et al. v. Philadelphia Rapid Transit Co., 90 Atlantic Rep., 645.)

Pennsylvania.—Company Not Responsible for Injuries to Infant.

In an action to recover for injuries to an infant by taking hold of a copper wire charged with electricity, a nonsuit is properly entered, where he had found in the street a spool of copper wire not belonging to defendant, to which he attached a stone and threw it over defendant's uninsulated feed wire and was injured by taking hold of the wire. (Green v. West. Penn Rys. Co., 92 Atlantic Rep., 341.)

South Carolina.—Reasonableness of Transfer Regulations.

A street car company whose regulations required persons holding transfers to take the next succeeding car at the point designated was justified in refusing transfers of passengers boarding the car at about 100 yards from such point and in demanding fare from them, and, on their refusal to pay, was not liable for their ejection. (Taylor v. Spartanburg Ry., Gas & Electric Co., 82 Southeastern Rep., 404.)

News of Electric Railways

THE DETROIT PURCHASE

Negotiations Are Begun on a New Basis for Purchase of Lines by the City

Following a refusal of the Detroit (Mich.) United Railway to accept an offer from the Detroit Street Railway Commission to have the city assume bonded indebtedness of the company to the extent of $23,285,000 in exchange for the lines of the company within the one-fare zone, a new plan for the acquisition of the property by the city is now in process of negotiation. The refusal of the commission's offer by the company followed upon the withdrawal of the first offer of the commission to assume bonds to the extent of $24,900,000 and the substitution of a second offer that eliminated from the price $1,715,000 of bonds now held in the company's treasury.

The plan now proposed and tentatively agreed to by both sides is that the price of the lines shall be set by the circuit judges of Wayne County sitting en banc as a court of chancery, with a right to appeal to the State Supreme Court by either party in the event of dissatisfaction with the award. To accomplish this plan the Street Railway Commission proposes the submission of the question of municipal ownership of the lines to the electors with the amount to be paid left blank on the ballot, the purchase price to be filled in later in accordance with the determination of the circuit judges. A three-fifths majority is required before this plan could go through.

J. C. Hutchins, president of the Detroit United Railway, in a letter to the commission declining the commission's second offer stated:

"The price so proposed is so much less than the value of the property involved that the board cannot recommend acceptance of such amended proposal by the stockholders. The board reaffirms its willingness to sell this property at the price offered by the Street Railway Commission in its original proposal under date of Feb. 23, 1915, namely, $24,900,000, notwithstanding that it regards this price as inadequate."

Upon the receipt of this letter, which followed an adjourned meeting of the company's stockholders held on April 28, the commission called Mr. Hutchins and F. W. Brooks, general manager, into conference, at which the idea of having the price set by the circuit judges was proposed and tentatively accepted. It is planned to have attorneys for the city start immediately upon the draft of a contract which will be the basis of further negotiations between the company and the commission.

CLEVELAND EXPENDITURES APPROVED

At its regular meeting on April 3 the City Council of Cleveland, Ohio, approved the following expenditures to be made by the Cleveland Railway: for an operating station at Denison Avenue and West Seventy-third Street, $100,000; tracks and overhead work at the same point, $80,000; shops at Harvard Avenue and East Forty-second Street, $100,000; carhouse at Harvard Avenue and East Fifty-fifth Street, $99,500.

At the same meeting the committee to which the matter had been referred authorized the acceptance of the franchise passed by the City Council of Lakewood recently. It is possible, however, that this ordinance may be subjected to a referendum vote.

The Cleveland Railway has asked its employees to suggest plans for collecting fares on the Detroit and Clifton Boulevard lines, passing through Lakewood, after the new ordinance goes into effect. The fare is to be 3 cents within the city of Lakewood and 5 cents between any point in Lakewood and any point in Cleveland. It is also believed by some that this ordinance is the beginning of the zone system of fares in Cleveland, as Lakewood, while it is not now a part of Cleveland, seems likely eventually to be annexed to the city. Another section within the city limits is paying 8 cents. This is the Euclid Village section, and cars must pass through East Cleveland, an independent municipality, to reach it.

PHILADELPHIA LOAN CARRIED

The $6,000,000 loan to be used to start construction of the high-speed rapid transit lines planned by Director of City Transit Taylor was passed at the special election held in Philadelphia, Pa., on April 29. The vote for the loan was 85,992 and against it 8772. Following the announcement of the result Mr. Taylor made public a statement in part as follows:

"The question of transit development has been placed clearly before the people of Philadelphia, and their decision with relation thereto has been rendered in such an emphatic manner that there should be no delay in starting construction. I am most grateful to all who have contributed to this splendid indorsement of the plan for transit development, and thus secured the prompt establishment of the much-needed facilities."

The ordinance of Councils authorizing a special loan election and fixing the amount of the loan specified that the money was to be used to construct a subway in Broad Street, from League Island, to Olney Avenue, with branch lines northeast and northwest from Broad Street and an elevated road from Front and Arch Streets to Rhawn Street. It remains with Councils to say which of these lines shall be started first. The Philadelphia Rapid Transit Company, under the contract entered into by it with the city, has ninety days in which to signify its attitude toward the construction and operation of the lines.

LABOR INVESTIGATION AT SPRINGFIELD

The Massachusetts Board of Arbitration has assigned a public hearing for May 12 at Springfield for an open investigation of the points at issue between the Springfield Street Railway and the local branch of the Amalgamated Association. Numerous conferences have been held recently by the board with the officials of the company and with the union representatives, but the company has refused to reinstate the three conductors discharged for irregularities in accounts, which cases have formed the basis of contention on the part of the men. In the conferences with the board the union first proposed that the two discharged men longest in the service of the company be restored to their positions and that the third man be reemployed as a motorman. It was then proposed that the senior in service be put back as a conductor and the other two as motormen. The final suggestion was that all three men be re-employed as motormen.

The company refused to accept any of these proposals, but in view of the claim of the men that the union objected to arbitration on the score of its cost, the company offered not only to bear its half of the expense of arbitration but to pay one-third of the employees' share up to $2,000 in case one man should be reinstated by the board, two-thirds up to $4,000 if two men should be retained, and the entire cost of the proceedings up to $6,000 if all three men were reinstated. The union would not agree to this proposition, but asked the company to lodge charges of larceny against the three men and to abide by the finding of the court in disposing of the matter. The company considered this proposition at length and finally rejected it on the ground that it could not consistently with its duty to the public to maintain a reasonable discipline among its employees and an efficient management of its business make the question of the right of discharge depend solely on the difficulties and uncertainties of criminal procedure. The State board has been assured that there will be no strike on the road pending the public investigation. At the hearing, which will begin on May 12, the company will be represented by its attorney, C. W. Bosworth; Vice-President C. V. Wood, General Manager H. M. Flanders and probably Traffic Manager Robert E. Cosgrove.

Commenting editorially on the labor situation in that city the Springfield *Union* said in part:

"To ask more of the company than it has already granted is unreasonable, and is so regarded by the public. If a strike ensues the blame will rest squarely on the officers and members of the association. The public knows that between the company and the association is a binding agreement to arbitrate all differences that cannot otherwise be amicably adjusted, and that both are legally and morally bound to respect the terms of this agreement. Resorting to a strike will not establish the innocence of the conductors, but it will brand the association as a labor organization that has no regard for its solemn obligations. A strike means loss of employment and ultimate defeat for the members of the union. If the situation were reversed, if it were the company and not the association that refused to accept arbitration, refused to keep its agreement, the same condemnation would be meted out to the company as will be visited upon the men in the event of their resorting to a strike. They will do not only themselves but the whole cause of organized labor hereabout an irreparable injury should they fail to respect the terms and conditions of their contract. All their grievances, all the justice that their cause may have, will be overlooked by the jury of public opinion should they bring upon Springfield this wholly unnecessary evil."

THE INDIVIDUAL INDIANAPOLIS CONTRACTS

Union Alleges Violation of Terms of Recent Arbitration Award

Following their motion to withdraw from the Federal Court the petition enjoining the Indianapolis Traction & Terminal Company from securing signatures to its individual service contract, attorneys for the union employees filed a complaint with the members of the Public Service Commission who constitute the board of arbitration, alleging that the company has violated several of the provisions of the award of the arbitration board. The complaint charges, among other things, that the company is using coercion against the union employees, is intimidating men to sign its individual contract, urging the men to deal direct with the company, etc.

On April 28 Chairman Duncan of the Public Service Commission and Commissioners Edwards and McClure began a hearing relative to the grievances filed. William Blackman and S. A. Smythe, representing the Department of Labor, who were sent from Washington at the request of the Central Labor Union of Indianapolis, were present at the hearings. W. H. Latta appeared as attorney for the company. J. J. Mahoney, superintendent of the company, testified that the employees had been requested through the carhouse foremen to sign the individual service contract, and that most of the men had reported at the office to execute the agreement. J. P. Tretton, assistant superintendent, stated that many of the non-union employees had requested that they be permitted to sign the contract in order that they might work on the Sundays they were required by the arbitration award to be off duty. A number of other car service men testified at the hearing, some stating that they had agreed to the terms proposed by the company, others that they had not. In no case was a witness able to point to any threat or intimidation used by the company against him. No evidence was offered by the attorneys for the union that any man had ever been discharged or discriminated against because he had refused to sign the individual contract.

Robert I. Todd, president and general manager of the company, denied that the Indianapolis Traction & Terminal Company was forcing any of its men to sign the contracts, but stated that he had issued orders to the effect that all the men should be afforded an opportunity to sign if they wished. Mr. Todd stated that most of the men had signed the contracts. The agreement was devised in order that the company could operate its cars on Sunday during the summer months by providing that the men waive the requirement of the arbitration award that they should be off one Sunday in each month, which requirement compelled 25 per cent of the trainmen to be off every Sunday. Chairman Duncan ruled that the question of the validity of the service contract had already been determined by Judge Anderson in the Federal Court. The Federal Court held that the contract is valid and in effect on its signers, this decision being rendered in the judgment in which the employees and labor leaders are restrained from attempting to bring about a strike on the city lines of Indianapolis.

CHICAGO AND HOME RULE

Several hearings have been held by the committee on public utilities of the Illinois Legislature to determine the necessity of "home rule" for Chicago, as well as how it should be administered in case it was granted. At a recent hearing evidence was taken, particularly as regards home rule administration. The Insull interests opposed "home rule" in any form at this hearing. They maintained that the State Utilities Commission had done good work, and that there was no criticism of that body. It was admitted that "home rule" appealed to the pride of the public, but what was wanted most was the best regulation. If that regulation was by the State, then it should be under State jurisdiction. It was also averred that the best regulation of public utilities could not come from a body of seventy men like the Chicago City Council, but must come from a body of qualified specialists.

The home rule bill as proposed authorizes the City Council to fix the terms of office of the commissioners; in fact, practically all power is delegated to that body, but the expenses are controlled by a State board, which also, upon request, may furnish expert assistance and data. At this hearing the Chicago Surface Lines again supported Chicago's request for "home rule," but counsel advised, however, that the railways did not favor the bill as it stood, but advocated a "home rule" commission created by statute. This commission should also have the power to subpœna and swear witnesses, make rules of direct and cross-examination under oath and other powers which would remove utilities from the jurisdiction of the courts.

RAPID TRANSIT QUESTIONS IN CINCINNATI

Walter M. Schoenle, city solicitor, of Cincinnati, Ohio, appeared before Attorney-General Turner of Ohio on April 29 and protested against the renewal of water and pipe leases from the canal in Cincinnati, as contemplated by Superintendent Miller of the State Board of Public Works. Mr. Schoenle construed the lease of the canal bed by the city as requiring the city to maintain works for supplying the users of water from the canal only until the expiration of the leases existing at the time the contract between the city and the State was made. He said that no renewal of such leases was contemplated, and intimated that the cost to the city of building a conduit to supply the six or seven concerns desiring a renewal of their leases would be about $1,000,000 and that it would be better to forfeit the lease than to undertake this. No use of the canal has yet been made by the city and it has not been necessary to build a conduit, but the purpose of leasing it was to supply a route for a portion of the rapid transit loop and transform it into a parkway. A rental of $32,000 a year is paid for the use of the canal. Attorney-General Turner promised to do all he could for the city, but if he decides in favor of the city his ruling will be opposed to that of former Attorney-General Hogan, who held that the leases of the water users might be renewed forever under the contract made with the city. Forfeiture of the canal lease would necessitate an entire change in the various plans suggested for the rapid transit loop.

Cincinnati friends of the Bauer rapid transit bill fear that in the few days remaining of the present session of the Legislature it will not find a place on the calendar of the House. According to present arrangements a recess will be taken on May 8 and the final adjournment will follow on May 11 or 12. Only four days will be left for passing bills. Another danger threatens it in the Jackson bill, which passed the House on April 28 and was sent to the Senate for ratification. This bill is meant to control the issue of bonds for municipal enterprises, but without amendment will probably make it impossible to finance the rapid transit loop.

One hundred citizens of Cincinnati appeared before Governor Willis on the afternoon of April 3 to urge that the Bauer bill be placed at the head of the House calendar for the following day. The Governor frankly stated to the delegation that several bills containing administration pledges to the people of the State had been delayed and that they would receive his undivided attention until they are passed. Other measures, including the Bauer bill, will then receive attention. The Governor stated that he is not opposed to the Bauer bill.

At a meeting of the City Council on April 27 the extension of the Sixth Street route was modified so that cars will run over the Hopple Street viaduct into Fairmont, but not to Cumminsville. The plan of routing College Hill and Westwood cars over the Mohawk bridge was postponed for eighteen months. The extension of the Vine Street route to Mitchell Avenue was permanently established. The ordinance requiring construction of tracks on Plum Street between Fourth and Eighth streets was repealed. Clifton and Elm lines will remain as they are. Construction of the proposed Warsaw-Elberon line was ordered, as soon as consents can be secured. The extension of the Warsaw route to Covedale was dropped as a result of this order. Legislation requiring double transfers under certain conditions was passed and several additional transfer points were established.

CANADIAN ELECTRIFICATION PROPOSAL

A special meeting of the City Council of Brantford, Ont., was held on April 27 to consider a proposition from Manager Todd, of the Lake Erie & Northern Railway, which is controlled by the Canadian Pacific Railway. The company suggested that if the city would hand over to it the Grand Valley Railway entrance to Galt and the entrance to Paris from the Galt end the company would connect the Lake Erie & Northern Railway with the Galt, Preston & Hespeler Railway and electrify the road through to Port Dover. The granting of the request would mean that the city would virtually have to abandon that portion of the recently acquired Grand Valley Railway between Paris and Galt, while the Canadian Pacific Railway would get an entrance to Paris. On the other hand the Grand Trunk Railway wants the city to retain the entire Grand Valley Railway and give it freight rights over the line into Paris. The Aldermen appointed the Street Railway Commissioners and representative of the Board of Trade to go fully into the matter.

STEINWAY TUNNEL OPERATION

The Public Service Commission for the First District of New York has adopted an agreement modifying the provisions of the dual system contract with the Interborough Rapid Transit Company to provide for the temporary operation of the Steinway tunnel. This tunnel was built by Interborough interests and is completed from a point in Forty-second Street, Manhattan, between Lexington and Third Avenue, under Forty-second Street and the East River to a point in Long Island City at Jackson and Van Alst Avenues. Under the dual system contract the tunnel was transferred to the city and made a part of the city-owned lines which will be operated by the Interborough Company. Under the direction of the commission the company has been reconstructing certain portions of the tunnel to fit it for temporary operation, which is expected to begin next month. The modifying agreement provides that it shall be operated in connection with the existing subway either by trains of cars or by single cars. Eventually the tunnel will be extended to a junction with the existing subway at Times Square, but for the present transfers will be given between the tunnel trains and those of the subway. An escalator will bring passengers to the surface of Forty-second Street, and they will have a short walk to the Grand Central station of the subway where their transfers will be good on trains going in either direction.

TORONTO CONSTRUCTION ORDERED

D. M. MacIntyre, chairman of the Ontario Railway & Municipal Board, issued an order on April 26 calling on the Toronto Railway to start the construction of the lines in the Ossington Avenue, Hallam and Dufferin Street district by June 1, and complete them by Aug. 1. On Nov. 6, 1914, the board issued an order instructing the company to build double tracks on Ossington Avenue, beginning at the tracks on Bloor Street, thence along Ossington to Hallam, along Hallam to Dufferin, along Dufferin to Lappin Avenue, along Lappin to Lansdowne Avenue and to a junction with the tracks on Lansdowne. The construction was to be subject to the approval of the city engineer of Toronto. The board ordered that the lines be in operation by June 1. The company made no attempt to commence construction of the lines, and the city of Toronto, through Corporation Counsel Geary, applied recently for a further order. The company argued that it was unable to raise the necessary money for the work because of financial conditions, and claimed that the jitneys might reduce the traffic. The city held that the company should be made to obey the original order of the board calling for the completion of the new line by July 1. The board, after consideration, decided that this would hardly give the company time to finish construction, but ordered a start by June 1, and the completion of the line by Aug. 1.

DECISION IN NEW JERSEY LEASE CASE

The right of the Board of Public Utility Commissioners of New Jersey to withhold its approval of the lease by the Pennsylvania Railroad of the West Jersey & Seashore Railroad and its franchises for 999 years was upheld by the Court of Errors and Appeals on April 22, in an opinion handed down by Chief Justice Gummere. The West Jersey & Seashore Railroad sued out a writ of mandamus when the utility board refused to approve the lease. The board demurred to the writ, and this action was upheld by the Supreme Court, and in turn approved by the Court of Errors, which affirms the Supreme Court. It was urged for the railroad that the delegation of power by the Legislature was a violation of the constitution. The Chief Justice holds that the Legislature vested in the board specific power to fix rates to be charged by this class of corporations, to compel railroads and street railroads to establish connections for the convenience of passengers, to protect grade crossings and various other functions. The Chief Justice says that the right of the Legislature to exercise these powers is unquestionable, as is also its right to delegate them. In regard to the claim that it would be a violation of the constitution for the utility board to have this power the Chief Justice says:

"We are unable to appreciate the force of this contention. The law which empowers a railroad corporation of this State to lease its road is a general one applicable to all such corporations, no matter how created. The condition or restriction imposed by the public utilities act upon the exercise of this power by these companies is equally general, binding upon every railroad company of the State and applicable to every lease proposed to be made by any such company."

The West Jersey & Seashore Railroad is controlled by the Pennsylvania Railroad through ownership of a majority of the $9,641,600 of common stock. The property has been operated in connection with the Pennsylvania system. The main branches of the road run from Camden to Atlantic City and Cape May. Stockholders of the West Jersey & Seashore voted to lease their road to the Pennsylvania in April, 1913, at a fixed rent sufficient to pay all fixed charges and 6 per cent on all the stock. Objection was made by the Public Utilities Commission that a perpetual lease would be tantamount to a conveyance in fee.

CAR CONSTRUCTIION HEARINGS

According to R. J. Fleming's statement to the Ontario Railway Board on April 30, the Toronto Railway has eighteen new cars in various stages of construction, but by some mischance plans for these cars were not submitted to the board as required by the order of last November. The result is that if, after the general hearing set for May 17 to consider the type of cars to be used, an order is issued calling for a plan different from that followed, the company will perhaps face the necessity of reconstructing some of the eighteen cars. The matter came up on April 30. Mr. Fairty, for the ctiy, asked that the haring be continued until May 17. Mr. Fleming, for the company, stated that the company had eighteen of the fifty cars ordered by the board under way. Chairman McIntyre of the Railway Board remarked that plans had not been submitted until recently, although the order called for cars of a design approved by the board. Mr. Fleming stated that the company had adopted the most modern type. Mr. McIntyre again pointed out that the order of Nov. 7 called for the submission of designs, and told Mr. Fleming that the company, in going on with construction without approval, was doing so at its own risk. In continuing the hearing to May 17 Mr. McIntyre pointed out that if that hearing resulted in modifications of the plans the company would be bound by the order.

THE CLEVELAND, AKRON & CANTON LINE

In connection with its proposed four-track subway under East Fifty-fifth Street at Cleveland, Ohio, the Cleveland, Akron & Canton Terminal Railway, through Ohio C. Barber, has begun negotiations with the State for the purchase of the old canal bed for a private right-of-way between Cleveland and Dresden. It is said that the promoters intend to lay a four-track electric line between the two points. From Dresden by way of the Muskingum River there is a direct marine route to the Ohio River. This route does not pass through Canton, but it is the intention to run a spur to that city. Such a road would open the territory in the Tuscarawas Valley which now has very limited service. Attorneys for the company stated before a special committee of the Cleveland City Council that the engineers' estimates showed a cost of about $1,000,000 per mile for the construction of the subway under East Fifty-fifth Street. Attorney W. W. White for the company refused to guarantee to begin construction work within two years. He insisted that there will be no unnecessary delay if the company is granted a franchise on fair terms. The committee also wants a purchase clause that will enable the city to take over the property within the city limits, if it should become desirable to do so.

Chicago Lines Move Offices.—The Chicago (Ill.) Surface Lines have transferred their general offices from the sixteenth floor of the First National Bank Building to the Borland Building, Chicago. The new quarters of the company will occupy the sixth, seventh, eighth and a part of the tenth floors.

Sea Beach Line Opened.—The Brooklyn (N. Y.) Rapid Transit Company has put in full operation its Sea Beach line from Sixty-first Street, Brooklyn, to Coney Island. This has been entirely reconstructed in connection with the new subway system. Until the Fourth Avenue line is open, probably next month, single cars on a short headway will be run instead of trains.

Petition for Removal of Massachusetts Commissioners.—G. M. Nichols, Lynn, Mass., a former newspaper publisher, has filed a petition with Governor Walsh asking for the removal of Chairman F. J. McLeod and Clinton White of the Public Service Commission. The petition contends that the commissioners made no attempt to prevent violations of law by the New York, New Haven & Hartford Railroad although as members of the present board and former Railroad Commission they had knowledge of the alleged violations.

Los Angeles Harbor Lines.—The committee of the whole of the City Council of Los Angeles, Cal., has decided to advertise for sale two electric railway franchises along South Park Avenue. One franchise provides for a line to extend from Thirtieth and San Pedro, along San Pedro to South Park Avenue and out to Slauson. The other franchise covers practically the same route except that the terminus will be Manchester Avenue. Under the charter the franchise is not to be for longer than twenty-one years, with the city having the right to purchase at the end of five years. It was in connection with the proposed construction of these so-called harbor lines that municipal ownership and possibly also operation by the municipality were urged.

Motorman a Carnegie Hero.—Albert May, a motorman in the service of the Bryan-College Interurban Railway, Bryan, Tex., since its organization five years ago, is in receipt of a letter from F. M. Wilmot, manager of the Carnegie Hero Fund Commission, Pittsburgh, Pa., advising him that the commission's attention has been called to an act performed on Dec. 7, 1913, by Mr. May in which he was instrumental in saving the lives of a man, woman and child in the great flood and overflow of the Brazos River, and that in recognition of the heroism displayed on that occasion the Carnegie Commission has awarded Mr. May a silver medal and the sum of $1,000. At the time of disastrous overflow, Mr. May was granted leave of absence by the company. Without hope of reward or even wages for his time, Mr. May, accompanied by other citizens, energetically and heroically went to the succor of those whose lives were imperilled.

PROGRAMS OF ASSOCIATION MEETINGS

Pennsylvania Street Railway Association

The program has been announced for the spring meeting of the Pennsylvania Street Railway Association to be held at the Fort Pitt Hotel, Pittsburgh, Pa., on May 11 and 12. The delegates will be expected to register early on the morning of May 11. At 10 a. m. there will be an excursion to the power plant of the Pittsburgh Railways. At 7:30 p. m. the dinner of the association will be held at the Fort Pitt Hotel. The regular meeting of the association will be called at 2 p. m. on May 11. The program of this session follows:

Address by President C. L. S. Tingley.

Paper, "Economies in Operating Small Cars," by J. F. Layng of the General Electric Company.

Presentation of question box problems.

Address, "Organized Safety," by Lew R. Palmer, chief inspector Department of Labor and Industry.

Address on civic opportunities or some similar topic.

The meeting on May 12 will be called to order at 9:30 a. m. Among the subjects are the following:

Report of the committee on filing schedules, rates and tariffs, by C. B. Fairchild, Jr., chairman.

Report of the committee on a uniform crossing agreement, by R. P. Stevens.

Discussion of question box, with W. A. Heindle in charge.

Address, "Legal Phase of the Workmen's Compensation Act," by D. A. Reed.

At the conclusion of the session there will be an excursion to the Westinghouse plant and other places of interest.

Gas, Electric & Street Railway Association of Oklahoma

The fourth annual convention of the Gas, Electric & Street Railway Association of Oklahoma will be held at the Lee-Huckins Hotel, Oklahoma City, Okla., on May 12, 13 and 14. Delegates will be afforded an opportunity to register between 11 a. m. and 2 p. m. on May 12. At 2 p. m. Mayor Overholser of Oklahoma City will deliver an address of welcome and George W. Knox, president of the association, will respond. Mr. Knox, who is general manager of the Oklahoma Railway, will then present his address as president of the association, after which the convention committees will be appointed. The papers to be presented on the afternoon of May 12 follow:

"The Modern Generating Station," by A. L. Mullergren, electrical engineer Benham Engineering Company, Oklahoma City.

"The So-Called Jitney Service," by J. J. Johnson, assistant general manager Oklahoma Railway.

At 5 p. m. on May 12 a special car will leave the hotel for Briarwood Park on the Oklahoma City-El Reno interurban line where a barbecue will be held.

On May 13 the following papers of interest to the electric railways will be presented:

"Utility Appraisals Under Order No. 774," by George C. Saunders, of the Oklahoma Gas & Electric Company.

"Relative Values of Coal, Oil and Gas as Fuel for the Production of Electric Power," by E. E. Hunter, chief engineer Oklahoma Gas & Electric Company, and L. G. Purtee, chief engineer Oklahoma Railway.

At the session of the association on May 14 the following papers will be presented:

"Care and Sale of Supplies and Current-Consuming Devices by Public Service Companies," by Galen Crow, general purchasing agent Public Service Company of Oklahoma.

"Public Utilities—Their Customers and the Public," by Noel R. Gascho, manager Alva Light & Power Company.

The presentation of these papers will be followed by the question box and a general discussion, after which the annual reports of the standing committees, the board of directors, secretary and treasurer and the reports of the convention committee will be presented. Officers will then be elected.

On the afternoon of May 14 those in attendance at the convention will be the guests of the Oklahoma Railway and will be taken in a special car on a sight-seeing trip of the city. The annual banquet of the association will be held at the Lee-Huckins Hotel at 8 p. m. on May 13.

Financial and Corporate

ANNUAL REPORTS

Georgia Railway & Power Company

The statement of income, profit and loss of the Georgia Railway & Power Company, Atlanta, Ga., for the calendar year 1914 follows:

Operating revenues	$6,341,183
Operating expenses	3,323,726
Net operating revenue	$3,017,457
Less taxes	434,347
	$2,583,110
Other income:	
Dividends	$ 5,718
Miscellaneous	160,748
Total	$ 166,466
Gross income	$2,749,575
Deductions:	
Interest on bonds	$1,236,527
Interest on notes	60,111
Extinguishment of discount	8,465
Rental dividends	801,168
Total	$1,606,272
Net income	$ 643,303
Sinking fund contributions	102,933
Balance	$ 540,370

The report states that on April 1 the company executed its first and refunding mortgage to secure a total authorized issue of $30,000,000 of 5 per cent forty-year sinking fund gold bonds. An amount of $8,865,000 of these bonds was issued and exchanged at par for a like amount of the first mortgage bonds of the Georgia Power Company, whose mortgage was then cancelled, and $1,000,000 of the bonds were sold to cover expenditures on account of construction. It is stated that charges to construction for 1914 for additions to the property of the Georgia Railway & Power Company other than the work being done by the Northern Contracting Company totalled $161,049.

Charges to construction for additions to the property of the Georgia Railway & Electric Company, which is leased by the Georgia Railway & Power Company, totalled $501,522. During 1914 the Georgia Railway & Electric Company sold $494,000 of refunding and improvement mortgage bonds to reimburse the Georgia Railway & Power Company for expenditures made in 1914 and 1913. The Georgia Railway & Electric Company also sold $430,000 of refunding and improvement mortgage bonds and $607,228 of common stock to repay a loan of $665,000, the balance being applied toward the payment of construction expenditures.

The total rentals due to the Georgia Railway & Electric Company, consisting of taxes, interest, dividends and sinking fund, aggregated $1,863,399 for 1914. On December 31 the total mileage of railway track owned or leased and controlled and operated by the Georgia Railway & Power Company was 231.888 miles, single track. During the year 5.119 miles were built and 0.218 mile was abandoned.

Oakland, Antioch & Eastern Railway

The first annual report of the Oakland, Antioch & Eastern Railway, Oakland, Cal., for 1914 is unusually complete in the details of income statement figures by accounts and by months. The sub-accounts in the operating expense group are also published in full. The total operating revenue for the year was $542,180. Of this $391,524 was for passenger revenue, the balance being made up of $117,651 for freight revenue, $16,506 for miscellaneous transportation revenue and $16,499 for other than transportation revenue. The total number of passengers carried during the year was 586,231, while the freight carriage amounted to 194,923 tons. Owing to completed lines and connections it is expected that during the next full year of operation the freight revenue should be materially increased. An automobile bus line between Pittsburgh and Antioch secured considerable of the Antioch passenger traffic, and similar facilities are to be installed between Molena and Rio Vista. These feeders operated in only part of 1914.

The total operating expenses of the company were $389,459, or 72.5 per cent of the gross revenues. This total was divided as follows: Maintenance of way and structures, $70,549; maintenance of equipment, $30,561; power, $68,752; conducting transportation, $157,864; traffic, $17,861; general and miscellaneous, $44,878; transportation for investment (credit), $1,007, and outside quarry operation, $5,229. The operating income of the company for the year was $147,491 and the gross income $147,623. Deductions totaled $284,986, leaving a deficit of $137,362. The total charges to road and equipment for the year were $896,599. The betterments included trestle and tunnel work, the installation of automatic electric block signals on the entire line and automatic electric brakes on part of the equipment and the erection of twelve stations. The total assessments on stockholders received to Jan. 31, 1914, were $1,215,120.

In concluding his report, W. Arnstein, president, says: "Owing to the generally depressed financial conditions, on account of which the earnings of practically all railroads have been on a subnormal basis, it has been impossible for this company to dispose of any bonds during the last year. Just prior to the outbreak of the European war, the directors had every reason to believe that a negotiation then being carried on with a large New York house would be consummated and the floating debt taken care of thereby, but the war prevented this. Notwithstanding adverse conditions and the loss caused by the abnormally high water and floods in the early part of 1914 and the loss of the ferry-boat, with the consequent increase in operating costs, the company earned during 1914 its operating expenses and about 50 per cent of the interest charge on its entire outstanding indebtedness, both funded and unfunded. With the return of normal traffic conditions and the full operation of feeder lines it is reasonable to expect that the earnings will be sufficient during the coming year to insure the success of the financial plan for paying off floating debt out of earnings."

Atlantic Shore Railway

The total operating revenue of the Atlantic Shore Railway, Kennebunk, Maine, for the year ended Dec. 31, 1914, amounted to $357,869. This was made up as follows: Passenger revenue, $303,818; freight revenue, $27,183; other revenue from transportation, $19,555, and other operating revenue, $7,312. The total operating expenses were $289,235, divided in this manner: Maintenance of way and structures, $63,812; maintenance of equipment, $36,161; power, $60,296; conducting transportation, $98,773; traffic, $1,368, and general and miscellaneous, $28,824. The operating income was $68,633, and miscellaneous income, $2,271, making gross income of $70,904. Taxes, interest and other deductions totaled $102,217, leaving a deficit for the year of $31,312. This combined with the debit balance on hand at the beginning of the year made a total deficit of $74,255 as of Dec. 31, 1914.

The total revenue mileage of the company was 1,355,695 car-miles in 1914 as compared to 1,344,707 car-miles in 1913. The total passengers carried were 4,995,796 in 1914 and 5,010,342 in 1913. Other statistics compare as follows: Gross earnings per car-mile, 1914, 0.2638 cent; 1913, 0.2761 cent; gross earnings per car-hour, 1914, 3.054 cents; 1913, 3.16 cents; operating expenses and taxes per car-mile, 1914, 0.2191 cent; 1913, 0.2159 cent; and operating expenses and taxes per car-hour, 1914, 2.535 cents; 1913, 2.471 cents. The company operates 95.164 miles of track and has eighty-six cars, fifty-three with electric equipment.

Cleveland, Painesville & Eastern Railroad

During the calendar year 1914 the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, received gross earnings of $404,492 as compared to $425,923 in 1913, a decrease of $21,431. Individually, however, the passenger revenue and power revenue showed increases of $7,199 and $8,942, respectively. The operating expenses and taxes decreased from $234,666 in 1913 to $220,651 in 1914, or $14,014, so that the net earnings of $183,840 in 1914 were a decrease of only $7,417 from the 1913 figure. On account of an addition of $3,999 of miscellaneous income in 1914, the gross income for this year was $187,840, a dcrease of $3,417 as compared to 1913. Deductions from income increased $4,956 during 1914, so that the surplus for the year decreased by $8,374 to $55,567.

The average miles in operation during 1914 were 38.32. The gross earnings per mile were $10,556, and the net earnings, $4,797, as compared to $11,115 and $4,991 in 1913, respectively. The operating ratio was 54.54 per cent in 1914 and 55.09 per cent in 1913. The receipts from the lighting and power department showed a gain of 49 per cent. The United Light & Power Company, which was purchased in the preceding year, gained 31 per cent. The total expenditures in 1914 for additions and betterments amounted to $19,536, of which the principal items were $14,693 for lighting and power, $2,656 for track and roadway, $1,158 for power plant and substations and $883 on cars and equipment.

FINANCES IN KANSAS CITY

Judge Hook Authorizes Receivers' Certificates for Extensions—Interest Held Up for Two Weeks Pending Satisfactory Reorganization Plan

Judge William C. Hook on April 29 authorized the receivers of the Metropolitan Street Railway to issue $592,500 of receivers' certificates for the purpose of constructing necessary extensions to the lines of the company in Missouri. These certificates, by order of the court, are a prior lien on the property, ahead of any bonds, notes or other obligations. The court held that the company's obligations to the city precede the claims of the bondholders.

In another ruling Judge Hook ordered the $496,000 of interest due on May 1 and May 15 to be withheld from payment for two weeks, to see if a plan of reorganization satisfactory to all parties concerned can be worked out. In case a reorganization plan is submitted which appears probable of being successfully carried out, the court intimated that it would be inclined to pay interest then, even if it meant the issuance of receivers' certificates for the purpose. All holders of judgments against the company joined with the city in protesting against the payment of the due interest.

Judge Hook laid down pointed rules in regard to the forming of a reorganization plan that would meet with his approval. There were two important elements in the necessary conditions: (1) The Kansas City Electric Light Company must take care of a fair and equitable proportion of the indebtedness; (2) The railway company must be so bonded as to leave a margin of safety and not endanger its ability to get money in the future. Judge Hook left to the security holders the adjustment of the interrelations of the various companies, particularly the imperative separation of the electric light and the street railway properties.

The question of payment of interest came up as an incident to a petition of the receivers as to the solution of paying for improvements. A schedule has been filed, showing that $2,427,865 must be spent in 1915 for maintenance and reconstruction and extensions, under franchises. The estimated revenues for 1915 would be $6,447,000, and the estimated expenditures, including interest and the item of $2,427,865, would be $7,306,965. The expenditures therefore would be $859,965 in excess of the revenues. The interest paid in 1914 was $1,459,000. The showing of the figures therefore was to the effect that if the required betterments were paid for from income, there would not be half enough left to pay the interest.

Mayor Jost at the hearing before the court declared that even if reorganization were effected, the contract obligations as to betterments would have to be met—he put them at $6,000,000—before bondholders got anything. He declared that there would be no extension of time for reorganization and acceptance of the franchise after July 7 unless there were a very strong presumption that reorganization was assured.

The court denied the request of the receivers that all the cases before it be consolidated. It is understood that the chief obstacle is the disinclination of the New York (N. Y.) Trust Company, trustee for the second mortgage bonds of the Metropolitan held by the light company, to join.

WESTINGHOUSE CONVERSION CHANGE

Company Proposes Conversion Plan More Favorable to Bondholders in Return for Change in Trust Indenture

The directors of the Westinghouse Electric & Manufacturing Company elected at a special meeting on April 5 to alter the prevailing provisions for the conversion of convertible bonds into stock. The conversion price of 200 will, under the plan, be reduced to par for the remainder of the year and thereafter will be 110. At the present time the owner of a $1,000 convertible 5 per cent bond can get only $500 in stock in exchange. With the new plan in force $1,000 of bonds will be equal to $1,000 of stock until Dec. 31, 1915. Bondholders will be asked to consent to a change in the trust indenture in return for the more favorable terms of conversion proposed. The change refers to the restrictions as to the issuance of preferred stock, the distribution of stock dividends and the issuance of any stock at more than 10 per cent below the market price of similar old stock.

If the plan becomes operative, either common stock to the amount required for conversion or new bonds convertible into common stock at the reduced price will be offered to shareholders for pro rata subscription at 105. To the extent that stock or bonds are sold upon this basis, the proceeds will be used to retire the present bonds at the redemption price. There are $19,476,000 of 5 per cent convertible bonds outstanding. The plan provides that new bonds may be exchanged for the old at par. Bonds presented for payment in cash will be paid off at 105, or the exchange may be made for both cash and new bonds.

The directors say: "The company will not require additional capital for its present volume of business or for any increase expected in the near future. It has made adequate provision without borrowing for the execution of the large orders recently received from foreign governments. On the other hand, in case of the radical increase of business which may come with good times, the company would be handicapped in securing additional capital by the restriction cited in the trust indenture."

American Light & Traction Company, New York, N. Y.—The earnings of the American Light & Traction Company on the stock of subsidiaries were $3,714,959 in 1914 as compared to $3,751,976 in 1913, while miscellaneous earnings in the two years were $717,420 and $714,257 respectively. The expenses amounted to $157,292 and $123,107, leaving net earnings of $4,275,087 for 1914 and $4,343,126 for 1913. With the surplus of the previous year of $9,495,882 in 1914 and $8,689,293 in 1913 combined with dividends of $3,811,932 in 1914 and $3,536,537 in 1913, the surplus balance on Dec. 31, 1914, amounted to $9,959,038 as compared to $9,495,882 on Dec. 31, 1913. During 1914 gas rates decreased $127,702 and electric rates $92,100, while coal and oil costs increased $66,000 and taxes increased $94,132 for subsidiaries and $31,788 for the holding company.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has applied to the Public Service Commission for authority to issue $1,500,000 of preferred stock for new construction and improvements. The stock will be offered to the stockholders at $112 a share. The petition states that the company plans to use $371,999 of the proceeds for track and line construction, $142.822 for cars and rolling stock and $135,377 for power stations and machinery.

Bryan-College Interurban Railway, Bryan, Tex.—The Texas Railroad Commission on April 22 granted the application of the Bryan & College Interurban Railway for permission to issue $28,000 of bonds for additions and betterments. This issue will complete the original authorization of $100,000 of bonds.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The gross receipts of the Columbus Railway, Power & Light Company during 1914 were $3,066,299 and the operating expenses $1,657,619, leaving net receipts from operation of $1,408,679. Interest, taxes, rentals and depreciation amounted to $783,101, so that there remained a surplus of $625,578. From this amount dividends of $448,185 on the preferred and the common stock were paid. The company suffered during 1914 on account of foreign disturbance and domestic depression. In the street railway department there was less travel, 78,949,559 passengers being carried in 1914 as compared to 79,560,640 in 1913, a decrease of 0.8 per cent. The decrease in revenue passengers was 0.9 per cent and in transfer passengers 0.4 per cent. The electric light and power department accomplished some growth during 1914.

Idaho Railway, Light & Power Company, Boise, Idaho.—In the suit brought by the Guaranty Trust Company, New York, as trustee, Judge Dietrich on April 19 passed a decree of foreclosure for all the properties operated by the Idaho Railway, Light & Power Company, with the possible exception of the lines formerly operated by the Boise Railroad. It is understood that the properties will be sold some time in June. The foregoing decision was made subject to a decree in the cross-complaint of E. H. Jennings, who asserts a claim of $180,000 against the old Boise Railroad lines. The court in a prior decision recognized the Jennings claim but reserved decision as to whether it should be given preference over that filed by the trust company.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The gross earnings of the Indianapolis Traction & Terminal Company, which leases the lines of the Indianapolis Street Railway, for 1914 were $3,378,757, as compared to $3,321,088 for 1913, an increase of $57,669, or 1.74 per cent, caused largely by a comparison with losses sustained in 1913 on account of flood and strike. During 1914 there was expended for maintenance of way and structures, $387,238, and for maintenance of equipment, $218,926, or a total of $606,164. A total of 18 per cent of gross earnings was expended upon maintenance of property. During 1914, a total of 27,150 ft. of single track of the Indianapolis Street Railway Company was rebuilt, 95 lb. of steel girder rail on concrete foundation with brick and granite block paving being used. A large amount of repairs to special work was done during the year, and two electric welding machines were kept constantly at work welding joints.

Interborough-Metropolitan Company, New York, N. Y.—Upon motion of Commissioner Hayward, the Public Service Commission for the First District of New York has instructed its counsel to prepare a letter to the Interborough Rapid Transit Company and the New York Railways requesting detailed information as to the proposed consolidation plan of the Interborough-Metropolitan Company, noted in the ELECTRIC RAILWAY JOURNAL of May 1. The commission desires to obtain this information to determine whether the proposed transaction involves any transfer of stock in violation of section 54 of the public service commissions law, which forbids any stock corporation not a railroad corporation to acquire or hold more than 10 per cent of the total capital stock of any common carrier. Inasmuch, however, as the Interborough-Metropolitan Company is not an operating company and the present plan simply embodies the reorganization of a holding company possessing lawfully acquired securities, it is doubted by many as to whether the commission has supervision in the matter. C. H. Venner has protested against the proposed plan on the ground that it does not give preferred stockholders any valid equivalent for their back dividends.

Kentucky Traction & Terminal Company, Lexington, Ky.—At a recent meeting of the directors of the Kentucky Traction & Terminal Company, arrangements were made to retire the last of the Passenger & Belt bonds, originally $138,000.

Little Rock Railway & Electric Company, Little Rock, Ark.—C. P. Perrie, secretary of the Union Trust Company, Little Rock, has been elected a director of the Little Rock Railway & Electric Company to succeed the late W. M. Kavanaugh.

Manchester Traction, Light & Power Company, Manchester, N. H.—The Manchester Traction, Light & Power Company has applied to the New Hampshire Public Service Commission for authority to issue $1,000,000 of bonds to provide for extensions and additions and to pay off floating debt.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—It is stated that the agreement submitted to the bondholders of the Oakland, Antioch & Eastern Railway some time ago for approval has been signed by more than the necessary 75 per cent, which renders effective the decision to defer interest on the outstanding bonds for three years. More than 75 per cent of bondholders have deposited with the Union Trust Company of California their coupons for such a period and it is expected that the whole plan will be completed within a short time. The California Railroad Commission has authorized the railway to refund certain promissory notes aggregating $200,400. The company is also given authority to pledge $36,000 of its first mortgage 5 per cent bonds as collateral security for a note held by the Union Switch and Signal Company, amounting to $21,028.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has announced that up to April 5 $9,585,600 of its $12,500,000 of 6 per cent first preferred stock, offered at 82½ in June, 1914, had been sold. More than 80 per cent of the authorized issue has been subscribed for, and none of the stock will hereafter be sold except to investors residing within and contiguous to the territory served in California. The company has called for redemption on May 27 the remaining $1,500,000 of its one-year 5 per cent notes due on Dec. 15, 1915. This redemption entirely clears up the floating debt.

People's Railway, Dayton, Ohio.—It is reported that a holding company is in process of organization in Dayton, Ohio, to take over the power, light, gas, street railway and interurban interests of that city. A meeting of railway men was held on April 30 to discuss the proposition. It is said that officers of the American Railways, Philadelphia, Pa., largely interested in the People's Railway, are promoting the consolidation, and that all the companies are agreeable, with the exception of the Oakwood Street Railway. The Dayton Power & Light Company and the Dayton Gas Company are included in the plan.

Portland Railway, Light & Power Company, Portland, Ore.—E. W. Clark & Company, Philadelphia, have sold or exchanged for maturing notes more than $4,500,000 of the new issue of $5,000,000 of two-year 5 per cent gold coupon notes of the Portland Railway, Light & Power Company, the offer of which was noted in the ELECTRIC RAILWAY JOURNAL of April 24. These notes are dated May 1, 1915, and the proceeds are for the retirement of $5,000,000 of 5 per cent one-year notes due on this date. The unsold balance of the new notes is being offered at 98 and interest. Holders of the maturing notes are offered the privilege of exchanging these to the extent to which the unsold notes remain available. Holders making the exchange will receive $20 in cash for each $1,000 of notes exchanged.

Public Service Corporation, Newark, N. J.—The New York Stock Exchange has listed $261,000 of general mortgage 5 per cent sinking fund fifty-year bonds of the Public Service Corporation of New Jersey, due in 1959. This listing makes a total amount to date of $37,261,000. The bonds were used in part payment for betterments to subsidiaries.

San Antonio (Tex.) Traction Company.—It is reported that leading stockholders of the San Antonio Traction Company have paid off $1,100,000 of indebtedness by taking additional shares of stock to redeem notes that had become due for the recent improvements to the company's holdings in San Antonio. The financing covers only past expenditures. A formal notification of the increase in capitalization to $2,500,000 is being prepared for the Secretary of State.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.—Robert Toland has been elected a director of the Trenton, Bristol & Philadelphia Street Railway to succeed Edward P. Toland, deceased.

United Railways Investment Company, San Francisco, Cal.—Announcement has been made that about $300,000 of collateral trust sinking fund 5 per cent bonds of the United Railways Investment Company, due in 1926, has been purchased by the trustee for the sinking fund.

Washington Railway & Electric Company, Washington, D. C.—The Public Utilities Commission for the District of Columbia has authorized the Washington Railway & Electric Company to issue $13,500 of general improvement 6 per cent debenture bonds dated Jan. 2, 1915. The proceeds are to be used for the following purposes: Portion of estimated cost of relaying tracks on a section of Upshur Street, $8,000; portion of estimated cost of placing sections of tracks on Butternut Street, on grade, $5,500.

DIVIDENDS DECLARED

Bristol & Plainville Tramway, Bristol, Conn., quarterly, 2 per cent.

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1⅝ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, first preferred; quarterly, 1½ per cent, original preferred.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Mar., '15	$68,847	*$63,015	$5,832	$17,230	†‡$11,269
1 " " '14	67,111	*83,972	†16,861	15,931	†‡32,372
9 " " '15	725,302	*654,114	71,188	155,161	†‡82,664
9 " " '14	751,888	*682,339	69,549	138,262	†‡67,216
CALGARY (ALTA.) MUNICIPAL STREET RAILWAY					
1m., Mar., '15	$46,157	$32,195	$13,962	$16,735	†$2,673
1 " " '14	56,606	47,480	9,126	15,121	†5,995
3 " " '15	135,966	93,495	42,471	49,856	†7,385
3 " " '14	166,311	145,118	21,193	45,365	†24,172
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, COLUMBUS, OHIO					
1m., Mar., '15	$95,760	*$66,362	$29,398	$27,540	$1,859
1 " " '14	97,316	*68,408	28,909	27,419	1,490
4 " " '15	272,865	*190,014	82,852	82,231	621
3 " " '14	274,298	*193,227	81,071	81,650	†578
CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., Mar., '15	$621,543	*$432,428	$189,114	$98,298	‡$112,268
1 " " '14	598,386	*431,518	166,868	88,370	‡99,795
9 " " '15	5,974,545	*4,360,129	1,614,416	884,532	‡924,545
9 " " '14	6,007,908	*4,464,075	1,543,833	802,263	‡937,389
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.					
1m., Feb., '15	$444,421	*$187,972	$256,449	$33,046	$223,403
1 " " '14	451,276	*187,905	263,371	30,060	233,311
2 " " '15	917,614	*387,408	530,206	66,612	463,593
2 " " '14	938,331	*392,558	545,773	62,629	483,144
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., Mar., '15	$3,055,709	*$1,341,969	$1,713,740	$912,878	‡$857,142
1 " " '14	3,129,767	*1,314,896	1,814,871	912,524	‡952,607
9 " " '15	24,912,836	*11,287,498	13,625,338	10,809,312	‡5,878,138
9 " " '14	24,831,587	*11,226,952	13,604,635	11,017,464	‡5,625,000
NEW YORK (N. Y.) RAILWAYS					
1m., Feb., '15	$982,481	*$732,115	$250,366	$285,395	‡$9,202
1 " " '14	951,832	*741,382	210,450	276,583	‡†35,389
8 " " '15	8,887,645	*6,379,241	2,510,105	2,287,660	‡547,007
8 " " '14	9,292,845	*6,593,318	2,699,525	2,213,866	‡742,700
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., Mar., '15	$24,051	*$23,916	$136	$7,976	†‡$7,811
1 " " '14	22,703	*22,722	†19	7,800	†‡7,792
9 " " '15	283,060	*232,704	50,356	71,085	†‡20,378
9 " " '14	275,154	*224,679	50,475	69,494	†‡18,652
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Mar., '15	$36,136	*$45,049	†$8,913	$6,259	†‡$15,102
1 " " '14	30,874	*47,627	†16,754	8,245	†‡24,565
9 " " '15	328,953	*392,401	†63,448	57,618	†‡119,474
9 " " '14	291,073	*438,679	†147,607	52,146	†‡195,316
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Feb., '15	$23,986	*$15,868	$8,118	$7,658	$459
1 " " '14	26,244	*15,502	10,742	7,639	3,103
12 " " '15	301,658	*193,016	108,643	91,567	17,076
12 " " '14	297,442	*195,034	102,408	90,624	11,784
RHODE ISLAND COMPANY, PROVIDENCE, R. I.					
1m., Mar., '15	$372,156	*$311,891	$60,265	$117,309	†‡$56,214
1 " " '14	392,406	*302,571	89,835	111,264	†‡20,709
9 " " '15	3,913,995	*2,978,147	935,847	1,061,948	†‡59,065
9 " " '14	3,988,469	*2,996,339	992,130	969,435	‡112,938
TAMPA (FLA.) ELECTRIC COMPANY					
1m., Feb., '15	$82,890	*$39,521	$43,369	$4,427	$38,942
1 " " '14	80,357	*42,018	38,340	5,074	33,266
12 " " '15	988,735	*514,697	474,038	53,205	420,833
12 " " '14	874,942	*484,777	390,164	56,331	333,834
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Mar. '15	$785,582	$529,704	$255,878	$52,720	$203,158
1 " " '14	748,576	492,993	255,583	49,649	205,934
3 " " '15	2,269,752	1,555,125	714,627	153,295	561,332
3 " " '14	2,173,420	1,452,077	721,343	144,174	577,169
WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.					
1m., Mar., '15	$18,408	$22,664	†$4,257	$1,449	†‡$5,698
1 " " '14	16,249	*23,422	†7,173	1,164	†‡8,327
9 " " '15	193,687	*203,696	†10,009	11,719	†‡21,631
9 " " '14	185,679	*193,548	†7,869	9,907	†‡17,593

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*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

Further City and State Legislative Progress Recorded—Interesting Chamber of Commerce Report in Oakland

The passage of legislation regulating the jitney continues to lag in most cases a cycle or two behind the movement for which it is a corrective. In New Orleans and Birmingham where the game of legislative battledore and shuttlecock has been played with the jitney measures for some weeks, it now seems likely that regulation will be finally enacted, while in Providence, Ashtabula, Shreveport and other cities noted this week regulatory measures have actually been enacted. In Houston the jitney ordinance passed recently by the City Council has been held to be unconstitutional and void, in the State of Washington the jitney bill passed by the Legislature has been declared by the Supreme Court of that State to be in force since April 10, and in Massachusetts the Attorney-General regards the bill there as unconstitutional.

The jitney regulatory ordinance passed by the Council of New Orleans has an amendment attached requiring a $5,000 indemnity bond for every vehicle operated for fare along a fixed route. At the final hearing before the Council to consider the matter of regulation more than 200 jitney representatives were present. Attorneys for the jitney operators implored the Councilmen and the Mayor not to pass the amended ordinance. They asserted that the measure would legislate the jitneys out of business or at least force the owners into a costly battle in the courts. The attorneys also emphasized their belief that the new amendment while in their opinion worded so as to be operative against the street railway, could not in reality be inforced against the company because of the latter's charter rights. In insisting on the unreasonableness of the bond, Attorney Warren Doyle, representing the jitney men, produced a letter from a bonding company saying that the company would not write a bond such as that provided for in the ordinance unless the applicant deposited collateral security to the full amount of the bond.

An ordinance regulating the jitneys was passed on May 3 by the City Council of Providence, R. I. Included in the terms of the ordinance are provisions that drivers must not stop jitneys within 25 ft. of white poles and the exclusion of these machines from certain portions of Dorrance, Mathewson and Exchange Streets, in the congested business area. The license fee is fixed at $5 per passenger seat for local machines and at $3 for inter-city buses. All drivers must be at least twenty-one years of age and pass a road test before licenses are issued. Drivers are allowed to solicit passengers "by voice," so long as the solicitation does not amount to an outcry. A bond of $500 per seat must be filed before the driver can engage in the business.

On the evening of May 3 the trustees of the Rhode Island Company petitioned the City Council to reduce the franchise tax from 5 per cent to 1 per cent of the gross earnings. The statement pointed out that at present the entire gross receipts of the Rhode Island Company are less than the amount which the road is called upon to pay for operating expenses, rental, taxes, and interest upon its indebtedness. The trustees stated that the cost of power offers no opportunity for reduction; that wages cannot be reduced unless and until existing agreements with employees are modified; that rolling stock maintenance cannot be reduced; and that track repairs offer the only opportunity for cuts in expenses. Usually 600 men are employed in track repairs in the summer, but this year only 300 can be given work because of the effect of the jitney. The trustees suggested that in addition to reducing the franchise tax, the city authorities relieve the company of the payment of the cost of maintaining that portion of the highways lying between its rails and a space 18 in. wide on each side and the payment of 4.5 per cent per annum upon one-third the cost of certain new highways. The statement points out that the jitney of the four-seated type has to pay less than 1 per cent of its receipts of $6 a day compared with 15 per cent in the case of the company.

The Commission Council of Shreveport, La., has passed an ordinance regulating the jitney. The measure provides for the payment of a license before engaging in the business, registration with the chief of police of the number of the car, the State license, the name and make of car and the seating capacity. The chief of police is to assign to each jitney a number, after the driver or owner has complied with the regulations, and this number is to be painted in black in type at least 4 in. high. The route and the rate of fare of every car are to be plainly marked and no signs are to be placed on the upper left-hand windshield where they might obstruct the view. Not more than two passengers are to be seated in the same seat as the driver, nor are any jitneys to be operated while any of the passengers or others are standing in the car or on the running board.

An ordinance regulating the jitney was passed by the Council of Ashtabula, Ohio, on April 26 on its second reading by suspending the rules. The ordinance provides that before applying for a license the applicant for permission to operate a motor vehicle for hire at a fare of less than 15 cents must first file a bond of $5,000 with the city treasurer for each and every car to be operated. In the event that the bond is a personal instrument there must be two signers thereon and each must make affidavit that he is worth the amount of the bond over and above all exceptions. The license is placed at $100 for each car covering a period of one year and is payable in advance. The measure also provides that the number of passengers carried by such motor vehicles shall not be more than the manufacturer's rating, this to include the driver. All passengers must be discharged at the curb, and the drivers of the jitneys must comply with the city traffic ordinances in addition to a section in the ordinance which prohibits racing for prospective passengers. No passengers are to be carried on the doors or the running boards. No person under the age of twenty-one years is to be allowed to drive a motor in public service. The law also provides that the motor buses shall operate continually from 5 a.m. until 11 p.m.

The jitney operators in Ashtabula have had two meetings for the purpose of organization and have employed an attorney to contest the ordinance. In the meantime they have suspended all operations as they claim the restrictions which are imposed by the new measure are too severe. The ordinance will probably be attacked on the ground that its restrictions tend to confiscate property and are unconstitutional. The Councilmen claim that the measure will withstand any form of attack. The jitney started in Ashtabula about Feb. 15 with one second-hand car and gradually increased to about twenty in the peak load of the day. Car owners from surrounding towns would even drive to the city in the morning and after operating their cars as jitneys all day return home at night. Several accidents have resulted from the careless handling of jitneys. One man was run over, a child was run down, a collision was caused by a car which had come to a sudden stop being rammed from the rear by another car, and still another auto was struck by a switch engine at the Center Street crossing.

The city authorities of Louisville, Ky., have been prevented from putting the ordinance affecting to regulate jitney buses into operation by court proceedings, which were begun by the attorneys representing some seventy jitney bus owners on the day before the measure was to become operative. The plaintiffs allege that the ordinance is unconstitutional and ask the court to enjoin the city from attempting to inforce any provision of the regulation or to conduct any prosecution for alleged violations during the time that the action is pending. The city asked for a continuance when the first hearing was called and postponement for a week was granted, the court ruling against the city attorney's request that the plaintiffs give bond. In the petition it is stated that the jitney operators find they cannot obtain bonds such as are required by the ordinance without depositing amounts equal to the bonds in cash or collateral with the bonding companies, a prohibitive requirement. Apparently no step has been taken by the jitney operators in the direction of complying with the ordinance and jitneys are operating without hindrance.

A bill to fix the liability in case of injury sustained by jitney passengers is advocated for passage either by Councils or the Legislature, by Mayor Blankenburg, of Philadelphia. The Mayor said that while he believed the city's police regulations for the operation of jitneys were as good as any in the country, the administration was not empowered to require the drivers to take out city licenses, and that in cases of accidents, there would be difficulty in placing the responsibility on the proper persons. The number of jitneys in Philadelphia on May 3 was well above 350, whereas there were only 250 a week ago, according to a census taken by reserve policemen on Broad Street, under orders from Superintendent of Police Robinson. The census does not include jitneys operating in other parts of the city.

In the Pennsylvania Legislature, by unanimous consent, the Jones jitney regulator was stricken from the House calendar on motion of its sponsor, E. E. Jones, Susquehanna. The measure would have made it necessary for owners of jitneys to file a $2,500 bond with the State and pay 2½ per cent of the gross receipts to the municipality in which the cars are operated. With the Jones bill out of the way, the House passed the bill authorizing street railways to operate jitneys in connection with their systems.

Owners of automobiles who convert them into jitney cars and drive them for hire must obtain chauffeurs' licenses, and any person engaged by such owners to drive the converted jitneys must also obtain licenses, according to an opinion by Attorney-General Egburt E. Woodbury of New York State, rendered to the corporation counsel's office of Schenectady. He based the opinion upon the provision of the motor vehicle law which reads: "The term 'chauffeur' shall mean any person operating or driving a motor vehicle as an employee or for hire." Many owners of automobiles in up-State cities have recently converted their autos into jitney cars, and in many instances have failed to obtain chauffeurs' licenses. The Attorney-General says that the driver of a so-called jitney car is driving it for hire as much as the driver of any other public conveyance. In his opinion such chauffeurs should be licensed.

The Thompson bill, now before Governor Whitman of New York, has been referrred to previously in the ELECTRIC RAILWAY JOURNAL. A hearing on the bill was held before the Governor on May 6. The principal contention of the representatives of the jitney operators was that the regulation of the buses should be left to the individual cities. Senator Thompson said that the original draft of the bill had been prepared by counsel for the Public Service Commission.

The consideration of the question of the regulation of the jitney in Davenport, Ia., which came before the City Council on April 22, was continued for two weeks. John G. Huntoon, general manager of the company, said that the jitneys were taking away from the street railway between $400 and $600 daily. It was not possible to make an accurate estimate of the amount because of the business depression and other conditions which were responsible for losses. The attorney representing the jitney interest insisted that if the ordinance now pending before the Council was passed the jitneys would be legislated out of business. This ordinance provides for a bond of $5,000 and a license fee of $75 for each car.

Mayor Bloom, of Pine Bluffs, Ark., has directed a letter to City Clerk William A. Lee urging the passage of a jitney ordinance to require an indemnity bond of not less than $5,000 and a license fee of not less than $25 a month for each car operated in Pine Bluffs.

The jitney bill passed by the Washington Legislature has been declared by the Supreme Court to be in force since April 10. The measure specifies that it is unlawful for jitneys to operate unless a permit has been obtained from the Secretary of State. It also holds jitney operators liable for the full amount of damages incurred to passengers or pedestrians through negligence or carelessness of the operator, but holds the surety companies only to the amount of the $2,500 bond. The law specifies that each applicant for permission to carry passengers for hire shall deposit and keep on file with the Secretary of State a bond running to the State of Washington in the penal sum of $2,500, with a good and sufficient surety company, which the law asserts is to pay for all damages which may be sustained by persons injured by reason of carelessness and negligence of the principal or agent in the conduct of the said business, or in operating a motor-propelled vehicle for hire. Every person injured by carelessness, negligence, or unlawful act of the person or corporation receiving a permit under the provisions of the act, or his heirs, shall have cause for action against the principal and surety upon the bond provided for all damages sustained. The full amount of the damages may be recovered against the principal, but the amount of recovery from the surety shall only be up to the amount of the bond. If any part of the act is held invalid, the remainder shall be held valid.

Official announcement made by Prosecuting Attorney Alfred H. Lundin, of Seattle, recently, indicates that, pending the hearing of the test case filed against the Seattle Taxicab & Transfer Company alleging illegal operation of vehicles for hire, no attempt will be made to bring about arrests in the twenty-two cases presented to the prosecutor's office by the Puget Sound Traction, Light & Power Company against jitney bus operators who were operating without bond or permit.

Tacoma jitney operators recently gave up further hope of delaying the operation of the jitney law requiring the $2,500 bond, and as a result many of them have filed their bonds with the Secretary of State.

The Auto Transit Welfare Association, representing the jitney interests, on May 3 filed petitions invoking the referendum on the jitney regulation ordinance passed by City Council. This action will hold up jitney regulation in Portland, Ore., for two years, unless the City Council is willing to take steps to force the issue at the election on June 7. The only way this can be done is by repealing the ordinance as passed and preparing and passing another measure to submit to the voters under the initiative.

The jitney ordinance passed recently by the city of Houston has been held to be unconstitutional and void by Judge William Masterson in the Fifty-fifth District Court at Houston. Judge Masterson decided the matter upon the question as to whether the ordinance was reasonable and discriminatory. The provision requiring a bond of $10,000 formed an important element in the case. Judge Masterson said in part: "The ordinance to regulate the jitney undertakes to regulate people who are engaged in a business similar to the Houston Electric Company. The question at issue seems to be the regulation of a dangerous or hazardous business. It therefore requires a test as to qualification. It seems to me that the operation of electric cars is just as dangerous and hazardous a business as the operation of an automobile, and yet no examination is required of motormen. I believe that the city has ample power to regulate both and to go just as far as consistent with their rights to operate. There can be no question but that the ordinance discriminates."

Two petitions were filed on April 27 by the Georgia Railway & Power Company, Atlanta, Ga., with the Georgia Railroad Commission. They deal with the jitney bus and both were drawn by the company. One is signed by P. S. Arkwright, president of the company, and the other is signed by a number of citizens to whom it was presented by representatives of the company. Among the sixty-three signers of the citizens' petition are practically all the bankers of Atlanta, the leading capitalists, wholesalers, retailers and real estate men. The list represents well the best in Atlanta's business life. Most of those who signed the citizens' petition declared themselves as being opposed to allowing the jitneys to operate at all in their present character. Recently the jitney bus operators in Atlanta sued for a permanent injunction against the city ordinance taxing them and requiring them to furnish a bond. They secured a temporary restraining order and their petition was heard with the city's answer. The decision of Judge W. D. Ellis of the Fulton Superior Court is expected to be rendered soon. The operators have declared repeatedly their intention of appealing to the highest court in the event of unfavorable action in this case. Their main contention is that by differentiating them from taxicabs the City Council drew a distinction that is unconstitutional. The number of jitneys in operation in Atlanta appears to be diminishing gradually, notwithstanding that they may still operate practically freely as when the first of them started in business on Jan. 28. It is evident, however, that the fortunes of the jitney operators are approaching a crisis.

A tentative ordinance drawn by City Attorney Boyd has been introduced before the City Commissioners of Birmingham, Ala. No license from the chauffeur or owner of the car is proposed. The requirement in regard to the indemnity bond is fixed at $1,000. A permit to cost $2 is provided for. The ordinance will apply to both jitneys and taxicabs. It is proposed to regulate the routes of jitneys.

The Chamber of Commerce of Oakland, Cal., has received the report of a committee it appointed to study the jitney in that city from the community standpoint. The committee states that "the jitney driver is living upon his capital, or the capital of someone else, because the income is not sufficient to provide for his living and the necessary operating expenses, plus fixed charges and depreciation." Extended investigation of the committee showed that the average jitney travels 137 miles a day with a car-mile income of 5½ cents. Considering depreciation and cost of operation and allowing $3 to the driver, it was found that even the smallest jitney could not run for less than 7 cents per mile. Investigation of standard traction bonds in California with a par value of $107,422,000 showed a shrinkage from December, 1914, to March, 1915, of $8,887,000, or about 3¼ per cent. The ultimate effect of this was apparent, the committee thought, to anyone who considered that more than $60,000,000 of California electric railway bonds were held by savings banks and local investors in California. The State received 5¼ per cent of the gross income of street railways, and the total tax paid on gross income amounted to about 12 per cent. This meant a total loss to the public on the principal lines of the State of $300,000 per annum, aside from the other forms of taxation placed by the public upon street railways in the building and maintenance of that portion of the street occupied by the roadbed. From 5 p.m. to 6 p.m. the average number of passengers transported in the 5-cent limit from the business center of Oakland (a length of three blocks on Broadway) was 113,500. Approximately thirteen jitneys would be required to give the same carrying capacity as one street car. Handling this traffic required 234 street cars with a headway of fifteen seconds. To move the same traffic with jitneys at thirteen to one would require 3000 cars. If the public continued to support the jitney it must expect a zone system of fares, because the small jitney cannot operate over a much longer route than 3 miles at a profit. The report is an extremely interesting one and quotes from the report of the bureau of fare research of the American Electric Railway Association, and from the ELECTRIC RAILWAY JOURNAL. A significant paragraph contained in the conclusion of the committee follows: "Time only can determine the outcome of the probable development of the motor-bus system of urban transportation as applied to our American cities. But it is quite conclusive that if the motor bus has come to stay it will not be in the shape of the present jitney. The final outcome will be evolutionary and the survival of the fittest."

H. A. Robson, public utilities commissioner for the Province of Manitoba, has addressed a memorandum to the different municipalities in which the Winnipeg Electric Railway operates, the notice being prompted by repeated application to the commission for the extension of the street railway lines and reduction in fares. The note from the commissioner is an intimation to the municipalities that if jitney transportation is not put under proper regulation the Winnipeg Electric Railway can no longer be expected to continue its progressive policy of extensions.

Attorney-General Attwill of Massachusetts has filed an opinion with the Speaker of the House to the effect that House Bill No. 2042, regulating the jitney, is unconstitutional. The opinion holds that the provisions of the bill requiring drivers of such vehicles to secure licenses from the municipal authorities and to file a bond as a condition precedent to a license appear to be constitutional, but that certain specified exemptions, including persons, firms or corporations engaged in bus service in connection with the hotel business, are inadmissible. The distinction could be well supported, says the Attorney-General, if the classification proposed were along the line of the number of passengers carried, the size or power of the vehicle, the rate of speed at which it may be operated, the skill of the operator, the nature of the district served or the control of the operator by the passenger. The bill was in the engrossment stage when the opinion by the Attorney General was rendered.

THE JITNEY CONVENTION

Brief Account of the Proceedings on the First Day of the Kansas City Convention

The inaugural convention of the International Jitney Association opened at the Coates House, Kansas City, Mo., at 10 a. m. on Tuesday, May 4. Perry T. Allen, Springfield, Mo., was in the chair, and E. K. Carnes, Kansas City, who had made the arrangements for the meeting, was acting secretary. These officers were elected permanently for this convention. Mr. Perry is an attorney and represents the jitney interests of Springfield in the suit to make permanent the temporary restraining order against the jitney ordinance in that city. An address of welcome by the assistant city counsellor of Kansas City was responded to by Editor Palmer of *The Jitney Bus*, New York, the organ of the movement. W. H. Miller, president of the Kansas City Jitney Association, delivered an address.

In the afternoon Harry G. Kyle, an attorney, talked on legislation passed by municipalities affecting jitney transportation. Ross B. Gilluly, attorney for the Kansas City Jitney Transportation Company, discussed insurance, reviewing recent legislation in Missouri under which an inter-insurance organization could be effected among jitney owners. L. M. Emlet, representing the Automobile & Bus Owners' National Protective & Benevolent Association, outlined the plans of that organization for liability insurance. Mr. Emlet is a Kansas City man and is vice-president of the association. This association was organized about two months ago at Muskogee, Okla., but plans to extend its scope over other forms of transportation. The other officers of the company are Muskogee men. The headquarters are to be moved to Kansas City. Dr. Gordon A. Beedle, surgeon of the Kansas City Jitney Transportation Company, talked on jitney accidents. Committees were appointed on the following subjects: finance, legislation, insurance, equipment, and regulation of cars and drivers. Among the visitors present from outside Kansas City were representatives of jitney associations in Iowa, Kansas, Missouri, Texas and Oklahoma and many unattached jitney owners and drivers and attorneys.

NORFOLK & BRISTOL FARE HEARING

The Massachusetts Public Service Commission heard the petition of the Norfolk & Bristol Street Railway on April 27 for authority to establish a 6-cent fare unit on the system. The company was represented by Robert H. Holt, counsel; Michael A. Cavanaugh, general manager, and F. M. Perry, superintendent.

In twelve years only two dividends had been paid by the company. Each of these was a 3 per cent declaration, and occurred in 1912 and 1913 respectively. The road was built by the Norfolk & Southern Street Railway in 1899, but went into the hands of a receiver soon afterward. It was sold at auction in 1901 and the present owners formed the Norfolk & Bristol Company and purchased the property for $345,000. There are 22 miles of track, built of 60-lb. rail, excluding 2 miles of 9-in. girder rail in Norwood and Walpole, an 1100-hp generating plant in East Walpole, eight double-truck semi-convertible cars equipped with air brakes and forced ventilation, and a 150-ft. x 50-ft. brick carhouse.

Financial data filed by the company showed that the total cost per mile of road was $22,804, compared with $39,084 for all other Massachusetts electric railways with the exception of the Boston Elevated. The company had paid about 0.5 per cent on its investment since its organization. The operating ratio increased from 74.4 per cent in 1909 to 84.3 per cent in 1914. Mr. Cavanaugh emphasized the company's policy of making repairs to property whenever these became necessary, regardless of the showing on the books. The latest increase in operating ratio is due to a reduction of $3,000 in revenue and an increase in expenses of $5,000, the latter being necessitated by the purchase of new trucks in place of old equipment and the rebuilding of a trestle. The road has felt the business depression in its effect on local industries. Its cost of power per car-mile is 3.6 cents, compared with 3.7 cents on the Fitchburg & Leominster Street Railway, 4 cents on the Boston & Worcester Street Railway, 4.5 cents on the Middlesex & Boston Street Railway, 4.9 cents on the Berkshire Street Railway, 5.2 cents on the Nahant & Lynn Street Railway, and 5.3 cents on the Worcester Consolidated Street Railway.

The gross earnings per car-mile were 20.6 cents in 1914, and in recent years these earnings had been about 8 cents per car-mile less than on other Massachusetts roads. Operating expenses per car-mile in 1914 were 17.3 cents. In the year 1914 the operating revenue was $93,978, compared with $96,007 in 1913; net earnings were $14,730, against $21,150, and net income was $11,936, compared with $18,308. The cars ran 455,736 car-miles compared with 459,120 in 1913. Transportation expenses came to $27,106 compared with $25,914 the previous year. The company estimates that the proposed fare increase will add $9,876 per year to the revenue. In putting the 6-cent fare into effect the company intends to sell tickets at the rate of fifty for $2.75, school children's ticket books at the rate of $1 for thirty-four rides and 10-strip tickets for school children at 3 cents per ride. Tickets good morning and evening are to be sold at the rate of ten for 50 cents. The hearing was continued until May 11 to give representatives of towns an opportunity to be heard.

Increase in Wages in Maine.—The Cumberland County Light & Power Company, Portland, Maine, has voluntarily increased the wages of its trainmen approximately 2 cents an hour.

Tail-Lights in Houston.—The City Council of Houston, Tex., has passed an ordinance requiring the street cars operated in the city to carry red tail-lights from a half hour after sundown until a half hour before sunrise.

Reduction in Fare Denied.—The Public Utilities Commission of Connecticut has denied the petition of citizens to enter an order to require the Connecticut Company to reduce the fare between St. Luke's Church, Noroton, and Atlantic Square, Stamford, from 10 cents to 5 cents.

Head-End Collision in Ohio.—A wreck occurred on the Lake Shore Electric Railway a few miles from Fremont, Ohio, on April 29, when two limited cars collided head-on. Many passengers were slightly injured, but no deaths have been reported. The cars took fire and were badly damaged.

Service Terms Under Discussion.—The representatives of the employees of the East St. Louis & Suburban Railway, East St. Louis, Ill., have taken up with the management the question of the modification of the service terms under which the men served in accordance with the agreement which expired on May 1.

Reduction in Fares Denied.—The Board of Public Utility Commissioners of New Jersey has denied the application for a reduction of the rate of fare to 5 cents from all points on the Bloomfield line of the Public Service Railway, a subsidiary of the Public Service Corporation of New Jersey, and also for the discontinuance of identification slips on the line.

Fare Changes on Peninsular Railway.—The Peninsular Railway, San José, Cal., has been authorized by the Railroad Commission to cancel its theater round-trip fares applying from various points upon its lines to Palo Alto, San Jose and Los Gatos, but the company was denied authority to increase its Sunday and holiday excursion rates from Palo Alto, Mayfield and Los Gatos to Congress Springs.

Transportation Lectures for Employees.—The first of a series of illustrated lectures on transportation has been given before the employees of the Third Avenue Railway, New York. The lectures trace the history of the development of transportation from the earliest time. The text and the lantern slides were prepared particularly to meet the needs of the men on the system. The second lecture will be delivered soon before the men in Yonkers connected with the Westchester lines.

Prepayment Cars in Interurban Service.—Pay-as-you-enter cars were put in operation on the Akron, Barberton & Wadsworth division of the Northern Ohio Traction & Light Company, Akron, Ohio, on April 18. Patrons have in general shown every disposition to make the plan successful and there has been a noticeable facilitation of traffic. Passengers pay the entire fare, whatever their destination, upon entering the car, and if they go beyond the Akron 5-cent fare zone, west bound, or beyond the Wadsworth 5-cent limit, north bound, they receive leave-car checks indicating destination.

Brooklyn Advertising Contract Terminated. — The Inter-City Car Advertising Company on May 5 began removing its closed candy stands from the station platforms of the Brooklyn Rapid Transit Company. The stands were sealed by employees of the railroad on May 1 when the advertising company's platform and car advertisements were ripped out and pasted over, following the expiration of its contracts with the railroad at midnight on April 30. The contract had been in force eight years. The railroad is said to have received $170,000 a year for the privilege. This was considered "ridiculously inadequate." The matter of advertising has been taken up with the Public Service Commission. According to T. S. Williams, president of the Brooklyn Rapid Transit Company, the company will probably undertake to carry on the business itself.

New Company Publication. — The Tri-City Railway & Light Company, Davenport, Ia., has begun the publication of *Tri-City Railway Service* in the interest of the employees of the company. The paper is 7 in. wide x 8½ in. high. It contains general news of interest to the employee and to the public and the complete schedules of car service in the tri-cities, corrected weekly. A feature of the publication is an "Answers to Correspondents" department. The following appeal to readers was published in the issue for April 12: "Readers of *Tri-City Railway Service* are requested to send in their ideas to the editor. The general public, as well as employees, are included in this invitation. If you have an idea concerning any branch of the service, write it out and mail it to the editor. Sign your name and street address, not for publication unless you wish it, but because the idea that is hidden behind an anonymous name is not worth considering."

A Jitney Contemporary.—*The Jitney Bus*, published in New York, has gone into its second issue. The paper is a monthly. The first number, dated April, contained thirty-two pages, including the cover. The May issue contains twenty-four pages, including the cover. The editorials in the respective issues are "Better Transportation and Fair Play" and "Stand Up for Your Rights." As might be expected the April issue bears unmistakable evidences of somewhat hasty preparation. A cross-page half-tone taken near Stearn's new store at Forty-second Street and Sixth Avenue, New York, carries as a caption "A Busy Jitney Thoroughfare." There is no doubt about the thoroughfare being busy, but the cars are the limousines of New York's first families and not purveyors of 5-cent rides. A great deal has been written about the hazards of the jitney as regards the pedestrian. Here is how the editor of *The Jitney Bus* has unconsciously made out the case against his friends: "The average citizens in the jitney belt stands on the curbing and takes a careful survey of the street in both directions before he starts to cross. Then when there is a break in the stream of jitneys he hurls himself across the street as if he had been shot from a cannon or was hurrying to flag a flock of thousand dollar bills."

Movies in an Accident Suit.—The following account of the use of moving pictures in an accident suit was contained in the Minneapolis *Journal* of April 28: "'The Death Race,' a three-reel motion picture, with the death scene deleted by censors, was shown in District Judge W. E. Hale's court late yesterday with judge and jurors as spectators. The movies may invade the Minnesota Supreme Court as the exhibition was made in presenting evidence in the trial of a case, and the film was ordered sealed by Judge Hale to be used in the event of an appeal. Jurors gripped their chairs, Judge Hale leaned forward, court attaches craned their necks, a hush fell over the courtroom and for four minutes the thrilling race of an automobile and a street car was on to see which first would reach the crossing. Just as the car and auto were about to crash, the picture machine gave its final splutter and the courtroom was in darkness. The object of the innovation in court procedure was to bring before the eyes of the court and jury the actual conditions at Clear Spring crossing on the Minneapolis-Minnetonka line, where on Dec. 13, 1913, Frederick W. G. Krumwiede, nineteen years old, was killed when an automobile in which he was riding with his father was struck by an electric car. The suit is for $7,500 against the railway brought by the mother of the boy."

Personal Mention

Mr. H. S. Collette has resigned as secretary of J. G. White & Company, Inc., and the J. G. White Engineering Corporation, and expects to reside permanently in California.

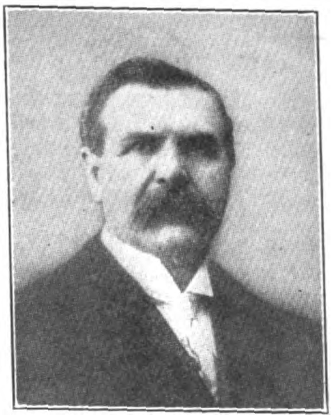
Mr. W. P. Geary, formerly assistant rate expert of the Railroad Commission of California, has been appointed acting rate expert to succeed Mr. H. H. Sanborn, who resigned recently.

Mr. H. H. Vreeland, director of welfare of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, was the guest of the National Civic Federation at its welfare conference in New York recently. Mr. Vreeland outlined the great work which the corporations he represents are accomplishing in this particular movement.

Mr. Thomas W. Martin and not his brother, Mr. W. L. Martin, has had charge of the legal work for the Alabama Power Company and its associated companies since 1912. Mr. W. L. Martin lives in Montgomery, Ala., and he was inadvertently confused with his brother, Mr. Thomas W. Martin, in a personal which was published in the ELECTRIC RAILWAY JOURNAL of March 20.

Mr. L. S. Reagan, formerly superintendent of construction of the Des Moines (Ia.) City Railway, has been appointed electrical engineer of the Charles City Western Railway, Charles City, Ia. In the new position Mr. Reagan will have charge of the electrification of this company's line between Charles City and Marble Rock, a distance of 17 miles, as well as of the 22-mile extension between Charles City and Alta Vista. Mr. Reagan was graduated from the school of electrical engineering of the University of Pennsylvania in 1904. He was in the employ of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., until 1913, when he resigned to accept the position at Des Moines.

Mr. Halford Erickson, who is now chairman of the Railroad Commission of Wisconsin, is the only member of the commission who has served continuously since it was established in 1905, and the enviable reputation which this commission enjoys is due in no small measure to the efficient and untiring efforts of its present chairman. Mr. Erickson was born and received his early education in Sweden and came to the United States in 1884. After taking his academic training in Minneapolis, Minn., he entered the service of the Chicago, St. Paul, Minneapolis & Omaha Railroad in 1890. He served the company in various capacities until he was appointed labor commissioner of Wisconsin in 1896. He held this position until 1905, when he was appointed a member of the first Railroad Commission of Wisconsin by Governor La Follette.



HALFORD ERICKSON

Mr. Clinton White, for the last fourteen years a member of the Massachusetts Railroad and Public Service Commissions, will retire from public life on May 18, when he will reach the age of seventy. Mr. White has been in the employ of the State for twenty years, and is well known in the public utility field as the "financial" member of the Public Service Commission. He was born in Charlestown in 1845 and for thirty years was in charge of shipping and receiving for a syndicate of manufacturers at Boston. He became an authority on terminal and wharf facilities early in his business career, and was for many years prominent in the Boston Chamber of Commerce. He is the senior vice-president of the Charlestown 5-Cent Savings Bank. Mr. White was appointed to the Massachusetts Railroad Commission in 1901 by Governor Crane, and has taken an important part in the work of that board and its successor, the Public Service Commission.

Mr. Donald Goodrich, son of Mr. C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., has been appointed superintendent of the Minneapolis division of the Twin City lines. He will succeed Mr. Edward Karow, who has been appointed to the position of assistant to Mr. Horace Lowry, vice-president of the company. Mr. Goodrich has had experience with the company in various departments.

Mr. W. S. Hays has joined the staff of the McGraw Publishing Company, Inc., to undertake special sales promotion work for the *Electrical World* and ELECTRIC RAILWAY JOURNAL. Mr. Hays comes from the commercial department of the Union Gas & Electric Company, Cincinnati, with which he has been connected since the completion of the merger of the New Midland Power & Traction Company, Cambridge, Ohio, with the Ohio Service Company, where he was superintendent and local manager.

D. H. CANTRELL

Mr. D. H. Cantrell, who has been elected president of the Little Rock Railway & Electric Company, Little Rock, Ark., as noted briefly in the ELECTRIC RAILWAY JOURNAL of April 24, is a member of the law firm of Rose, Hemingway, Cantrell, Loughborough & Miles, Little Rock, and was admitted to practice by the Supreme Court of Arkansas on June 22, 1889. Mr. Cantrell became connected with the street railway which was doing business in Little Rock in 1897 as claim agent and assistant attorney, handling small matters. In 1901 he was made an assistant attorney, the firm of Rose, Hemingway & Rose then being general attorneys and counsel for the Little Rock Traction & Electric Company. In 1905 Judge Hemingway, now senior member of the law firm, who was president of the Little Rock Railway & Electric Company, relinquished to Mr. Cantrell the entire legal department of the road, and since that time Mr. Cantrell has been its general attorney and counsel. For the last four or five years Mr. Cantrell has been vice-president of the company, and on April 10, 1915, he was elected to the presidency to succeed Judge W. M. Kavanaugh, who died on Feb. 21, 1915. Mr. Cantrell has lived all his life in Little Rock and has been actively engaged in the practice of law since he was admitted to the bar. He will exert his energies in directing the plans and policies of the company and will continue personally to look after the company's legal business. The Arkansas *Gazette*, Little Rock, concluded an editorial, "The New Head of the Street Railway," as follows: "We feel sure that in D. H. Cantrell the street railway people have found the man to continue the broad-gage policies that have advantaged both the company and the people it serves. In fact, with Mr. Cantrell as president and Mr. C. J. Griffith as general manager the street railway owners need not worry about their Little Rock property. It will always be found in good shape."

OBITUARY

William H. Bancroft, formerly president of the Utah Light & Railway Company, Salt Lake City, Utah, now included in the system of the Utah Light & Traction Company, is dead. Mr. Bancroft was vice-president of the Oregon Short Line and first vice-president of the San Pedro, Los Angeles & Salt Lake Railroad. He retired from active service on Feb. 1, 1914, retaining the title of vice-president of the Oregon Short Line. He was born on Oct. 20, 1840, at Newburg, Ohio, and entered railway service in April, 1856, as telegraph operator and ticket clerk of the Michigan Southern Railroad. He remained continuously in railroad service from April, 1856, until 1914. He rose through the various grades to be executive head of all the Harriman lines in the inter-mountain territory, and when the Harriman interests acquired control of the Utah Light & Railway Company in November, 1906, Mr. Bancroft was elected president of the company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Montana Railway Company, Montana, Ark.**—Incorporated in Arkansas to build a 3-mile railway in Montana to mines of Johnson & King Mining Company. Capital stock, $7,000. E. H. Johnson and Lee King, incorporators.

Jacksonville & Florida Railway, Jacksonville, Fla.—Application for a charter has been made by this company in Florida to build a 60-mile electric railway between Jacksonville and Providence. Capital stock, $500,000. Headquarters, Jacksonville. Officers: A. W. Mackinlay, president and general manager; R. F. Ensey, vice-president, and Charles G. Wilson, secretary and treasurer. [May 1, '15.]

***Furman & Yemasse Railroad, Furman, S. C.**—Chartered in South Carolina to build a 20-mile interurban railway between Furman and Yemasse. Capital stock, $10,000. Incorporators: J. H. Adams, W. P. Ellis and H. Weindal.

***Richmond & Eastern Railway, Richmond, Va.**—Chartered in Virginia to build a line from the Fulton Brick Works at Richmond to Fort Lee, Va., 5 miles. Capital stock, $2,000 to $5,000. Officers: John C. Robertson, president; J. Taylor Robertson, secretary and treasurer.

***Kanawha Traction & Electric Company, Parkersburg, W. Va.**—Chartered in West Virginia to build an electric railway in Parkersburg from a point on the west bank of the Ohio River to extend by the most practicable route to a point at or near Murdock Avenue. Capital stock authorized, $3,000,000. Incorporators: Mason C. Ambler, Edward Brast, W. W. Jackson, Harry Logan and Ben T. Neal, all of Parkersburg.

FRANCHISES

Lowell, Mass.—The Bay State Street Railway has asked the Council in Lowell for a franchise to extend its Varnum Avenue line from Lexington Avenue to Fowler Street.

Lincoln, Neb.—The Lincoln Traction Company has asked the Council for a franchise in Kansas City for an extension down K Street south to J Street and east to Randolph Street.

New Rochelle, N. Y.—The Westchester Electric Railroad has asked the Council for a franchise for an extension of its line on Winyah Avenue from North Avenue to the Pelham line in New Rochelle and also for a franchise to double-track its line on Franklin Avenue in New Rochelle.

Cleveland, Ohio.—The Cleveland, Akron & Canton Terminal Railway has asked for a franchise to build a four-track line between the lake and the Cuyahoga River Valley and under East Fifty-fifth Street, Cleveland. O. C. Barber, Barberton, president. [Jan. 30, '15.]

Windsor, Ont.—The Sandwich, Windsor & Amherstburg Street Railway has asked the Council for permission to build the Ferry Avenue loop line in Windsor.

Petersburg, Va.—The Petersburg & Appomattox Railway has received a franchise from the County Commissioners for an electric railway along the county road from Petersburg to City Point, 10 miles. Two small bridges will be required. Bids for construction will be received within sixty days. The company has given a bond for $20,000 to Prince George County to complete the line by Dec. 1. Officers: T. M. Wortham, president; B. W. La Prade, vice-president, and W. W. La Prade, treasurer and chief engineer, all of Richmond. [May 1, '15.]

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has asked the Council for permission to relinquish its franchises covering Stewart Street, between Sixth and Eighth Avenues; on Eighth Avenue, between Stewart Street and Lenora Street; and on Seventh Avenue, between Olive Street and Stewart Street in Seattle. The tracks on these streets have not been used by the company for many years. Some time ago the company asked to be allowed to suspend operations on these tracks, without relinquishing its franchise, and the Council opposed this proposition. The franchise committee of the Council has stated that it will recommend for passage the ordinance accepting the relinquishment.

TRACK AND ROADWAY

Monterey & Del Monte Heights Railway Company, Monterey, Cal.—This company has received permission from the Railroad Commission to abandon the operation of its line between Monterey and Del Monte Heights.

***Jacksonville, Fla.**—Charles H. Mann, president of the Jacksonville Chamber of Commerce, has received preliminary surveys and data in connection with a proposed electric railway from Ortega to the Florida State camp ground at Black Point.

Miami (Fla.) Traction Company.—This company's line in Miami is nearing completion and a new bridge is to be built at once over the river at Twelfth Street. B. B. Tatum, Miami, president. [Feb. 6, '15.]

Freeport Railway & Light Company, Freeport, Ill.—Work has been begun on the 1-mile extension of this company's line to the southwest section of Freeport.

Chicago & Joliet Electric Railway, Joliet, Ill.—Announcement has been made that work on the proposed extension of the Hickory Street line in Joliet from Smith Street to Theilers Park will be begun at once.

Quincy (Ill.) Railway.—Among the improvements planned by this company during the year will be the rebuilding of its south track on Maine Street from Eighth Street to Eighteenth Street in Quincy. The roadbed will be leveled and new creosoted ties laid in a bed of concrete. Heavier and longer rails will be laid.

Charles City (Ia.) Western Railway.—This company will be operated under 1200-volt power. Seven miles of poles have been placed. There are 18½ miles to be electrified and 8 miles of extension. The grading is being done under the management of R. E. Shugert, Nevada. The bridge work has been let to William O'Neal, Sioux City. There will be 1500 ft. of bridge work; the longest bridge to be 750 ft. across the Little Cedar and a 30-ft. span over the Chicago, Milwaukee & St. Paul Railroad east of Charles City. Surveys are being made to Elma and Alta Vista, both of which connect with the Great Western Railroad. When completed it will be decided which one will be used.

Iowa City (Ia.) Electric Railway.—Plans are being made by this company to extend its lines to Manville Heights Addition via the City Park. The proposed line will extend to the intersection of Ferson Avenue and River Street in Manville Heights Addition to Iowa City. Work will be begun at once and it is expected that it will be completed by Aug. 1.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company has placed in operation its extension from Quincy Avenue in Pittsburg to Lincoln Park.

Paducah, Ky.—Plans are being made to revive the project to build an interurban electric line from Mayfield, Ky., to Humboldt, Tenn. Arrangements to finance the road were suspended last fall. R. H. McNeely, Paducah, is interested. [April 18, '14.]

Kentucky-Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—Arrangements are being made by this company to resume work on the construction of its proposed electric railway from Paducah to Murray, via Mayfield.

Brandon (Man.) Municipal Railway. — The City Council of Brandon has decided to make the following extensions of its line in Brandon: Princess Avenue from Twenty-second Street to Twenty-fourth Street; from the present terminals on Victoria Avenue and Princess Avenue east to Percy Street; on Eighteenth Street, from Victoria Avenue to College Avenue and along College Avenue to Thirteenth Street.

Boston (Mass.) Elevated Railway.—This company plans to construct soon a new surface line in Fourth Street and across L Street, South Boston, which will provide a short route between City Point and the post-office district of Boston. By the new route the running time from City Point to the South Station will be cut to seven minutes and from City Point to Post-office Square to ten minutes. Nearly double this schedule is required on the more circuitous of the existing routes.

Springfield (Mass.) Street Railway.—Among the improvements planned by this company for the near future will be the relaying of new rails on its Bircham Bend line in Springfield.

St. Paul Southern Electric Railway Company, St. Paul, Minn.—Plans are being made by this company to extend its line through South St. Paul into St. Paul over the lines of the Minneapolis & St. Paul Suburban Railway which join that of the interurban company at Inver Grove.

Kansas City (Mo.) Railways.—Plans are being considered by this company to build 14 miles of double-track extensions in Kansas City. The new extension of the Prospect Avenue line northward from Fifteenth Street to Independence Avenue, Kansas City, has been placed in operation.

Springfield Railway & Light Company, Springfield, Mo.—The construction of an extension of the Monroe Street line to Phelps Grove Park in Springfield is being contemplated by this company.

Omaha & Council Bluffs Street Railway, Omaha, Neb—This company contemplates 4 miles of track reconstruction in paved streets this year. This will be laid with 97-lb. 7-in. girder-grooved rail on 6-in. x 8-in. x 7-ft. white oak and creosoted red oak ties with 6 in. of crushed-rock ballast. Vitrified brick and granite block will be used as the pavement surface.

Public Service Railway, Newark, N. J.—Among the improvements planned by this company is the relaying of nearly 1 mile of new tracks in Orange Street, Newark, and the double tracking of the Newark-Paterson line through Passaic. The work will be of standard construction, with girder rails laid on a concrete foundation.

United Traction Company, Albany, N. Y.—Work has been begun in Albany on this company's extension of the Arbor Hill line. The branch will be double track and will extend from Judson Street to North Lake Avenue.

International Railway, Buffalo, N. Y.—This company plans to build an extension of its line to be known as the Abbott Road line, which will extend between Pearl Street and Erie Street and Abbott Road and Woodside Avenue in Buffalo.

Walden, N. Y.—Surveys will be begun at once by Thomson & Wooster, Walden, for the proposed line to connect the Orange County Traction Company's line at Walden with that of the Wallkill Transit Company at Goshen.

Oakwood Street Railway Company, Dayton, Ohio.—Construction has been begun on this company's extension in Oakwood. The line will begin at the junction of Brown Street and Main Street in Oakwood, and extend over Oakwood Hill and southward through Oakwood, following the Lebanon Pike as far as Peach Tree Road.

***Findlay, Ohio.**—Plans are being made to build an electric line between Ada and Findlay. No names are yet given of those interested in the project.

Lake Erie & Youngstown Railroad, Youngstown, Ohio.—Plans are being made by this company to resume work in the near future on its line to connect Youngstown with the shores of Lake Erie near Conneaut. Work was suspended several months ago on account of financial conditions. [Jan. 30, '15.]

Toronto, Ont.—The Ontario Legislature has passed acts authorizing the Hydro-Electric Power Commission of Ontario to report on, construct and operate electric railways under certain conditions, and some 300 municipalities have asked for surveys and reports on the feasibility of constructing lines through their districts. The commission has made preliminary surveys on about 1500 miles of line chiefly in southwestern Ontario and expects to issue reports soon to the municipalities. A report on the construction of a 100-mile line in the district north and east of Toronto has been made, and the ratepayers in eleven municipalities have passed by-laws and their councils have signed contracts with the commission asking for the construction of a line about 80 miles long through this district. This work will probably not be begun until the government has announced whether or not it will grant subsidies to these railways, and until the city of Toronto has arranged for a satisfactory entrance to the city. Frederick A. Gaby, Toronto, chief engineer, of the Hydro-Electric Power Commission.

Toronto (Ont.) Suburban Street Railway.—Construction has been begun by this company on its line between Toronto and Guelph. The roadbed is being constructed beside the Canadian Pacific Railway tracks from the Humber River to Islington. The new roadbed at this point is south of the Canadian Pacific Railway tracks. At Islington it runs under the steam railway line northward to Dundas Street. A new bridge is being built over the Humber River.

***Germantown, Pa.**—Plans are being urged by the Business Men's Association of Germantown to build an electric line in East Germantown, north of Chelten Avenue. The route will extend on Chew Street north of Chelten Avenue to Gorgas Street, east on Gorgas Street to Stenton Avenue, north on Stenton Avenue to Mount Airy Avenue to Germantown Avenue.

Hershey (Pa.) Transit Company.—Rails are being laid by this company on the last section of its line between Hershey and Elizabethtown.

McConnellsburg & Fort London Railway, McConnellsburg, Pa.—A contract has been placed with Reed & Company, Hazleton, to build this company's line between McConnellsburg and Fort London. [April 17, '15.]

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—The new interurban line between Charleston and North Charleston has been placed in operation.

Chattanooga (Tenn.) Railways.—This company, which is a subsidiary of the Chattanooga Railway & Light Company, will resume work within the next few months on its line between Roseville and Fort Oglethorpe. About two years ago work on the construction of this line was begun and about two-thirds of the cost of the work has been expended. All material for this work has been purchased.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Material has been received and construction will be begun at once by this company on its new passenger and freight building in Rialto. The structure will be of the Mission type and of cement construction. The work is being done by the Kling Contracting Company, Los Angeles.

Ottumwa Railway & Light Company, Ottumwa, Ia.—The office building in Ottumwa in which this company maintained its offices was destroyed by fire on April 22. Temporary offices have been secured.

Charlottesville & Albemarle Railway Company, Charlottesville, Va.—This company plans to construct an office building with substation in rear in Charlottesville. It also expects to purchase a 2000-kw rotary converter and material for 20 miles of 22,000-volt transmission lines.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company has ordered from the Westinghouse Electric & Manufacturing Company one 1000-kw, 600-volt d.c., 15,000-volt a.c., three-phase, sixty-cycle, 750-r.p.m. compensated wound d.c. generator, synchronous motor generator set.

Baton Rouge (La.) Electric Company.—This company expects to build a new $200,000 power plant in Baton Rouge to replace the present power house. The structure will be 100 ft. by 75 ft. It is expected to install three 500-kw turbines and three 400-hp boilers.

Scranton & Binghamton Traction Company, Scranton, Pa.—This company plans to install in its power house at Scranton one 400-kw, 600-volt d.c., six-phase, twenty-five-cycle, 750-r.p.m., compound-wound, a.c., self-starting rotary converter; three 150-kva, 370-volt, high-tension to rotary voltage low-tension, single-phase, twenty-five-cycle, oil-insulated, self-cooled transformers and one two-panel switchboard. This apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—During the next few weeks this company plans to build a new water intake at its power station, lay seven new 440-ft. submarine cables across the river and build one brick distributing station on each side of the river into which the above mentioned cables will be brought. The company expects to purchase new circuit breakers, meters and other apparatus that may be necessary to rebuild its present railway switchboard.

Manufactures and Supplies

ROLLING STOCK

Sioux Falls (S. D.) Traction System has recently bought two cars.

Norton & Taunton Street Railway, Norton, Mass., has ordered seven cars and one snow plow.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., contemplates the purchase this year of fifty city passenger cars.

Connecticut Company, New Haven, Conn., advises that it is prepared to issue specifications for ninety-two new cars.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, has ordered one motor freight car body from the Laconia Car Company.

Androscoggin Electric Company, Lewiston, Maine, has ordered one motor express car body with arch-bar trucks from the Laconia Car Company.

Chicago (Ill.) Elevated Railways has placed an order with the Cincinnati Car Company for 122 all-steel cars. The new cars are to be 48 ft. in length and similar in design to those built for the railway in 1914.

Shore Line Electric Railway, Norwich, Conn., has ordered a dump car from the Universal Car & Manufacturing Company. The car is of the Universal 2-A trailer type and is equipped with M. C. B. couplers and Westinghouse air brakes.

Detroit (Mich.) United Railway, according to an official announcement, is taking steps to place orders for 100 center-entrance cars for use in the Detroit city service. The motors of the new cars will be of sufficient capacity to pull trailers, fifty of which the company expects to place upon the lines this year.

TRADE NOTES

Lord Manufacturing Company, Brooklyn, N. Y., has located its general sales office at 105 West Fortieth Street.

Keyes Products Company, New York, N. Y., has removed its New York office from 71 West Twenty-third Street to Room 1847, 120 Broadway.

Esterline Company, Indianapolis, Ind., has received orders for twenty-four SE-95 "Golden Glow" headlights from the St. Joseph Railway, Light & Power Company, and for twenty-two SM-95 "Golden Glow" headlights from the Bristol & Plainville Traction Company.

Edwin G. Hatch, New York, N. Y., has received orders for sixty protective clamping sets for the overhead line crossings of the Lehigh Navigation Electric Company. Other recent purchasers are the Illinois Traction System and the Edison Electric Illuminating Company, Cumberland, Md.

O. L. Remington, general manager William McLean & Company, engineers, manufacturers and importers, Melbourne, Australia, is on a trip to this country investigating methods, apparatus and new developments in the electric railway field. Mr. Remington is accompanied by Mr. McColl, engineer of the firm.

L. S. Brach Supply Company, New York, N. Y., advises that additions of its automatic flagman for road-crossing protection have been made on the following railways: Fort Wayne & Northern Indiana Traction Company; Lake Shore Electric Railway; Cleveland, Painesville & Eastern Traction Company; Wilkes-Barre Railway; Lackawanna & Wyoming Valley Railroad; Rhode Island Company.

Mechanical Rubber Company, Cleveland, Ohio, mechanical branch of the United States Rubber Company, recently held its fifth annual convention in Cleveland, at which meeting 106 of the department managers and representatives of the United States Rubber Company's stores were present. During the convention, which lasted one week, many interesting papers were read and discussed relating to the products of the company. A paper on tape, which comprises one of the large departments, was read by George E. Austin, manager of the New York branch.

Jeffrey Manufacturing Company, Cleveland, Ohio, has removed its New York branch from 77 Warren Street to 50 Dey Street, adjoining the Hudson Terminal. The company in its new headquarters will carry stock in power transmission machinery, including shafting, hangers, pulleys, collars, couplings, clutches and bearings, and elevating and conveying appliances. It will also be prepared to handle orders pertaining to electric mines, industrial and storage-battery locomotives. George H. Mueller, assistant sales manager of the company, is manager in charge of this office.

Philadelphia Toboggan Company, Germantown, Philadelphia, Pa., is manufacturing at its plant in Germantown a line of carousels and coaster cars for electric railway parks. The president of the company, Henry D. Auchy, was formerly in charge of the management of Chestnut Hill Park, near Philadelphia. The company formerly supplied its amusement devices to various parks in the United States on the concession basis, operating them from Germantown. It now has discontinued operating them and is only concerned with manufacturing them. Shipments have been made to Sydney, Australia, for White City Park of that city, and coaster cars have been built for parks of Paris and London. Devices have also been furnished for the Philadelphia Rapid Transit Company's Willow Grove Park, and for the Lehigh Valley Transit Company at Central Park, Allentown. The company is now building an artistic and elaborate device known as the "Panama Canal" for the Mahoning & Shenango Railway at its Idora Park, Youngstown, Ohio. The company is located at No. 130 East Duval Street.

ADVERTISING LITERATURE

MacGovern & Company, New York, N. Y., have issued a bulletin of their electrical and steam machinery, cars and car equipment, etc.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34-M describing and illustrating its Class "O" pneumatic steam and power-driven compressors.

Edison Lamp Works of General Electric Company, Harrison, N. J., have issued Bulletin No. 43,550, which contains illustrations of various installations of its Mazda lamps for sign lighting.

Ohio Brass Company, Mansfield, Ohio, prints in its O-B bulletin for March-April, 1915, illustrations of the overhead construction in various locations of the lines of the Havana Railway, Light & Power Company, Havana, Cuba. Large quantities of O-B materials are employed in the construction of this double-trolley overhead system.

Underwriters' Laboratories, Inc., Chicago, Ill., have issued a catalog which describes the organization, purpose and methods of the laboratories for the testing of appliances and devices in respect to life and fire hazards and accident prevention. The chief financial support of the laboratories has been received from the National Board of Fire Underwriters, under whose general direction the work is carried on. The casualty features are carried on in co-operation with the Workmen's Compensation Service Bureau.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a 135-page revised reprint of a series of articles which appeared in the *Electric Journal* and which describe switchboards for a.c. power stations. A large number of illustrations and diagrams of switchboards are contained in the bulletin. The switchboards are classed under the three following types: "The self-contained" panel type, the "remote mechanically controlled" type, and the "electrically operated" type. The company has also issued a folder describing its lightning arresters, of the multipath spark gap, condenser, magnetic blow-out, and electrolytic types.

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., has issued a catalog of its automatic time switches for opening and closing an electric circuit at any predetermined time of the day or night. These switches consist of three units, the switch proper including the current-carrying part; the propelling mechanism which operates the switch and the time element or clock. These time switches will close and open the circuit a number of times without resetting, thus requiring attention only when winding is necessary. Their performance may be easily varied, as for instance, omitting operation on Sundays and holidays, and proceeding with the usual cycle on the following days. Various types of these time switches are described in detail in the catalog.

Fort Wayne Electric Works of General Electric Company, Fort Wayne, Ind., has issued Bulletin No. 46,101 illustrating and describing in detail its Type P demand indicator or printometer. This indicator is designed for use in connection with a watt-hour meter whereby, at regularly recurring time intervals, a printed record is made of the total energy consumption as registered by the watt-hour meter. The indicator, besides registering the energy consumption, makes a simultaneous record of the time of day at which the various amounts of energy were consumed. From such record, the maximum demand, the time at which it occurred, and the demand during each period of the day can be easily determined. This information is of value in verifying or establishing equitable rates, determining load factors, or diversity factor, regulating the use of off-peak load, determining the use of break-down service, handling complaints and making special tests of power conditions. Bulletin No. 46,100 describes the Type M demand indicator or maxicator. This device is designed to give information in regard to the maximum demand for energy from the line as well as information in regard to the total number of kilowatt-hours used.

Harrison Safety Boiler Works, Philadelphia, Pa., have recently issued a leaflet entitled "Testing V-Notch Meters," which points out that the feed-water meter is a sort of cash register for the coal pile, since it keeps a record of the returns in amount of water evaporated for the expenditure for fuel. When the evaporation is low, the operator will naturally look for the cause, and though he cannot watch everybody and everything the meter can do it for him, so far as the performance of the boiler is concerned. These facts lend special interest to the publication, which is No. 18 in the series of engineering leaflets issued by the company. It contains reprints of two important papers on the V-notch weir such as is used in the Cochrane metering heater. The first paper, by James Barr, describes at considerable length and detail the apparatus used by him and the results obtained in tests conducted at Glasgow University in 1907-1909, by which he established the fact that with a V-notch weir the true discharge for given conditions could be determined within 0.33 per cent. The other paper, by W. S. Giele, describes a commercial testing apparatus of large capacity installed by the Harrison Safety Boiler Works for the purpose of carrying out an extensive series of tests upon V-notch weirs of different dimensions as actually installed in commercial meter chambers which are manufactured by them. Both papers are interesting as illustrating on the one hand the many refinements which are essential in the precise investigation of problems in hydraulics, and on the other the admirable constancy of the V-notch weir when used under known and predetermined conditions.

NEW PUBLICATIONS

The Act to Regulate Commerce. By Herbert C. Lust. La Salle Extension University, Chicago, Ill. 1914. 337 pages. Cloth, $1.75.

The average man has little knowledge of the work involved in the establishment and supervision of the national rate system. This is not surprising, however, for the interstate commerce act is itself long and intricate, and until recently there has been no analysis made of the principles governing traffic. Now, however, about 15,000 principles governing the movement of interstate traffic have been classified and analyzed, and this book presents these in such condensed and simplified form that a study of its pages will enable the laity to apply the interstate commerce act with a substantial degree of understanding. Electric railway operators who desire a readable and broad description of the theory and practice of the present rate system will do well to examine this treatise. The act is discussed section by section, and each is clearly and concisely explained. There is an appendix containing the complete text of the interstate commerce act and various amendatory acts.

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TRAFFIC SURVEY CHARACTERISTICS

This week we are beginning a valuable series of articles by Mr. Doolittle on the subject of traffic survey characteristics and practices. We say valuable, for it is highly important that every electric railway operator should thoroughly understand the purpose and the possible results of traffic studies in their relation to the provision of maximum accommodation for passengers. Under the existing complexity of operation, with its restricted margin of profit, the circumscribed personal relation between the management and the public and the wider commission and public interest in utility service, it is apparent that systematic and scientific methods are necessary to a proper adjustment of service to traffic. For the present, the point most worthy of emphasis in Mr. Doolittle's admirable analysis of traffic characteristics is the fact that in dealing with diversity of loading during non-rush hours two phases of the subject must be considered—passengers without seats and seats without passengers—not the former only. After a study of the diversity factor, additional service to a certain degree can be furnished at reasonable cost in order under normal conditions to furnish seats for all, but always the important figures concerned are the seat-miles and the passenger-miles and not the seats and the passengers. In other words, the demand of passengers for passenger-miles can be advantageously granted by a railway only to such an extent as the inelasticity of the unit of seat-miles per round trip does not cause an expensive burden on general traffic because of idle seat-miles. The value of measuring service according to the ratio of seat-miles to passenger-miles cannot be overestimated.

UNINTENTIONAL HEAT TREATMENT

An interesting article was published in the issue of this paper for April 10 describing an experiment in building up worn wheel flanges by welding. The author invited co-operation in connection with further experiments, as the plan was economical and seemed to be promising. In this issue a communication is printed giving valuable information on the metallurgy of the process and indicating that unfortunate conditions may be produced within the metal by a non-uniform heat distribution. We all know from general observation how sensitive steel is to temperature changes, particularly to sudden changes, chilling or quenching producing in general a hardening effect. This effect depends upon the temperature from which, and the rate at which, the quenching occurs, as well as the chemical composition of the steel. It follows, as a matter of course, that in a locally and highly heated mass, such as occurs in spot welding, different zones are heated and cooled very differently. Hence we should expect some such effect as to that which Mr. Hayes refers. Moreover an analagous condition has been found in other welding operations. Fortunately, the experiment described is one easily repeated. It is to be hoped that others of our readers will investigate the subject in the same rational manner. There are, it seems to us, three questions to be answered. First, if wheel flanges and treads can be built up without serious injury to the structure of the metal, would such building up be profitable? Assuming an affirmative answer for the sake of argument, then, in the second place, is it possible to build up worn or broken sections without the formation of the hard and the soft zones described by Mr. Hayes? Finally, assuming a negative answer for the same reason, is such stratification a dangerous condition under some conditions of railway service, and if so under what conditions? The subject is one on which further light could profitably be thrown.

POLICIES WITH EMPLOYEES

As a succinct, clear and forceful exposition of the policies pursued by a railroad in the handling of its employees, the statement presented last week to the federal commission on industrial relations by W. W. Atterbury, vice-president Pennsylvania Railroad, is a remarkable document. The analysis of the company's view of unionism is worthy of note. While recognizing the propriety of union organizations for the betterment of conditions, the company in carrying out its supreme duty of insuring safety of operation feels justified in resisting all union activities tending to undermine discipline, and in maintaining continuity of operation follows the plan of opposing labor organizations addicted to sympathetic strikes and other devices not concerned with intra-company affairs. This is a good platform, but with this word of commendation we pass to the general fact back of it—that the ideal characteristic of employment on the Pennsylvania Railroad is permanency. Through training, liberal wages and welfare provisions this carrier has achieved an exceptionally high figure for average length of service; in fact, the majority of its employees work until pensioned or dead. While we recognize that a system like the Pennsylvania Railroad can offer attractions of employment not possible of attainment by electric railways, particularly the smaller lines, yet we believe that the latter carriers could profit by carrying out more fully the Pennsylvania Railroad's conception of one big family.

REGENERATION AND ELECTRIC BRAKING

The recent revival of interest in energy regeneration for electric traction calls attention to the fact that the idea is not new even when applied to direct-current motors. In fact, it was one of the first ideas that suggested itself to the pioneers in electric traction, and considerable inventive skill was devoted to devising means for accomplishing this end. Electric braking, which might be considered as a modification of the idea of regeneration in that it uses the momentum of a train when stopping to generate current, has been applied more extensively to direct-current motors than regeneration, especially abroad. But while the electrical equipment required for electric braking is much more simple than that required to make a railway motor send back current into the line when the train is coasting, both services impose on the motor an added load. This means that motors of larger capacity than would otherwise be required have to be used, and in the past this has been considered sufficient of a handicap to prevent the adoption of the plan.

On a mountain division of an electrified steam railroad, however, a different situation is presented, and all of the three-phase installations of this kind, so far as we now recall, have been equipped with regenerating motors. This fact indicates that if regeneration can be secured easily from a direct-current motor, as is predicted in the case of the Chicago, Milwaukee & St. Paul locomotives, the advantages seem to be worth while.

Manifestly the conditions under which regeneration is most desirable are those under which it can be made permanently to reduce the peaks on the powerhouse and thus reduce the investment required in generating apparatus. Where this cannot be done, any saving effected by regeneration in kilowatt-hours only is of considerably less value and in the case of a hydroelectric power station, may be of no value at all. But an installation with a small number of locomotive units, in which kilowatt-hours only are saved, may become later an installation with a large number of locomotive units in which the extent of the regenerated energy will be reflected in the reduced kilowatt capacity of the station.

So far as other possible savings are concerned, strictly speaking, there is hardly anything cheaper than brakeshoes. Nevertheless, if the work of stopping a long train or of holding a long train at a predetermined speed on down grade can be transferred from the brakeshoes to electrical apparatus, cheaply and effectively, a distinct gain is no doubt obtained, even if its full effect is not shown in a saving in brakeshoe metal, wheels and track.

No one who has not actually observed the effect of regenerative braking on a three-phase mountain railway can realize the great ease of control over the brakes possessed by the locomotive engineer, and this must have its effect in operating economies through the maintenance of better schedule speed. Any steps looking forward therefore to improved methods of regeneration as applied to direct-current apparatus are of interest.

HIGHER FARES AND THE WAGE EARNER

At public hearings before commissions sitting in jurisdiction upon street railway fare increases one of the chief arguments against higher rates is usually based upon the effect of the additional charge upon the wage earner. It is constantly claimed that even an additional fare of 2 cents per person riding per day is a serious burden to impose upon the workingman or shop girl, both of whom, it is often contended, find it next to impossible to make both ends meet under present wage conditions. As for a 7-cent fare, with its per riding capita additional toll of 4 cents per day, where two trips are made inside a single-fare zone, this is anathema to the opponents of the proposed increase.

Now we heartily approve of the philanthropic thought behind these suggestions, but we must also remember that it is very easy for anyone to be charitable when other people pay the bills. In this particular case it is especially unfair to ask the railway company to bear the expense because, if it does so, it must also carry at the same fare a great many people who are amply able to pay for their transportation. In other words, these well wishers are asking the railway companies to give the benefit of low fares not only to the poorly-paid wage earner but also to the well-to-do. If wages are so low that transportation must be rendered to the employees of various industrial and mercantile establishments at less than its fair cost in order that they exist in decency, the proper line of attack is not upon the street railway fare but upon the inadequate wages themselves.

There is still another side to the question. No careful student of modern sociological conditions can overlook the daily and weekly expenditures for pleasure which enter the budget of the average city wage earner, even where the weekly income is, say, between $8 and $12. Is there much question that the "movies" find their supporters largely from the wage-earner class? Then there are expenditures for tobacco, liquor, gum, confectionery, petty luxuries in dress and what not, many of them doubtless unnecessary, but none the less enjoyed by wage earners of both sexes. No doubt there are some who cannot "raise" the price of admission to a "movie" show once a week, but if a somewhat searching study of the faces, clothing and "set-up" of the devotees of the screen both in city and in country tells anything, it indicates that somehow or other the workingman and his family manage to attend these shows with a pretty fair degree of regularity. In fact, complaints have not been lacking from saloonkeepers that the popularity of the "movies" has diverted a substantial amount of revenue from the bar to the box office, and the patronage of these shows, even during the period of business depression which seems at last to be leaving the country, has been nothing less than amazing to the average person.

If the wage earner, then, finds it possible to spend money pretty frequently for petty luxuries, does not the contention that a 6-cent or 7-cent fare in place of an existing 5-cent tariff will bring him to penury look a bit forced? No one need begrudge the workingman or the shop girl plenty of harmless enjoyment to realize that the fair cost of service should be met by the wage earner, even if it involves some curtailment of his or her outlays for pleasure. People in the salaried and professional walks of life have to adjust their outlays for pleasure and luxuries in accordance with their net incomes, and if they do not do this somebody has to suffer for it.

It is well also to realize, in thinking about this subject, that frugality is not a present characteristic of the American people, that the tendency for inclination to overrule obligation is very strong in private life to-day, and that from 2 cents to 4 cents a day is little likely to "break" the average man or woman engaged in business or industrial pursuits. And it is further to be realized that transportation service is really cheap at 6 cents or 7 cents a ride in many thinly-settled communities with scanty resources for getting about.

Probably no adjustment of fares ever can be made which will not be a hardship to some persons, but by and large there appears to be very little present reason on which to found justifiable opposition to rates of fare which only adequately meet the fair cost of the service rendered.

THE JITNEY AS A GOLD BRICK

The baneful influences of the jitney bus are by no means confined to the railway company, to the jitney passengers who are crowded promiscuously in a car never intended for public transportation and to the public in the street who are put in danger by a large number of irresponsible drivers. The jitney owner himself is entitled to a great deal of sympathy because he is undoubtedly being beguiled into the purchase of a gold brick whose gilding will soon wear off. So far as we know, the large manufacturers of automobiles have not encouraged the jitney movement, but this has not prevented automobile supply dealers and others who would profit from an increase in the number of jitneys from making all sorts of absurd claims of the profits of jitney operation to encourage the unsophisticated to invest their savings in cheap cars to carry passengers at 5 cents each.

To quote some examples, it was only a few weeks ago that we reproduced in our reading pages the advertisement of a supply dealer in Chicago which read, "Be the first to operate a jitney bus line. Why work for $25 a week when with an investment of a few hundred dollars you can start in business and make $100 a week?" Another popular article published during the past month carries the head: "The jitney bus gold mine. The new means of public transportation opens up a virgin field for the automobile"; and ends: "dependable cars can be operated at such a low cost that they can be used for transportation purposes at a profit that makes the trolley car magnates shake in their shoes." The truth about the cost of jitney operation has been reiterated in these columns many times, but a specific instance now and then is not without its value. The following, obtained directly from the jitney driver whose experience it describes, by one of our own staff, may be enlightening.

Mr. Leviten, once a waiter at the Grunewald Hotel, New Orleans, is one of that city's pioneer jitney drivers. In fact, he entered the business some three months ago, purchasing a new Ford car for just $531. The car seats four passengers, one comfortably alongside the philosophical owner and three more or less crowdedly on the rear seat.

Promptly at 12 o'clock noon Mr. Leviten begins his essays in personal transportation, and he does not quit until 3 a.m.—a stretch of fifteen hours which he avers no employer other than himself could drag out of his much-abused system. A jitney a ride is Mr. Leviten's modest fee up to midnight, but those who would jitney in the wee sma' hours pay 10 cents. His usual run is from the busiest part of Canal Street to Jackson Avenue Ferry, the round trip being made in eighteen or twenty minutes according to the condition of the pavement or traffic regulation. "Layover" is a word not in Mr. Leviten's lexicon. However, he is not only an unusually careful driver, but also a most obliging one. He will gladly go out of his way to land a passenger at his doorstep. In one instance three passengers were so overcome at being carried two blocks beyond the station of this Jehu that they presented him jointly with an extra 25 cents.

Coming now to the factors that make up the income statement, Mr. Leviten was asked what his fifteen hours' incessant labor every day in the week brought him: "About $8 to $9 a day," he said, and added that of this he spent $2 a day for maintenance, fuel and lubrication costing another $1.50 a day. As business on rainy days was practically zero, his average daily earnings could hardly exceed $7. Therefore his income, less current maintenance, fuel and lubrication, was $3.50 a day. But Mr. Leviten estimates that at the end of nine months' service he will have to buy a new car. Hence his summary of the jitney business goes no further than the statement: "One makes a living and no more." In fact, he believes that a $5,000 bond and regulation as to fixed routes would drive the jitney out of the field at once. The 250 odd jitney drivers of New Orleans, he said, were forming an association, not to give service on some co-operative plan but to fight proposed legislation of the character described.

Mark, then, that a hustling, aggressive jitney driver, operating under the extremely short-haul conditions of a twenty-minute round trip, with no restrictions or obligations of any character, finds it necessary to work fifteen hours for net earnings (after the cost of a future car is allowed for), less than those of a motorman. Mr. Leviten may be a good waiter, but he is evidently not a great success as a traffic financier. Yet his case is typical of thousands. How many more misguided workmen will invest their savings in this hopeless quest before New Orleans and other communities pass ordinances that will save these men from their own inexperience and do justice to the companies which have developed electric railways in good faith?

New Power Station for Havana

The Havana (Cuba) Electric Railway, Light & Power Company Has Just Placed in Operation a New Power Station to Replace Its Three Existing Plants—Unusual Conditions Due to Location and Climate Have Involved Special Treatment of Details in Design and Operation

BY C. W. RICKER, ASSISTANT GENERAL MANAGER AND CHIEF ENGINEER RAILWAY DIVISION, HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY

The consolidation of the Havana Electric Company and the Havana Gas & Electric Company some two years ago made it evident that a new electric generating plant should be built to take the place of the three old and inadequate power stations then in operation. The new station was needed not only to reduce the cost of producing power, which alone would have fully warranted the investment, but, what is more important, to meet the constantly increasing need for electric energy in the company's many and varied activities.

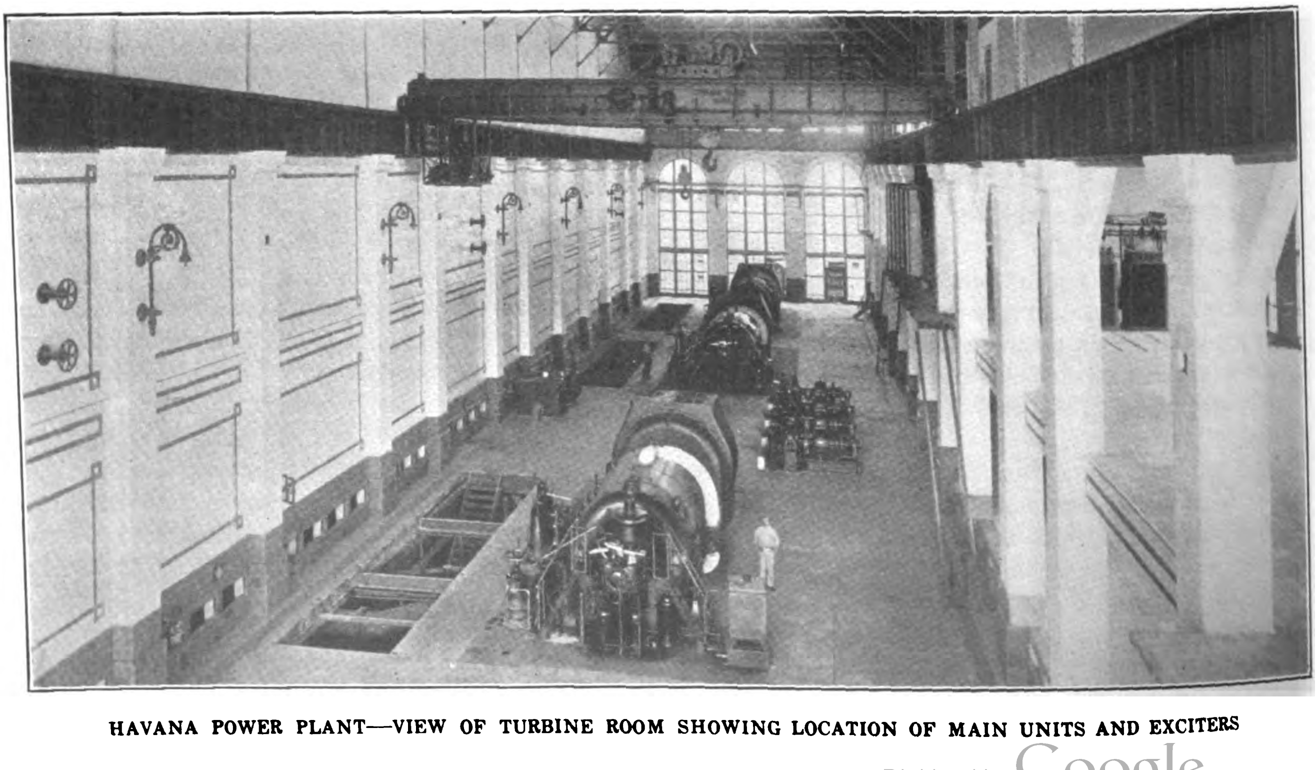
In consequence a contract for equipment was made early in February, 1913, with the Westinghouse Electric & Manufacturing Company. This covered three 12,500-kw turbo-generators, together with condensers, boiler-feed pumps, automatic stokers, exciters, transformers, electrical switch-gear, and control apparatus, the limited capacity of each generating unit being due to the fact that no single piece exceeding 100,000 lb. in shipping weight could be transported without excessive difficulty and expense. Shortly after placing this order a contract was made with the Babcock & Wilcox Company to furnish and install twenty-four 6000-sq.-ft.. horizontal water-tube boilers with internal Foster superheaters, and with the selection of the principal features of apparatus the plans for the power house building were rapidly developing, work being begun on the foundations on March 17, 1913.

The first of the generating units was started on Oct. 1, 1914, and began to carry load regularly on Oct. 3. On the first day of December, 1914, two main units were in regular operation and the old plant, which had supplied the larger portion of the lighting and commercial power loads, was finally shut down. On Dec. 11 the third generating unit was put into regular operation, and on Dec. 31 all of the railway load was transferred to the new station, with the exception of that which was to be carried by a new substation then under construction.

MECHANICAL AND ELECTRICAL EQUIPMENT

In general the new station is divided into three sections or panels, each consisting of one generating unit complete with its condenser, condenser pumps, boilers, and connecting piping. The general auxiliaries for the station, consisting of exciters, boiler-feed pumps, plant-service and heater-supply pumps, feed-water heaters and meters, constitute a fourth group. This is located between the second and third of the main units. The steam piping of the three sections is connected by an equalizer or tie-line header, to which the auxiliary group is connected so that the general auxiliaries may be supplied with steam directly from any section or sections of the boiler plant in operation. All condenser pumps and general auxiliaries are steam-driven and they exhaust into a bank of open feed-water heaters.

As the only water available for boiler feed must be purchased from the city water supply system at a very high price, and is heavily charged with scale-forming matter, it is important to save all the condensate possible and to keep it free from oil. Consequently, all auxiliaries are turbine-driven except the three house-service pumps, the stoker engines and a few small pumps. These exhaust through oil separators, and in this way only a very small part of the steam condensed in the main feed-water heaters or the condensers ever comes in contact with cylinder oil. The only known

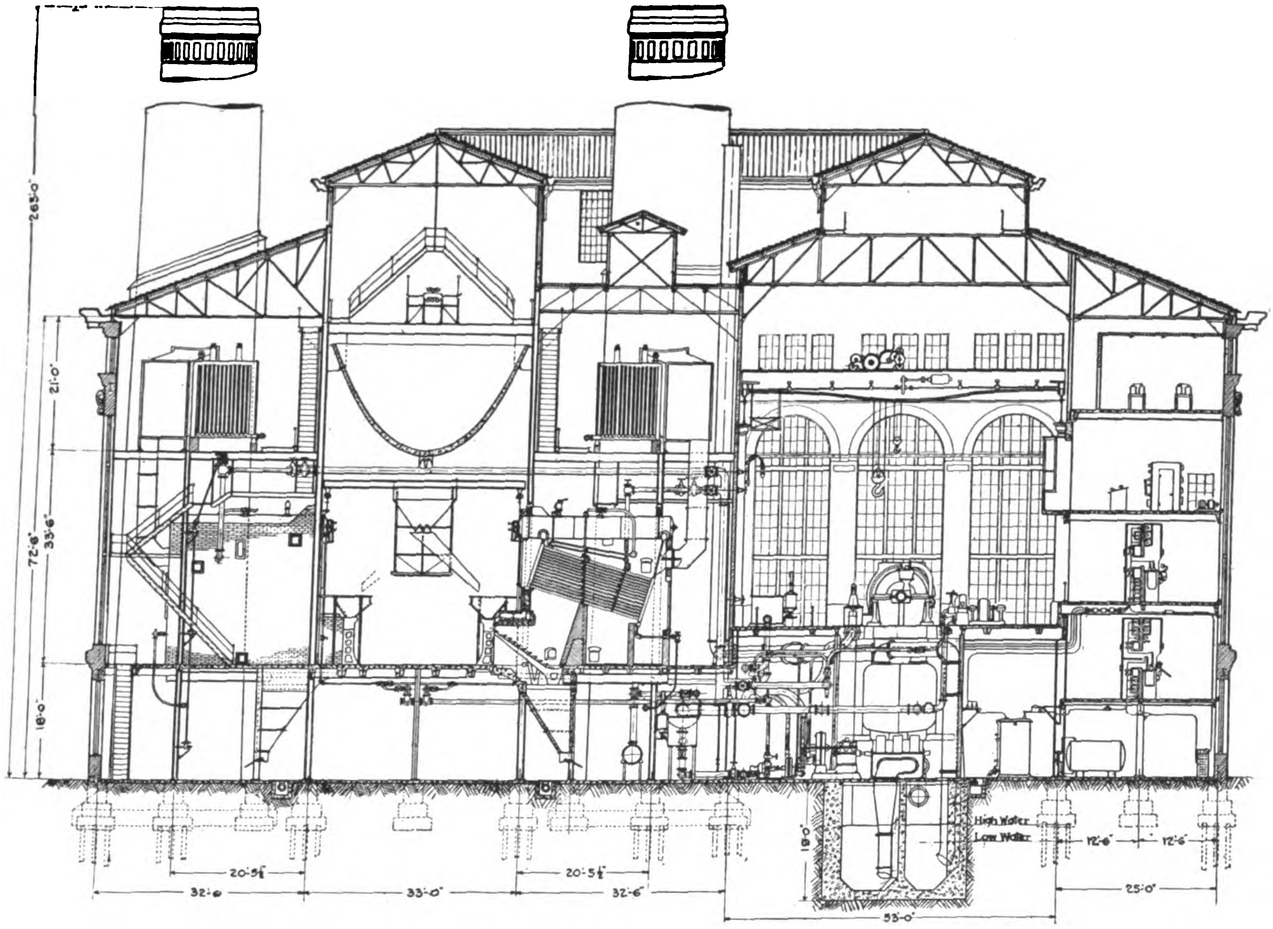


HAVANA POWER PLANT—VIEW OF TURBINE ROOM SHOWING LOCATION OF MAIN UNITS AND EXCITERS losses of water evaporated in the boilers are due to leakage from pipe and boiler joints and the steam blown into the stoker grates.

The steam piping was laid out in accordance with the general plan of three main sections and an auxiliary section all tied together by an equalizer or tie-header with sectionalizing valves. This general scheme is followed also in the exhaust piping of the auxiliaries, the drain piping and the circulating water system of the main condensers. The drainage of the high-pressure steam piping flows through groups of traps which discharge to the main heaters, the low-pressure drains lead to the outside water service.

Owing to a city ordinance which forbids the connection of pumps which draw water directly from the city main, a storage tank has been provided outside the building into which water flows under normal pressure. For this the pit of an old gas holder formerly used by the gas department was repaired and covered and another similar pit is under construction. The combined capacity of the two pits will be about fifteen days' supply of water for the make-up and for general plant service with the present equipment fully loaded. If the plant is operated non-condensing, however, the supply would last for only a few hours. All rain water from roofs and other clean surfaces will flow into the storage tanks.

This large fresh-water supply is of great importance, as the city water is subject to variation of pressure and even to occasional interruptions which in the past have threatened the constancy of service very seriously. In addition, if the plant had to run non-condensing under heavy load for even a few minutes, the flow from the city pipes would be quite inadequate to keep the boilers supplied.

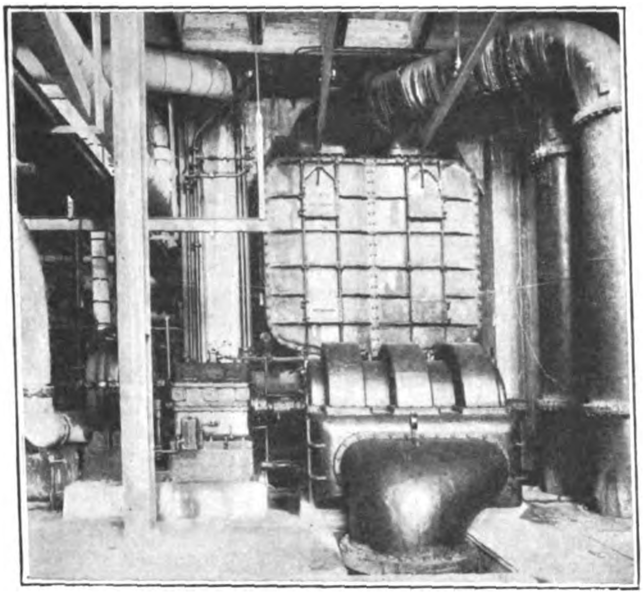


HAVANA POWER PLANT—CROSS-SECTIONAL ELEVATION SHOWING ARRANGEMENT OF MACHINERY

The electrical characteristics of main generators were selected on the basis of the various systems of distribution already in use, such matters as climate, character of available station labor, and distance from the base of supplies being also considered. Distribution to the railway substations is made at 13,200 volts by aerial lead-covered cable. About three-fifths of the lighting and power loads is made at 2200 volts by overhead single-wire lines, while two-fifths is made at 6000 volts by underground lead-covered cables. All of the three systems are three phase and at a frequency of sixty cycles. While both lighting and power systems cover the whole city the greater part of the load in the vicinity of the plants is transmitted at 2200 volts.

The determination of generator voltage was based upon the fact that 6000 volts offers no advantages as compared with 13,200 volts and has the disadvantage of much higher copper cost. This left the choice between 2200 volts and 13,200 volts, both being entirely practicable for the generators purchased, but mainly on account of the constant high humidity and also the distance in both space and time from the base of supplies and the difficulty in getting station attendants in Cuba who were used to such high-tension winding, the lower of the two voltages was selected. This involved some serious difficulty due to the great size of the generator leads and generator circuit breakers, but these objections were considered easier to overcome, under the circumstances, than the local difficulties with high tension.

Three sets of single-phase raising transformers for 13,200 volts with a capacity of 6000 kva per bank were purchased as an initial equipment. These have divided secondary coils and sub-voltage taps so that one bank may be used to supply the 6000-volt distribution as



HAVANA POWER PLANT—VIEW IN BASEMENT SHOWING TWIN CONDENSER

long as that continues in service. The main generators are provided with automatic oil circuit breakers having positive time-element and reverse-energy trips, designed especially for the protection of the lead busbars and station wires, because the large current in case of a short-circuit could do very serious damage.

A fourth generating unit of the same capacity as the first three can be installed in the present building with only relatively slight expense for modifications in the piping system, and additions of corresponding sections to the busbar and switch structure and the control switchboard. Further extensions with similar or larger generating units can be made at either end of the present building, and these can be completed ready for use before removing the present end walls without interfering with regular operation in any way.

STEAM GENERATING EQUIPMENT

The tract of land on which the power plant is located has 600 ft. of waterfront on an arm of the harbor of Havana, and a reinforced concrete wharf designed for 30 ft. of water has been built across the whole frontage. A track is laid along the face of this wharf and this connects with the yard system in the power plant track and with the double-track freight line of the Havana Terminal Railway, which crosses the property in the public streets between the wharf and the power plant. The principal object of the wharf is the receipt of coal, and for this purpose a complete unloading and conveying apparatus has been installed. This can take coal from barges or ships and deliver it to the storage bunkers of the plant, which hold about 3000 tons, or to the railroad cars for transport either to the present coal-storage yards located near by or to any other point reached by the connecting tracks. Coal can also be received in cars from the storage yard or elsewhere and delivered to the plant bunkers. This extra precaution was taken because all coal must be imported and it may be necessary or convenient to receive and store larger quantities of coal than the plant bunkers can hold. The storage yard has a normal capacity of 6000 tons and in emergency double that amount.

The 6000-sq.-ft. boilers are equipped with improved Roney stokers which provide for the evaporation of at least 40,000 lb. of steam per hour per boiler with the best efficiency at rates between 23,000 lb. and 28,000 lb. of steam per hour. Based on the customary rating of boilers this is equivalent to a maximum of 200 per cent of nominal rating, with best economy between 130 per cent and 150 per cent. As each main unit with its auxiliaries requires about 180,000 lb. of steam per hour at the most economical load and 225,000 lb. at the maximum continuous load, eight boilers are allotted to each main group, this being enough to support the maximum load at best economy and still supply full load safely with two boiler units out of service for cleaning or repairs.

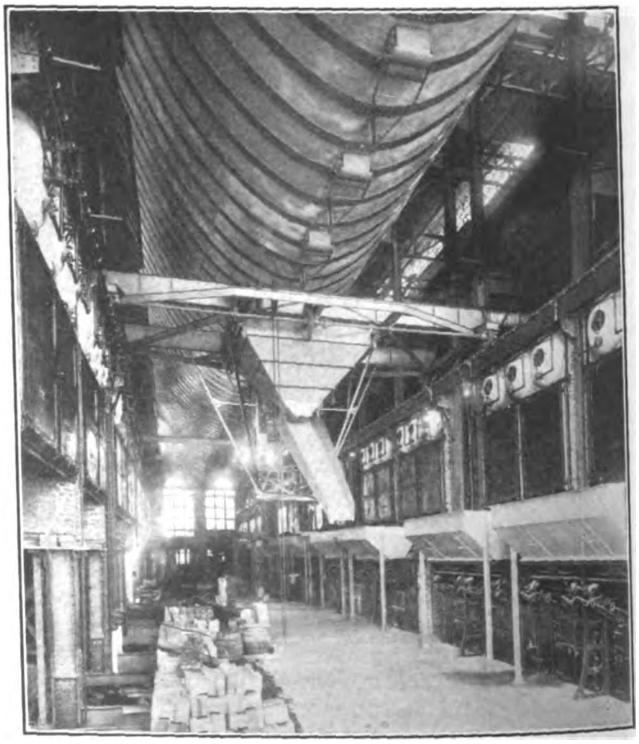
The boilers are of the Babcock & Wilcox standard all-wrought-steel type set in brick with the front headers 12 ft. above the floor.

These stokers have flat suspended tile arches 6 ft. long projecting out in front of the boiler setting in a half Dutch-oven. In consequence the stokers do not extend inside the combustion chamber or obstruct the gas passages.

Because of the high transportation cost it has been found most economical to use only the best grade of coal produced in the eastern part of the United States. At present New River semi-bituminous coal averaging about 14,800 B.t.u. per pound is being purchased.

All of the boilers are placed upon one level and are arranged in two lines of twelve boilers each, extending parallel to the long dimensions of the turbine room. They are set in batteries and face each other across a wide aisle. This arrangement was selected as offering the maximum space and coolness with a minimum of ground occupied, the consideration of climate involving the need for ample ventilation. The length of the building was determined by that of the two rows of twelve boilers with two chimneys for each row. This length corresponds with that required for the generating and electrical equipment, leaving room for a fourth main unit to be added when the load reaches the capacity of the original installation.

The four chimneys are 268 ft. high above the basement floor and 250 ft. above the grate. They are built of reinforced concrete with walls 19 in. thick at the



HAVANA POWER PLANT—VIEW IN BOILER ROOM SHOWING TRAVELING COAL HOPPER OVER FIRING FLOOR bottom and 6 in. at the top, and they taper from 20½ ft. in external diameter at the bottom to 15 ft. at the top. A separate self-sustaining concrete lining extends to a height of 104 ft. above the ground. The smoke flues are built of sheet steel stiffened with angles. They are 7 ft. wide x 12 ft. high and are placed over the aisles behind the boilers. Space has been left over each row of boilers for the installation of economizers in future.

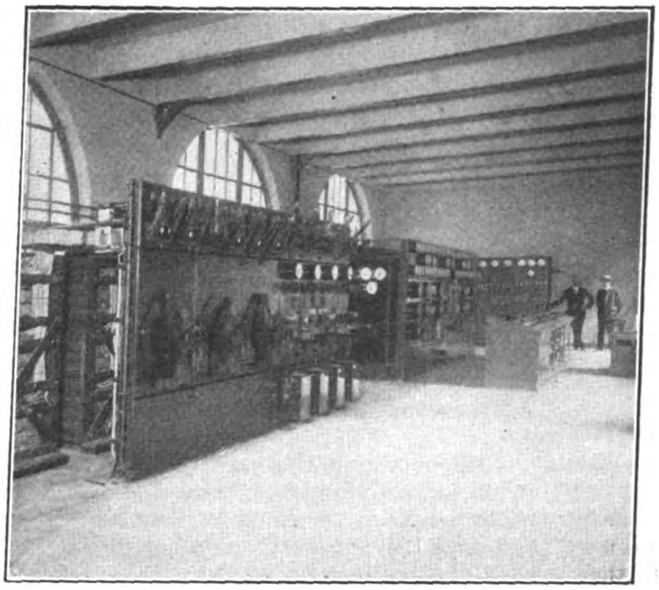
Above the level of the boiler and over the wide aisle between them is a parabolic reinforced concrete bunker of 3000 tons capacity. Beneath this is a traveling larry with a weighing hopper of 10 tons capacity which can receive coal from gates placed at intervals of 10 ft. along the bottom of the bunker. After the coal is weighed on the larry it is discharged into steel receiving hoppers of 4 tons capacity which are set just over the usual feeding hoppers of the stokers. By this scheme coal can be drawn from any desired portion of the bunker, thus preventing bunker fires from becoming serious.

The boiler-room floor is 18 ft. above the basement or ground level, and underneath each stoker is extended a large concrete-lined steel ash hopper with a dump gate which drops the ashes into the vacuum ash-handling system or else into small cars in case the present system is out of service.

GENERAL ARRANGEMENT OF EQUIPMENT

As the turbine room is placed alongside of the boiler room with the turbines in a line parallel to the two rows of boilers, the three turbine units are located so that each is approximately opposite to a corresponding group of eight boilers, four on each side of the center aisle in the boiler room. At the same time room is left at one end for an additional generating unit as well as about 40 ft. of clear space in the center of the turbine room, along one side of which are placed the four 100-kw exciter units.

A brick wall extending from the boiler-room floor to the roof divides the boiler house from the turbine room, but the basement is open and continuous to the further side of the turbine foundations. The main generating units are set on longitudinal steel beams supported on concrete piers transverse with this wall, thus leaving spaces under the unit and between the piers open for auxiliary apparatus and ventilation. In order to avoid having pumps below ground level, the main units and the turbine room floor were set 24 ft. above the ground, thus affording ample head room for the condensers and auxiliaries. Directly below each main turbine is placed a 30,000-sq.-ft. surface condenser with the circulating pump at the boiler-room end and the air and hot-well pumps at the side, all set on the ground floor. The other turbine auxiliaries are set along the wide aisle running the length of the basement on the side that is nearest to the boilers, the boiler-feed, service and heater pumps being in the central space between the second and third turbine foundations under the exciters on the floor above.



HAVANA POWER PLANT—VIEW OF CONTROL SWITCHBOARDS IN OPERATING GALLERY

HAVANA POWER PLANT—VIEW OF SUCTION TANK FOR ASH-HANDLING SYSTEM

Large openings are left in the turbine-room floor so that all the auxiliaries in the basement are in plain view from above, and all except the condenser circulating pumps and the feed-water heaters can be reached directly by a crane of 50 tons capacity which runs the length of the turbine room.

At the side of the turbine foundations opposite to the boilers a brick wall divides the basement from end to end but leaves full-size openings into the spaces under the generator ends of the main units. Each of these spaces is closed off at the boiler-room end of the piers so that one side of the basement serves as a ventilating duct or aisle and is completely separated from any part of the building containing steam machinery or piping. In this space the raising transformers are set and the main generator and exciter leads are run in the open between their respective generators and the bus and switch structures. Over the large transformers are removable hatches in the turbine-room floor, through which the crane can lift the transformers complete.

The entire side of the building opposite to the boiler room is divided by four galleries about 26 ft. wide in which are placed all the station busbars, switch-gear and electrical-control apparatus. This arrangement separates the electrical switching and control apparatus and the steam equipment almost as completely as if they were in separate buildings. At the same time it preserves the unity of the plant and the accessibility of each part of the equipment.

The first electrical gallery is open to the ventilating aisle but is shut off from the turbine room, while those above are separated from the turbine room only by the building columns and railings, except the operating room which is fully inclosed.

CIRCULATING WATER SUPPLY

Extending for the length of the building directly under the turbine foundations is a double canal for condenser circulating water which is drawn from and returned to the harbor. The top of the canal is covered with a 9-in. reinforced-concrete slab, upon which the circulating pumps are set, directly over the center wall which divides the entering water from the discharge. The turbine foundation piers are carried on the walls of the canal, across which they extend over steel girders.

Outside of the building the canal divides into two lines of cylindrical reinforced-concrete pipes. One of these connects the discharge canal to the harbor at the down-stream end of the wall and the other runs parallel to the end of the building to a screen basin built for one of the old plants of the company located at this point. The screen basin is connected to the harbor by a tunnel 5 ft. square. In this basin are located four baskets made of copper frames covered with heavy wire screen. These are arranged so that flat screens may be dropped in front of them and the baskets then removed one at a time, carrying the material they had strained out of the water. Any matter that lodges against the flat screens is washed into the basket when it is replaced and the flat screen removed. The screens are now lifted with a chain block which will later be replaced by compressed air hoists. The material removed consists largely of jellyfish, which clog the screens of the condenser tube if admitted, but when exposed on land soon vanish in an odor which is anything but sanctified.

Over the water level in the discharge canal and just below the cover is placed a 30-in. cast-iron water line which connects the inlet chambers of the three condensers so that, if necessary, any circulating pump can supply a limited amount of cooling water to any other condenser.

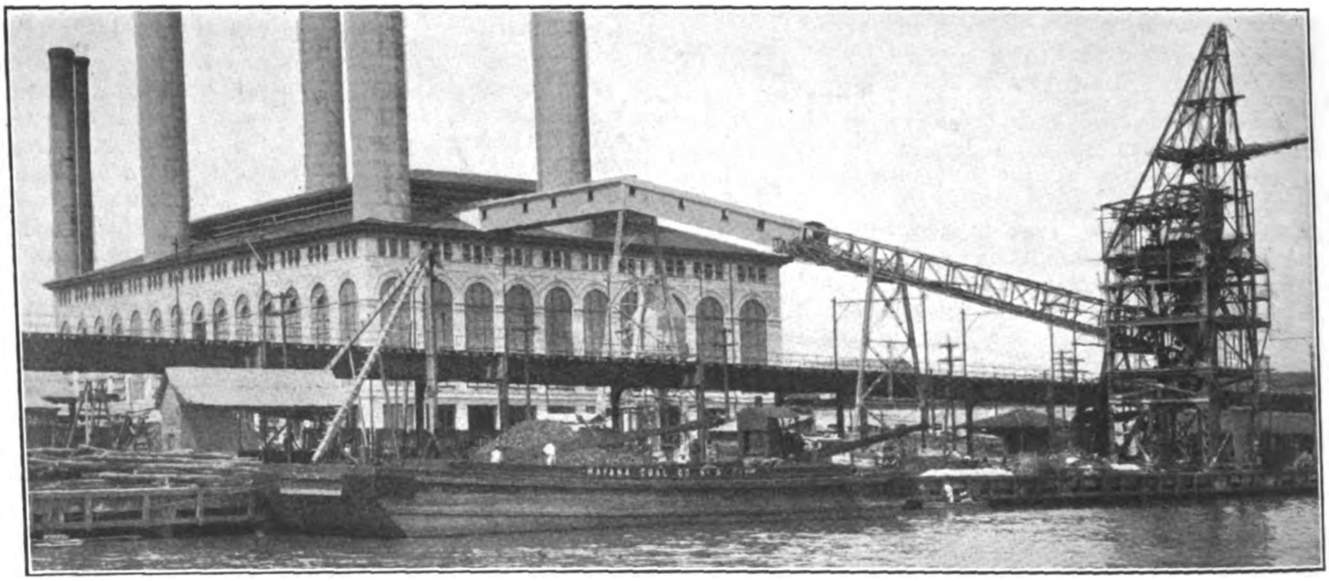
The water boxes, covers, and circulating piping of each condenser are so divided that the circulating water can be cut off from one-half, leaving the other half of the condenser in service. By means of this arrangement half of the tubes may be cleaned at a time with a loss of only 1 in. or 2 in. of vacuum during the process. This rather unusual arrangement was made because at times the harbor waste holds in suspension a great amount of very sticky matter which coats the condenser tubes and reduces their heat-transmitting capacity very seriously. It is, however, easily washed out with a brush and a small stream of water. The condensers slope about 8 in. from the horizontal so that the tubes may drain empty when not in use. This diminishes the corrosion which is unusually severe because of the high temperature and impurity of the salt water used for cooling.

STEAM-DRIVEN AUXILIARIES

To supply the various steam-driven auxiliaries there are two loop headers, one for the exciters and one for the pumps. Both headers are connected into the 10-in. equalizer main on both sides of the middle boiler header and both are provided with valves so that exciters, boiler-feed pumps and house-service pumps can be fed from whichever section of the boiler plant is in service, leaving the remaining boiler group headers and the other two sections of the equalizer header entirely cold. The auxiliaries of each generating unit, comprising the condenser pumps, oil pump and gland pump, are connected directly to the equalizer or tie-line just opposite the main turbine.

With this piping arrangement it is possible to operate any main generating unit, with a full complement of auxiliaries, from any of the boilers, although of course there would be considerable drop in pressure under extreme conditions. Full loads can be carried on one turbine when supplied with the maximum length of steam piping, and a large saving in cost of piping is effected by the use of a small tie-line instead of a connected header system.

The exhaust steam from all the turbine-driven auxiliaries passes into a header running the length of the turbine and located about 11 ft. above the floor. At the center, connections are made with two open boiler-feed-water heaters of 300,000 lb. per hour capacity each. At suitable points connections are made between the header to inlet valves on the low-pressure stage of each of the main turbines. These admit steam to the turbines at constant pressure, so that when more steam



HAVANA POWER PLANT—GENERAL VIEW OF PLANT FROM WATER FRONT flows into the exhaust header than can be condensed in the feed-water heater, these valves admit the surplus steam into the main turbines, where it does useful work. It is estimated that under normal conditions 1 lb. of this exhaust steam saves from 0.3 lb. to 0.4 lb. of high-pressure boiler steam, and then, as it is condensed, it becomes available for boiler feed instead of being wasted to the open air as is usual. The exhaust header is, of course, provided with outlets to atmosphere through automatic back-pressure valves which are set to open at a slightly higher pressure than is needed to lift the constant pressure valves into the low-pressure stages of the main turbine.

In order to allow the escape of air and other gases which are always present in steam the feed-water heaters are provided with vent pipes to a small surface condenser through which the cold water passes on its way to the main heaters. Each heater, then, discharges through the vent a mixture of air and steam, the steam being condensed and the air escaping through a suitable opening. Owing to the arrangement of outlet valves of the exhaust system the heaters are under slight pressure and therefore no pumps are needed to draw the mixture of air and steam to the vent.

ELECTRICAL OPERATING FACILITIES

The operating room for the plant is in the middle of the third gallery just opposite the exciters in the space between the second and third generators. The front of the room projects about 4 ft. beyond the gallery and is inclosed with wireglass set in steel casement sash. The lower panes are clear, giving a full view of the turbine room. One end of the operating room is closed by a concrete wall. Beyond this are the station-auxiliary transformers, but the other end is covered by a wood and glass partition which is movable to provide more space when it is required. From the projecting front of the room two flights of stairs run to the turbine-room floor. These are set close against the gallery and one leads toward each end of the building.

The control and instrument switches and indicator lamps are mounted on an inclined desk which is divided into sections, one for each generator, exciter, transformer bank, and group of six feeders. These are arranged in the same order as the apparatus. On the desk is mounted a copper strip diagram of the station buses and connections. In this the control handles, signal lamps and model disconnector switches are placed to correspond with the real circuit breakers and switches so that the operator has a plan of the station connections always before him with indications of the actual condition of all switches. The circuit breaker controllers, ammeter switches and synchronizing switches are of rotary drum type. The latter have detachable non-interchangeable handles of different colors to show the generator in operation and the incoming generator, together with interlocking circuit contacts which make it impossible to close the incoming generating circuit breaker unless the right switch and handle are used in synchronizing. Each generator desk panel has also control switches for the corresponding field switch, motor-operated field rheostat and governor adjusting motor of the steam turbines.

The indicating and recording instruments are mounted on a vertical board 3 ft. 6 in. behind the desk, the panels of the board being placed opposite the corresponding panels in the desk. The Tirrill voltage regulators are on the same vertical board.

Standing back to back with the instrument board and about 4 ft. behind it is a similar board containing the relays, circuit-breaker contactors and other small auxiliary devices. The exciters are controlled from a switchboard of seven panels standing in line with the instrument board. The exciter-control apparatus, consisting of knife switches for the positive, negative and equalizing leads, with a carbon circuit breaker in each negative lead, is hand-operated, and the cables come direct from the exciters and generator fields to the switchboard. The exciter bus is in duplicate.

In connection with maintenance of the electrical equipment it should be remarked that an outfit for dielectric stress trials has been installed. This consists of a 150-kva, single-phase, testing transformer, 2200 = 14,000 volts, with a separate regulating transformer which, when operated in conjunction with a small induction regulator, produces a smooth voltage curve from zero to the maximum. This outfit is to be used to test the insulation of new apparatus, cables and repair work before putting it in service. All electrical apparatus is to be tried out from time to time to find the weak places without needless damage and so forestall and prevent breakdown when in actual service.

Ample locker and toilet rooms are provided for the different divisions of the operating force. These are situated in the basement of the boiler house, in the turbine room and in each of the four electrical galleries. This portion of the equipment has seldom received adequate attention in Cuba, and it is intended to make this a model installation.

In conclusion it should be said that all machinery and apparatus except the boilers and the turbines, the contract for which included erection, was received by the railway company at the port of export and, after being landed in Havana by the steamship company, was taken to the plant and installed by a force employed directly by the Havana Electric Railway, Light & Power Company. The installation was subject in some cases to the advice and supervision of erecting engineers sent from a native works, but all special foundations, structures for electric busbars and switches and the like were designed and carried out directly by the regular force of the railway company.

OFFICERS AND ENGINEERS

A list of some of the officers and engineers of the company most closely related to the power development follows: President and general manager, Frank Steinhart; assistant general manager and chief engineer, railway division, C. W. Ricker; chief engineer, lighting division, D. Lombillo-Clark; superintendent of power, W. B. Flanders; electrical engineer, C. S. Sanderson; commercial engineer, E. W. Barron; engineer of power plant, R. L. Nelson.

Real Significance of Taxation

The Boston *Herald* recently published an editorial upon taxation under the caption "A Typical Instance," which is of more than local interest to public utilities and their customers. The writer stated that Stone & Webster, whose varied public service enterprises are of nation-wide scope, report that 5.5 per cent of the gross earnings of the companies under their management are immediately paid over in taxes, chiefly to the municipalities in which they do business. In several Massachusetts cities this proportion rises to 10 per cent of the gross revenue. The source of this money is the customers of the public utility companies, the editorial states. It is one of the costs of the service, and it is necessary to charge enough more for electricity to carry this expense, or, where the price of the commodity sold is fixed by statute, as in the case of a 5-cent car fare, the service is either reduced to a corresponding extent or else improvements are withheld.

Traffic Characteristics[*]

Peculiarities of the Public Demand for Service—Importance to the Utilities of Knowing the Riding Habit of Patrons—Statistical Measurement of Traffic

BY F. W. DOOLITTLE, DIRECTOR OF THE BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

The American Electric Railway Association, in its Code of Principles, has declared that "quality of service must primarily depend upon the money received in fares." The cost of urban passenger transportation service and the extent of the service rendered are interrelated. Traffic characteristics are the controlling factor of the cost of carrying a passenger, and, conversely, the adequacy of earnings is an important if not controlling factor in the traction company's policy with respect to providing transportation facilities. The extent of this interrelation has not been generally appreciated. It is the purpose of these articles to describe the relation of studies of traffic characteristics to service, leaving to future articles the relation of service and traffic characteristics to the cost of passenger transportation service.

With the limitations of earnings, the objective point of every transportation official is to provide the maximum amount of accommodation for passengers. Traffic studies are an important means to this end. It is only by a full knowledge of the riding habits of its patrons that an electric railway can furnish this maximum service. The day has passed when any individual, by his personal observation, can have sufficient knowledge of the demands for service at each point along the line to enable him to allocate service where it will serve the best purpose.

UNUSED ACCOMMODATIONS

As will be evident from the study of typical traffic characteristics, traction companies supply on an average greater accommodations than the traffic will warrant. In a typical twenty-four hour period more seats are supplied than there are passengers demanding transportation. The occurrence of some of this superfluous transportation is due to the physical impossibility of creating such facilities immediately and where such facilities are called for and the necessity of maintaining a regular headway and completing a trip to its destination irrespective of the number of patrons accommodated. Some superfluous transportation at certain points and times with deficiencies at other points and other times is due to misplaced service. The development of the modern traffic study has taken place in order to secure information of the traffic demand in such detail and with such accuracy as will give the necessary information for the construction of time-tables properly adjusting the service to the traffic.

In the following article it is proposed to give some idea as to the necessity and results of typical studies, when such studies may be undertaken with profit, and how they should be carried out.

GENERAL CHARACTERISTICS

It is not many years since operating men first felt the need of a more accurate knowledge of the distribution of traffic over their lines and throughout the day, than their general knowledge gave them, and from a still more recent period dates the development of systematic and scientific traffic counts.

With the growth in magnitude and complexity of urban transportation, there has come about a less personal relation between the operating officer and the employees and patrons of his company.

With the increased cost of labor and materials and the increased quantity and quality of service given for an unvarying fare, there has resulted a decreased margin of profit.

With the growth in numbers and powers of regulatory bodies, there has arisen a more intensive study on the part of the public of the service rendered by public utilities.

Development along these three lines has rendered necessary in recent years, for many companies, traffic studies that in the earlier stages of the industry would have been an extravagance. And to-day, however great the necessity for such studies, they still remain an extravagance—in the sense that all inefficiency is extravagant—if they fail to provide the maximum amount of useful information for a minimum expenditure.

In the last few years many studies have been made by consulting engineers, public commissions and operating officers. It is of interest to examine rather briefly the methods employed and the results obtained, and to see what, if any, progress has been made toward the development of a simple standard method of procedure.

In general, two purposes are to be served by obtaining traffic data. The first is to enable the company to fit its car-miles to the passenger-miles of its patrons in such a way as to minimize costs in so far as is consistent with the comfort of passengers and the development of new business.[†] The second purpose is one that exists because of the necessity of meeting complaints preferred in good faith, and arising from observations of varying accuracy, or preferred from an ulterior motive, and made the basis of an attack against the company before a body of great power which, if not in possession of the truth, may impose severe penalties.

In so far as the revenues of a company and its track capacity will permit, the comfort of patrons will be cared for, but it is not always obvious just where and when the car-miles that are at the disposal of an officer are most needed, and it is to meet this condition that traffic studies are necessary.

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[*] This is the first of a series of reports dealing with the practical uses of traffic survey, compiled by the bureau of fare research of the American Electric Railway Association. The succeeding reports will discuss the traffic survey from its organization to the application of its results to time-tables and will be entitled: "Organizing the Traffic Survey—Mapping Out the Work of Traffic Observation in Large and Small Companies;" "Traffic Observations—Extent and Frequency of Collection of Data;" "Changes in Cost of Operation, Due to Shifts in Service," and "Applying Traffic Studies to Time-tables."—EDS.

[†] The following abstract of a decision rendered Jan. 28, 1915, by the Georgia Railroad Commission, in re: Application by Georgia Railway & Power Company illustrates a well-defined tendency on the part of the regulatory bodies to take into account conditions as a factor which must be considered in regulation. P. U. R. 1915 A., page 901: The syllabus of this decision is, in part, as follows: "A street railway company, upon showing a large decrease in its revenues, owing to a general business depression, is entitled to relief from expense of all service in excess of the reasonable needs of the public. The commission, in investigating the question whether a street railway company is supplying excessive service, will not proceed upon the theory that a decrease in the use of all the lines of the system, as a whole, justifies less service on any individual line, but will ascertain service conditions, facilities, and uses on each individual route, and will pass upon each without reference to other routes in the system. Curtailment of expenses necessitated by decrease in travel, and consequent falling off of revenues of a street railway, owing to a general business depression, should not necessarily be made by taking off cars operated during 'rush hours,' since widespread business depression affects travel for pleasure and on Sundays and holidays more than it does travel necessary for persons to get to their work or places of business. Adequate urban street railway service does not mean that every passenger on every car operated should be furnished a seat, but that the company should provide reasonable seating accommodations in its cars for such patrons as desire them, in so far as it can reasonably anticipate and measure the volume of traffic to be taken care of."

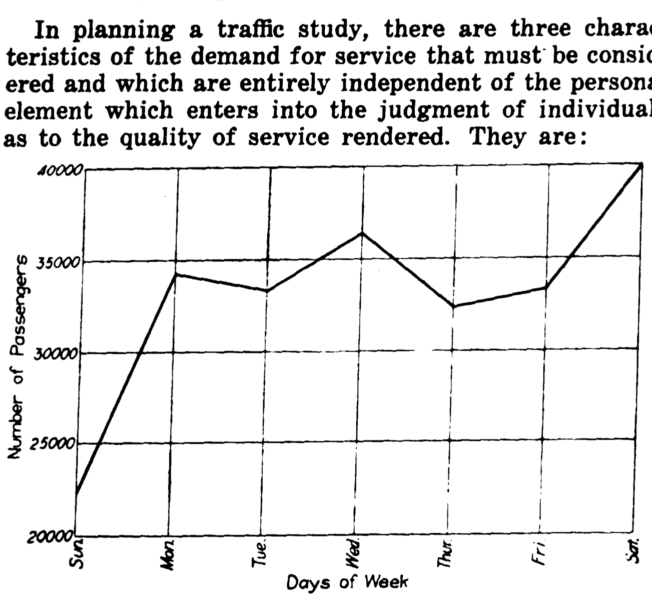
TYPICAL TRAFFIC CHARACTERISTICS

In planning a traffic study, there are three characteristics of the demand for service that must be considered and which are entirely independent of the personal element which enters into the judgment of individuals as to the quality of service rendered. They are:

(*a*) The seasonal and daily variation in the riding habit of the community.

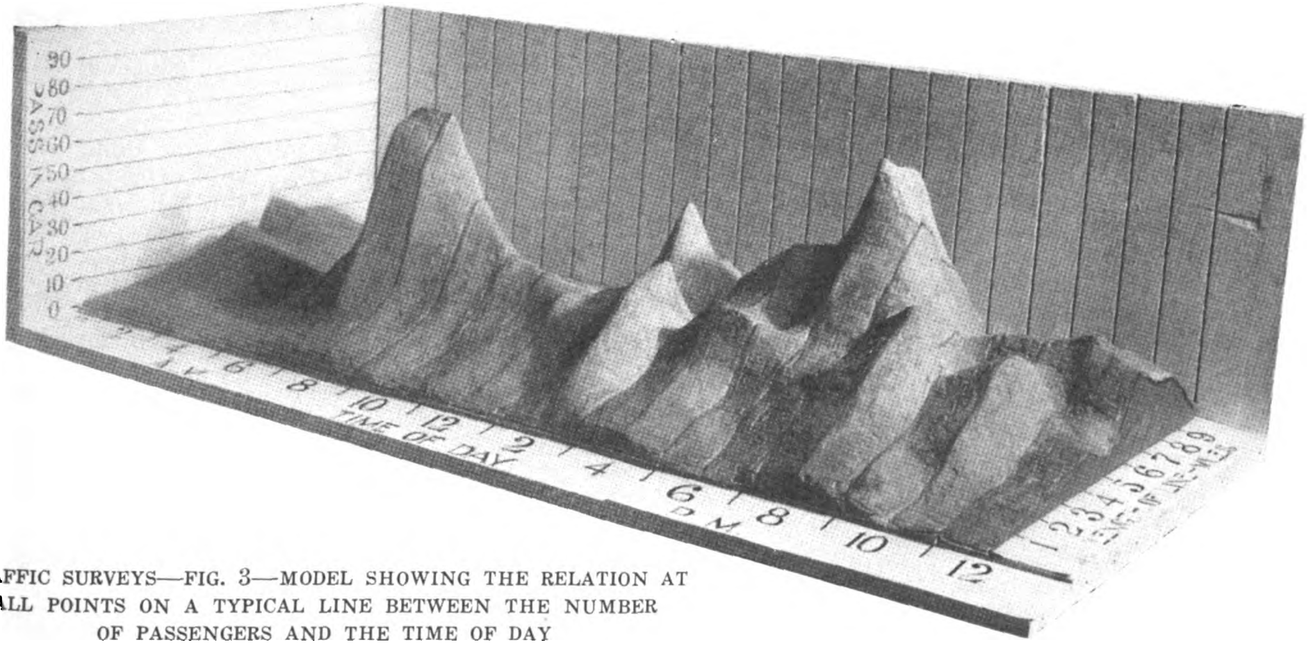
(*b*) The concentration of riding within certain hours of the day, and

(*c*) The variation in the number of passengers wishing to ride on consecutive cars operating at an undistorted headway.



TRAFFIC SURVEYS—FIG. 1—CHART SHOWING VARIATIONS OF TRAFFIC FROM DAY TO DAY THROUGHOUT THE WEEK ON A TYPICAL LINE

The exceptionally heavy loading of the first car to pass after an unusual delay is expressly eliminated from consideration, and there is in mind only the fact that due to causes entirely beyond the control of any company, cars passing at regular intervals of time will not be carrying the same number of passengers.

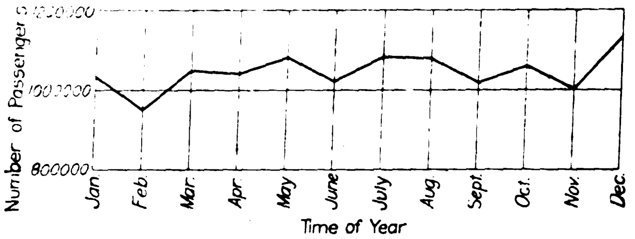


TRAFFIC SURVEYS—FIG. 3—MODEL SHOWING THE RELATION AT ALL POINTS ON A TYPICAL LINE BETWEEN THE NUMBER OF PASSENGERS AND THE TIME OF DAY

The first two characteristics of traffic demand combine to bring about regularly recurring peak loads, and their effect can be foretold with considerable accuracy. The third is largely accidental in its nature, but while the number of passengers wishing to ride on each car cannot be estimated beforehand with great precision, it is still possible to reach a fairly accurate knowledge of the diversity of loading on the cars passing a given point in any fifteen-minute or thirty-minute period.

The following figures illustrate the peculiarities of traffic demand previously referred to:

Fig. 1 shows how traffic on a typical line varied from day to day throughout a week. It would be of interest to speculate on the reasons for the fluctuations from Monday to Friday and for the 15 per cent increase in traffic on Saturday. Does this figure represent conditions fairly well maintained throughout the year, or were unusual conditions encountered at the time these data were taken? Does the Saturday increase represent travel to parks, to ball games or to steam and interurban electric railway stations, or does it represent evening rides to places of amusement? Does it offer any suggestions as to means of increasing traffic and particularly traffic at times when the company's equipment is not in use? These and many other questions it is within the province of the traffic survey department to answer.



TRAFFIC SURVEYS—FIG. 2—CHART SHOWING FLUCTUATIONS FROM MONTH TO MONTH IN TRAFFIC ON A TYPICAL LINE

Fig. 2 represents fluctuations of traffic from month to month and will suggest inquiries of value to any company. Is the seasonal variation in riding due to weather conditions, a situation indicating a considerable competition with other means of transportation? Does hot weather, cold weather or rainy weather induce the greatest amount of riding, and does this indicate competition with automobiles as well as with walking? Does the summer increase result from ball games or public parks and beaches, and in what proportion? The traffic survey department should not only prepare data on which to base schedules but should, as well, assist the officers of the company in the solution of the problems arising from an attempt to encourage such traffic as can be handled at a profit.

Fig. 3 is a photograph of a model constructed to show the relation between the number of passengers and the time of day, for each point of a typical line. The hourly variation in traffic is clearly indicated by the height to which the model rises above its base, and the accuracy of the use of the term "peak" in connection with traffic is demonstrated.

Fig. 4 is a photograph of a model constructed to show the variation in car loading from point to point on a typical line and indicates that since the seating capacity of each car is fifty persons, there is being run a large number of idle seat-miles, necessitated by the requirements of maximum headway and by the fact that cars cannot be put into service and taken out of service at every point on the line at the will of the operating department. These four figures are introduced primarily as illustrating conditions which the schedule maker must know, and while comment has been made on the value of knowing the causes of the traffic fluctuations there indicated, we are primarily concerned with the organization and methods best adapted to the collection of such data as are the basis of these figures.

STATISTICAL MEASUREMENT OF DAILY VARIATION

The extent to which traffic tends to concentrate itself in certain hours of the day has an important bearing on the cost of passenger transportation service, and this concentration is measured by a number which may be called the "concentration index of traffic." Defined, the concentration index of traffic is a number which when multiplied by the number of passengers carried in twenty-four hours gives the number which would be carried if rush-hour traffic continued uniformly throughout the day.

To illustrate: A certain company carried 5500 passengers on one line in twenty-four hours, and of these 500 were handled between 5 p. m. and 6 p. m. Had this rush-hour traffic existed throughout the twenty-four hours, 12,000 passengers would have been carried. The concentration index of traffic for this line then is 2.18, for 2.18 × 5500 (the number actually carried) is 12,000 (the number which would have been carried if rush-hour traffic had existed throughout the twenty-four hours).

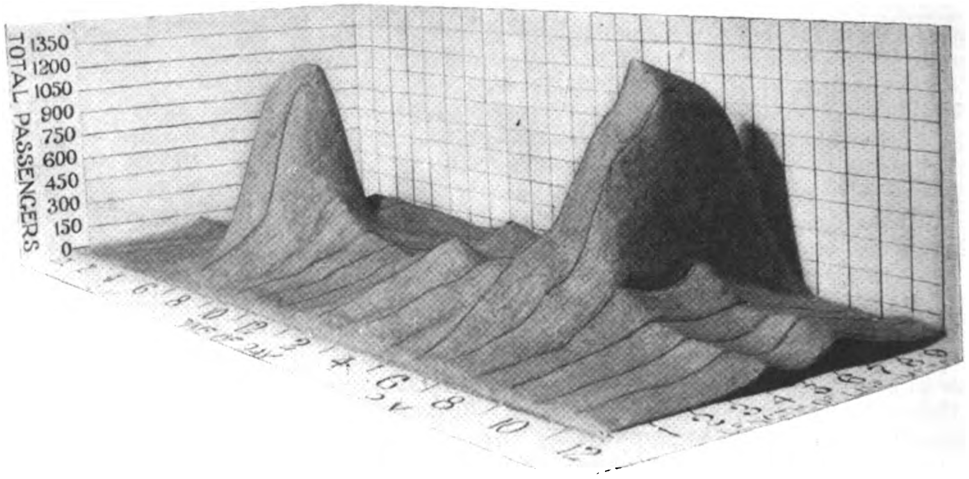
The extent to which traffic tends to vary from car to car presents one of the great difficulties encountered in the attempt to render high-grade service, and this diversity is measured by a number representing the relation of the largest number of passengers on any one car to the average number on all cars passing a given point in a definite period of time.*

For example, the five cars passing a certain point during fifteen minutes contained respectively, twenty-one, forty-two, forty-three, forty and twenty-five passengers, the average number being thirty-four. The relation of the maximum, forty-three, to the average, thirty-four, is 126 per cent, this being then the measure of the diversity of loading.

APPLICATION OF OBSERVATIONS TO SERVICE

Eliminating from consideration those accidental variations in service which even the most carefully and conscientiously operated lines occasionally meet, and those unfortunate traits of human nature that at times lead individuals into exaggeration which amounts to misrepresentation, it will be found that the peculiarities of traffic demand which must be known and met to insure good service are those already defined, viz.: "concentration" and "diversity."

On the majority of lines, during the rush hour, there are two points fairly well defined which it is also of importance to determine. They are the point at which the maximum load is first obtained, and the point at which the loading becomes appreciably less than the maximum. Between these points occur such conditions of loading as cause complaints, and beyond the second occurs, if at all, excess car mileage, the elimination of which is the constant effort of the management.



TRAFFIC SURVEYS—FIG. 4—MODEL SHOWING THE VARIATION ON A TYPICAL LINE OF CAR LOADING AT VARIOUS POINTS

As the seating capacity of each car is fifty, the model indicates a large number of idle seat miles, necessitated by requirements for maximum headway and the impossibility of taking cars out of service at points where necessity ceases.

Particularly during the non-rush hours the lack of uniformity of the flow of traffic into and out of cars may cause a considerable variation in the number of passengers in cars moving at a uniform headway, the result of which is that certain passengers may be obliged to stand. A knowledge of this non-rush-hour variation in loading or "diversity" will assist in determining the excess of seats over passengers which it is necessary to provide under normal conditions to furnish seats for all, at a time of day when a company can best demonstrate to the public that it is acting in good faith in its attempt to serve the convenience and comfort of its patrons.

Too often in the past, however, franchise requirements and commission rules and regulations have overlooked the fact that the number of seats in a car is fixed and that it is impossible to put into service and remove from service at every point on a line cars to meet the service requirements imposed. In order that the fare paid may purchase the maximum amount of service, which is equally desired by the operator and the patron, consideration must be given to two phases of diversity of loading: (1) Passengers without seats; (2) seats without passengers.

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*Unusual distortion of headway arising from a block of any sort will produce a large diversity of loading and should be eliminated from consideration.

In order to furnish ten passengers with seats for a mile trip, it may be necessary to run a car with seats for forty passengers 5 miles. The 200 seat-miles furnished for 10 passenger-miles may impose a burden on the service that is not to the best interest of the patrons as a whole.

An interesting example of the difficulties and dangers arising from an effort to fit car operation, which is inelastic because the smallest unit of service that can be rendered is the seat-miles of a round trip of one car, to an inelastic standard of service has recently come to notice.

The diversity of loading observed on a certain line was such that it was believed that the furnishing of 33 per cent more seats would insure no standing except by preference. At the time the original survey was made, the company was furnishing during each fifteen-minute period a seat per passenger at the point of maximum loading, but due to the diversity of loading some cars had vacant seats and others had standing passengers. Under the circumstances, 4.2 per cent of the passenger-miles were being made by passengers who could not find seats. After the service (seat-miles) was increased by one-third, it was found that 3.8 per cent of the passenger-miles were made by standing passengers. Thus to increase by 0.4 per cent. the number of seated passengers, it was necessary to increase the seat-miles furnished by 33 per cent.

Diversity indicates a vacant seat for every standing passenger on a schedule providing a seat per passenger, and while a passenger may stand for one block only, the vacant seat is carried through to the end of the run. Diversity in loading is accidental, and to provide completely against such abnormality in the flow of traffic is usually so expensive as to impose a serious burden upon the traffic as a whole. While, therefore, it may be impossible to take care of all diversity in loading, it is nevertheless important that this diversity should be known and that the attendant circumstance of vacant seats should be shown in connection therewith.

Up to a certain point, additional service can be furnished at certain times of the day and in certain localities at a reasonable cost, and where this is possible it should of course be done, but it should be constantly borne in mind that the figures to be considered are not seats and passengers, but seat-miles and passenger-miles. This point should be especially emphasized, and although there are attendant difficulties due to the fact that the charge for urban transportation is very generally not based on the length of ride, such data as can be obtained should be used to measure service not by the ratio of seats to passengers at any point but by the ratio of seat-miles to passenger-miles within a given district and during a definite period of time. This last ratio measures the relation between what the passenger wants and what the company provides. It should be possible to determine then the diversity of loading and the points between which maximum loading exists, from the data taken in any traffic study, in addition to the information usually determined as to the number of passengers passing points of heaviest traffic at different hours of the day.

In 1909 for a period of twenty-four hours a count was made of every passenger entering and leaving every car of one of the largest companies, at every point on the line. Frequent observations have been made by many companies of the number of passengers passing some point of heavy loading during thirty minutes or an hour in the evening rush. Between these two studies lies the practical mean, and if the fact be borne in mind that the simpler the plan the more frequently the observations can be made, the question involves the determination of the point, for each of the following items, where increased expenditure is not accompanied by data which is sufficiently greater in value to justify the outlay.

(*a*) Type of man and organization to be employed on the work.

(*b*) Frequency of collection of data.

(*c*) Extent of data to be taken.

These features of traffic studies will be discussed in later articles dealing with the organization to be employed, and the extent and frequency of data to be taken.

Tramways in the United Kingdom

A. J. Lawson Analyzes the Operating Results for the Year 1912-1913

An analysis, prepared by A. J. Lawson, of the operating results of the tramways in the United Kingdom for the year 1912-1913, was published in two issues of recent date of the London *Engineer.* The analysis was based on the Board of Trade report noted in the London Letter in the ELECTRIC RAILWAY JOURNAL of Feb. 6, page 301. The capital expenditures during the period were £79,359,758 on 2661 route-miles, equal to an outlay of £18,229 per mile of single track. The added track during the year was only 25 route-miles, the largest amounts being 10 miles in Birmingham, 7 miles in Belfast and 4¼ miles in London. It is stated that tramway construction seems practically at an end, unless the London County Council should add a few more miles to complete its present unfinished network. The total number of cars ordered during the year was 338, all electric.

In Greater London the number of passengers decreased more than 22,500,000, but throughout other parts of the United Kingdom the number of passengers increased not less than 92,500,000, making the total number 3,319,857,293. The tramway passengers outnumbered the steam-railroad passengers nearly two and one-half to one. On an average fare of 1.065*d.* per passenger they produced £14,282,651, which, with revenue from other sources, made an aggregate of £14,972,919. The working costs were £9,384,798, leaving a net income of £5,588,121. The average working costs amounted to 6.70*d.* per car-mile, and the total costs, including interest, sinking fund charges and rentals, to 9.86*d.* per car-mile.

Power costs ranged from 0.442*d.* per car-mile for Glasgow car operation to 2.629*d.* per car-mile for Burnley. For seven interurban lines, traffic expenses averaged 2.463*d.* per car-mile, ranging from the high mark of 3.144*d.* for the Birmingham & Midland Company to the low point of 2.163*d.* per car-mile for the Lanarkshire Tramways. For ten small provincial lines the average was 2.826*d.* per car-mile, running from 3.462*d.* per car-mile in Derby to 2.315*d.* per car-mile in Stockport. Car repairs rose to an average of 0.748*d.* per car for all tramways. The average cost per car-mile for track maintenance was 0.53*d.*

For all tramways the number of people carried per car-mile averaged 9618 and the fare 1.065*d.* per passenger. With three exceptions, the passenger fares on all the London tramways were below the passenger expenses, the all-around average deficiency being 0.012*d.* for each of the 796,235,110 passengers carried. The average fare for the twenty-seven largest municipal undertakings ranged from 0.776*d.* in Glasgow to 1.269*d.* in Dublin. Five trackless trolley car systems in the United Kingdom showed a deficit for the year's operation.

New Carhouse and Shops at Holyoke

The Novel Features of This Fireproof Structure Include Roof Trusses Incased in Concrete and Crane Service, in Addition to Wheel Hoists and Car Hoists

The new carhouse recently built by the Holyoke (Mass.) Street Railway Company possesses a number of features which differ materially from the approximate standards that have been largely established by custom. The most prominent of these is the use of partly-inclosed special work, the three tracks of each bay branching from the ladder-track lead just outside of the building line and entering the building on a curve. This arrangement necessitated a bend in each partition wall of the carhouse to provide clearance at the inside of the curved track but permitted the use of sliding doors which are entirely concealed when open. In general the special work was designed first and the building was made to conform to it on account of the desire to attain the maximum value from the ground space notwithstanding the limited width of street in front of it.

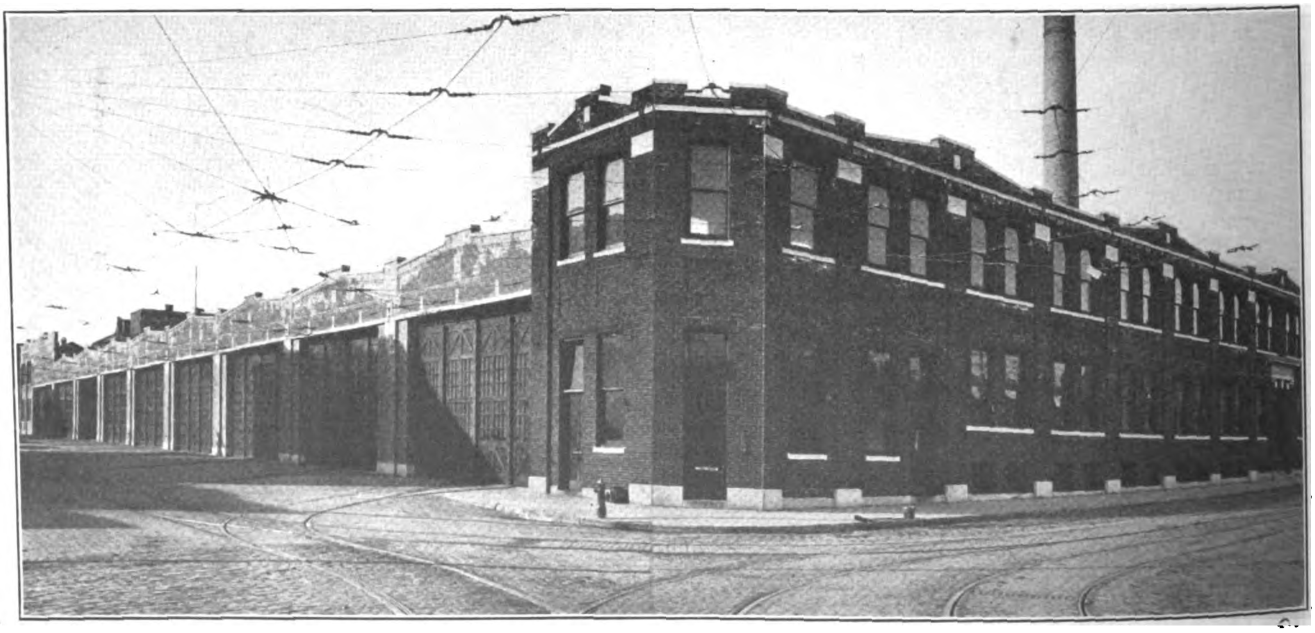
The building covers the entire tract owned by the company, which consists of a rectangular piece of land 400 ft. x 190 ft. At one side of the building is a two-story section devoted to the offices, the dimensions of this section being 26 ft. x 190 ft. On the ground floor are located the executive offices of the company, a waiting room for the public and a headlight room. On the second floor are located the engineer's office and drafting room, offices for the heads of departments, and locker and recreation room for the uniformed men. In the basement underneath this section are located the boilers for heating the entire building, the coal storage bin and a sand-drying system, which delivers sand to spouts in the adjoining carhouse.

Adjacent to the office section are four operating bays, each 190 ft. x 36 ft. 9 in., and containing three tracks placed on 11-ft. centers. Each bay can accommodate eleven double-truck cars 45 ft. long and still leave a 3-ft. passage at each end of the bay. Pits are arranged under the tracks in the operating bays, so that nine of the eleven cars in each may be inspected without shifting. Adjoining the four operating bays are three storage bays arranged in similar manner to the operating bays except that they are not provided with pits. The foundations, however, have been carried low enough so that pits may be installed in the future.

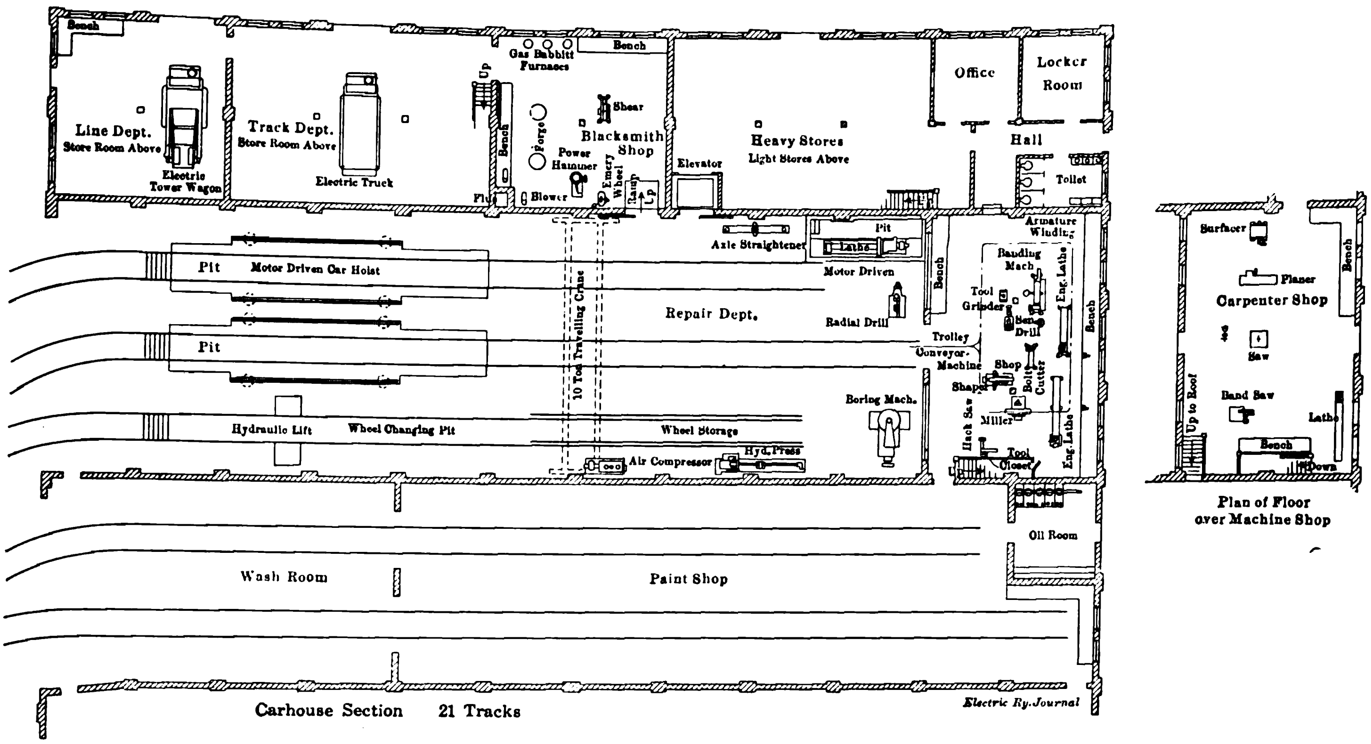
Adjoining the storage bay is the paint shop, which has two tracks placed on 15-ft. centers. The end of the bay next to the entrance is arranged for a washroom and will accommodate two 45-ft. cars at a time, and this is separated from the paint shop by dustproof glass doors. At the extreme end of the paint-shop bay is located the storage room for oils and paints.

Next to the paint shop is the repair bay which is 45 ft. 8 in. wide and 190 ft. long. For the first 150 ft. from the entrance this bay is one story in height, there being 22 ft. clear under the bottom of the roof truss. This portion of the repair-shop bay is provided with three tracks spaced on 15-ft. centers, two of these being provided with motor-operated screw hoists for lifting car bodies from the trucks. The third track is provided with a hydropneumatic pit hoist for changing wheels. The screw hoists were furnished by the Columbia Machine Works, and the hydropneumatic pit hoist by the Watson-Stillman Company.

Over this portion of the bay runs a 10-ton, floor-operated, Niles electric crane which serves the large machine tools located in the shop. The 30-ft. space at the end of the shop is of the same exterior height as the first 160 ft. but is separated from it by steel and glass partitions and has two floors. On the bottom floor are located the small machine tools and on the second floor are the wood-working tools. The small machine tools on the first floor of the machine shop are served by a 1-ton trolley hoist running around the shop and through the doors to a point that connects with the traveling crane. This crane is supplied with energy direct from the overhead trolley through a home-made trolley-pole about 3 ft. long, which is provided with a jumper cable run from the contact wheel to the switch terminals on the frame of the crane. The arrangement made it unnecessary to install the usual horizontal bare contact wiring on insulators mounted against the wall near the



HOLYOKE SHOP—EXTERIOR VIEW SHOWING TRACKS AND DOORS


Bench
Line Dept.
Store Room Above
Electric Tower Wagon
Track Dept.
Store Room Above
Electric Truck
Gas Babbitt Furnaces
Bench
Up
Bench
Forge
Power Hammer
Blower
Shear
Blacksmith Shop
Emery Wheel
Elevator
Heavy Stores
Light Stores Above
Office
Locker Room
Hall
Toilet
Armature Winding
Pit
Motor Driven Car Hoist
Pit
Hydraulic Lift
Wheel Changing Pit
10 Ton Travelling Crane
Repair Dept.
Wheel Storage
Air Compressor
Hyd. Press
Axle Straightener
Pit
Lathe
Motor Driven
Radial Drill
Boring Mach.
Trolley Conveyor
Banding Mach.
Tool Grinder
Drill
Machine Shop
Shaper
Bolt Cutter
Miller
Hack Saw
Tool Closet
Eng. Lathe
Eng. Lathe
Bench
Bench
Oil Room
Wash Room
Paint Shop
Carhouse Section 21 Tracks
Electric Ry. Journal
Surfacer
Planer
Carpenter Shop
Saw
Band Saw
Lathe
Bench
Up to Roof
Down
Bench
Plan of Floor over Machine Shop

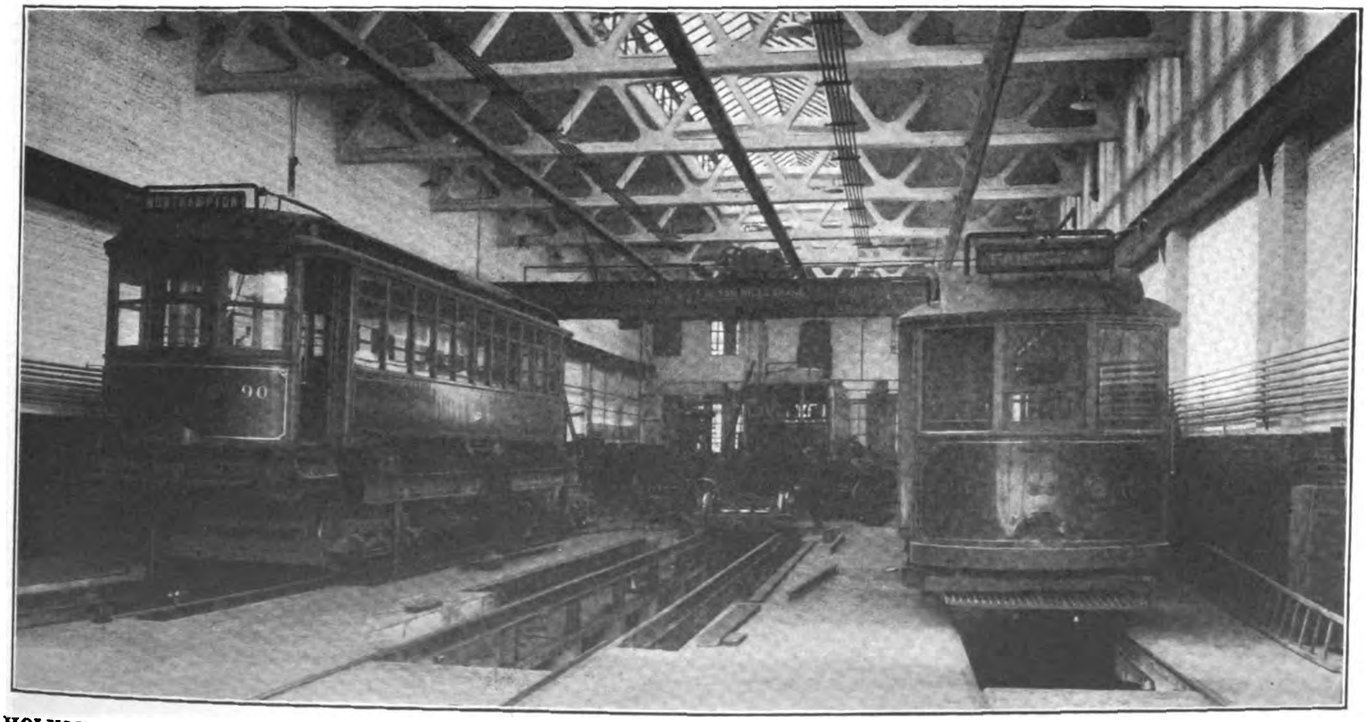
HOLYOKE SHOP—PLAN OF REPAIR SHOP SECTION ADJOINING CARHOUSE, SHOWING TOOL ARRANGEMENT

crane rails. No operator's cage is required on the crane, as the controllers for the various horizontal and vertical movements are provided with pendant cords running near the floor.

Adjoining the repair-shop bay is a section in which is located the line and track department, and blacksmith's shop, the storeroom, the master mechanic's and storekeeper's offices, the upholstery shop, the stock room, etc. This portion of the building is two stories high.

The construction of the building is generally standard, the walls being of brick and the roof having reinforced-concrete girders resting on brick pilasters. The two-story portions of the building, however, are framed with structural steel, all of this being fireproofed by surrounding it with not less than 2 in. of concrete. The roof trusses, as shown in the accompanying illustration, have the separate members incased in concrete for the double purpose of reducing the weight and improving the lighting. The floors in the offices are of reinforced concrete with a maple top flooring, and those in the repair shop and the room for heavy stores consist of creosoted wood blocks laid on a concrete base. All other floors are concrete with granolithic surface.

All preliminary studies for the building design were made by G. E. Pellissier, consulting engineer, Springfield, Mass., who also had charge of the design and installation of the track special work, machine-shop equipment and the lighting and overhead work. Mr. Pellissier also acted in an advisory capacity during the construction of the building.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HOLYOKE SHOP—VIEW IN REPAIR SHOP, SHOWING CAR HOISTS AND OVERHEAD CRANE AND CONCRETE-COVERED TRUSSES

Steel Parlor Cars for Waterloo-Cedar Rapids Line

A Description of One of the Parlor-Observation Cars Built of Structural-Steel Shapes—An Unusual Lighting System Is Installed, and as the Cars Are to Be Used Always in the Rear of Two-Car Trains, Controllers Are Omitted Although Motors Are Provided

To furnish its patrons a standard of service equal to that of the two steam roads with which it connects, the Waterloo, Cedar Falls & Northern Railway has just placed in service three all-steel, parlor-observation cars. Aside from this demand for the service, the cars are intended to cater to that class of the public which desires the best accommodations and is willing to pay for them. Moreover, the attractive appearance of this new equipment will, it is believed, help to make this road's service popular. A buffet service will be provided, the menus being attractively printed cards which will be distributed through the mails to advertise the line.

The new cars compare in length and width with the standard steam railroad equipment used for this purpose. They are also among the first all-steel cars of this type to be built for an electric interurban railway. The principal dimensions are as follows:

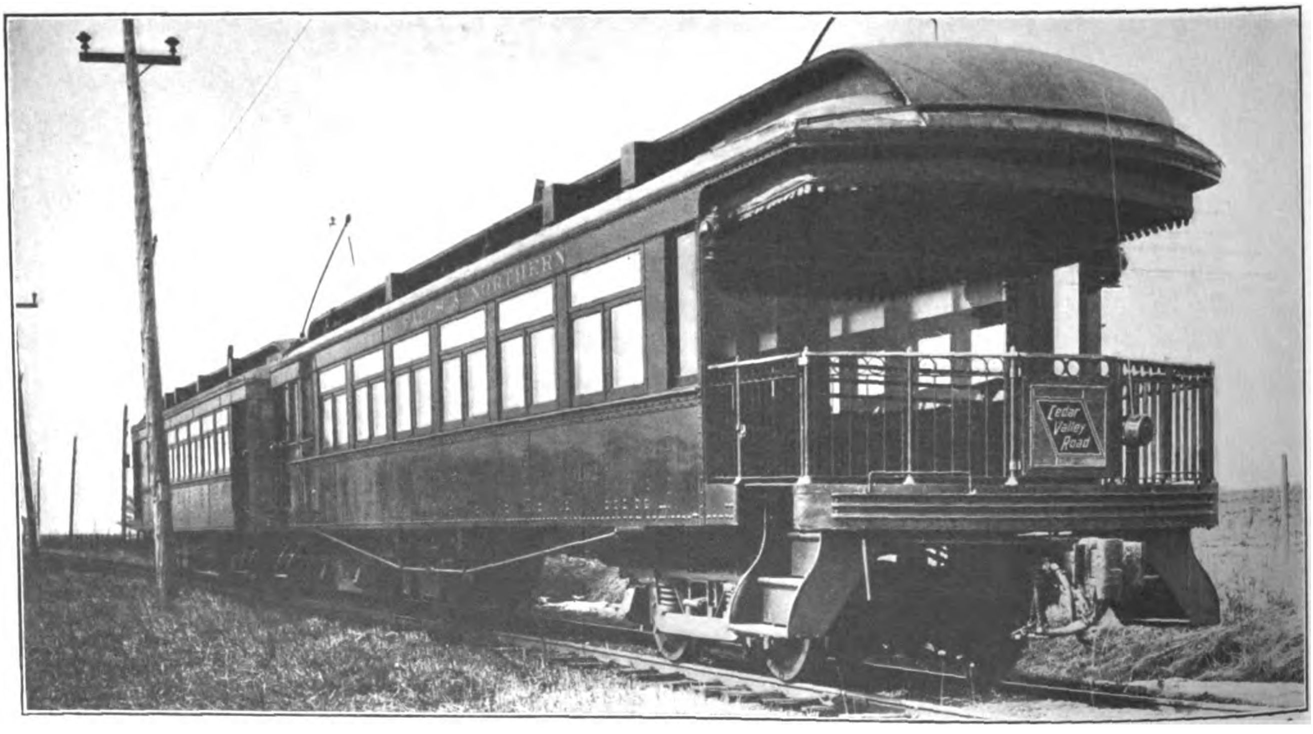
Length over all	60 ft. ⅜ in.
Truck centers	38 ft. 4⅜ in.
Wheelbase	6 ft. 10 in.
Width over belt rail	10 ft. 3 in.
Inside width	8 ft. 10½ in.
Diameter of wheels	36 in.
Seating capacity	30

The body is divided into a main passenger compartment and an observation compartment, and opening off the latter is a commodious observation platform. A kitchenette, 6 ft. x 3 ft. 2 in. in size, occupies a space in the partition between the two main compartments, portable tables being provided for the buffet service. At the front end of the main passenger compartment are two toilets, one on each side of an inclosed passageway, and also an inclosed space provided for a Peter Smith Heater Company's hot-water heater. Fourteen leather-upholstered wicker chairs are arranged along the sides and at the end of the observation compartment, and twelve chairs of the same design are located in the main passenger compartment. A built-in writing desk and a desk chair occupy one corner of the main passenger compartment, patrons being furnished with envelopes and letter paper bearing the company's trademark, "Cedar Valley Road." A leather-upholstered davenport is located beside the partition between the two main compartments.

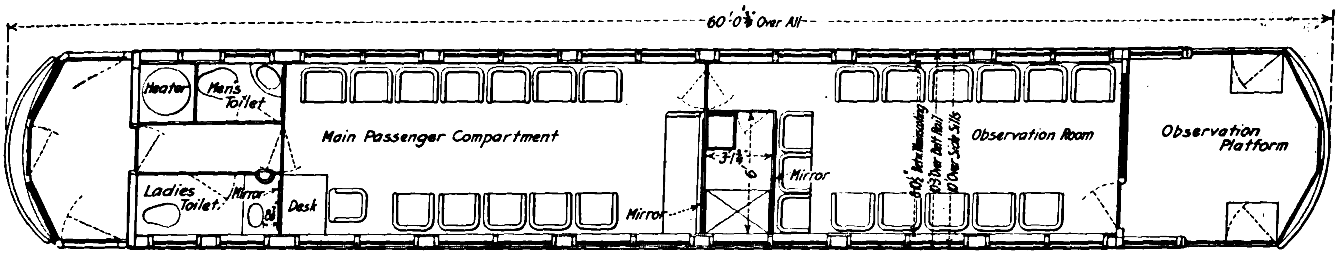
DETAILS OF CONSTRUCTION

Essentially the body framing of these cars was built as a truss side frame designed to carry the load transmitted to it by the cross-bearers in the underframe. The underframe is stiffened against buffing and pulling strains by two 8-in., 18-lb. I-beam center sills which extend between buffers. The compressive stress in the top chord of the side frame is taken up by the 4-in. x 3-in. x 5/16-in. deck plate, which is reinforced by the 3/16-in. letterboard, this being stiffened at its base by a 1-in. x 1-in. angle. This compressive stress is in turn absorbed by the panel and intermediate posts between the windows, which are riveted rigidly to the side girder. The last-named member is formed of a 3/16-in. web, a 6-in. x 3½-in. x ⅜-in. bottom flange, a 3½-in. x 3-in. x ⅜-in. top flange, which is reinforced by the 3-in. x ⅜-in belt rail. This girder is 2 ft. 10⅜ in. in depth and the intermediate and panel window posts serve as angle stiffeners.

Intermediate window posts are formed of 2¼-in. x 2¼-in. x ¼-in. tees, and the panel posts, which vary in width depending on the arrangement of window openings, are formed of 2-in. x 3-in. x 5/16-in. angles separated at proper intervals by 3/16-in. plates. At the partitions between compartments the steel carlins are tied together by web plates which are neatly housed and



WATERLOO-CEDAR RAPIDS CAR—REAR VIEW OF PARLOR CAR SHOWING OBSERVATION PLATFORM



WATERLOO-CEDAR RAPIDS CAR—FLOOR PLAN, SHOWING ARRANGEMENT OF SEATS

finished where they are exposed to the view of passengers in the car body. The intermediate sills in the underframe are formed of 4-in., 8½-lb. I-beams, and these are arranged so that the 4-in., 5-½-lb. channel cross-bearers rest on their upper flanges. Outside of the body bolsters the intermediate and center sills are of the same sections, namely, 8-in., 18-lb. I-beams. The body bolster is built of structural steel angles and plates, being 12 in. wide x 15 in. high and in the form of a box girder.

The construction is of steel throughout with the exception of the flooring and roof sheathing. Although this is a monitor-roof car, the side-post members are made continuous from side sill to side sill, being bent to the contour of the roof to form the principal carlins. The car-body flooring is formed of two layers of yellow pine with one thickness of building felt paper between them, and an insulating medium, consisting of mineral wool, is packed in the 4-in. space between the bottom of the sub-floor and a plate which rests on the bottom flanges of the cross-bearers.

EQUIPMENT

As will be noted in the views of this car shown in the accompanying illustrations, the observation platform is provided with an ornamental brass hand rail and is sheltered by the projecting hood of the car-body roof. The side framing provides for six double windows and three single windows. The double window openings are fitted with single sashes, above which are rectangular sashes continuous over each window opening. These upper fixed sashes are glazed with pressed-prism plate glass. The floors in the few main passenger compartments are covered with a green Wilton carpet. The observation platform floor as well as that in the vestibule at the opposite end of the car is covered with an interlocking rubber tile.

The car-body equipment includes Utility automatic ventilators, Lindstrum improved ratchet brake handles and Peacock geared brakes, Curtain Supply Company's ring fixtures, Hedley anti-climbers and American-La France fire extinguishers.

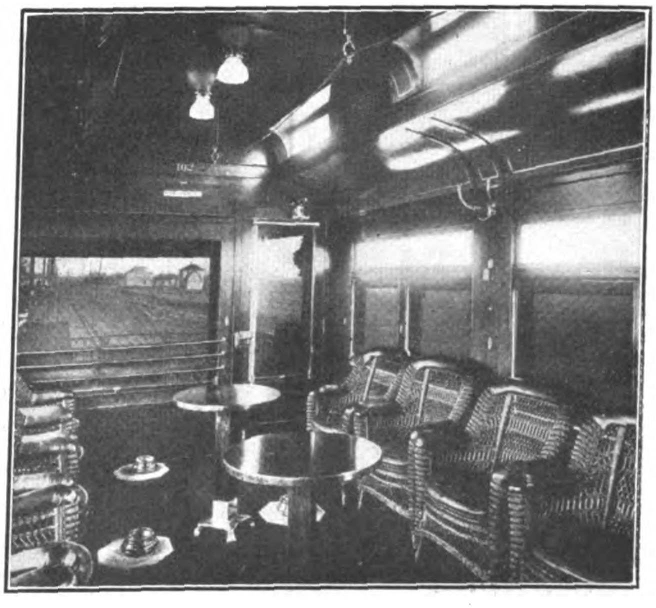
The bodies are mounted on McGuire-Cummings Company's No. 70 high-speed interurban trucks, equipped with 36-in. M. C. B. rolled-steel wheel pressed on A. E. R. A. standard axles. Since the car is to be operated only as a trailer in two-car trains, no controllers are provided, but four Westinghouse 333-E-7 commutating-pole motors insulated for 1500 volts have been installed, these being controlled by jumpers from the leading car. The motors have a rating of 120 hp at 650 volts and a gear ratio of 25 to 52. The control equipment on the leading car and the switch group on the trailer are of the HL non-automatic type, which provides for full speed on 1200 volts and half speed on 600 volts.

LIGHTING SCHEME

Ten 56-watt, 130-volt lamps in series on 1200 volts and five in series on 600 volts were provided in the car lighting scheme. Each car is wired in conduit installed along the monitor deck with circuits passing between the carlins above the transom board to condulet tees and thence to the conduit boxes concealed behind the headlining. The complete installation includes two circuits of ten lamps each, with every other lamp connected to the circuit at the opposite side of the car. This was done so that if one circuit failed the illumination would be reduced one-half but would be uniformly distributed. Each lamp is fitted with an Alba shade set against the headlining where the conduit box is concealed, and the shade is made removable for repair work.

Energy for lighting is supplied through jumpers which connect the lighting circuits to the change-over switches installed on the motor cars. The light circuits are also fused and switched in a cabinet in the hot-water heater space at the front end of the car, but the change-over function is supplied at the leading car in all cases. The location of the change-over switch was selected so that by a single operation the motorman on the leading car could close all circuits in the two-car train when passing from 600-volt to 1200-volt propulsion current. Air for the control and the brakes on the parlor car is supplied from the compressor set on the leading car.

A novel feature of the electrical equipment is an insulated section in the trolley rope. This may be observed as the heavier rope section near the trolley wheel in one of the accompanying illustrations. A section of rubber hose, just large enough to slip over the trolley rope, forms the principal part of this insulation. After it is in position the ends are wrapped with rubber and friction tape and painted with insulating varnish. The section of hose is 12 in. long, and as this is sealed against moisture it furnishes a dry section of trolley rope which is equivalent to a 12-in. insulator. This method of insulating the trolley rope provides a



WATERLOO-CEDAR RAPIDS CAR—INTERIOR VIEW OF OBSERVATION COMPARTMENT safeguard which is believed to be superior to the ordinary wood-strain insulators or other devices which have been employed on other 1200-volt d.c. equipment.

The cars were built at the Paris (Ill.) plant of the McGuire-Cummings Manufacturing Company, and they were designed under the direction of C. D. Cass, general manager of the Waterloo, Cedar Falls & Northern Railway. A preliminary description of the character of construction employed in the extension of this company's lines between Waterloo and Cedar Rapids, over which these cars will operate, appeared in the ELECTRIC RAILWAY JOURNAL of July 19, 1913.

Line Construction for C., M. & St. P. Electrification

Construction of Overhead Is Progressing Rapidly—Work on the Second Section Has Been Begun

Overhead construction for the electrified section of the Chicago, Milwaukee & St. Paul Railway is progressing at a rapid rate from Three Forks, Mont., westward to Deer Lodge, Mont., unusually thorough methods and equipment having been provided to carry on the work efficiently and with expedition. The type of construction train engaged in erecting the catenary with the twin contact wires that are to be used for this installation is shown in the accompanying illustration. The trains include four box cars, upon the roofs of which wooden superstructures have been erected, so that the linemen have a platform 160 ft. long on which to work.

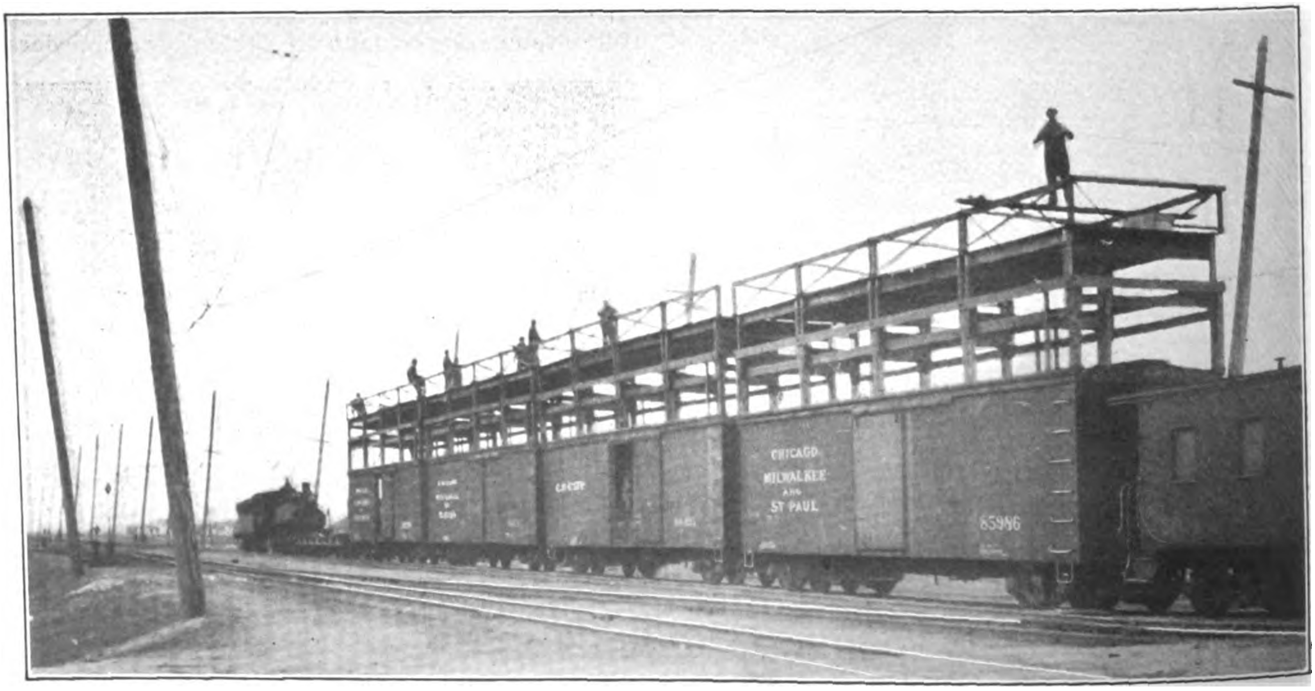
It is expected that the 113 miles of overhead construction between Deer Lodge and Three Forks will be completed early next fall, practically all of the line material for the installation being on the ground or en route at the present time. This includes more than 100,000 hangers and some 250,000 malleable-iron castings for the catenary construction, all of which were furnished by the General Electric Company. The line material, it may be said, has been sherardized throughout without exception, to eliminate the possibility of corrosion.

Work has also been started on the electrification of another engine division extending eastward from Three Forks to Harlowtown, nine electric locomotives in addition to the twelve now under construction having been ordered early in March. It is planned to start overhead construction work on an additional engine division each year until all four of the proposed electrified districts are completed, making a total of 440 miles. This is to be in service under electric operation by Jan. 1, 1918.

Continuing Interest in Safety Work

Few companies have devoted more attention to the safety movement or have given it greater permanency than the Chicago & Joliet Electric Railway, Joliet, Ill., J. R. Blackhall, general manager. Recently this company was instrumental in promoting an exhibit and lecture course on health and safety first which was attended by more than 22,000 people, largely of the laboring class. By enlarging the scope of the safety work to include public health, the railway was enabled to join forces with the Joliet Public Health Central Council, and together they have conducted an educational campaign in the prevention of accidents and disease. The exhibit and lecture course was promoted under the auspices of the company and the council at an expense of less than $500. This amount was borne by local manufacturers, public utilities and various other civic organizations. The purpose of the lecture course was principally to encourage community action, and the exhibits included machinery for carrying out the required measures. The program and exhibit were continued for nine days, the program consisting of afternoon and evening sessions and including musical entertainment and lectures by prominent speakers, some of them being of national reputation.

The railway has become quite enthusiastic about the safety movement, which has now been under way for practically a year. The management states that the results have greatly exceeded its expectations. Until about four months ago the percentage of accidents had been greatly reduced as a result of the safety work. For the past four months the company has had no accidents to report to the Illinois Public Utilities Commission. When it is considered that reports must be made of all accidents in which persons are injured and incapacitated for more than twenty-four hours, or damage is caused to property amounting to more than $150, it will be seen that this means real results.



C., M. & ST. P. LINE CONSTRUCTION—FOUR-CAR TRAIN FOR LINEMEN

Pennsylvania Association Spring Meeting

The Meeting Held in Pittsburgh on May 11 and 12 was Devoted to Workmen's Compensation, Organized Safety, Small Car Operation and Other Live Topics, and Important Committee Reports Were Discussed

The spring meeting of the Pennsylvania Street Railway Association was held at the Fort Pitt Hotel, Pittsburgh, on May 11 and 12 with an attendance of about one hundred persons. The opening session was called to order at 2:10 p.m. by C. L. S. Tingley, vice-president American Railways, who briefly welcomed the members, congratulated them upon a successful year and outlined the plan of the meeting. He then introduced J. F. Layng of the General Electric Company who read a paper on "Economies in Operating Small Cars," following its presentation with a series of lantern slides. Abstracts of this and others of the papers will appear in next week's issue. After a spirited discussion of this paper President Tingley departed from the order of the program and called upon D. A. Reed, chairman of the Industrial Accidents Commission, who spoke upon "Workmen's Compensation in Pennsylvania." This paper provoked a discussion which finally resolved itself into a friendly matching of wits between W. B. Rockwell, manager Eastern Pennsylvania Railways, and Mr. Reed. The atmosphere having been somewhat replenished by this play of "static" in the air W. A. Heindle, general superintendent Wilmington & Philadelphia Traction Company, read a list of six topics forming the question box, which were to be discussed at Wednesday's session. Before adjournment the chair appointed, as a committee on resolutions, W. E. Boileau, general manager Scranton Railway; J. E. Wayne, superintendent York Railways and W. B. Rockwell.

In discussing Mr. Layng's paper C. B. Fairchild, Jr., executive assistant Philadelphia Rapid Transit Company, said that Mr. Layng had treated the one-man car from the standpoint of the manufacturer, interested in better service and in economy. He would like to hear a discussion from the operating companies' standpoint. Where traffic was light it might be possible to put enough one-man cars on the line to offer frequent service and still show a profit. The largest obstacle to its use would seem to be the grade crossing.

W. E. Moore, vice-president and general manager West Penn Traction Company, stated that the company has twenty one-man cars, and that they showed a cost in labor of about $5 per car-day. One old car which had been redesigned had a capacity of forty-four passengers and weighed 8 tons. On the subject of grade crossings he stated that the motorman had been permitted to flag crossings or, in case a clear view of the tracks was to be had from the car, to proceed without leaving the car. The number of accidents had actually decreased to perhaps a quarter of the former number. Passengers seemed to object to the one-man arrangement at first but had come to like it. In brief, his company had found it a success.

W. B. Rockwell said that as we are all looking for means of securing economy in operation, why should not the same principles apply to electric cars as to horse cars. He quoted an incident from horse-car days which indicated at least one case in which the change from two horses, a conductor and a driver to one horse and a driver did not turn a financial failure into a success. Mr. Rockwell was somewhat pessimistic regarding the one-man car and asked for actual statistics regarding numbers of accidents with it. In reply Mr. Moore said that while he had no exact figures with him he was sure that there had been the reduction in the number of accidents stated. When the passengers board and alight at the front entrance the motorman sees that this has been safely accomplished before he starts the car, and there is no confusion of signals possible, as when the conductor controls these operations.

In introducing Mr. Reed, Mr. Tingley said that about four years ago the Pennsylvania State Legislature discussed accidents and compensation but decided not to make a jump in the dark. A commission, representing the employer, the employee and the law, was appointed and this commission presented an able report two years ago. The legislature ordered still further study of the situation. In the discussion which followed the presentation of the paper Mr. Rockwell said that it was refreshing to meet a lawyer who was not an "ambulance chaser." He believed in the compensation act, and in anticipation of such an act he had put it into practice five years before. His only criticism was that the percentage of wages paid to the injured party was too high. Mr. Reed contended that the compensation was actually less than 50 per cent in some cases. There is some difficulty in locating the blame for an accident and the conclusion is apt to be affected by the point of view of the man drawing it.

Mr. Tingley called attention to the possibility of an injured employee's drawing more money ill than well, due to the provision that no deduction should be made from the compensation on account of contributions from beneficial associations. He thought that it would be economical for the association to form a mutual benefit association to carry the railway risks although the suggestion may be premature at this time in view of the fact that the laws, if passed, do not become effective until 1916.

WEDNESDAY'S SESSION

The Wednesday morning session was called to order at 9:45 o'clock by President Tingley and a report of the committee on filing rates and tariffs was made by C. B. Fairchild, Jr. Recommendations for standard rules had been submitted to the bureau of rates of the Public Service Commission and these had been taken under advisement. The committee had been assured that the bureau would issue a new draft based upon these recommendations and this will be submitted and suggestions invited before definite action is taken. Mr. Tingley stated that he had seen the draft of the ordinance and predicted that when it reaches its final form it will be the best thing of the kind so far developed. The report was received and the committee continued.

R. P. Stevens, president New Castle & Lowell Railway, chairman of the committee on a uniform crossing agreement, reported that a joint meeting had been held with representatives of the Public Service Commission at Harrisburg on Nov. 16, 1914. Paul Spencer, United Gas & Improvement Company, Philadelphia, was appointed chairman of a sub-committee to draw up specifications and he had selected J. S. Jenks and Mr. Stevens to represent the association on the sub-committee. The sub-committee had held weekly meetings in Philadelphia throughout the winter, beginning Dec. 1. On May 1 an agreement on specifications was reached, these occupying sixty-seven typewritten pages.

As prompt action was necessary the specifications were submitted to the executive committee for approval.

The report of the treasurer, H. M. Stine, Harrisburg, was then read. It showed receipts of $2,666.68 since the last meeting, including the balance from last quarter, and expenditures of $1,269.41, leaving a balance of $1,397.27. For the executive committee Mr. Tingley reported an active membership of thirty-eight, representing 80 per cent of the mileage in the state. There was still a fine field for securing associate members from among the small companies. The association needed their interest especially regarding legislation. As an instance he cited the Jones bill which failed of passage, with fifty legislators sitting in their seats without voting.

The question box discussion next took place. This will be reported in next week's issue. An address was then delivered by Lew R. Palmer, chief inspector Department of Labor on "Organized Safety." This is abstracted below.

After resolutions of thanks to the speakers and to the Pittsburgh Railways, the Duquesne Light Company, the Westinghouse Electric & Manufacturing Company and the General Electric Company, had been passed the meeting adjourned.

In addition to the formal exercises described above the members enjoyed an informal dinner with music and moving pictures and trips to the electric works, the Homewood shops and other points of interest.

ORGANIZED SAFETY

BY L. R. PALMER, CHIEF INSPECTOR DEPARTMENT OF LABOR AND INDUSTRY, STATE OF PENNSYLVANIA

Under the above title, Mr. Palmer traced the development of the electric railway from the standpoint of the numbers of men employed and outlined the organization of the National Safety Council, of which the Pennsylvania Association is an associate member. He stated that the Department of Labor and Industry will co-operate with the association in promoting safety methods and that, as a director of the National Safety Council, Commissioner J. P. Jackson has co-operated in the organization of local safety councils in Philadelphia, Pittsburgh, Reading, South Bethlehem, York and Harrisburg. He explained the importance of the proposed street and electric railway section of the National Safety Council in view of the enormous number of passengers carried by the electric railways.

Mr. Palmer stated that 25 per cent reduction in preventable accidents can be attained by the installation of mechanical safeguards. Of the remainder 45 per cent must result from organization and 30 per cent from education. In the electric railway industry it is necessary to educate not only the workman but the public. In this the railways will be greatly assisted by the educational and public safety section of the national council.

In steam railroad operation from 1 per cent to 2 per cent of the gross receipts go for settlements and local accidents, but with the electric railways any showing under 5 per cent is generally considered good. One American city made a record of 23 per cent in one year and 19 per cent in the following year. Many cities, particularly in the Southwest and the West, have shown from 10 per cent to 12 per cent accident cost. One Pacific Coast city of moderate size after five years of publicity work reduced its accident cost approximately $250,000 per year.

Mr. Palmer then described the safety work of the Brooklyn Rapid Transit Company, complimenting that company upon the work done. He stated also that during the four or five years since the Chicago & Northwestern Railway began to work out an efficient safety organization, deaths of employees have been reduced more than 35 per cent and injuries to employees more than 25 per cent. Steam railroads having a mileage of 200,000 out of a total of 240,000 have organized safety work. The "Frisco" system reports that during the first eleven months of the safety campaign accidents were reduced 33 per cent and injuries 27 per cent, while the New York Central lines report a reduction of 37 per cent comparing 1914 with 1912. The El Paso & Southwestern system reports that for the year ended June 30, 1914, the fatal accidents decreased 41 2/3 per cent and injuries causing time loss of more than three days, 32 per cent.

The United States Steel Corporation from 1906 to 1913 saved 11,074 of their workmen from serious or fatal injuries, a serious injury being one that results in the loss of thirty-five days or more. During three years past this corporation has shown a gross saving in casualty expense of nearly $5,000,000, with a net saving of nearly $3,000,000.

In conclusion Mr. Palmer compared some costs of the present war, which he said was due to lack of the co-operation upon which safety rests, showing that the cost for this year to Great Britain alone will be much more than the total sum invested to date in all of the electric railway systems in this country.

Fire Protection Association Adopts Railway Association Standards

The National Fire Protection Association in convention at Hotel Astor, New York City, May 11, 12 and 13, adopted the report of its committee on electric railway light and power plants, C. H. Patton, Cleveland, chairman, which recommends the adoption of the American Electric Railway Association recommendations as a guide for the construction of electric railway properties in lieu of the association's recommendations of 1907 covering such buildings. The committee also recommended that additional suggestions for such buildings be published and that the association's sprinkler recommendations be modified so as to include railway properties. The various codes and other recommendations of the association were also advised to be broader, if necessary, to cover such properties. One of the recommendations made by the committee was that the same type of construction be recommended for carhouses, power plants, substations, etc. Buildings of fire resistive construction with or without sprinkler protection and buildings of mill construction with sprinkler protection, were considered preferable. Fire areas or units in such buildings were recommended to be made as small as possible, a reasonable limitation for such fire units in carhouses being given as 1800 ft. of trackage.

Buildings used for car storage should be designed for this purpose only, all other occupancies being properly separated therefrom. The fire hazards in carhouses are mainly due to the heating system and to the presence of electric wiring. Such installations should be made according to the association electrical code and its rules for heating systems. Convenient cut-off sections should be provided for cleaning, washing, oiling, repairing and other work on cars and motors when such work is done in considerable quantity. It also recommended that the Underwriters Laboratories' label service be extended to car-wiring installations.

With the exception of the recommendations made in its report the committee considers the American Electric Railway Association recommendations and the associations' building, sprinkler, heating, electrical and other codes and recommendations sufficient guides for railway property construction.

The Development of Motor Ventilation

An article on the subject of motor ventilation, by R. E. Hellmund, was published in the issue of the ELECTRIC RAILWAY JOURNAL for May 1. In continuation of this subject Mr. Hellmund has furnished a series of ten diagrammatic motor cross-sections showing graphically the progress mentioned briefly in his article.

The earliest motors were well ventilated because uninclosed, but when the inclosed motor was developed about 1893 it was necessary to provide an air circuit inside to permit circulation air and consequent convection of heat. An early inclosed motor is shown in Fig. 1. Five years or so later radial ventilating ducts were added, as seen in Fig. 2. These performed much better than the coil ends the function of fans and at the same time increased the radiating core-surface.

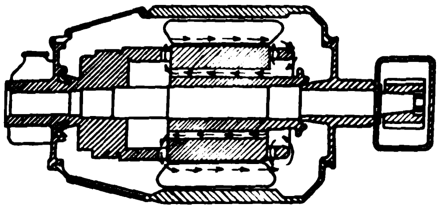


FIG. 1—INCLOSED LONGITUDINAL-DUCT TYPE MOTOR

The fan action of the coil ends causes circulation of air through ducts and field coils.

The next step in increasing the continuous rating was to provide openings to the outside air, circulation being insured by the fan effect of the spacing fingers in the ducts and the "chimney" effect of the motor. The inlet and outlet openings were protected as shown in Fig. 3. Then followed the forced ventilation of large motors by means of external blowers, leading naturally to the internal fan motor as illustrated in Fig. 4. Here a fan is mounted on the shaft at the pinion end and draws air through longitudinal ducts in the core and commutator, driving it out across the field coils.

One of the first types of ventilation used on street cars is shown in Fig. 5. This was a semi-ventilated type, the armature only being directly ventilated. Another semi-ventilated motor is shown in Fig. 6. The objections to these types are that they are subject to dirt and dampness without having the full benefits of ventilation.

An improvement was the fully-ventilated feature illustrated in the remaining figures, which show the types successively developed as described in Mr. Hellmund's article. The captions will serve as guides in recalling his statements. In the diagrams B = baffle; D = duct; F = fan; G = air gap; I = inlet; O = outlet; P = pole piece.

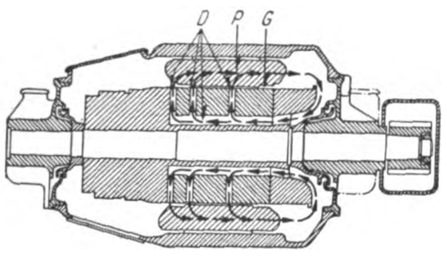


FIG. 2—INCLOSED RADIAL-DUCT TYPE MOTOR

The fan action is produced in the ducts by the spacing fingers between sections of laminations.

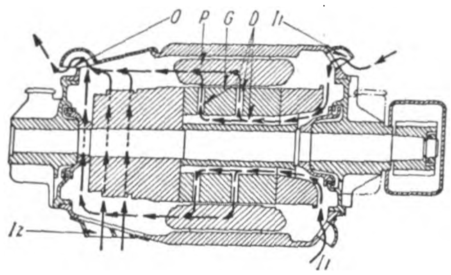


FIG. 3—VENTILATED RADIAL-DUCT TYPE MOTOR

External air is circulated through the motor by the combined fan action and chimney effect.

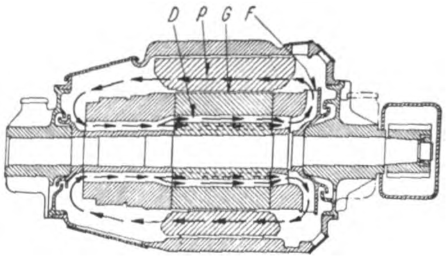


FIG. 4—INCLOSED FAN-TYPE MOTOR WITHOUT RADIAL DUCTS

Air circulation produced as in Fig. 1 except that a fan replaces the open coil ends.

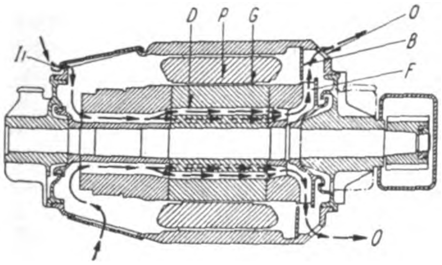


FIG. 5—ARMATURE SEMI-VENTILATED FAN-TYPE MOTOR

Outside air is circulated through the motor armature only by means of a single fan.

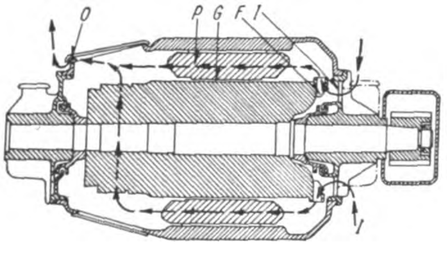


FIG. 6—FIELD SEMI-VENTILATED FAN-TYPE MOTOR

Armature core ducts are omitted and air is circulated by a single fan through the field coils.

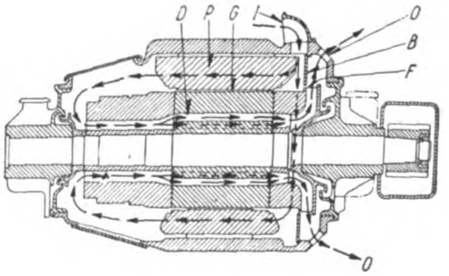


FIG. 7—SERIES-VENTILATED FAN-TYPE MOTOR

One fan circulates outside air around the field coils and through longitudinal armature core ducts.

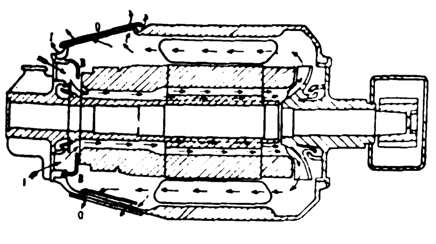


FIG. 8—REVERSED SERIES-VENTILATED FAN-TYPE MOTOR

Same principle as the preceding except that the direction of the air circulation is reversed.

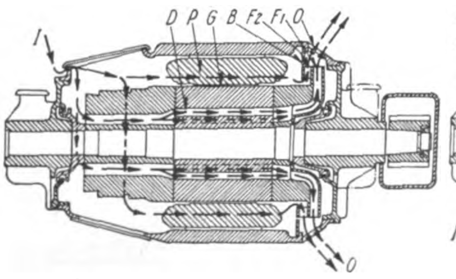


FIG. 9—PARALLEL-VENTILATED FAN-TYPE MOTOR

A double fan produces two streams of air, flowing through field coils and armature respectively.

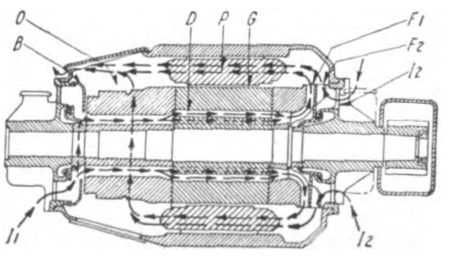


FIG. 10—COMPOUND-VENTILATED FAN-TYPE MOTOR

Like the series plan but with a second field-coil-cooling stream added by a second fan.

American Association News

Informal Executive Committee Meeting Held—Transportation Plans Announced—Power Distribution Committee Considers Revision of Specifications—Meeting of the Milwaukee Section

AMERICAN ASSOCIATION EXECUTIVE COMMITTEE

An informal meeting of the executive committee of the American Association was held in New York on May 11. The members in attendance were: C. Loomis Allen, Syracuse, N. Y., president; Charles L. Henry, Indianapolis, Ind., vice-president; L. S. Storrs, New Haven, Conn., vice-president; T. S. Williams, Brooklyn, N. Y., vice-president; M. C. Brush, Boston, Mass., president T. & T. Association; H. H. Vreeland, New York, past-president; W. Caryl Ely, Buffalo, N. Y., past-president, and E. B. Burritt, New York, secretary. The Manufacturers' Association was also represented in connection with the convention plans. The discussion covered the convention trains, of which details are given elsewhere in this issue; committee reports, all of which are due shortly, and the convention program, which will be announced as soon as a few details are completed.

POWER DISTRIBUTION COMMITTEE

As stated on page 889 of the issue of this paper for May 8, a meeting of the Engineering Association committee on power distribution was held in New York on April 29 and 30. The committee first considered the stranding of cables in connection with the new standard stranding proposed by the A. I. E. E. standards committee sub-committee on flexible stranding. The power distribution committee was of the opinion that there is no demand for a change from the existing standard. It was recommended that representatives from the power distribution and equipment committees be appointed to advise with the A. I. E. E. sub-commitee. A suggestion from the 1915 committee on wire and cable specifications of the Association of Railway Electrical Engineers regarding a slight change in the standard specifications for rubber insulated wire and cable was considered, but no action at present was recommended.

A report from the sub-committee on concrete poles was received summarizing the minutes of the meetings reported in this journal last week. The sub-committee was not yet able to report upon a formula for the deflection of concrete poles of tapered cross-section and recommended that the subject be carried over to next year's commitee for consideration and that this matter be made a subject for research. The sub-committee was instructed to formulate its report, including a description of tests which it has made on the committee's design of concrete poles, setting forth recommended changes in the constants to be used with the formulas proposed by the 1914 committee. As a matter of information the design of poles used in Rochester, Syracuse and Cleveland and the results of tests made on these poles will be included. Slight changes in the table of deflections and loads shown on pages 23 to 25, section Ds 3a of the Manual will be included.

On the subject of steel poles, the sub-committee reported that manufacturers have agreed as to the thickness of steel pipe to be used in the construction of poles and also upon the standard pole section length for each length of pole. There is still some difference of opinion as to the physical constants and the formulas to be used in computing deflections of steel poles. Some changes in the specifications for tubular steel poles, in the cantilever formula for computing the deflection of steel poles, and in the steel pole tables were approved by the committee.

The national electrical safety code as proposed by the United States bureau of standards was brought to the attention of the committee and the members were urged to forward criticisms and comments to Secretary Burritt so that they may be available to the representatives of the association who will attend the July conference in Washington. It was also suggested that those who care to do so should send communications to the ELECTRIC RAILWAY JOURNAL for publication in view of the extreme desirability of having the utmost publicity on the subject before final decisions are reached.

The report of the power distribution committee meeting will be concluded in next week's issue.

CONVENTION TRANSPORTATION PLANS

In accordance with the announcement on this page last week, circulars have been sent out by H. G. McConnaughy, director of transportation of the transportation committee of the American Association, giving details of the tours which have been arranged in connection with the coming convention. It is proposed to arrange for three or more trains, two of them making complete circular tours, including a week's stay in San Francisco and returning by various scenic routes. One tour will leave New York about September 23, stopping at Albany, Utica, Syracuse, Rochester, Buffalo, Cleveland, Chicago, St. Paul, Minneapolis, Glacier Park, Spokane, Seattle, Tacoma, Portland, Shasta Springs, San Francisco, Yosemite National Park, Los Angeles, Pasadena, San Diego, Riverside, Grand Canyon, Albuquerque, Kansas City, Chicago, to New York. This will require about thirty days, including the week in San Francisco. The second tour will leave New York about Sept. 26, stopping at Newark, Philadelphia, Harrisburg, Pittsburgh, Columbus, Indianapolis, St. Louis, Kansas City, Denver, Colorado Springs (via Royal Gorge), Glenwood Springs, Salt Lake City, Ogden, Lake Tahoe, San Francisco, then following the same route as the first train, the whole requiring about 27 days. The third train will make an especially fast run for those who cannot take part in the longer tours. It will leave Chicago to reach San Francisco on Oct. 4. This will be a going trip only. The transportation arrangements are in charge of J. H. Pardee, master of transportation, president J. G. White Management Corporation, New York; W. O. Wood, assistant master of transportation, president New York & Queens Railway Company, Long Island City, N. Y.; Bertram Berry, Haywood Brothers & Wakefield Company, New York; H. G. McConnaughy, director of transportation, Dearborn Chemical Company, New York; E. B. Burritt, secretary American Electric Railway Association, New York, and about one hundred others representing the American Association in geographical sections, and the Manufacturers' Association.

MILWAUKEE SECTION

The Milwaukee section has adopted the plan of holding joint monthly meetings with the N. E. L. A. company section, alternate meetings being in charge of each. On April 22 the meeting was conducted by the lighting section.

COMMUNICATIONS

Possible Lines of Power Plant Progress

THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MD., May 12, 1915.

To the Editors:

The new Interborough turbines described in your issues of April 17 and 24 probably represent the most advanced skill of steam turbine designers to-day, and the highest efficiency thus far obtainable from steam-driven engines. It is said the thermal efficiency is about 25 per cent.

The steam turbine has been quite steadily improved in efficiency during the past twenty years, and although the curve of rate of improvement is naturally much less steep than it was some years ago, it is reasonable to expect some further gains in the efficiency of the turbine itself. I believe that designers now feel that blade angles and speeds can be so modified as to show an improvement over even these new turbines, but any such gains would probably be very small. The subdivision into high and low-pressure spindles, each with its own generator and appropriate speed, has undoubted advantages. It is possible that the efficiency of the whole machine can be increased in one or more of the following ways:

1. By reheating the steam between high and low-pressure sections.
2. By increasing the superheat from the present 100 or 150 deg. Fahr. to 200 or 250 deg. Fahr., as used in Europe.
3. By improvement of the heat transference in condensers. Data are accumulating which indicate that very considerable gains are possible in this direction, and systematic experimenting with condensers is to be encouraged.

I should, however, like to suggest consideration of the use in power stations of some of the features of the locomobile which have caused its high efficiency. This self-contained power plant, with the engine mounted on top of the boiler, with no steam-pipe losses, with the hot gases from the boiler passing through a steam superheater and then about the engine cylinders, then to the stack at about 350 deg. Fahr. (instead of 600) yields a delivered horse-power on about 1.25 lb. of coal per hour. This is accomplished with a small compound engine which would under ordinary conditions use about 20 lb. of steam or at least 2.5 lb. of coal per developed horse-power-hour.

Probably most of the features of the locomobile have been tried out or at least suggested in connection with power plants of larger size. I am told that Z. de Ferranti obtained some notable results by jacketing a turbine with furnace gases. While there may be adequate reasons for not using them in many cases, I venture to mention a type of plant which lends itself to the adoption of those features. A bluff near the bank of a river or lake offers the proper site, the face of the bluff generally requiring masonry reinforcement. The boilers would be placed about on the level of the water and the turbines on the bluff as nearly over the boilers as practicable. The condensers would be below the turbines, in recesses and at a suitable level with respect to the water supply. An economizer would be interposed, and it is possible that the gases leaving it could be passed about the turbine casings. These heat-absorbing arrangements would render assisted draft necessary. While indulging in these perhaps extreme speculations it may not be out of place to suggest that if internal-combustion engines were used in conjunction with the steam plant, the exhaust gases could be used to augment the stack draft, and the cylinder jackets as feed-water heaters. Experiments which I have recently made in the use of gas-engine exhaust lead me to expect a considerable effect as an adjunct to the stack. Of course, the substitution of gas-engine jackets as feed heaters would contemplate motor-driven auxiliaries.

A further gain in many plants may be expected from the use of improved water-purifying apparatus and the resulting cleaner heating surfaces.

CARL C. THOMAS,
Professor of Mechanical Engineering.

Dr. Rosa on the Safety Code

SAN FRANCISCO, CAL., May 7, 1915.

To the Editors:

I have read with interest your editorial in the issue of the ELECTRIC RAILWAY JOURNAL for May 1, concerning the proposed "National Electrical Safety Code," in which you raise the question whether the rules are "fair to small as well as large roads" and whether they "are practicable as well as theoretically desirable." I have also read Mr. Tingley's letter in the same issue in which he says:

"In no sense do I wish to criticize the most excellent scientific work done by the bureau of standards, but it is done purely from the scientific standpoint and without regard to practicability; it has in mind large and expensive organizations such as are used in government work, and it has proposed rules which would impose grave hardships upon the smaller companies." This statement shows that Mr. Tingley is utterly unacquainted with the work which the bureau has been doing, and could not have read the rather full statements which have been published concerning this work, the object of said statements having been to prevent just such misapprehension.

Mr. Tingley supports his statement by reference to two operating rules contained in Part 4 of the code, these rules having been issued recently as the second edition of Circular No. 49. Before speaking of these rules, however, I should like to give briefly the history of this section of the rules.

After collecting and studying about a hundred different sets of operating rules prepared and issued by electrical companies for their own use, and studying the operating rules in use in several foreign countries, the bureau prepared a first draft of a set of rules, some of which seemed of doubtful value. We then prepared a list of forty-six questions, mostly concerning the rules that appeared for one reason or another unsatisfactory, and sent the list to several hundred operating companies, including large, small and medium-sized companies. We received a large number of carefully prepared replies which were utilized in revising the rules. It was at first intended to have typewritten copies of these revised rules sent to a number of companies for criticism before publication, but we realized that criticism was needed from a larger number than it was practicable to reach with a limited number of copies, so the rules were printed and sent to several thousand companies, with a request for criticism and suggestions for improvement in the next edition.

We received several hundred letters in reply, many of them expressing grateful appreciation of our work, and many also very valuable suggestions for the improvement of the rules. Some contained rather severe criticism which led to further correspondence, and in some cases the writers admitted that the rules were better than had appeared to them at first impression.

After frequently going over and revising the rules in the light of all our correspondence and consultations they were, of course, very much more satisfactory than the original edition contained in Circular No. 49.

In the meantime the accident prevention committee of the National Electric Light Association had studied Circular No. 49 and revised it to some extent, and then printed it and sent it out to a large number of operating companies, many of which were known to be in sympathy with the idea of having safety rules, and a large percentage of whom had books of rules of their own. A large number of valuable criticisms were received by the committee, many of which were from small companies, or from large companies operating small plants. When the replies were all in the criticisms on the various rules were systematically arranged and manifolded, and every member of the committee was supplied with a copy, as were the three representatives of the bureau of standards who met with the committee. Two days were spent in going over the criticisms and revising the rules, and then at a later session two days were spent in going over the revised draft of the rules as prepared by the bureau on the basis of its study and correspondence, and of personal conference with a large number of operators and engineers. As a result of this thorough and conscientious study an agreement was reached as to every rule in the book, and they were then manifolded and sent out by the bureau and by the N. E. L. A. committee to those who had previously given criticisms, with a request that the revised rules be examined and any further suggestions or criticisms made that would make the rules more useful or more acceptable. Some further suggestions were received and another joint meeting of the committee and the representatives of the bureau of standards was held, and again an agreement as reached not only as to the substance, but as to the precise wording of every rule. In most cases the agreement was unanimous. It is hardly necessary to say that the members of the N. E. L. A. committee, all of whom represented operating companies, looked at the rules from the operator's standpoint, and their aim was to reduce the liability of accidents without unnecessary interruptions to service or needless expense, just as it had been the aim of the bureau to do. After this final revision of the rules they were published recently as the second edition of Circular No. 49. Whether Mr. Tingley's characterization of the work as "done purely from the scientific standpoint and without regard to practicability" is based on a careful study of the revised rules, or whether he assumes that, because the bureau of standards has been concerned in the matter it must be so, I do not know.

Let us now examine the two rules cited as examples of this "scientific and impractical work." The first is Rule No. 407, which reads as follows:

407. *Local Foreman.*

If more than one person is engaged in work on or about the same electrical equipment or lines, one of the persons shall always be designated as the foreman locally in charge of the work.

The explanatory note published in Circular No. 49 on this rule is as follows:

> In every group of workers, however small, one should always be understood to be the leader or senior, to give and receive messages and orders for the group. He may be called boss, leader, or by any other term, but for convenience is referred to as "foreman," although not necessarily having such rank.

Mr. Tingley's objection that a workman designated as a foreman will demand increased pay does not seem conclusive. If he performs the functions of a foreman continuously over a gang of men, he will earn, and ought to receive, a foreman's pay. If he is merely the senior workman of a small group he is not likely to demand increased pay, and should not receive more than he earns. This method permits one foreman to supervise several small gangs, and yet have some one responsible in each gang. It is believed by those who have had a great deal of experience that this is a thoroughly practicable rule, and where possibility of serious injury to persons and property exists, as in work on electrical equipment and lines, and where mistakes and misunderstandings may lead to very serious consequences, it is believed to be far better to have a clear understanding as to who is the responsible foreman or leader in every group of workmen than to have several men working together and no one in charge.

The second rule is No. 434, which reads as follows:

434. *Maintaining Service.*

(*a*) When live circuits, on which "men at work" tags have been placed, are opened automatically they should be kept disconnected until the chief operator has given proper authorization for reconnection.

(*b*) When overhead circuits other than trolleys and third-rail circuits open automatically, the local operating rules shall determine how they may be closed with safety for persons on or near those circuits. The chief operator shall be advised of the conditions.

(*c*) When circuits feeding supply lines become accidentally grounded, as shown by the indication of ground detectors at stations, they shall be tested to determine where the ground exists. If the ground cannot be definitely located and removed by the operator, an immediate report of the finding shall be given to the chief operator who shall order a patrol of the lines affected to definitely locate and remove the ground as soon as practicable.

Above 7500 volts it will usually be found advisable to disconnect until the lines have been found cleared of the ground.

Fallen wires and otherwise grounded circuits are the most frequent source of fatalities to the public, and hundreds of deaths and serious accidents are thus caused every year. A few days before I left home a well-known citizen of Washington was killed on the sidewalk near his own house by a fallen wire. Within the last few weeks five deaths have been caused in California by the same cause, two only a few days ago near San Francisco (since I have been in the city), and three a few weeks ago in Los Angeles. The fallen wires belonged to two of the largest and best-managed electrical companies in the country, and these companies are willing to spend a good deal of money to be able to determine when their lines are grounded, in order that they may remove the hazard to the public as soon as possible when a ground occurs. Nobody in California has yet suggested to us that this rule is too severe. On the contrary, it has been criticised by one experienced and successful operator as too lenient. A careful reading shows that the rule suggests what should be done, but leaves almost everything to the discretion of the operator and the provisions of the company's operating rules. It would be hard to find in the whole set of rules a poorer illustration to prove that the rules are too scientific and impractical!

The three parts of the code of safety rules that deal with construction have recently been printed in a preliminary edition for discussion and criticism. We have not, however, trusted to correspondence and study with the committee of any one engineering society for the development of these rules. We realized that it was a much more serious undertaking to prepare construction rules than to prepare satisfactory operating rules. Hence we have been holding conferences, in various cities throughout the country, with representatives of the electric light and power, railway, telephone and telegraph companies, of state industrial and public service commissions and city inspection departments, with consulting engineers, manufacturers of electrical apparatus and supplies, electrical workers and others interested in the subject. We have held such conferences in Boston, New York, Philadelphia, Washington, Cleveland, St. Louis, Los Angeles and San Francisco. In the last-named two places each conference continued two days and we had about fifty engineers and others present. The rules were read one by one and discussed as fully as time permitted. Many good suggestions were received and the rules were very highly commended. We had heard a great deal about the differences in practice between East and West, and knew something about them, but our feeling now is that it will be easier to provide in the rules for the necessary differences due to different conditions than we had supposed. Nobody out here has accused us of being academic, but many have expressed approval and satisfaction with the way we are doing our work.

We are going to Portland for a conference next Monday and Tuesday, and then to Seattle, Spokane, Boise, Denver, Omaha and Chicago. (Other representatives of the bureau are traveling in the South and Middle West conferring with representatives of the electrical utilities about the rules.) In every place we meet the responsible and experienced officers of the various companies and have the fullest and freest discussion of the rules.

By the time we return to Washington we shall have subjected the rules to an amount of study, criticism and discussion that few, if any, similar sets of rules ever received. The conferees are not scientists but engineers, business men, operators and workmen. The representatives of the bureau (except myself) were educated as electrical engineers and have had practical experience in electrical engineering. I am the only one concerned who may be suspected of being tainted with too much scientific training, but as I have had something to do with electrical engineering for twenty-five years, and in recent years have spent more time on engineering problems than on purely scientific ones, I hope I shall not be regarded as being entirely disqualified.

In the introduction to the rules of Circular No. 54 the following statement occurs:

> "Criticism is invited of the proposed rules contained in this publication, and suggestions for their improvement, either by way of changes or additions. Before offering such criticism, however, it is hoped that the statement concerning the plan and scope of the code will be read, as well as the notes on the rules. The intent of the rules will thus be better understood, and criticism will be correspondingly more valuable."

We welcome criticism, but, as Mr. Tingley says, it must be constructive and not merely destructive to be worthy of attention. We have nothing but praise and grateful acknowledgment for the frank and cordial co-operation we are receiving from the hundreds of able and experienced men who are conferring with us on the rules, and we have obtained a great deal of constructive and valuable critiscism from them.

On the other hand, criticism from those who have read the rules hastily, or who are not in sympathy with safety measures, or who judge the rules solely by their own limited experience, and think that any rule is needless if they have never killed anybody through the hazard the rule seeks to remove or reduce, is not very valuable, and, if published, it may, through misleading others, be worse than useless. E. B. ROSA,

Chief Physicist, Bureau of Standards.

National Electrical Safety Code

AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION

OFFICE OF THE PRESIDENT
CLEVELAND, OHIO, May 5, 1915.

To the Editors:

Although the ELECTRIC RAILWAY JOURNAL has repeatedly called attention to the proposed "National Electrical Safety Code" which is in process of preparation by the national bureau of standards, treating the subject editorially and in the communications columns in the issues of April 3 and 17, and May 1, I believe it advisable to call the attention of the electric railway industry once again to the conference to be held in Washington on July 1 and 2 under the auspices of the bureau of standards. The object of this conference is to get the proposed safety code into final form with a view to having it adopted tentatively and the rules, regulations and practice described therein put into use for one year's trial. It is the further intention of the bureau to review and revise the rules if found necessary, and any suggestions or criticisms which experience in their use may bring out during the interim, will be carefully considered by a committee, after which they will become standard.

For the purpose of reviewing and revising the rules, it is the plan of the bureau of standards to create a committee of representatives of state industrial and public service commissions, inspection departments of cities, the National Association of Municipal Engineers, the National Brotherhood of Electrical Workers, the American Institute of Electrical Engineers, the National Electric Light Association, the American Electric Railway Association, the National Fire Protection Association, the National Safety Council, the national bureau of standards, the Workmen's Compensation Service Bureau, the telephone interests and the casualty insurance interests; the whole comprising a committee of some forty-eight members.

The American Electric Railway Association has appointed W. J. Harvie as its representative and we urgently request that as many criticisms and suggestions upon this important matter as possible be placed in Mr. Harvie's hands so that they may be used by him on July 1 and 2. In connection with this we desire particularly to call attention to an abstract of a paper by Dr. Rosa of the bureau of standards, published in the issues for April 3 and 17, of the ELECTRIC RAILWAY JOURNAL and a very clear and important communication by Mr. Harvie, setting forth the status of the matter as published in the issue of April 17.

Again, we are obliged to advise the electric railways that the rules of the proposed safety code when placed in use will demand a great amount of time and attention to details of construction and operation, requiring in many cases radical changes in construction and methods from those now in general use, and its application is bound to result in considerable expense. While it is the intention of the bureau of standards to have one year's experience with the code as it will be revised before the conference on July 1 and 2 before final adoption as standard, nevertheless, it is highly desirable that the rules be placed in such shape as to become, from the very beginning, as practical as possible. L. P. CRECELIUS, President.

[NOTE—Circular No. 54, "Proposed National Electric Safety Code—Preliminary Edition Submitted for Discussion and Criticism, Not for Adoption," is now available in printed form. Copies can be secured at 25 cents each from the superintendent of documents, Government Printing Office, Washington, D. C.—EDS.]

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

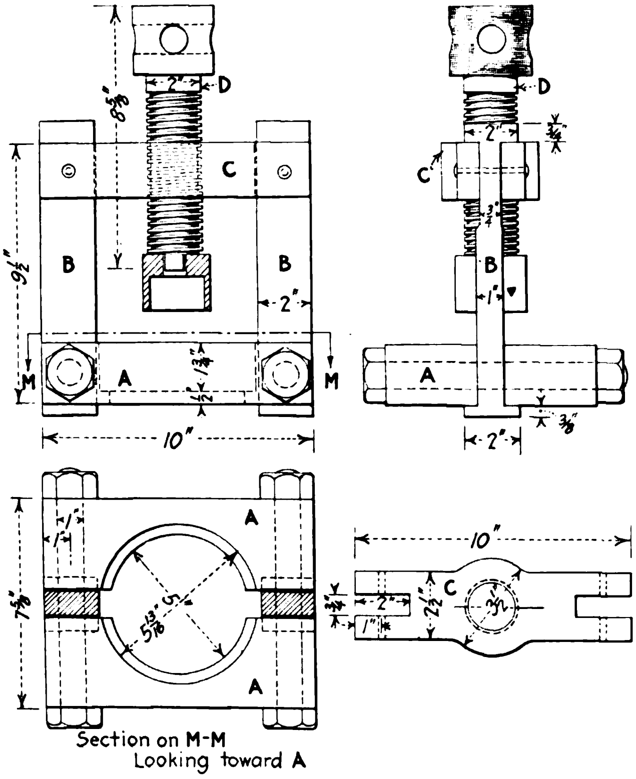
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Notes on Gears and Pinions

BY R. H. DALGLEISH, ELECTRICAL ENGINEER CAPITAL TRACTION COMPANY, WASHINGTON, D. C.

I have been very much interested in the articles in recent issues of the ELECTRIC RAILWAY JOURNAL on methods of mounting and removing pinions. This subject is very much in the minds of railway men at the present time, and on it, unfortunately, we do not all agree. I hope that our friends will take advantage of the columns of this paper to tell us their experiences with heat-treated gears and pinions.

In the article by A. A. Ross in the issue of April 24 the writer takes exception to the use of a gas ring in removing pinions. This exception is well taken, and I agree with Mr. Ross in the statement that heat should not be applied to heat-treated pinions, as there is a possibility of applying enough heat to destroy the value of the heat treatment. Pinions may be heated in boiling water before mounting, but should not be subjected to the action of a flame. With the use of heat-treated pinions more care must be taken in handling them than was necessary in the past with the untreated material.



PINION PULLER—CAPITAL TRACTION COMPANY, WASHINGTON, D. C.

In Mr. McAloney's article in the same issue of the ELECTRIC RAILWAY JOURNAL he shows the results of using a soft pinion with a hard gear. The result is as would be expected. His sketch also shows that the car was probably run in one direction only, which is not good practice if it can be avoided, as very much better wear will result if it is run in both directions. This company has made a number of tests by mating gears and pinions of different grades of hardness and has reached the conclusion that the best results are obtained when gears and pinions are of the same degree of hardness.

The life of a gear or pinion in railway service is dependent upon so many conditions that it is difficult to say just what it should be. Lubrication, axle-bearing wear, and the care used in mounting and removing the pinions, are some of the practices which must be watched carefully by the consumer.

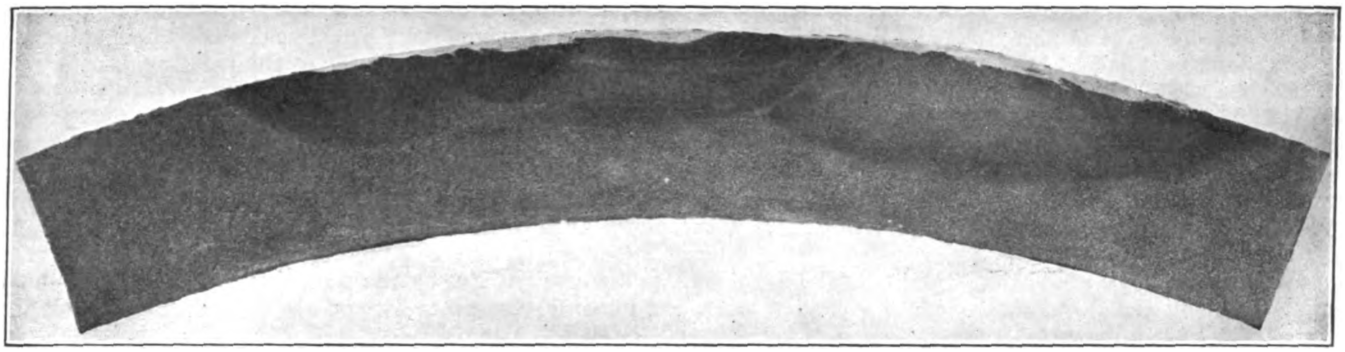
This company has for some years been using a pinion puller, illustrated in the accompanying drawing, which gives a bearing on most of the pinion teeth and has proved very satisfactory. This puller was designed by W. H. McCarty, master mechanic of the company. The puller illustrated was designed for use with the Westinghouse 101-B motor. As will be seen from the drawing, it consists of a pair of yokes, *AA*, hollowed out to fit around the pinion and clamped together by a pairs of bolts. Between the two yokes a pair of tension members, *BB*, are clamped by the same bolts. The other ends of *BB* are connected by a cross-piece, *C*, having an enlarged central portion drilled and threaded to receive the jack screw *D*. This screw carries on one end a washer hollowed out to fit over the end of the axle. While this puller takes a little time to adjust to the pinion, once in place it cannot slip and it gives an even pull all around. It is made of fairly hard steel so that it will keep its shape.

Danger of Welding Processes as Applied to Tires and Wheels

BY MORGAN D. HAYES, MIDVALE STEEL COMPANY, PHILADELPHIA, PA.

We have noticed in the issue of the ELECTRIC RAILWAY JOURNAL for April 10 an article under the caption "Restoring Steel Wheel Flanges with a Welder," written by F. A. Murphy of the Chicago, Ottawa & Peoria Railway. In connection therewith we beg leave to comment upon the same from our standpoint as steel tire and steel wheel makers.

During the past two years on several occasions our attention has been called to various experiments with oxy-acetylene and electric welding apparatus for the purpose of repairing certain parts of car equipment. These experiments started with the filling in of small blowholes or cavities in tires or wheels to smooth over evident defects in manufacture. Later, the process was used to fill in cavities or flat spots in tires and wheels, due to operating conditions which resulted in their being shelled out or skidded flat. In Mr. Murphy's article we notice that the electric welding process is now being used for filling in the hollow spaces of worn flanges, thereby restoring them to full contour. As the uses of this process seem to be progressive, and may eventually lead to the restoring of a section of a flange or rim, we think it well to call attention to the very positive dangers attending the use of this system by showing some illustrations which our research laboratory has recently furnished us on tires repaired by this process.



DANGERS OF WELDING—FIG. 1—SECTION OF BUILT-UP TIRE WELDED BY SEVERAL FLAME APPLICATIONS

In this investigation we selected three flaked tires, of the following chemical composition:

Tire Number	Heat Number	Carbon	Phosphorus	Manganese	Silicon	Sulphur	Nickel	Chromium
485813	13/759	0.63	0.040	0.697	0.237	0.035	0.14	0.10
448057	10/2695	0.70	0.016	0.704	0.232	0.023	0.34	0.15
300083	8/3026	0.68	0.016	0.738	0.296	0.018	...	...

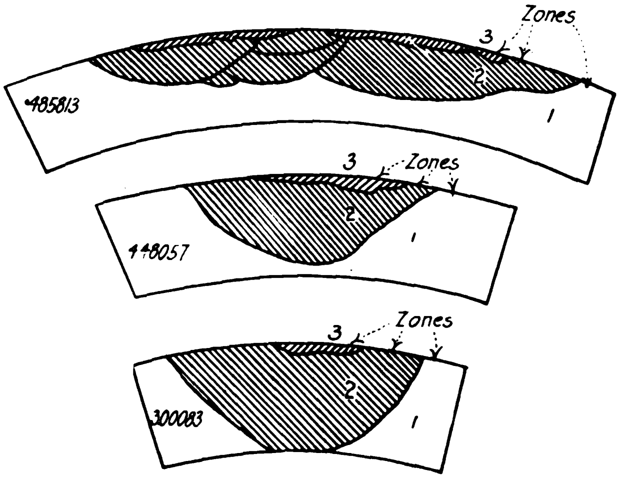
Pieces from 8 in. to 12 in. in length, in which there were comparatively deep defects caused by flakes or shells, were cut from the tires, and these pieces were sent to an oxy-acetylene plant and welded according to their approved railway methods. In the plant where the welding was done the following explanation was given as to the method of welding: "Pieces were put in a furnace and heated all over (to save oxygen), then filled and allowed to cool, not heated after being filled. After being filled in, and still at a welding heat, we hammered them down."

Upon the return of the pieces to our plant, a section ½ in. thick was cut longitudinally from each piece, and one side of each was polished and etched to show the condition of the metal.

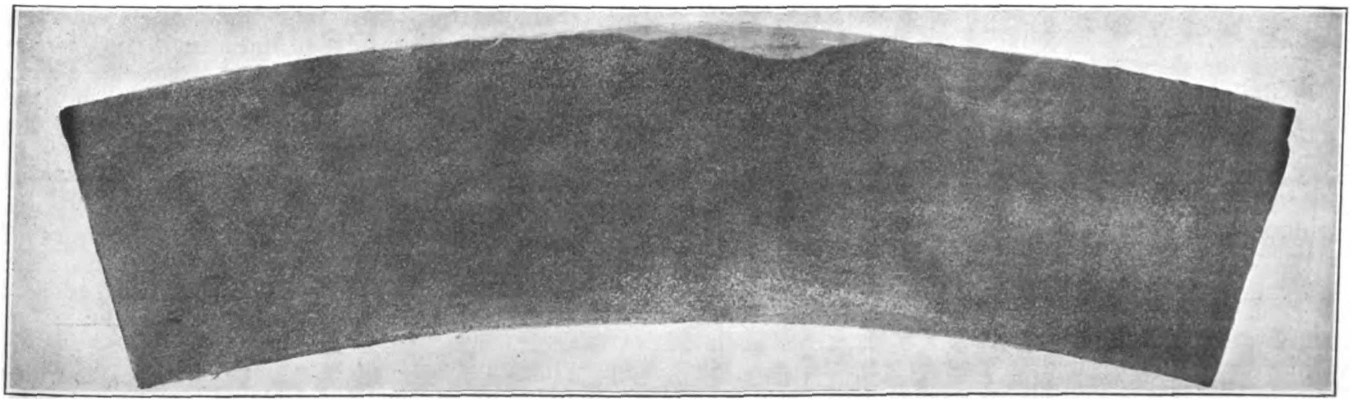
From the above, and after examination of the sections, it appears that they were heated to a point below the critical temperature in the furnace, fusion afterwards taking place under oxy-acetylene flame, at a necessarily much higher temperature on the tread of the tire. In order to show fully the results of this welding, the accompanying illustrations should be consulted.

Of these illustrations Fig. 1 is from a photograph of the piece of tire outlined in the upper diagram in Fig. 3, and demonstrates clearly to the naked eye the changes that have taken place under the welding process. Fig. 2 is from a photograph of the tire section represented in the middle diagram in Fig. 3. Fig. 3 was made from the three sections of tire in order to show more graphically the wave lines which appear in the photographs.

In Fig. 3 it will be noticed that each tire section shows three characteristic zones which might be described as follows: Zone 1—That part which remains in the original state of grain size, but in which the scleroscope readings indicate that the metal is probably softened by the anneal considerably below *Ac* (the critical temperature), which it has reached during this process. Zone 2—This is closer to the fused metal, and is the original tire metal which has been heated to a point above *Ac* during the fusion, and which when cooled has taken on a condition similar to that of a quench as the heat has been rapidly withdrawn from this section by the surrounding metal. The line of demarcation between Zones 1 and 2 shows the isothermal line which has been that of the critical temperature of the material. It is a characteristic of all steels that when cooled from such a temperature they are in the very poorest conceivable condition. Thus along the line between Zones 1 and 2 we have a condition which is



DANGERS OF WELDING—FIG. 3—DIAGRAMS OF ZONES IN TIRE METAL AFTER WELDING



DANGERS OF WELDING—FIG. 2—SECTION OF BUILT-UP TIRE WELDED BY ONE FLAME OPERATION the weakest that can possibly be obtained in tire metal. Zone 3—The new metal actually fused into the tire by the oxy-acetylene flame.

In Zone 1 the metal gives scleroscope readings of about 34 to 35; in Zone 2, 38 to 40, there being a sharp line of demarcation between the two zones; and in Zone 3, about 22, indicating a low-carbon material. All three zones appear very distinctly to the naked eye, side by side, on polishing the sections and etching them with nitric acid.

In Fig. 3 it will be noted that the line of demarcation runs diagonally across the tire, showing a zone of weakness directly across the tire. Since Zone 3 is soft over hard metal, the only action that could take place is a rapid wearing away of Zone 3 and its subsequent "shelling out." But between Zones 2 and 1 we note that there is a difference of five points in the scleroscope hardness in favor of Zone 2. There is thus a hard shell pressing on a soft one, a condition exactly similar to that which caused shelling in the original tire. Therefore, summing up, we see that the method of building up tires by welding produces two weaknesses, either of which might be fatal to the tire. That is, there is a zone of maximum poor condition running diagonally across the section of the tire in some cases; and, second, there is hard metal placed above soft metal.

Referring to the uppermost diagram in Fig. 3, it will be noted that the several successive fusions are shown by wave lines. They were caused by the moving of the flame along the tire to fuse it at several different but connected points, the flame being too small in area to heat the tire sufficiently and at one time throughout the entire length of the fused portion. The middle and lowermost diagrams in this figure show that a single contact of the flame, without motion, was sufficient to fuse in the new metal at the points desired, hence the absence of the many wave lines referred to above.

A careful study of the tire sections illustrated should convince the average railway man that something very radical has happened to change the uniformity of the material in these tires, and furthermore, it does not need an expert metallurgist to make the claim that the wave lines, showing separate and distinct zones, represent in themselves potential lines of weakness in these tires. Should failure occur it would no doubt be along these surfaces of cleavage which separate the zones of different hardness, as well as of different grain size.

Only through a complete heat treatment of the whole tire (a quench from a temperature above the critical, and an anneal at a temperature below the critical) after it had undergone such a welding process, could the metal be restored to a safe condition, but we take it that where this system of welding is being used, no such process follows. Therefore, the dangers which we have pointed out above are ever present. No reputable tire manufacturer would consider that a tire in the condition shown by these sections from tires which have gone through the welding process, are in a proper condition for shipment.

We understand that further experiments are being made with different kinds of welding steel, that is, steel of different carbon content, the idea being to approach more nearly the hardness of the original tire itself by using a higher carbon welding material. Even here the dangers of the process cannot be eliminated, for the reason that the welding flame used, whether electrical or oxy-acetylene, cannot be controlled in its decarbonizing effects and, even if the danger of decarbonizing could be eliminated, the fact that a high carbon metal is quenched in surrounding metal from its melting temperature, leaves this higher carbon metal in a condition even worse than that which we have tried to describe above. It is evident that this line of experimentation with various carbons but accentuates the danger of the tire completely breaking down when returned to use after being repaired by the welding process.

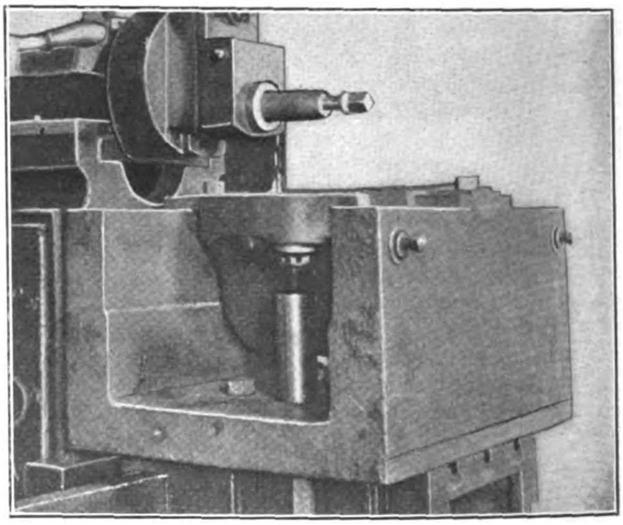
Much might be written on this subject in studying the metallography of tires or wheels subjected to this process, but we believe that in giving the illustrations above mentioned, a sufficiently graphic demonstration has been made to make the motto "Safety First" loom very large in the eyes of the cautious railway man, and before applying these methods of repair to a tire on a passenger engine, or the flange of a steel wheel under a passenger coach, we would ask him to "Stop, Look and Listen."

Tri-City Railway Bearing Practice

BY JOHN SUTHERLAND, MASTER MECHANIC TRI-CITY RAILWAY & LIGHT COMPANY, DAVENPORT, IA.

Unusual bearing mileage is being obtained on the cars of the Tri-City Railway & Light Company, Davenport, Ia. Motor-axle and armature bearings have averaged 100,000 miles and recent refinements indicate that this mileage will be greatly increased. This company's mechanical department now has a few bearings that have given 150,000 miles and show no wear. This success is attributed largely to care exercised to obtain accurate bearing fits and to the manner of fastening the bearings in position.

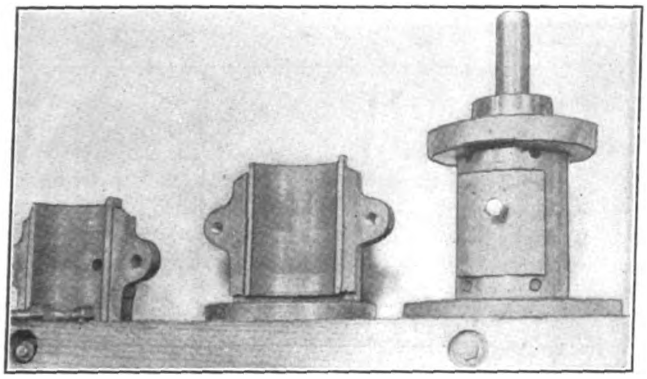
In one of the accompanying illustrations is shown a babbitting mandrel for motor-axle bearings, and a jig used for boring the bearings after they have been babbitted. The feature of both the mandrel and the boring jig is their simplicity. One-half of a motor-axle bearing is fastened to the mandrel by a stud belt which clamps a metal form into the oil-box opening. A ring with a thumb screw fits over the collar and clamps the bearing accurately in position. All babbitting is done by a shop laborer, who, after a bearing has been poured, fits the two halves into the boring jig. It is estimated that the labor cost per bearing complete is approximately 12 cents. When the laborer is not babbitting he is engaged in cutting bushings of seamless steel tubing which are shrunk on worn armature shafts. An allowance of 1/64 in. of wear is permitted before an armature shaft is turned down and bushed to the standard size adopted for that type of motor.

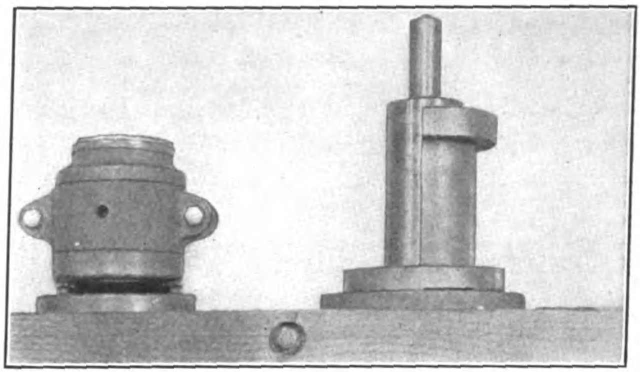


TRI-CITY BEARING PRACTICE—JIG FOR PLANING CAPS

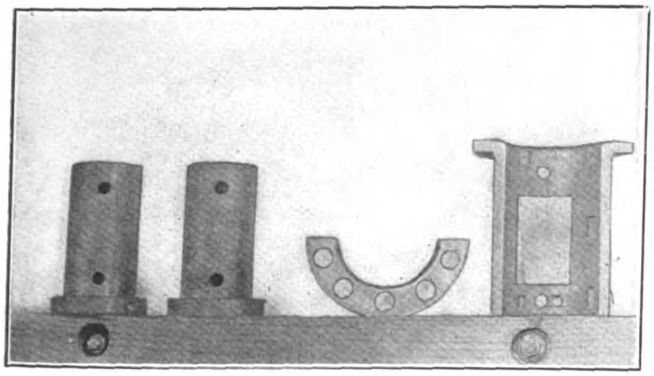
A bearing boring jig is also shown in one of the accompanying illustrations. It is made in two parts which bolt together to clamp the bearing securely and accurately in position. There are fifteen of these boring jigs, and all are made interchangeable on the face plate of one lathe. All of these jigs and mandrels have been accurately machined to insure first quality finished bearings. This company also believes, from past experience, that all bearings should be machine bored to obtain the maximum service.

Home-made, cast-iron axle bearings have also been used by this company with much success. To reduce to a minimum the machine work necessary on the cast-iron shells before babbitting, tapered rectangular holes on the inside of the shell and tapered round holes on the collar are provided in casting. This method of keying the babbitt to the shell also permits an increase in the amount of taper, in both the rectangular and the round holes. Samples of these cast-iron shells are shown in one of the illustrations.


TRI-CITY BEARING PRACTICE—MANDREL ASSEMBLED AND JIG IN PARTS


TRI-CITY BEARING PRACTICE—MANDREL WITH BEARING REMOVED AND BORING JIG ASSEMBLED

Accuracy in the preparation of bearings for service is not all that is necessary to obtain good results. Experience with bearings fastened in position only by dowels has led the mechanical department of this company to discontinue their use. For a number of years this company has fastened bearings in position by planing all axle and motor caps so that one diameter is slightly scant. After this is done the bearing is set in the cap, the halves of which are drawn tightly together with an 18-in. wrench. The bearing is thus clamped securely in position and a uniform grip over its entire surface is insured. This manner of fastening has produced a uniform bearing wear and there is little or no wear on the surface in contact with the cap. One of the accompanying illustrations shows one bearing which was fastened only by the dowels, and in another a bearing which was fastened by planing the axle cap is shown. The large dowel-pin openings in one of the bearings are clearly evident. This bearing also shows wear on the outside of the shell where a 1/16-in. ridge has formed at the end opposite the collar. The worn bearing had been in service one year, while the bearing fastened by planing the caps had been in service for seventeen years and shows no wear. The uniformity of bearing wear resulting from this method of fastening has also greatly increased bearing mileage. It has been made a rule, however, that new bearings shall be fitted to all armatures removed from service for repairs. It is also interesting to note that this company uses all split bearings to make it unnecessary to pull the pinion when a bearing is renewed.


TRI-CITY BEARING PRACTICE—WORN DOWELLED BEARING, CLAMPED BEARING AND HALVES OF CAST-IRON SHELL

A jig for planing armature and axle caps is shown in the illustration on the preceding page. This comprises two small screw jacks used to hold the cap firmly in position, a small wedge-shaped wooden block employed to hold the cap against the mandrel until the jacks are placed, a set of mandrels, and a special bed-plate casting. Interchangeable mandrels are provided with this jig to fit the different types of motor and axle caps. All armature and axle caps are planed so that the diameter at right angles to the halves of the cap is between 3/64 and 3/16 in. scant, depending upon the amount of planing necessary to secure the bearings firmly in position. The amount of metal planed off is usually sufficient, however, to allow a small gap between the halves of the cap when the bearings have been clamped tightly in position. In this way the pressure on all bearings may be made approximately the same.

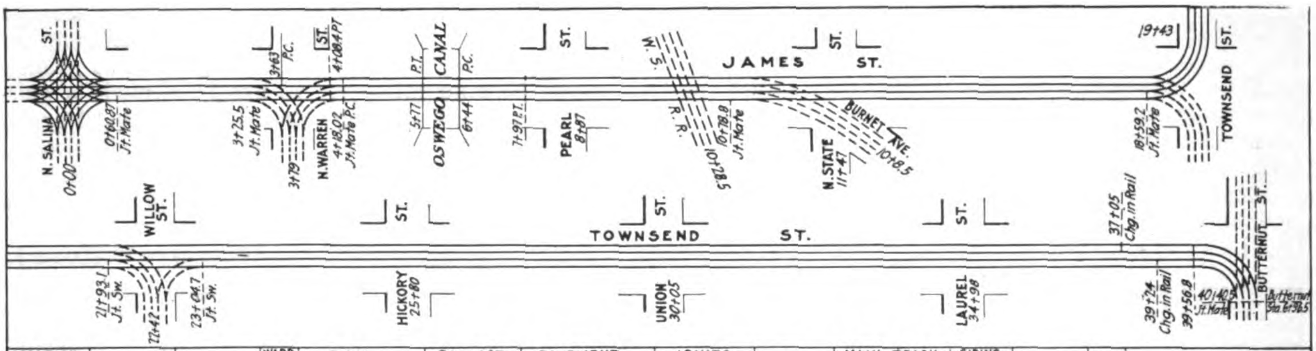
Way Records

BY E. P. ROUNDEY, ENGINEER MAINTENANCE OF WAY NEW YORK STATE RAILWAYS—SYRACUSE LINES

The article on "Way Records on a Cost per Section Basis" by Frank W. Hulett, which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for April 3, is interesting. I believe that Mr. Hulett has adopted a first-rate system.

On this division of the New York State Railways we have used a similar track record, a copy of which is shown on the chart on page 946. This record requires about thirty-five sheets like the sample and is, of course, corrected every year.

We have another track and pavement report which is practically a history of the track and pavement construction for the past twenty years. In this report each street is given two pages, one showing all original track construction and reconstruction, the other all original paving, construction and reconstruction. The items listed in the "original track" record are: Location of section; length of section; kind of track; which track is covered by record; sidings; distance between track centers; kind of rail used; kind of ties used; kind and location of tie-rods used; kinds of joints; kind and depth of ballast; paving; year of installation, and remarks. The items in the "original pavement" record are: Location of section; length; kind of track; track



LOCATION STREET OR R. OF W.	FROM	TO	WARD OR TOWN	RAIL		BALLAST		PAVEMENT		JOINTS		TIES	MAIN TRACK		SIDING XOVER ETC.	TOTAL	TILE DRAIN	REMARKS
				SECTION	DATE	KIND	DATE	KIND	DATE	KIND	DATE		1ST.	2ND				
James St.	N. Salina	Townsend St.	4	L.S. 103-426	1913	Concrete	1913	Sandstone	1913	Continuous	1913	Steel	1920'	1920'	640'	4480'	4"	
Townsend St.	James St.	Butternut St.	4	P.S. 90-200	1900	Stone	1900	Brick	1900	12 Hole Std.	1900	Pine	2181'	2181'	—	4362'	—	

SUMMARY OF MATERIAL

RAIL		RAIL		BALLAST		BALLAST		PAVEMENT		JOINTS		TIES		REMARKS
SECTION	FEET	SECTION	FEET	KIND	FEET	KIND	FEET	KIND	FEET	KIND	FEET	KIND	FEET	
L.S. 103-426	3340'			Concrete	3340			Sandstone	4480	Continuos	4480	Carnegie Steel	3340	
L.S. 119-341	1140'			Stone	1140			Brick	4362	12 Hole Std.	4362	Pine	1140	
P.S. 90-200	3886'			Stone	4362							Pine	4363	
L.S. 117-228	476													

WAY RECORDS—SAMPLE TRACK RECORD CHART, NEW YORK STATE RAILWAYS

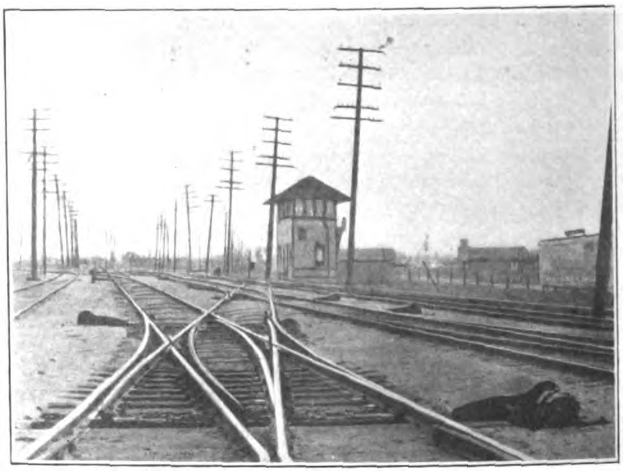
covered by the record; kind of pavement; kind of paving in devil strip; distance between track centers; sidings; year of installation, and remarks.

As regards maintenance costs I would say that several years ago we had the system divided into about 150 different sections, each section having a job order number. This made a great amount of work for the auditing department and we finally decided that the information accumulated was not worth the cost of getting it, as it had in most instances no real practical value. At the present time we carry about twenty-five different sections, each with a job order number. These are selected sections chosen in each case for some particular reason on account of special conditions or construction regarding which we wish to keep maintenance costs for a series of years. The sections do not coincide with those in the track report and they may be changed from time to time as we complete the necessary information for the different sections.

Interlocking Installation on Pacific Electric

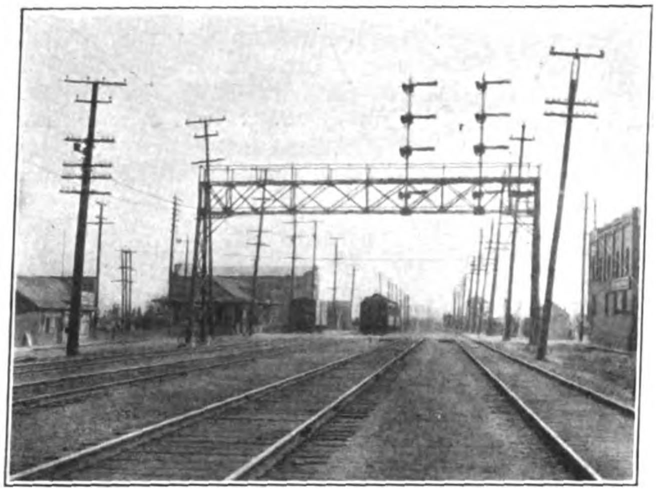
One of the largest, if not the largest, interlocking plants in the United States for controlling electric interurban traffic was put in service Sept. 14, 1914, at Watts, Cal., an important junction on the Pacific Electric Railway. The location is at the end of the four-track line out of Los Angeles, where a junction of the double-track lines to Santa Ana, Redondo and Long Beach is effected and where the Los Angeles local cars terminate their runs.

The installation is of the General Railway Signal Company's all-electric type and includes a source of electrical energy in the form of storage batteries, which, with suitable switchboard and control appliances, are located in the lower floor of the tower. There is an eighty-eight-lever frame, Model 2, unit-lever-type electric interlocking machine equipped with sixty-four working levers which control seventy-five functions—switches, derails and signals. The switch and derail operating mechanisms are actuated by 110-volt electric motors. These operate the switches and derails to normal or reverse position, and lock them in such position, when the proper lever in the machine is manipulated. High signal operating mechanisms of the semaphore type are provided, which are also actuated by 110-volt electric motors, and which move the semaphore arms to positions corresponding with the position of the levers in the interlocking machine. High signals are semi-automatic, that is, they are controlled by their respective track circuits, also by their respective levers in the interlocking machine. The dwarf signal mechanisms are of the semaphore type, but are actuated by a solenoid arrangement. These signals govern low-speed movements, also movements against the current of traffic. Automatic protection is given by a.c. track circuits which, in connection with suitable control appliances, prevent the display of a proceed indication unless the track is clear and switches in proper position.



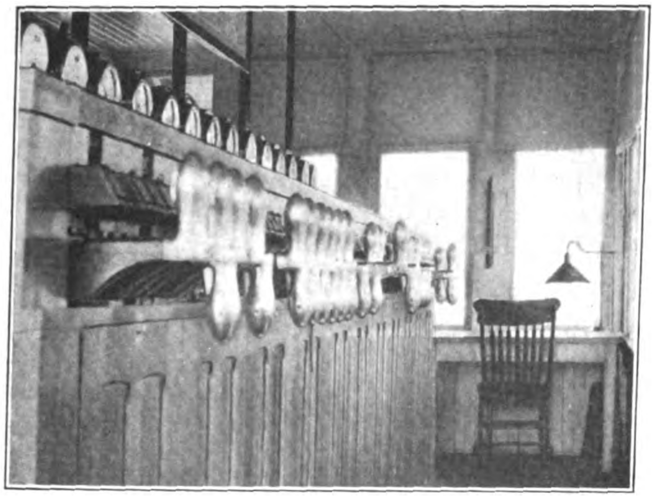
VIEW AT END OF FOUR-TRACK LINE FROM LOS ANGELES, SHOWING MAIN CROSS-OVER AND INTERLOCKING TOWER

In this plant the operation of each switch, derail or signal mechanism is effected by electric energy, and in accordance with the demands of safety provision is made to determine whether the switch, derail or signal have responded to the manipulation of their respective levers, and have operated to the proper position. This



HIGH SIGNALS NEAR JUNCTION GOVERNING DIVERGING ROUTES IN ADVANCE

is accomplished by the following "indication": In order to move a switch from normal to reverse position the leverman pulls toward him the proper lever, which makes only part of its complete stroke. This preliminary movement of the lever locks mechanically all conflicting levers, and closes a circuit which allows battery current to flow to the switch machine which operates and unlocks the switch, then moves the switch to the reverse position, and finally (provided the switch has been moved to its full reverse position) makes the switch motor, operating as a generator, send into the interlocking machine a dynamic current, or "indication." This energizes the indication magnet and informs the leverman that the switch has moved to its full reverse position and that the lever can be pulled out to its full reverse position. The final stroke of the lever unlocks such levers as do not conflict with the reverse position of the operated lever.



INTERIOR VIEW OF TOWER SHOWING INTERLOCKING MACHINES AND INDICATORS

The entire operation requires but a few seconds, if no abnormal condition interferes, but if a bolt or other obstruction prevents the switch from operating to its full reverse position, the dynamic "indication" could not be generated, all conflicting levers would be locked, and the leverman would know that something was wrong. The operation of signals is indicated in the same manner as switches and derails except that signals do not indicate in the clear position as there would be no sacrifice of safety if a signal failed to operate to the clear position.

Daily traffic through the plant is very heavy and consists of 362 main-line trains, 260 local trains, and forty freight trains, making a total of 662 trains every twenty-four hours.

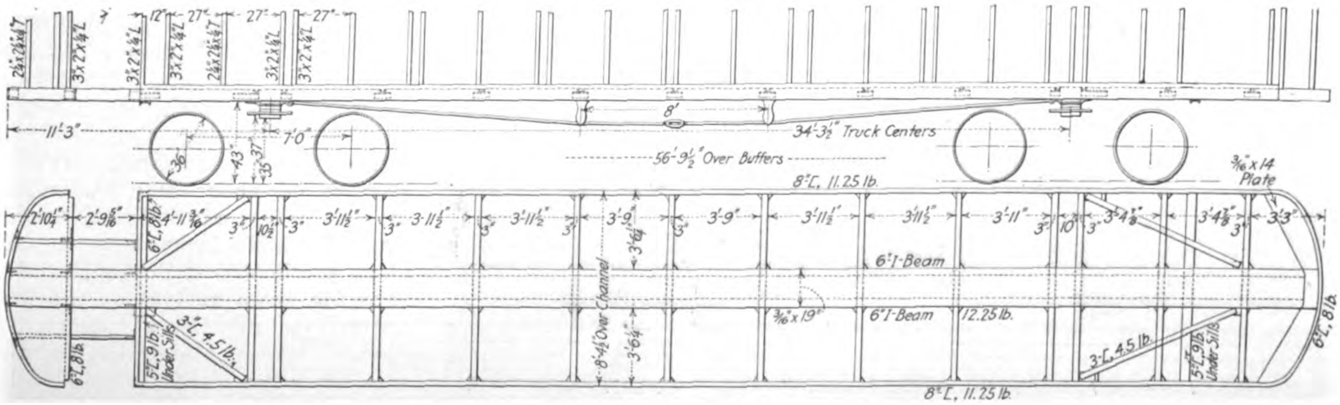
The total number of lever movements per 24 hours is 5716. During the period from Sept. 14, 1914, to Jan. 20, 1915—128 days—there was a total of 731,648 lever movements. It is reported that during this period no train was stopped on account of any defective failure of the signal system.

Light-Weight Steel Interurban Car

The new, all-steel interurban passenger cars of the Toledo, Fostoria & Findlay Railway are of unusually low total weight for high-speed passenger cars notwithstanding the use of standard commercial steel sections throughout. These cars were built for single-end, single-unit operation in a high-speed interurban service, the bodies being divided into passenger, smoking and baggage compartments. A feature of the specifications was that countersunk rivets were not allowed where round-head rivets could be used. The railway required this because round rivet heads would advertise to the public the fact that the new cars were not made of wood. As a matter of fact, the cars are of all-steel construction except for the inside finish, the insulation and the flooring. The general dimensions and weights are as follows:

Length over buffers	56 ft. 9½ in.
Distance between post centers	32⅝ in.
Width over all	8 ft. 6½ in.
Seating capacity	60
Weight of car body	29,550 lb.
Weight ready for service	68,000 lb.

A comparison between the 1913 all-steel car built for the Union Traction Company of Indiana, the 1914 all-steel car built for the Elevated Railroads of Chicago and this car shows the unusually low total weight:



FOSTORIA CAR—FRAMING PLAN AND ELEVATION

	Fostoria Car	Union Traction Car	Chicago Car
Over all length	56 ft. 9½ in.	61 ft.	48 ft.
Over all width	8 ft. 6½ in.	8 ft. ½ in.	8 ft. 8 3/16 in.
Weight of body	29,550 lb.	45,200 lb.	35,600 lb.
Weight of trucks and equipment	38,450 lb.	40,400 lb.	34,900 lb.
Total weight	68,000 lb.	85,600 lb.	70,500 lb.

The under and side framing of the car were designed to aid in supporting the structure, the box-girder center sill providing for unusual buffing and pulling strains. The center sill is formed of two 6-in. I-beams with 3/16-in. by 19-in. cover plates. Riveted to the sides of this center sill and to the 8-in., 11¼-lb., channel side-sills are 3-in., 4½-lb., channel cross-bearers spaced approximately 4 ft. apart. The cross-bearers are riveted with flanges up. The body bolsters are composed of two 3-in. channels spaced on 10½-in. centers. The end sills are made of one 6-in. channel reinforced with a 5-in., 9-lb. channel that is riveted to the side sills with the flanges down.

Body framing above the side sills is formed of 3-in. x 2-in. x ¼-in. angles at the panel posts and 2¼-in. x 2¼-in. x ¼-in. T-beams at the intermediate posts. These, together with the steel sheathing below the belt rail, on the panel posts and in the letterboard are designed to act as a riveted girder with a depth equal to the height of the car side. The steel side walls are insulated with compressed cork ¾ in. thick and the body is sheathed on the inside with ¼-in. Agasote finished to correspond with the rest of the interior. Two thicknesses of 13/16-in. yellow pine with two layers of waterproof tar paper between were used for the car body flooring. The lower floor was laid crosswise and the upper floor lengthwise of the car. The aisles in each passenger compartment were fitted with removable corrugated rubber mats having metal ends.

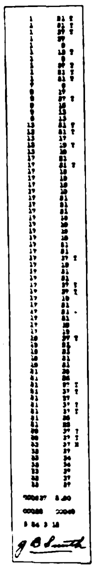
Steel carlines at each panel post support the roof and the T-beams at intermediate posts are made continuous from side sill to side sill. This roof is sheathed outside with ½-in. cypress and is covered with canvas. The headlining is 3/16-in. Agasote finished in light buff. All cross bulkheads are made of 14-gage steel riveted to the side and door posts. The bulkhead between the smoking and passenger compartment is glazed in the upper portion and fitted with a swinging door at the center. The bulkhead between the baggage and smoking room is solid and is provided with a sliding door.

The main passenger compartment of the car is equipped with nineteen Hale & Kilburn, stationary-back, leather-covered, 40-in. seats. The smoking room is fitted with eight similar seats upholstered in rattan. In the baggage room are two wooden slatted seats which are hinged to the sides of the car and used only when the car is crowded. Two five-light circuits for 94-watt Mazda lamps with Alba shades and one circuit for the 23-watt lamps in the toilet, the vestibule, the baggage-room and for the signal lamps make up the lighting system. A Peter-Smith hot-water heater is installed in one corner of the baggage compartment and eight Nichols-Lintern automatic ventilators, four on each side of the roof, supply the necessary ventilation. The equipment includes also Peacock hand brakes, Nichols-Lintern air sanders, Hedley anti-climbers, and M. C. B. radial couplers. The body is mounted on Baldwin Class AA trucks with 36-in. rolled steel wheels on 6-in. hammered steel axles with 5-in. x 9-in. journals. Westinghouse No. 304-A motors are mounted on these trucks and the cars are equipped with automatic air brakes and Providence interurban-type fenders. These cars were designed and built by the Niles Car Manufacturing Company, Niles, Ohio, under the direction of E. Smith, general manager of the Toledo, Fostoria & Findlay Railway.

Recorder for Passenger-Mile Earnings

An example of the ingenious and useful mechanical devices that have been developed to meet the recent insistent demand for automatic aids for the conductor and accountant will be found in the Bonham traffic recorder. This machine produces a printed slip upon which is recorded the boarding and alighting points of each passenger on the car, and in addition totals the number of cash or ticket fares and the passenger mileage made upon each trip. As a result traffic statistics of a most elaborate character are available at all times for every run, and the necessity for guesswork or expensive traffic counts to adjust the service to the requirements of the traffic is absolutely eliminated.

At the same time the recorder affords economy in auditing and gives a basis for checking reports of special-service men. It classifies each fare and enables the auditor to determine accurately the earnings of every train and the earnings per passenger-mile. To the operating department it supplies a tabulated statement of traffic between stations by trains and does away with the necessity for counting passengers at terminal points and ringing them all up at once upon a city register. A typical record slip and the tabulated results for a single trip are shown in the accompanying illustration.



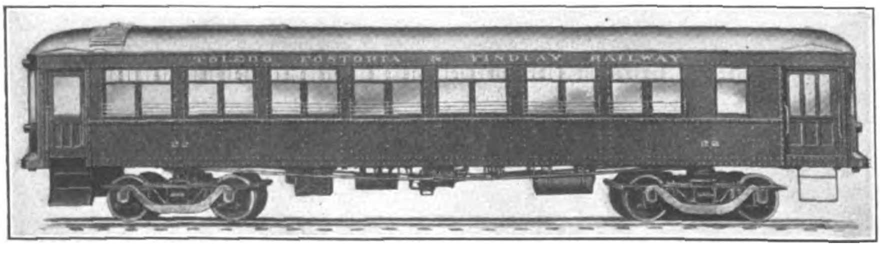
Division 6, Train No. 24, Cond. G. B. Smith.
March 15.

Station No.	Station Name	Passengers On Cash	Passengers On Ticket	Passengers Off
1	Anderson	3	7	..
7	Country Stop	1	.	..
9	Alexandria	4	1	3
13	Summitville	2	3	3
15	Country Stop	..	..	1
17	Fairmont	23	4	2
19	Jonesboro	4	1	14
21	Marion	5	4	22
25	Country Stop	..	..	4
29	LaFontaine	..	2	..
33	Treaty	7	..	..
34	Country Stop	..	..	2
37	Wabash	..	..	20
	Total	49	22	71

Cash Fares	49	
Ticket Fares	22	
Total Passengers		71
Amount Cash Fares	$5.80	
Amount Ticket Fares	9.40	
Train Earnings		$15.20
Passenger Miles		837
Earnings per Passenger Mile		.018
Miles per Passenger		11.8
Through Passengers		3
Passengers from:		
Town to Town		63
Town to Country		7
Country to Town		1
Country to Country		0

RECORD SLIP AND CALCULATED RESULTS FROM TYPICAL TRIP

Inherently the machine is easily and rapidly operated, and as an example of this feature the manufacturers point to the experience on the Anderson-Wabash division of the Union Traction Company of Indiana. In this case the trains leaving the town of Marion in the rush-hour carry an average of about 100 passengers to a number of outlying towns. These variable fares, however, are always collected and recorded before the train arrives at the first outward-bound stop, which is reached within ten or twelve minutes after the start.

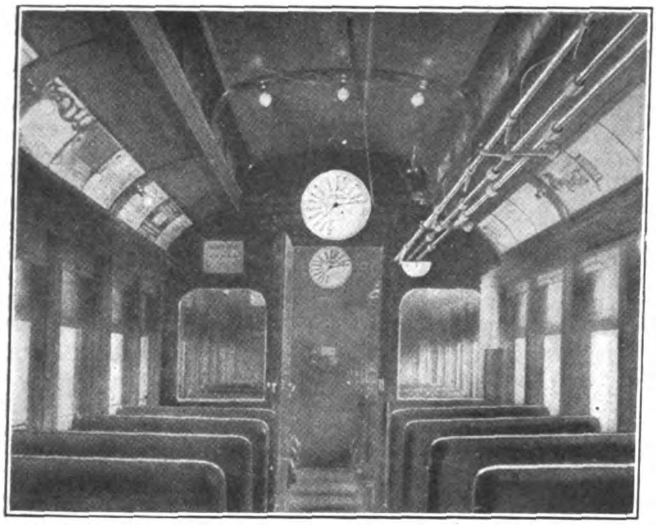


FOSTORIA CAR—VIEW SHOWING TWIN-WINDOW ARRANGEMENT AND DOOR LOCATION

The operation of the recorder is

based upon the mileage traveled by the person paying fare. Instead of setting the register in terms of money, the machine is set in terms of stations or fare points, and the act of setting the pointers to any two given stations automatically computes both the distance traveled by the passenger and the amount of the fare.

The recorder proper is located at the rear end of the smoking compartment of the car, and two dial cases, one at the front end of each compartment, carry the dials on which are printed the names of the stations on the division over which the car is operating. Four dials are provided within each case, with stations of a division marked on each side, so that a different dial is available for any one of eight different divisions if necessary, the change of dials being easily made. Each dial is divided into half-mile sub-divisions covering 100 miles of run. The dials carry three pointers, one indicating the starting point and another the destination. The third is provided for arbitrary fares, being moved backward or forward to make the deductions or additions involved by the change from the standard rate per mile.



VIEW SHOWING RECORDING DIALS MOUNTED IN SEPARATE COMPARTMENTS

Movement of the pointers is effected by two rods running the length of the car, and fares are recorded by slightly rotating a register rod in the usual manner, a movement in one direction recording cash fares and in the other direction recording tickets. Half-fares are recorded with equal readiness, and the only operation involved by a change in direction of the car is the turning of a knob on the recorder case. The printed record, which is completed by the automatic printing of the total number of cash passengers, ticket passengers and passenger-miles, as well as the total cash collected, the date, the train, and the division, may be made up either at the end of each trip or at the end of each conductor's run, the conductor being identified by signing his name on the record through an opening in the recorder case. The records may be removed either by the conductor or by an inspector, at the option of the operating department, and they are in such form that they can be easily filed as permanent statements of the operation of each train. The device is manufactured by the Bonham Fare Recorder Company, Hamilton, Ohio.

Woodchoppers in the town of Hampton, N. H., felled a tree across the high-tension wires of the Massachusetts Northeastern Electric Railways on April 2, cutting off the power which operated trolley cars in six cities and more than twelve towns in southern New Hampshire and northeastern Massachusetts.

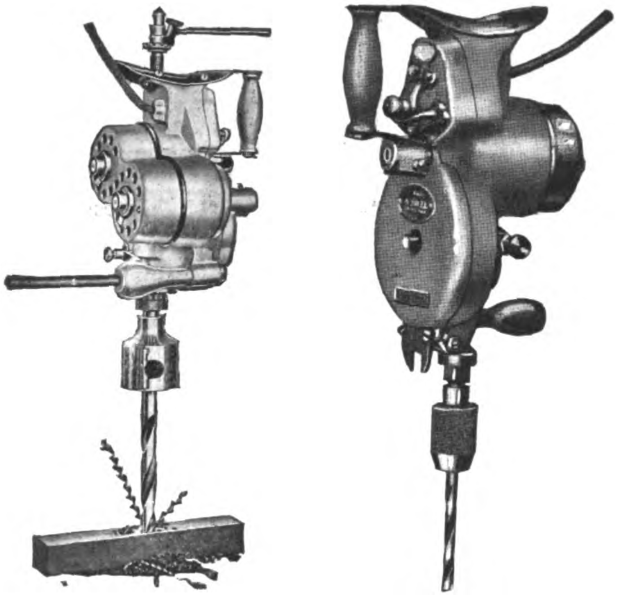
Rustless Steel Tanks

The Dover Boiler Works of New York City, through an agency contract with the manufacturers of the preservative material known as bitumastic enamel, have placed upon the market a line of rustless and leakproof tanks, which are actually guaranteed to remain in that condition for a period of not less than ten years. Bitumastic enamel is not a paint, but a natural product, which, applied to metal under correct conditions, impregnates its pores and becomes an integral part of it, in the sense that it will not peel or flake. Rust cannot attack the metal as the enamel completely protects it, the substance being resistant and water-repellant. The effects are really the same as if the tank was porcelain-lined. The material, however, appears to have ability to withstand reasonable mechanical abrasion.

New Portable Electric Drills

The Western Electric "Temco" portable drills are especially designed to give long and efficient service under severe conditions and hard usage and are essentially all-around tools. They have the general shape of an ordinary breast drill, are compact in design and unusually light. The weight is well balanced, making handling easy, and the electric switch is most conveniently placed near the handle.

A special feature is the ease with which the motor may be reversed when the drill sticks. Whether working at high or low speed, a touch of the switch reverses the motor, loosening the drill or sending it ahead as required. These drills will also tap holes, the reversing feature being of great advantage for this work. They are, of course, particularly valuable where the material cannot be carried to a drill press, as the tool can be easily carried to the job.



NEW PORTABLE ELECTRIC DRILLS

The motors are built to operate on either direct or alternating current at 110 volts or 220 volts. Connection is made to the nearest lamp socket by means of a flexible cord and attachment plug. There are two principal sizes, of which one has a capacity up to and including ⅜-in. holes in steel, cast iron or similar substance, and weighs only 12 lb. complete. The other has a capacity of ½ in. in steel, has two speeds and, without the chuck, weighs about 19 lb. It is equipped with two motors. The Western Electric Temco line also includes a tool-post grinder, a valve grinder for automobile engines, and a buffer and polisher.

News of Electric Railways

JITNEY AND FRANCHISE DEVELOPMENTS IN DES MOINES

Important and interesting developments in the Des Moines situation are the plans of the Des Moines (Ia.) City Railway to supplement its present service with a motor-bus system, and overtures by the City Council for a re-opening of franchise negotiations. Important also is the passage by the City Council, on its first reading, of a jitney bus ordinance which, if finally adopted, will regulate the operation of jitneys as provided in the law passed by the Iowa Legislature which adjourned recently.

The jitney ordinance will come up for final reading during the week ending May 22. It was drawn and presented to the City Council by J. B. Wiley, business agent of the Street Car Men's Union. It requires that each jitney driver provide a $5,000 indemnity bond and limits the number of passengers to be carried. It provides also that only one passenger may ride in the front seat with the driver. Provision is made for the regulation of routes, fares, and schedules. Councilmen German, Mitchell and Leonard voted for the ordinance. Mayor Hanna and Councilman Myerly opposed it.

As to the installation of motor-bus service by the railway company, which is favored by the city, Emil G. Schmidt, president of the company, says he is willing to put in auxiliary motor-bus service in congested districts, as feeders, and as connecting links between car lines.

Mr. Schmidt is understood to look with favor on the proposal of the City Council to compromise the franchise controversy. The Council has sent a note outlining concessions to the company. These are: To permit the company to operate motor buses; to make liberal concessions on the question of net income as affecting fares; to change certain provisions in the city draft objectionable to the company; to fix the capitalization at the actual amount invested in the system by the present owners. The note of the City Council in closing says:

"It is also proposed to make such changes in other provisions of the franchise which may be objectionable to you as can be made with due regard to the real interests and rights of the people of the city. We earnestly invite your co-operation in a sincere effort to adjust the transportation question in this city."

Regarding the question of capitalization, Mr. Schmidt says the proposal of the city would be acceptable were the Council willing to add interest on the money invested by the present owners since the time of such investment.

In spite of the arrival of better weather the jitney bus business does not seem to be thriving as well as at first. Within the last few weeks more than twenty of the 100 jitney drivers licensed in the city have called upon the city treasurer to refund their license fees. This refund could not legally be made.

SPRINGFIELD LABOR DIFFICULTY

As a result of conferences with the local board of trade the Springfield (Mass.) Street Railway dispute over the discharge of three conductors for alleged appropriation of fares will be taken to the courts. The company will sue the three conductors involved for recovery of the funds in a jury-waived sitting of the Superior Court or else in the police court. If proved guiltless, a conductor will be reinstated and if found guilty, discharge will follow without further argument. Both the company and the local union agree to abide by the finding of the court. C. V. Wood, vice-president of the company, said that there will be little delay in carrying the case to the courts. Resort to the police court can be had in case the company feels that the respective amounts affected do not warrant demanding damages sufficient to give the Superior Court jurisdiction. The new agreement holds that determination of the issue by a single justice of a court rather than by court and jury seems nearer by analogy to the methods of arbitration provided in industrial contracts. As a result of the agreement the hearing scheduled for May 12 by the State board of arbitration was cancelled. The danger of a strike is averted.

Commenting editorially upon the agreement the Springfield *Republican* said in part:

"That this proposal (criminal action) as a substitute for arbitration was a clever, even masterly bid for public favor was instantly apparent, and the company's real reason for rejecting the proposal was not to be seen on the surface probably. It is now clear why the company was reluctant to appeal to the courts. The settlement eliminates a jury trial. Juries are liable to be biased against corporations. Whoever marked out the process of an appeal to the courts in a civil action merits the congratulations and praise of the entire community. The conductors will get a fair trial and the company will not be denied justice because it is a corporation."

MAY ELECTRIFY FRISCO SUBURBAN LINES

E. N. Sanderson, president of the Federal Light & Traction Company, New York, N. Y., which controls the Springfield Railway & Light Company, Springfield, Mo., recently accompanied E. D. Levy, general manager of the Frisco Lines, and about twenty prominent citizens of Springfield on an inspection trip over the Springfield-Chadwick line, and it is stated that as a result of the inspection arrangements may be made for leasing from about 30 to 50 miles of each of the five radiating lines of the steam railroad through the Springfield Railway & Light Company for the purpose of suburban electrification at possibly an overhead d.c. line voltage of 1200. At the office of the Federal Light & Traction Company in New York it was stated that the proposition was strongly favored by the citizens of Springfield, and that negotiations for the lease of the lines may be entered into with the Frisco system, and the electrification carried out provided the plan is acceptable to the receivers of the Frisco and the lease can be made on suitable terms. Mr. Sanderson, who returned to New York last week, expects to revisit Springfield in about two weeks to make further investigations.

THE PENNSYLVANIA'S ATTITUDE TOWARDS LABOR

The Pennsylvania Railroad has presented to the Federal Commission on Industrial Relations a frank statement of its policies with employees. The management believes that the company's greatest asset is the loyalty and efficiency of its men. Its labor policies are described as an effort to protect that asset. It early realized the importance of training its own officers. To make the service attractive it was essential that employment as far as possible be permanent. As a result the majority of those who enter the service of the company continue with it until they die or are pensioned. The company believes that railroad employees should be paid liberal wages and that every feasible safeguard should be provided for the personal safety of employees and passengers. The management recognizes the propriety of men organizing for the purpose of bettering their condition, subject only to such restrictions as may protect the elemental essential of safe and continuous operation. In dealing with organizations among its employees the company has felt that the employees themselves were the best judges of the forms of organization into which they desired to go. There has therefore been no interference in the employees' choice in this matter. The employees have always been given full opportunity to redress their grievances whether associated with labor organizations or not. The company is opposed to employees affiliating themselves with an organization which might call a sympathetic strike. If there is to be a strike on the road the management believes that it should be the result of the choice of its own employees and because of some difference between the company and its own men, and for no other reason. In normal times the Pennsylvania system has 250,000 employees. The management believes that the best test of the sincerity of its interest in the welfare of its men is the fact that so large a percentage of its employees have made the service of the company their life work.

CLEVELAND EXTENSION SUBSIDIZED

Peter Witt, street railway commissioner of Cleveland, Ohio, agreed recently to a 3-mile extension of track on what is known as State Road on a basis that he believed to be correct and which he felt would come into general use sooner or later. He said that in the past railway companies had built their tracks into allotments and into country districts where they would be compelled to operate for several years at a loss. The managements felt that they were doing a civic duty in aiding the development of the cities, and this would be all right if the people in general did not foot the bill. Mr. Witt believes that extensions make land values and that those who profit by them should help pay the cost of such extensions. That was the idea he advanced when the land owners on State Road asked for the extension. Two other routes could have been taken, but this one will serve the greatest number of people. Mr. Witt said that he would recommend the 3-mile extension if the property owners, in return for the advance in the value of their property which would follow, would pay $1.50 a front foot toward the cost of the extension, or 75 cents a foot on each side of the street. They have agreed to this and the company will receive about $24,000 as a result.

B. I. BUDD ADDRESSES CHICAGO JOVIANS

At the regular Monday luncheon of the Chicago Jovian League, on May 10, Britton I. Budd, president of the elevated railroads of Chicago, gave an illustrated talk on Chicago's transportation facilities. This address was devoted largely to the development of the elevated railroads and its effect upon the growth of Chicago. Some interesting figures relating to the increase in real-estate values were presented. Property in some localities that had sold for $40 a foot front in 1892 was now selling for $2,000 a foot front. Without a rapid-transit system the increase would have been but little. Mr. Budd also stated that one of the lines recently extended was showing an increase in traffic of from 12 to 14 per cent per year. A check of the service furnished to the employees of eight large plants during the past winter showed that it was 98 per cent perfect, although at times the weather was exceedingly severe.

Mr. Budd also described briefly the new all-steel cars and what the company expected them to accomplish and the loading and unloading schemes adopted on the loop platforms, since through-routing of all cars was effected. As anticipated through-routing had increased the loop track capacity 60 per cent. His comments on traffic conditions were illustrated by charts and tables comparing conditions in Chicago with those on elevated lines and in subways elsewhere.

In closing, Mr. Budd remarked that too often transportation problems had been solved on a basis of return to the company rather than on the service to be rendered. This was diametrically opposed to the public point of view, which must ultimately be accepted. The best service the art can afford should be furnished, and for elevated and subway systems the highest speeds consistent with safe operation should be attained. Mr. Budd believed that the merger of the surface and elevated lines would improve service conditions in Chicago.

NEW ORLEANS POWER IMPROVEMENT

The southern office of the United Gas & Electric Engineering Corporation is busily engaged under the direction of Samuel J. Dill, vice-president, in important improvements for the New Orleans Railway & Light Company. In addition to providing the fifty new cars, described in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1915, the company is undertaking an extensive modernization of the power generating and distribution system. At this time the company has four power stations, namely, Claiborne, Edison, Magazine and Market. As far as practicable, generation will hereafter be confined to the Market station, while the outlying Claiborne and Edison stations will be used chiefly as rotary converter substations.

The company has already bought a 15,000-kw turbine from the General Electric Company, additional Babcock & Wilcox boilers and Westinghouse underfeed stokers for the same. Six 1000-kw rotary converters will be ordered. Other changes required are the rearrangement of the piping at the Market station and the rebuilding of transmission lines because of changes in the centers of power distribution.

STRIKE IN DETROIT

The conductors and motormen in the employ of the Detroit (Mich.) United Railway went on strike on the morning of May 13 after an all-night session following the refusal of the company to reinstate Motorman Peter Whaling, who was dismissed recently for carelessness in car operation. Whaling is a member of the executive board of the local union. The men declare that they will stay out until he is put back. The company says it will not yield, but will stand by the agreement, which calls for a board of review and arbitration in such cases. W. D. Mahon, president of the Amalgamated Association, says that the association will stand behind the union.

COURT MODIFIES ALBANY ORDER

Appellate Division justices on May 5 modified, in several instances, the orders of the Public Service Commission for the Second District of New York compelling the United Traction Company, operating in Albany, to improve its equipment and service. The court holds that the company should have a rehearing on the order of the commission requiring the immediate purchase of forty-two modern cars of the type of the new Pine Hills cars. All the provisions are affirmed with the exception of this one and another relating to the underground feeder system of the company. All the justices concurred in the opinion written by Presiding Justice Smith.

The matter was thrown into the courts through the securing from Supreme Court Justice A. V. S. Cochrane at Hudson of a writ of certiorari and a temporary stay to the inforcement of the commission's orders. Through this the traction company secured the right to review the utilities board's orders and its refusal to grant the company a rehearing. Application for a rehearing was made by the company on the ground that the European war prohibited the raising of money to carry into effect the provisions of the commission's orders. As to a rehearing, the opinion of the Appellate Division justices is that the company's plea should have been considered.

The third and fourth provisions of the commission's order, compelling the purchase of six new cars for use on the Belt lines, must be obeyed. In this particular the court says: "We are of the opinion that the commission was justified in making the direction and that the cost of the cars is not sufficient to justify a stay pending the application and determination of a rehearing."

The fifth provision of the order, which provided that the United Traction Company should arrange with the Schenectady Railway for giving transfers within the city, is a reasonable one, according to the justices. The court added further: "And it is difficult to see why transfers should not be given. If the Schenectady Railway objects, the Public Service Commission must take the necessary steps to effect such an arrangement."

The Appellate Division annulled one of the provisions of the commission's order. This related to an order making it compulsory for the company to notify the commission on April 1 of each year as to material yearly extensions to be made by it to the underground conduit feeder system. The court decided that the right to order wires placed underground should be left to the municipality.

Some slight modifications tending to simplify the order of compelling the company to install a telephone system exclusively for its own use before April 1, 1915, were made and the modified provision affirmed. The temporary stay secured by the company delayed the consummation of these provisions.

A summary of the original order of the commission was published in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1914, page 1365. In the issue of this paper for Jan. 16, 1915, page 156, the objections of C. S. Sims, vice-president of the company, to the order were summarized. The commission subsequently denied the company a rehearing, and in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 30, 1915, reference was made to the order secured by the company through Supreme Court Justice Cochrane at Hudson for a writ of certiorari and a stay of the order.

Pennsylvania Full-Crew Law Repealed.—The Pennsylvania Legislature has repealed the full-crew law of that State and has sent to the Governor a bill providing that the Public Service Commission shall regulate the manning of trains.

Accident at Power Plant Suspends Service.—The Highland Park & Lake Burien line, Division "C," of the Seattle (Wash.) Municipal Railway, was forced to suspend operation on May 5 as a result of the burning out of one of the rotaries at the Lake Burien substation. Several days elapsed before service was restored.

Kansas City, Kan., Obligations Cleaned Up.—The street railways, commonly called collectively the Metropolitan, operating in Kansas City, Kan., had a general clean-up of contract obligations recently, the period covered dating back to 1904, the accounts between the street railways and the city being started fresh, by the payment of $30,000 to the city by the Metropolitan.

City's Attorneys Working on Detroit Purchase.—Except for the statement that the city's attorneys are working on the terms of a contract to be submitted to the directors and stockholders of the Detroit (Mich.) United Railway, no information has been given out during the week regarding the proposed new plan of municipalizing the Detroit street railway lines, under which the purchase price will be fixed by the Circuit Court of Wayne County sitting in chancery.

Stone & Webster to Have Executive Representation at Dallas.—Announcement has been made in Dallas by Stone & Webster that it has been thought wise for the owners of the street railway and electric lighting properties of that city to be directly represented locally and Charles F. Wallace, who has been one of the Stone & Webster organization for more than twenty years, is to live in Dallas and will be at the head of the affairs of the companies. No other changes are in view.

Gasoline Car in Interurban Service.—A gasoline motor car with seats for forty passengers built by employees of the Hutchinson (Kan.) Interurban Railway is being tested on the Anthony & Northern Railway between Pratt and Byers, Kan. The car has a six-cylinder engine, developing 54 hp, and on the initial trip made the 52 miles from Hutchinson to Pratt in two hours and ten minutes. It will make two round trips a day between Pratt and Byers. It is lighted with electricity by a small independent unit.

Tax Suit in Kentucky.—Suit has been filed by the State of Kentucky against the South Covington & Cincinnati Street Railway asking for $18,250 penalty at the rate of $50 a day for the delay incident to the railway company's suit to enjoin collection of taxes on the amount of the franchise assessment as increased by the State Board of Equalization. The suit was dismissed on May 1, 1914, having concerned the action of the board which sat in 1912. The company paid the taxes of $2,100 and the State now seeks to collect the penalty.

Some New York Bills Signed.—Governor Whitman of New York has signed the bill giving the Public Service Commission of the First District of New York power to enter into an agreement with the Long Island Railroad whereby subway trains of the Queens extension may be run over the tracks of the Long Island Railroad from Corona to Bayside and Whitestone Landing. The Governor has also approved the bill authorizing changes in uncompleted sections of a rapid transit road, after contracts have been made, with the consent of the Board of Estimate.

Another Company Publication.—The Chicago (Ill.) Elevated Railways has distributed the first edition of *Elevated News*, a publication issued to acquaint the people of Chicago with the elevated system. This pamphlet will be published monthly, and will be distributed from the elevated stations. The first issue of the *Elevated News* contains only four pages of printed matter regarding service and complaints, but subsequent issues will contain eight pages. To give these booklets permanent value to the public, the inside two pages of the eight-page form will contain a map of the elevated system on which the stops will be indicated.

Electrical Prosperity Week Meeting at Toledo.—Electrical men and retail merchants of Toledo and other northern Ohio cities gathered at the Commerce Club, Toledo, on May 6 to hear of the plans for the "Electrical Prosperity Week" campaign. E. R. Kelsey, publicity manager of the Toledo Railways & Light Company, acted as chairman of the evening. J. M. Wakeman, general manager, and Harry W. Alexander, director of publicity of the Society for Electrical Development, Inc., were the principal speakers. Frank R. Coates, president of the Toledo Railways & Light Company, made a brief speech indorsing the work of the society and the plans for the sales campaign.

New Wage Demands in Chicago.—The present contract between the Chicago Surface Lines and its employees expires on May 31, 1915, and the employees have formulated their new demands. These are said to include a demand for 33 cents an hour during the first year and 36 cents an hour during every year thereafter, and a maximum day of ten hours in twelve. Motormen and conductors are now paid 23 cents an hour for the first three months, with increases every six months until the maximum of 32 cents an hour is reached after five years of service. The existing contract also provides that the men shall not work more than ten hours in sixteen.

Pennsylvania Constabulary Attacked.—At the hearing before the Industrial Relations Commission in Washington on May 6 James H. Maurer, a member of the Pennsylvania State Legislature and president of the Pennsylvania State Federation of Labor, cited a recent street railway strike in that State in his argument against the State constabulary. He told of an appeal made by him to a former Governor in connection with the strike mentioned and the investigation that followed, in which he said it was shown that members of the constabulary resorted to unduly offensive tactics. He said that the desire of New York, Illinois and Virginia to establish State constabulary forces was not based on any history of industrial troubles that would justify the creation of such organizations.

Philadephia Loan Plan Before Legislature.—The Pennsylvania House has adopted the Vare-Taylor resolution to amend the constitution so as to increase the borrowing capacity of the city of Philadelphia by 3 per cent for the purpose of transit and port developments exclusively. This resolution was adopted in the 1913 session of the Legislature. The action in the House on May 6 marks its final passage through the Legislature. The people will vote next November upon the amendment. This increase of the borrowing capacity on assessed realty from 7 to 10 per cent means that the borrowing capacity will be enlarged by about $66,000,000, which may be devoted to a realization of the plans for transit development advocated by A. Merritt Taylor, director of city transit of Philadelphia.

Chicago Surface Lines Club.—The Surface Lines Club, an organization of the employees of the Chicago Surface Lines in executive, supervisory and clerical capacities, was formed on May 4, 1915. More than 600 employes have expressed their desire to join. For the present the members will devote their attention chiefly to athletics. The club is the result of a spontaneous "get-together" movement which had its first expression in the formation of a bowling league. At the Trophy Night dinner given by the employees, the club movement was inaugurated. All the company officials have expressed their intention of becoming members. The following have been elected officers for the first year: Joseph V. Sullivan, president; Herbert Wheeler and W. E. Nemits, vice-presidents; C. R. Manzer, secretary; Henry Nordin, assistant secretary; M. V. Morton, treasurer; Walter Jones, assistant treasurer. The management of the company will provide headquarters for the organization.

Commission Disapproved Abandonment of Line.—The Public Service Commission for the First District of New York has refused to approve the declaration of abandonment filed by the New York & Queens County Railway as to a portion of its franchise route in Flushing Avenue, Queens, between Ehret Avenue and Jackson Avenue. The company's failure to construct the line was made the subject of a complaint upon which the commission held formal hearings. It was shown that the route was covered by the company's franchise and the commission directed its counsel to apply to the Supreme Court for a writ of mandamus to compel the company to construct and operate the line. The proceeding was instituted, but before it was argued the company filed with the commission a declaration of abandonment and the court proceeding was held in abeyance pending action upon this declaration. The commission's opinion says that the evidence would support a declaration of abandonment as to other portions of the company's route except as to this part of the Flushing Avenue route.

Increasing New York's Elevated Facilities.—Within seven or eight months the third-tracking of the elevated roads in Manhattan and the Bronx will be partially completed and the new express service will be begun on some parts of the system. The lines to be enlarged are the Second, Third and Ninth Avenue roads, of which the Second Avenue has no third track at all. On the other hand the Third Avenue line is now provided with a third track from Forty-second Street north and the Ninth Avenue from Christopher Street to 116th Street. It has been found necessary for a complete third-track system to reconstruct a large part of the existing lines, and this has had to be done without in any way interfering with the operation of the train service. The work was designed by George H. Pegram, chief engineer of the Interborough Rapid Transit Company, New York, N. Y., and has been approved by Alfred Craven, chief engineer of the Public Service Commission for the First District of New York. It is being carried out under the supervision of C. V. V. Powers, division engineer of the commission, by T. A. Gillespie & Company, Snare & Triest, and Terry & Tench. More than 50,000 tons of new steel are to be built into the old structures.

Composite Cars on New York Elevated.—The Public Service Commission for the First District of New York has sent to the Interborough Rapid Transit Company a letter stating that its recent order requiring the removal of 478 composite cars from the subway and the release of such cars from the lien of the original subway operating contract has no bearing upon the company's proposal to use the composite car bodies for operation on its elevated railroads. The company had stated that if such car bodies were not to be used upon the elevated railroads there was no necessity for the action taken by the commission "as we cannot acquiesce in the elimination of these car bodies from the equipment account under Contract No. 1 until some saisfactory agreement has been reached with the city as to their ultimate disposition." In reply the commission stated that the composite cars were ordered out of the subway operation under the authority of the public service commissions law in order to conserve the safety of the public traveling in the subway and that the order is not and cannot be made in any way dependent upon the question of whether the commission, acting under the provisions of the rapid transit act and of the elevated extension certificate, will or will not permit the utilization of these car bodies for elevated service.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Signal Association

The Railway Signal Association will hold its second stated meeting of the year at the Hotel Astor, New York, on May 26 and 27, 1915. On Wednesday, May 26, the business session will last from 9 a. m. to 2 p. m., and the reports of the committees on power interlocking, manual block and electrical testing will be discussed. A boat trip on the Hudson has been arranged for the members and guests who attend the meeting on Wednesday, the trip being to West Point and return. On Thursday there will be a session from 9 a. m. to 12:30 p. m. and another session from 2 p. m. to 5 p. m. Reports will be presented of the committees on standard designs, electric railway and a.c. signaling, storage battery and charging equipment, and on lighting protection.

Missouri Public Utilities Association

Arrangements have practically been completed for the ninth annual convention of the Missouri Public Utilities Association to be held on board the *S. S. Quincy* on May 27-30.

Among the papers on the program of direct interest to electric railway operators are the following:

"Financing and Valuation of Public Utilities," by C. F. Enright, St. Joseph, Mo.

"Power House Economics," by E. J. Billings, results engineer Doherty Operating Company, St. Joseph, Mo.

"Relation Between Our Association and the Public Utility Commission," by J. H. Van Brunt, vice-president and general manager St. Joseph Railway, Light, Heat & Power Company.

"A Brief Talk on the Subject of Appraisal and Rate Regulation," by R. E. McDonnell, of Burns & McDonnell, Kansas City, Mo.

"The Effect of Jitney Service on Transportation Companies," author not announced.

West Virginia Public Utility Association

The public utility companies of West Virginia held a meeting at Huntington on April 26 and effected a temporary organization to be known as the West Virginia Public Utility Association and elected the following to hold office until the meeting for permanent organization, which is to be held on June 8 and 9 in Charleston: President, Herbert Markle, general manager of the Appalachian Power Company, Bluefield; vice-president, G. O. Nagle, general manager of the Wheeling Traction Company, Wheeling; secretary and treasurer, W. C. Davisson, general manager of the West Virginia Water & Electric Company, Charleston. The following directors were elected: W. L. Foster, manager of the Beckley Water & Light Company, Beckley; W. G. Mathews, president of the Virginian-Western Power Company; M. A. Maxwell, general manager of the Logan Light & Power Company; H. E. Wyatt, superintendent of the Huntington Water Company; O. B. Welch, manager of the Williamson Light & Power Company; Herbert Markle, Bluefield, W. Va., and G. O. Nagle, Wheeling, W. Va. A committee has been appointed to draft a constitution and by-laws to be submitted to the meeting to be held on June 8. The membership of the association is to include representatives of gas, traction, electric light and power, and water companies.

Southwestern Electrical & Gas Association

The convention of the Southwestern Electrical & Gas Association will be held at Galveston, Tex., on May 19, 20, 21 and 22, with the Galvez Hotel as the association headquarters, and the place where all meetings, sessions, etc., will be held. The opening session will be held at 9 a. m. on May 19, followed immediately by the morning railway session at 10 o'clock. There will be a second railway session at 2 p. m. or 2:30 p. m. On the second day, May 20, there will be an electric light and power session at 9:30 a. m. and the same at 2 p. m. or 2:30 p. m. On the third day, May 21, there will be a "general" session at 9:30 a. m., and an afternoon session of the same at 2 p. m. or 2:30 p. m. The session on Saturday morning, May 22, will be the business and executive session of the convention, when reports of the various committees will be received, nominations made, election of officers and committees held. The accountants will also have separate sessions on May 20, at 9:30 a. m. and again at 2 p. m. or 2:30 p. m.

Among the interesting papers and addresses scheduled for presentation at the convention is an address by Charles B. Scott, manager of the bureau of safety of the Middlewest Utilities Company, and the secretary of the accident prevention committee of the National Electric Light Association. His address will be on the subject "Important Factors in Accident Prevention."

The following papers of interest to electric railway operatives are being written for the convention:

"Four Interesting Points in Track Work and Paving," by B. R. Brown.

"Economies in Repair Shop Work and Maintenance," by V. W. Berry.

"An Absolutely New Type of Street Car for City Operation," by C. O. Birney.

"A Study of the Jitney," by R. T. Sullivan.

"What the Southwestern Electrical & Gas Association Can Do for Me," by A. V. Wainwright.

"The Advertising Influence of the Employee," by F. R. Slater.

"Welfare Work and Education of the Employee," by Richard Meriwether.

"Positive and Negative Elements in Trade," by Fred Johnson.

Several other papers and addresses have been promised. The executive committee has ordered that the question box be repeated. A number of entertainments have been arranged.

Financial and Corporate

ANNUAL REPORTS

American Cities Company

The statement of income, profit and loss of the American Cities Company, New York, N. Y., for the year ended Dec. 31, 1914, follows:

Income	$1,928,676
Operating expenses and taxes	$85,724
Interest advances from subsidiary companies	9,144
Total	$94,868
Net earnings	$1,833,808
Interest on collateral trust gold bonds	500,000
Net income	$1,333,808
Dividend on preferred stock at 6 per cent	1,233,210
Surplus for the year	$100,598
Surplus at the beginning of the year	$194,994
Less expenses applicable to prior period	4,127
	$190,867
Surplus at end of the year	$291,465

The American Cities Company owns in the aggregate 85.83 per cent of the preferred stock and 95.79 per cent of the common stock of the New Orleans Railway & Light Company, the Birmingham Railway, Light & Power Company, the Memphis Street Railway, the Little Rock Railway & Electric Company, the Knoxville Railway & Light Company, and the Houston Lighting & Power Company. If the American Cities Company's proportionate share of the undivided surplus earnings over dividends of these companies were included in the foregoing statement, the surplus would be increased to $222,419 for 1914.

The gross earnings from all sources of the combined constituent companies were $14,822,105 for 1914, an increase of $141,803 over 1913. The operating expenses and taxes totaled $9,133,582, an increase of $15,596, while deductions, including interest charges, totaled $3,480,973, an increase of $133,174. The net income for the year amounted to $2,207,550, a decrease of only $6,967.

The operating expenses of the New Orleans Railway & Light Company were increased approximately $100,000 on account of the advanced price of coal and gas oil. New contracts for these commodities, however, were entered into in December, 1914, at prices which it is estimated will effect a saving in 1915 of approximately $90,000. The operating ratio of the constituent companies was 52.77 per cent in 1914 as compared to 53.67 per cent in 1913.

Duluth-Superior Traction Company

The comparative statement of income, profit and loss of the Duluth-Superior Traction Company, Duluth, Minn., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Operating revenues:		
Revenue from transportation	$1,289,917	$1,260,061
Other revenue	23,647	23,853
Total revenues	$1,313,564	$1,283,914
Operating expenses:		
Way and structures	$50,441	$52,627
Equipment*	76,816	65,577
Traffic	901	655
Conducting transportation	469,632	463,266
General and miscellaneous	162,202	166,039
Total operating expenses	$759,992	$748,164
Net operating revenue	$553,572	$535,750
Taxes	$66,520	$66,537
Depreciation	100,000	74,100
Total taxes and depreciation	$166,520	$140,637
Surplus for fixed charges and dividends	$387,052	$395,113
Total fixed charges and dividends	377,372	388,276
Net income to surplus account	$9,680	$6,837

*Equipment expense for 1914 includes $9,645 to cover depreciation of equipment for the last six months, as required by the Interstate Commerce Commission.

The total revenue of the company increased $29,650, or 2.3 per cent during 1914, as compared to 1913. The total operating expenses increased $11,828, or 1.5 per cent during the same period, so that the net operating revenue increased $17,822, or 3.3 per cent. The total of taxes and depreciation increased $25,883, or 18 per cent, giving a decrease in the surplus available for fixed charges and dividends of $8,061, or 2 per cent. The fixed charges decreased $2,154 and the common stock dividends $8,750, however, so that the net income increased $2,843.

During 1914 there was expended for renewals and charged against the depreciation reserve an amount of $58,498. The appropriation to this reserve for 1914 was $100,000, the increase of $25,900 being considered necessary to provide adequately for depreciation during the current year and make the comparison less unfavorable with the future depreciation that will be required under the I. C. C. system of accounts. A sum of $18,000 was expended to meet sinking fund retirement of $20,000 par value of bonds.

The amount expended for new construction and expenses during the year was $41,913, the two largest items of which were $28,414 for track and roadway and $12,646 for conduit and feed wire. The total amount expended was $49,233, but deduction of $7,320 was made for equipment sold. The total single-track mileage of the company is 82.51. The gross passenger earnings per single-track mile were $15,623.

WASHINGTON-OREGON REORGANIZATION

Bondholders' Committee Submits Plan to Be Declared Operative by Depositing Holders Before July 1

The committee representing holders of the first and consolidated mortgage bonds of the Washington-Oregon Corporation, Vancouver, Wash., consisting of C. M. Brown, J. Crosby Brown, L. J. Morris and J. D. Winsor, Jr., has submitted a reorganization plan which may become operative unless it is dissented from by the holders of the majority of the deposited bonds. Further deposits may be made on or before June 15. The plan must be declared operative, if at all, before July 1.

The proposed reorganization plan, carrying no assessment, provides for the organization of the new corporation with the following capitalization: Prior lien mortgage twenty-year 6 per cent bonds, authorized, $350,000; to be issued now, $200,000; general lien mortgage twenty-five-year 6 per cent bonds, authorized, $2,500,000; to be issued now, $675,000; Twin City Light & Traction Company first mortgage 6 per cent bonds, authorized, $350,000; outstanding, $342,000; 6 per cent cumulative preferred stock, authorized and to be issued, $1,200,000; common stock, authorized and to be issued, $550,000.

The first and consolidated mortgage bondholders will receive for each $1,000 deposited: (1) $400 of 6 per cent general lien bonds; (2) $600 of 6 per cent cumulative preferred stock; (3) an additional amount of preferred stock equal at par to the accrued interest to the date of foreclosure sale on the deposited $1,000 bond and to the interest on the $400 of general lien bonds for one year; (4) a provisional equal proportionate interest in 51 per cent of the common stock. Second mortgage bondholders and other junior creditors have an option up to April 15, 1920, to purchase the common and preferred stock for the par value of such preferred stock, with all accrued dividends. If the option is not exercised, they will still receive 49 per cent of the common stock. The preferred stockholders would then receive all unallotted preferred stock and dispose of the remaining 51 per cent of the common stock. The $200,000 of prior lien mortgage 6 per cent bonds provides for reorganization expenses, the repayment of taxes advanced by the Fidelity Trust Company, foreclosure and receivership expenses, and repairs and improvements recommended by the engineers.

The Washington-Oregon Corporation operates a street railway in Vancouver, and connects Vancouver and Sifton (Vancouver division) and Centralia and Chehalis (Twin City division). E. M. Hayden was appointed receiver in July, 1914. The earnings of the property under receivership for the seven months ended March 31 were as follows: Gross earnings, $168,537; operating expenses, $93,714; taxes, $12,833, and net earnings, $61,990.

TRAMWAYS AND LIGHT RAILWAYS IN CHOSEN, COREA

According to the annual report of the railway bureau of the governor-general of Chosen, Corea, for the year ended March 31, 1913, the tramways and light railways at the end of the year were six; namely, the systems operated by the Nikkan Gas & Electric Company and two other companies and three operated as private enterprises. The aggregate capital of these companies totaled yen 9,876,600. The miles of line open to traffic numbered 22.3, consisting of 14.6 miles of electric tramway in Keijyo operated by the Nikkan Gas & Electric Company, 5.8 miles of light railway operated by steam and 1.9 miles of manual tramway. The mileage to be opened hereafter consists of 150.3 miles, which includes 7 miles of electric tramway to be operated by the Chosen Gas & Electric Company. The passenger traffic of the Nikkan Gas & Electric Company during the year amounted to 10,031,402, and the freight traffic to 1810 carloads. The total receipts were yen 302,351 and the total expenses yen 163,824, leaving a profit of yen 138,527. This company operates sixty-one electric cars and twelve wagons. During the year under review it had one collision, eighty-one derailments, sixteen injuries to passengers and fifteen injuries to the public.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The holders of the first mortgage 5 per cent bonds of the Barcelona Traction, Light & Power Company were to vote on May 11 in London in regard to the suspension of coupons due from Dec. 1, 1914, to June 1, 1918, and their discharge by the issuance of 5 per cent ten-year notes, such notes not to constitute a charge upon any property. The notes would be redeemed in five installments at 20 per cent during the last five years of their term, either in cash or, at the option of the company, by the issuance of an equivalent amount of the 5 per cent bonds. Previous items relating to this company were published in the ELECTRIC RAILWAY JOURNAL of Feb. 27 and May 1.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Announcement has been made that E. H. Rollins & Sons, New York, have sold the $1,150,000 of two-year 6 per cent notes dated May 1, 1915, which they recently offered at 99½, as noted in the ELECTRIC RAILWAY JOURNAL of May 1. The total authorized issue is $2,000,000, the remaining $850,000 being reserved for future capital purposes.

Boston (Mass.) Elevated Railway.—In regard to the recent decrease in the Boston Elevated Railway dividend, as noted in the ELECTRIC RAILWAY JOURNAL of May 1, President W. A. Bancroft says: "As the last dividend of the year is payable on May 15 to stockholders of record on May 6, we were obliged to estimate the earnings for the last three months of the fiscal year to June 30 and base the final dividend upon that estimate, having in mind the usual provisions for maintenance. Last year we paid 5 per cent, but the earnings thus far during the current fiscal year and the estimate for the remainder do not justify us in declaring more than 4½ per cent for this year. The demands made upon the company have been and are so great as to require an increase in income as an offset. We believe that the public recognize the situation, and we hope that they will be ready, in the not far distant future, to meet it."

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—In regard to a report of a proposed merger of the Buffalo, Lockport & Rochester Railway with the International Railway, C. D. Beebe, president of the former company, states that the matter of bringing the two lines under one control has been discussed for more than a year but the proposition is no further advanced now than at the beginning. If a merger should ever develop, it might work with either company assuming control. Mr. Beebe stated, however, that it was certain that there would be no action for some time to come and he doubted whether there ever would be any merger between the two companies.

Butte (Mont.) Electric Railway.—In the matter of the March 1 interest default of the Butte Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of April 3, *The Commercial & Financial Chronicle* quotes James H. Anderson, treasurer of the company, to the effect that no receiver has been appointed and no reorganization is contemplated. The reason for the default is stated to be the reflection in the company's earnings of the number of men out of employment in Butte. Conditions are now somewhat improved, however, and the officials are hopeful that earnings will warrant meeting the bond interest due on Sept. 1.

Chicago (Ill.) Railways.—The Chicago Railways has declared a dividend of 4 per cent on Series 1 certificates, payable on June 5 to holders of record on May 22. The directors also declared out of accumulated earnings, a dividend of 2 per cent on Series 2 certificates, the distribution being for no particular period, but payable as above. This is the second distribution made on Series 2 certificates. The other was 2 per cent paid on Feb. 10, 1914.

Cleburne (Tex.) Street Railway.—The property of the Cleburne Street Railway was sold on May 4 at public auction to John W. Floore, Sr., who holds the first mortgage of $12,500 on the property. The sale price was $7,500. Mr. Floore stated that he would have cars running on the line within thirty days. The appointment of a receiver for the company was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Ohio Public Utilities Commission has authorized the Cleveland, Southwestern & Columbus Railway to issue $119,875 of twenty-year 5 per cent first consolidated mortgage bonds to be sold for not less than 85. The proceeds are to be used to reimburse the treasury for money expended from income during 1913 and 1914 for capital purposes. Pending the sale of the bonds, the company is authorized to pledge them as security for loans at not less than 65. The application for this issue was noted in the ELECTRIC RAILWAY JOURNAL of March 20.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—The Appellate Division of the Supreme Court has decided in favor of the Public Service Commission for the First District, the certiorari case instituted by the Dry Dock, East Broadway & Battery Railroad upon the action of the commission in refusing to approve an issue of $2,800,000 of refunding bonds. The commission had held that the proposed issue would make the capitalization greater than the actual physical value and that the company had not shown the money to have originally been expended on capital account. The court now holds that the commission was right in withholding its approval. The value of the property was not material, but the company should have proved that the original expenditure was made for capital account.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has called for redemption on July 1, at 105 and accrued interest, the $1,661,000 of purchase money 5 per cent bonds due on Jan. 1, 1949. The cash for the redemption of these bonds was secured mostly from the payment on May 1, by the city of Elmira, of $1,500,000 for the water supply plant of the company. The balance is to be secured by the issuance of $232,000 of 5 per cent fifty-year first consolidated mortgage bonds, which the Public Service Commission has authorized to be sold at not less than 90. Already, however, cash for the redemption is on deposit with the United States Mortgage & Trust Company, New York, and bonds may be deposited at any time.

Fairmount Park Transportation Company, Philadelphia, Pa.—Judge Thompson in the United States District Court has filed an order directing Samuel M. Clement, Jr., and Frank Silliman, Jr., receivers of the Fairmount Park Transportation Company, to sell at auction the property and assets of the company. This order is a formal step in connection with the reorganization plan recently effected. By inventory the value of the property, including the buildings in Woodside Park, has been fixed at $1,018,188. The entire property is subject to a first mortgage of $750,000. References to the reorganization plan were made in the ELECTRIC RAILWAY JOURNAL of Jan. 16 and Feb. 27.

Fresno (Cal.) Interurban Railway.—The Fresno Interurban Railway has asked the California Railroad Commission for authority to issue 250 shares of capital stock at 80 and $70,000 of bonds at 90. The proceeds are to be used in constructing an extension to Gould Colony, an extension into the business district of Fresno and a spur track to the Larton winery.

Interborough-Metropolitan Company, New York, N. Y.—It is reported that the plan to unite the Interborough-Metropolitan Company and the Finance & Holding Corporation into the Interborough Consolidated Corporation, as outlined in the ELECTRIC RAILWAY JOURNAL of May 1, is assured of success. More than 60 per cent of the preferred stockholders, including nearly all of the small holders, have sent in proxies, and many of the large holders have assented within the last few days. It is believed that practically the unanimous consent of all stockholders will be voted at the special meeting called for June 1.

Interstate Railways, Camden, N. J.—The stockholders of the Interstate Railways at a recent meeting approved the plan to issue new irredeemable preferred stock to take the place of the former preferred issue. Previous references to this change were made in the ELECTRIC RAILWAY JOURNAL of Jan. 23 and April 10.

Jersey Central Traction Company, Keyport, N. J.—A committee composed of F. Eichelberger, C. H. Koppleman and H. R. Taylor is endeavoring to unite the minority stockholders of the Jersey Central Traction Company. The stock control of this company was recently purchased by Laird Brothers, Wilmington, Del., as mentioned in the ELECTRIC RAILWAY JOURNAL of April 3.

Lehigh Valley Transit Company, Allentown, Pa.—E. G. Grace has been elected a director of the Lehigh Valley Transit Company to succeed Charles M. Schwab, resigned.

Long Island Railroad, New York, N. Y.—Mayor Mitchel on May 1 approved the bill authorizing the Public Service Commission to contract with the Long Island Railroad for trackage rights to Whitestone Landing and Little Neck in connection with the proposed Flushing-Bayside route of the new subways.

Metropolitan Street Railway, Kansas City, Mo.—In view of the interest and franchise situation in Kansas City, as described in the ELECTRIC RAILWAY JOURNAL of May 8, the committee of holders of the consolidated mortgage 5 per cent bonds of the Metropolitan Street Railway has issued a circular explaining the causes of the recent non-payment of interest and stating that it may become necessary to carry through to a speedy conclusion the foreclosure of the mortgage. It is said that a very large majority of the bonds has already been deposited. A report from the receivers shows passenger receipts for December, January and February as follows: December, $518,598; January, $486,508, and February, $439,863. Miscellaneous receipts in these months added to the balance on hand made the available amounts as follows: December, $1,104,173; January, $801,381, and February, $864,113. The total available during the period was $2,207,171. The total expenditures were $1,915,440, leaving a balance on March 1 of $291,731. The statement does not include among disbursements current liabilities, incurred previous to March 1, but due, amounting to $220,924; unvouchered accounts of $13,720, unsettled personal injury claims, and deductions for interest and taxes coming due.

Northern Electric Railway, Chico, Cal.—F. M. Clarke, attorney for holders of the sundry overlying bonds of the Northern Electric Railway, has issued a letter opposing the proposed bankers' agreement for the reorganization of this company and stating that a new plan will soon be submitted.

Northern Texas Electric Company, Fort Worth, Texas.—A quarterly dividend of 1 per cent has been declared on the common stock of the Northern Texas Electric Company, payable on June 1 to holders of record on May 15. The payment compares with 1¾ per cent quarterly from September, 1913, to March, 1915, inclusive.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The board of directors of the Oakland, Antioch & Eastern Railway has been increased in number from nine to eleven, H. P. Scott and H. A. Mitchell being again elected to the board. The names of the other directors were published in the ELECTRIC RAILWAY JOURNAL of April 17.

Ocean Shore Railroad, San Francisco, Cal.—The delinquent date for an assessment of $3 per share on the stock of the Ocean Shore Railroad has been set for June 2, with the sale date on July 7. This assessment was mentioned in the ELECTRIC RAILWAY JOURNAL of April 24.

Pacific Gas & Electric Company, San Francisco, Cal.—An application has been filed with the California Railroad Commission requesting that H. A. McClelland and the Mercantile Trust Company be granted authority to convey and transfer to the Pacific Gas & Electric Company all their interest in the street railway line extending from the J Street extension, owned by the Pacific Gas & Electric Company, to the tract of land known as "Elmhurst."

Petaluma & Santa Rosa Railway, Petaluma, Cal.—The California Railroad Commission has rendered a decision relative to the value of the property of the Petaluma & Santa Rosa Railway. The commission finds the reproduction cost as of June 30, 1912, to be $1,610,607, and the present value $1,438,485. These figures are for operative and non-operative property. The total main track mileage is 31½ miles. The company operates steamers between Petaluma and San Francisco.

San Francisco (Cal.) Municipal Railways.—The operation of the municipal railway system of San Francisco for March produced a record in earnings, the excess of receipts over expenditures being $74,102. The gross receipts for March were $188,434, while the expenditures were $114,332. Of this latter amount the largest single items were $23,533 for power purchased, $27,621 for wages of motormen and $29,630 for wages of conductors.

Seattle (Wash.) Municipal Street Railway.—Seattle's two municipal car lines, Division "A" and Division "C," were operated during April at a loss of $1,870, estimating the cost of power at $400 for each line as in March. Division "C" lost $466 and Division "A" $1,404. For the first time the revenues of Division "A" exceeded the actual cost of operation. The revenues amounted to $1,368 and operating cost to $1,246, exclusive of $400 for power and $1,125 for interest.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—W. A. Wilson, president Southeastern Ohio Railway, Light & Power Company, has been appointed receiver on the application of J. M. Brown, Wheeling, W. Va. Judgments for $14,080 in five suits have been secured against the company. Mr. Wilson states that the receivership was caused by the loss of revenue following the destruction of the Sixth Street bridge in Zanesville during the flood of 1913, which interrupted the through traffic.

Toronto (Ont.) Railway.—Wood, Gundy & Company, Toronto, have purchased $100,000 of Toronto Railway 4½ per cent first mortgage bonds, due on August 31, 1921, at a price of 94.6 and accrued interest, to yield 5½ per cent.

Twin City Rapid Transit Company, Minneapolis, Minn.—Owing to a mistake in compilation, the statement of the March monthly earnings of the Twin City Rapid Transit Company in the ELECTRIC RAILWAY JOURNAL of May 8 did not contain any notation regarding other income and omitted rentals and interest from the fixed charges. The correct figures follow: operating revenues, $785,582; operating expenses, $529,704; operating income, $255,878; other income, $2,541; fixed charges, $137,644, and net income, $120,775.

United Railways Investment Company, San Francisco, Cal.—D. B. C. Catherwood, Philadelphia, has been elected a director of the United Railways Investment Company.

Wilkes-Barre & Hazleton Railroad, Hazleton, Pa.—The local County Court has handed down a decision in regard to the necessity of the Wilkes-Barre & Hazleton Railroad paying a tax on corporate loans in Pennsylvania. This company, a New Jersey corporation, is a holding company owning practically all of the capital stock of the Lehigh Traction Company, the Wilkes-Barre & Hazleton Railway and the Wilkes-Barre Terminal Railroad, all doing business in Pennsylvania. The holding company has no office or agent in Pennsylvania and has used none of its property and invested none of its capital there. Upon an appeal from a settlement for the tax on the company's bonds held by residents of the State, it was held by the court that the mere owning and holding of the stock and the bonds of the three operative corporations and the receiving of dividends and interest thereon was not "doing business" within the meaning of the law. Even if it were held that such activities did constitute "doing business," then such was done outside of Pennsylvania, for the situs of the securities is in New Jersey, the domicile of the holding company.

York (Pa.) Railways.—The gross earnings of the York Railways for the year ended Nov. 30, 1914, were $796,645 as compared to $767,161 for the preceding year, an increase of $29,483. In 1914 the operating expenses increased by $10,612 to a total of $408,142, allowances for depreciation increased by $179 to a total of $16,916 and taxes decreased by $145 to a total of $39,755, so that the net earnings showed an increase of only $18,837 to $331,833. With an increase of $6,260 for interest and bond discount, the net income amounted to $108,494, an increase of $12,576 over 1913. This, combined with the surplus for the preceding period of $76,806 and decreased by dividends of $80,000, made a balance at the end of the year of $105,300. The capital expenditures during the year amounted to $196,762, of which $47,453 was for the railway property. The railway lines were extended 0.67 mile, and 1.38 miles of track were reconstructed.

DIVIDENDS DECLARED

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent., preferred.

Illinois Traction System, Peoria, Ill., quarterly, three-quarters of 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1 per cent, common.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
ATLANTIC SHORE RAILWAY, SANFORD, MAINE					
1m., Mar., '15	$24,780	$20,249	$4,530	$621	$3,909
1 " " '14	23,196	20,519	2,676	674	2,002
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Mar., '15	$139,636	*$134,846	$4,790	$4,213	$577
1 " " '14	154,393	*140,872	13,521	364	13,157
9 " " '15	1,511,809	*1,323,297	188,513	31,872	156,641
9 " " '14	1,578,134	*1,331,483	246,652	3,141	243,511
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE					
1m., Mar., '15	$63,222	*$28,927	$34,295	$17,695	$16,600
1 " " '14	62,498	*31,047	31,451	17,470	13,981
12 " " '15	783,153	*373,088	410,065	209,713	200,352
12 " " '14	776,310	*354,444	421,866	207,782	214,084
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Mar., '15	$83,439	*$59,227	$24,212	$29,338	†$5,126
1 " " '14	87,550	*56,490	31,060	27,676	3,384
12 " " '15	1,052,266	*704,083	348,183	344,499	3,684
12 " " '14	1,202,708	*715,389	487,319	308,253	179,066
CLEVELAND, PAINESVILLE & EASTERN RAILWAY, WILLOUGHBY, OHIO					
1m., Mar., '15	$29,914	*$17,198	$12,717	$10,918	$1,799
1 " " '14	30,310	*16,154	14,156	11,167	2,989
3 " " '15	82,887	*50,861	32,025	32,818	†792
3 " " '14	83,937	*49,181	34,755	32,785	1,970
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO					
1m., Mar., '15	$254,656	*$150,327	$104,329	$39,225	$65,104
1 " " '14	250,185	*160,251	89,934	39,494	50,440
12 " " '15	3,075,551	*1,863,999	1,211,552	475,816	735,736
12 " " '14	3,017,220	*1,960,830	1,056,390	487,843	568,547
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.					
1m., Mar., '15	$1,138,211	*$610,462	$527,749	$367,264	$160,485
1 " " '14	1,133,415	*612,191	521,224	349,991	171,233
12 " " '15	14,031,558	*7,523,913	6,507,645	4,261,763	2,245,882
12 " " '14	13,829,419	*7,701,971	6,127,448	3,952,884	2,174,564
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.					
1m., Mar., '15	$102,222	*$70,438	$31,784	$35,991	†$4,207
1 " " '14	105,452	*70,868	34,588	35,299	†717
3 " " '15	289,759	†210,984	78,775	107,909	†29,133
3 " " '14	300,961	*203,169	97,793	105,642	†7,849
SOUTHERN UTILITIES COMPANY, NEW YORK, N. Y.					
1m., Mar., '15	$83,149	*$60,444	$22,705	$17,243	$5,462
1 " " '14	80,275	*66,564	13,711	15,684	†1,973
12 " " '15	1,068,531	*778,032	290,499	205,013	85,486
12 " " '14	938,719	*707,884	230,835	176,117	54,718

*Includes taxes. †Deficit.

Traffic and Transportation

THE JITNEY BUS

A Summary of Recent Significant Developments Covering Various Phases of the Problem

No intimation has come from Governor Whitman of New York in regard to the action likely to be taken by him with respect to the Thompson bill to regulate the operation of the jitney in New York State. At the hearing at Albany before the Governor, Ex-Senator W. W. Armstrong, representing the Rochester Jitney Association, said the bill was a bludgeon to remove competition. He described the jitney as a poor man's taxi and said that if the minimum fare was fixed at 10 cents there would be no opposition. Senator Thompson, sponsor for the bill, said that Ledyard T. Hale, of counsel for the Public Service Commission of the Second District of New York, prepared the original draft of the bill. David Robinson, secretary of the Broadway Association, New York City, favored the bill because it would tend to regulate traffic and protect life. Frederick H. Elliott, secretary of the Safety First Society of New York City, favored the bill in the interest of safety. William Nottingham, Syracuse, favoring the bill, said that the transportation companies now in the field were called upon to bear heavy burdens in serving the public. Mayor Schoolcraft of Schenectady favored the bill as a step in the direction of home-rule for the city. These who opposed the bill characterized as a joker the clause reading "the consent of the authorities as defined by the railroad law." Among the others who spoke in favor of the Thompson bill was H. M. Addinsell, of Harris, Forbes & Company, New York, bankers. He said that if unregulated jitneys were allowed to take the cream of the street railway business, investors would not receive the protection to which they were entitled. While street railways had no legal right to expect perpetual freedom from competition they did have every right to expect freedom from unregulated and practically untaxed competition of the character being offered by the unregulated jitney.

The hearing before the Georgia Railroad Commission on the petitions by the Georgia Railway & Power Company and a number of citizens that it take supervision over jitney buses was set for May 12. The answer of the jitney-bus men was filed with the commission on May 10. In it they admit they are hauling passengers along the streets, but deny they are in any sense common carriers as contemplated by the Georgia statute. They contend that if supervision is extended over them it should be extended over hacks, drays, furniture vans, delivery wagons and all other conveyances for hauling passengers and freight. Answering that paragraph of the company's petition which recites that the jitneys do not furnish transportation to all alike, regardless of race, condition, or color, they say it is true, and that moreover they do not intend to furnish such impartial transportation. If this be discrimination, they contend that it is up to negroes and others affected to complain to the commission, and that it is not for the electric railway to concern itself with the matter. The jitney men claim that inasmuch as they cannot exercise the right of eminent domain, they are not common carriers within the meaning of the law, and that this distinction, not the fact that they haul passengers for hire, controls the question before the commission. The application of the commission ruling in this case will be State-wide, so the hearing will affect the jitney situation not only in Atlanta but in Savannah and Macon, in both of which cities the jitneys are in use.

The permanent injunction against the city, sought by the jitney-bus operators in the Fulton Superior Court at Atlanta, to prevent enforcement of the recently enacted ordinance requiring licenses, bonds, etc., was denied several days ago by Judge W. D. Ellis, and the attorneys for the jitneys have appealed from his ruling. Meanwhile the temporary restraining order issued by Judge Ellis remains in force. The ordinance is of no effect in the interim, and it may be midsummer before the higher courts announce their conclusion.

The service of the Mahoning & Shenango Railway & Light Company in Youngstown, Ohio, has been affected by the jitney buses on only two lines. The jitneys operate almost exclusively during the rush hours parallel with these lines, but during the non-rush hours there are comparatively few automobiles in use. The company has practically doubled its service during the rush hours, but has decreased it during the non-rush hours when the jitneys are not running. As a result the rush-hour business has increased materially, while the non-rush business has not changed materially. A very strong and persistent sentiment has started among the patrons of the lines demanding that the Council pass a jitney regulatory measure requiring continuity of jitney service throughout the day and night.

Judge King Dykeman, in King County Supreme Court, at Seattle, Wash., has upheld the legality of the law passed by the Legislature requiring jitney owners to file a bond with the Secretary of State in the sum of $2,500, to indemnify passengers against accident. On May 5, immediately after the ruling, it was estimated that of the 395 jitneys operating in Seattle daily, only about 100, the ones that filed their bonds, were carrying passengers.

The Puget Sound Traction, Light & Power Company has declared open warfare against the unbonded jitney operators. A. L. Kempster, manager of the company, said: "We will ask for the arrest of unbonded operators as fast as violations of the State law are brought to our attention. We are prepared to press these cases, as a matter of self-protection. In addition to the enormous loss caused by the advent of the nickel chasers, we shouldered a heavy loss through continued operation of regular service, sometimes with almost empty cars. I may say, also, that the jitney driver will not be the only one to find himself confronted with the necessity of obeying the law, as the 'We Go Anywhere' cars have been included in the investigations that we have made."

I. M. Howell, Secretary of State, of Washington made the following statement in regard to the jitneys: "There are 177 cars licensed by the State of Washington, to do 'for hire' business, all being jitney buses in cities of the first class, as follows: Seattle, 103; Spokane, thirty-five; Tacoma, twenty-six and Everett, thirteen. The cars holding the State licenses range from Fords, which are in the majority, to $5,000 cars. Eight women drivers now hold jitney licenses. Beginning June 10, the jitney drivers will have to take out new licenses under the motor code, which will cost at the rate of 50 cents per horsepower. This charge will run from $11.50 for a Ford, up to twice that sum for the higher powered makes. As a surety bond costs the jitney driver between $95 and $100, depending whether it is sold for cash or on terms, and the State license, under the jitney law is $5, this will make it necessary for the jitney drivers to spend at least $111.50 for each car before they can begin operating."

More than 150 of the 400 employees of the Middlesex & Boston Street Railway appeared before the Board of Aldermen of Newton, Mass., on May 10 in opposition to the establishment of a jitney service between Newton and West Newton. Arthur A. Ballantine, who represented the company in the rate proceedings before the Massachusetts Public Service Commission last fall which resulted in the establishment of the 6-cent fare unit on the system, appeared on behalf of the men, stating that if jitney service should be authorized in Newton, the earnings of the railway company's employees would probably be lessened.

The Aldermen of Providence, R. I., have been holding secret sessions to consider amendments to the jitney ordinance enacted recently.

One of the newest things in jitney service in Kansas City is the baggage transportation enterprise in which Mrs. C. M. Gibson, secretary of one of the Kansas City jitney associations, is interested. The company has three Overland trucks which are to respond to calls to carry baggage to or from the stations. A plan is being developed to extend the service to parcel delivery. Kansas City has now nearly fifty buses in service, with more coming. These now ply on regular routes between the business and residence sections. A new company has ordered a string of buses, however, that will be put into cross-town service, on regular schedule. There are many street railway lines that are partially "cross-town" lines, but in most cases long detours are necessary to cross the city in the residence districts—but by transfers the street railway passenger can arrive fairly close to any place to which he wishes to go, for a nickel.

The suit brought at Memphis, Tenn., to enjoin the enforcement of the state law requiring jitneys to furnish a $5,000 bond has been dismissed in the Chancery Court on the ground that the chancellors had no jurisdiction. Under the ruling all jitneys not bonded will be kept off the streets.

H. T. Pierce, Ashtabula, Ohio, who was placed on trial recently on the charge of operating a motor bus without a license was discharged by Acting Police Judge A. B. Ullman in the Police Court at Ashtabula on May 6. The Judge held that the $100 license fee was excessive, and that the ordinance in that respect was invalid. The judge said that the city charter, as far as the passage of the jitney ordinance was concerned, was in effect, and that while the city has a right to regulate motor bus traffic in a reasonable manner, a license fee of $100 a year was excessive. The court held that had the fee been fixed at $25 or even $50 it would have had no hesitancy in upholding that part of the ordinance. The Council, acting under the charter, did have a right to pass the ordinance as an emergency measure. The opinion prevails in Ashtabula that the decision handed down is not in accord with the laws of the State. It is expected that the case will go to a higher court for a further decision. The terms of the Ashtabula ordinance were reviewed in the ELECTRIC RAILWAY JOURNAL of May 8, 1915.

An ordinance to regulate jitneys has been introduced into Philadelphia Select Councils. The bill states that each jitney must be provided with a license issued by the Department of Public Safety, and that certain policemen be detailed to act as inspectors. The owner of each car shall furnish a $5,000 bond, as possible indemnity against accident or failure to pay fines or licenses. The license for each car is fixed at $75 a year, and $1 a year for the driver. Drivers must be registered by the police department, must bear identification cards, and must not overcrowd their cars. Each driver or owner must file with the police department the route he follows, and if he changes must pay a fee of 50 cents. Approval of the police to change of route must be obtained.

A franchise has been granted by the city of New York to the Far Rockaway Transportation Company to operate a motor bus line between Rockaway Park and Woodmere in accordance with the terms outlined in the ELECTRIC RAILWAY JOURNAL of April 3, page 691. Double-deck buses will be used. The service will be established on July 4 with a schedule calling for the operation of cars on a half-hourly basis.

The Fidelity Trust Company, Baltimore, Md., has printed in pamphlet form for free distribution a summary of the activities of the jitneys in various parts of the United States, based on reports received from 138 cities in forty-five States and the District of Columbia and including eight of the principal cities of the Dominion of Canada. Of the 138 cities from which reports were received the information indicates that jitney buses are operating in 106, leaving thirty-two in which the street railways have as yet escaped this form of competition. Seven of the cities report that jitneys had appeared there, but had been discontinued after a fair trial because the owners found that they were unprofitable.

The cars of the Vincennes (Ind.) Traction Company bear signs "Two Rides For 5 Cents To-day." This follows the reduction in the rate from a straight 5-cent fare to six tickets for 25 cents and the move has been taken in an effort to overcome the diversion of the traffic to the jitneys. The City Council is working on an ordinance designed to control the jitneys. S. S. Bush, president of the street railway, has been invited to attend a conference that is soon to be held on the measure.

In company of the board of directors and officials of the company, counsel for the Paducah (Ky.) Traction Company recently waited on the city adminstration to protest against the unrestricted manner in which jitney buses are operating in Paducah, without being required to take out licenses, give bonds or otherwise submit to regulation. It was intimated by counsel that unless some action in that direction was taken the railway company would be forced to cut its schedules on all lines and perhaps reduce service to an hourly basis on some of the less important lines.

NEW BEDFORD & ONSET FARE HEARING

The Massachusetts Public Service Commission heard the petition of the New Bedford & Onset Street Railway on May 5 for authority to establish a 6-cent fare unit in place of the present 5-cent rate, and a 3-cent unit in place of the existing 2½-cent scholar's ticket. Henry H. Crapo, president of the company, supported the petition. He submitted a brief reviewing the history of the road in considerable detail. The company operates 40.6 miles of track. For the nine months ended March 31, 1915, the gross earnings were $116,423; operating expenses, $81,723; net earnings, $34,700; deductions from income, $22,999. During the entire period of thirteen years the company has had four full years in which a dividend of 3 per cent was paid on its stock. No dividend was paid in 1914 and under present conditions none can be paid in 1915. The total average annual return to the stockholders has been 0.92 per cent. The original rates of fare were 5 cents in each town except in Wareham. For through travelers from New Bedford the first fare zone included transportation on the Union Street Railway between any point in New Bedford on the latter system and the Fairhaven-Mattapoisett line. This fare zone has not been changed and no change is sought. A single-fare zone included the towns of Mattapoisett and Marion each, and two-fare zones were in the town of Wareham.

The through fare from New Bedford to Onset, excluding transfer privileges in New Bedford, was originally 25 cents, the distance being 21.1 miles, a rate of 1.18 cents per mile. In 1904 the number of fare limits for the through trip was increased from five to seven, with the approval of the Railroad Commission. This increased the total fare to 35 cents, or to 1.66 cents per mile. On the Middleboro, Wareham & Buzzards Bay road the through fare from Middleboro to Bourne, 25.36 miles, was originally 25 cents, or about 1 cent a mile. During the receivership this rate was 40 cents, or 1.57 cents a mile, and since 1905, the rate has been 35 cents, or 1.38 cents a mile, barring slight changes in the length of the line due to the construction of the Cape Cod Canal. Since 1905 reduced rate tickets at twenty-four for $1 have been sold at the company's offices. A system of overlaps, making center to center fares, has gradually been worked out to the general satisfaction of the communities served. It is not proposed to change either the fare zones or the overlaps. With the proposed substitution of a 6-cent fare unit, a corresponding adjustment is to be made in the sale of tickets. These will be marketed at the rate of twenty for $1.

The proposed increase will make the rate of a cash fare for the through passenger from New Bedford to Onset 41 cents, or 1.94 cents a mile, and to the passenger riding on reduced-rate tickets, 35 cents, or 1.66 cents a mile. The through fare from Middleboro to Monument Beach, a distance of 24.825 miles, will be 42 cents, or 1.69 cents a mile, and by tickets the rate will be 1.41 cents a mile. The average cash fare on the system on a 6-cent fare will be 1.92 cents a mile, and on the reduced rate tickets, 1.60 cents a mile. Mr. Crapo stated that although the zones and overlaps differ in length, making the per mile rate vary within the zones, the proposed plan works out somewhat after the Milwaukee zone system, giving a 5-cent fare in New Bedford and in the zones outside roughly 2 cents a mile. The New Bedford & Onset road is strictly a suburban property.

Mr. Crapo said that the investment in the property was prudent at the time it was made, but judgment was mistaken in the amount of summer excursion riding. Fifteen years ago there was a distinct demand for trolley pleasure riding which has largely disappeared, in no small degree due to automobiles. The receipts of the road have increased only 1.5 per cent per annum in its life, and this increase is almost entirely from local riding in one or two zones. Practically none of the railway was permitted to be built in the existing highways, except by widening these to the full width of the track space, involving land and roadbed costs out of proportion to the usual outlay for suburban railways. The cost of the system per mile, taking into account the fact that the Taunton & Buzzards Bay portion was purchased at $8,833 per mile at the receiver's sale, was $25,075, compared with $50,103 for all Massachusetts roads except the Boston Elevated. Since the railway was built wages of conductors and motormen have increased in rate about 35 per cent and the actual amount paid per car-hour, more than 50 per cent. In 1905 the wages of conductors and motormen were 2.71 cents per car-mile operated, compared with 4.24 cents for 1914, partially due to the increased number of long-service men employed and to the payment of wages for layovers.

Important renewals are necessary. To cover these properly and at the same time take care of the depreciation on equipment now required would take several times the annual surplus of the last year or two. The proportion of funded debt to capital stock is less than that of most other railways. In the life of the road the taxes it has paid have totalled $86,981, compared with dividends of $66,000. It is estimated that if the increase in fares yields 50 per cent of the theoretical revenue, $15,000 a year may be added to the road's income. The case has been taken under advisement.

REDUCTION IN CITY FARE

The British Columbia Electric Railway Has Announced the Sale of Eight Tickets for 25 Cents on City Lines Without Transfer—Statement of General Manager Kidd

On May 3 announcement was made by the British Columbia Electric Railway, Vancouver, B. C., that on and after May 10 the company would offer a special non-transfer ticket, good only within the city limits of Vancouver and Victoria, at the rate of eight for 25 cents. The issue of all types of tickets previously used by the company will be continued at the old rate to cover travel where transfers are demanded. These rates are straight 5-cent fare, a strip of five tickets for 25 cents being provided for the accommodation of passengers. Workingmen's tickets are sold at ten for 40 cents, consisting of five white tickets, which can only be used before 8 a. m., and five green tickets, which are good at any time, and the usual arrangement of school-children's tickets at ten for 25 cents. The new eight-for-a-quarter tickets are not good on any interurban cars.

George Kidd, general manager of the company, in announcing the change, stated that the serious decrease in the company's receipts made it necessary for the company to choose between reducing expenses by cutting down the service and endeavoring to increase travel by lowering the fares. He said that it must be apparent to every citizen in Vancouver and Victoria that the present service could not possibly be maintained with the present patronage. To cut down the service would mean that a portion of the plant would lie idle and a large number of men be laid off. According to Mr. Kidd it was impossible for any one to predict with anything approaching accuracy the effect of an alteration in fares. Actual experience alone could prove whether it was economically possible for the company to sell eight tickets for 25 cents. If it could be done the company would do it. Asked if in adopting the low fares the company had been influenced by the policy of other street railways throughout the States and Canada, as shown by their attitude in dealing with the jitney, Mr. Kidd said:

"No! Many of the street railways in the United States, fortunately for them, are receiving assistance in solving their jitney problems by the strong action of the municipalities and State Legislatures, in enacting special regulations to meet the dangerous conditions arising out of a new form of ill-regulated and irresponsible competition. The British Columbia Electric Railway has taken no part in fostering antagonism to the jitney, believing that the common sense of the citizens and the authorities will sooner or later result in adequate regulations being enforced. The public who ride in our cars are protected by the most stringent Government regulations under the 'Tramway Inspection Act' and also by the terms of franchises granted to it in mutual good faith by the various municipalities, franchises which have always been liberally interpreted by the company. To give effect merely to those clauses in the 'Tramways Inspection Act' alone, clauses devised for the protection and safety of the public, more than $300,000 has been spent by the company in the last three years, a sum more than equal to the value of all the jitneys that are at present competing unfairly against the company.

"Now contrast the exacting obligations we have to meet with the conditions prevailing upon our public thoroughfares to-day with the jitney service in its present unregulated condition, so that our streets are becoming a menace to every citizen. All the company asks is that it shall not be subject to unfair competition. We do not fear jitney competition. We have carried the public in Vancouver almost from the foundation of the city, through the many years of its wonderful progress, a progress in which the company has played a conspicuous part, and our business is to continue in bad times as well as in flourishing times, to satisfy the public in all its reasonable demands, and by acting fairly to it we propose to continue as the transportation company throughout our territory.

"The unfair jitney competition, the absence of even the most reasonable regulation of that extraordinary traffic, has certainly affected the credit of the company in the London money market, and until conditions improve any further expenditure on the system will be altogether out of the question. In England the investing public is hard hit by the present war, and nothing would contribute more to maintain their confidence in British Columbia enterprises than strong and speedy action by the authorities resulting in regulations being passed placing the jitneys on the same competitive footing as the street railway company.

"I have intimated that the reduction of fares at the present time is an experiment, an experiment which we hope will be a success if our patrons give us their loyal support. This they have done for so many years, and if they will continue to do so, and also use their influence to prevent our competitors having unfair advantages, then Vancouver will be able to boast, and that boast will not be an idle one, that here we have the cheapest, safest, cleanest and quickest service in North America. The matter now rests with the public, who must be the final arbiters."

In connection with the introduction of its new special ticket the company decided to make it popular with the general public. As tickets were to be printed on cardboard of tango color, the name tango ticket was chosen and an extensive publicity programme was carried on by the company during the week May 3-10 to bring this name before the public as well as impress upon them the benefits which would accrue to the traveling public from the standpoint of economy and the good to the city as a whole as a result of using tango tickets. Half-page advertisements were taken throughout the week in all the daily papers in Vancouver and Victoria as well as considerable space in weekly publications circulating throughout the cities. Extensive use was also made of news articles, written from a local standpoint, as to the advantages which the public would derive from the use of the tango ticket. One very striking illustration used in both advertisements and news articles pointed out that thirty-two rides at a 5-cent fare meant an expenditure of $1.60, while thirty-two rides on tango tickets cost only $1, the result being the saving to the individual of 60 cents on an investment of $1. The company also inaugurated a word competition, prizes of $50 being offered both in Victoria and Vancouver—the first prize being $20 and eight other prizes ranging down to $2—for the largest lists of words which could be formed from the letters in the words tango ticket.

Throughout the entire week every car in Vancouver and Victoria carried a striking fender sign noting the sale of tango tickets on May 10. Eight sheet posters were also displayed on billboards along the tram lines. As a result of the publicity methods adopted the words tango ticket became during the week the general talk of the public both in Vancouver and Victoria. The company planned to have May 10 known as tango ticket day in both cities where the new tickets will be accepted. The conductor of each car was to wear a white satin badge on which is printed in tango color "Ask me for tango tickets, eight for 25 cents." Tango pennants, 12 in. by 16 in. in size on which is printed the words "Use Tango Tickets" were arranged to be floated from the trolley pole of each city car. One of the daily newspapers proposed to recognize the day as tango ticket day and offer to the readers of its Sunday issue prizes in a guessing contest as to the number of tango tickets that would be disposed of by the company on the first day of sale.

THE JITNEY CONVENTION

Permanent Organization of Jitney Bus Operators Effected at Meeting in Kansas City

Although the attendance at the jitney convention in Kansas City on May 4, 5 and 6 was small, organization was effected of the International Jitney Association, and plans were laid for a careful study of jitney problems.

The name International Jitney Association was chosen with a view to including Canadian associations. Kansas City was made headquarters, and E. K. Carnes, formerly traffic manager, then secretary of the first jitney association there, who arranged the national convention, was elected secretary-treasurer, at a salary of $1,500 a year. The other officers are Perry T. Allen, Springfield, Mo., president; E. F. Maxwell, Topeka, Kan., vice-president; Ross B. Gilluly, Kansas City, general counsel; Dr. Gordon A. Beedle, Kansas City, surgeon. The president and vice-president, with the following chairmen of committees, constitute the board of directors: William Haensler, San Antonio, ways and means; Rex Means, St. Joseph, Mo., insurance; C. F. Morphew, Kansas City, good roads and equipment.

A bureau will be established by the general counsel to collate data on jitney legislation. The surgeon will manage a bureau for advice and the distribution of information on physical qualifications of drivers, and on such other matters as may be properly referred to him. These bureaus and the committees will co-operate with the secretary, so that information on the operation of jitneys may be collected and analyzed.

The committee on good roads and equipment will carry out investigations and report by bulletins to member associations.

The insurance committee will continue investigations begun by a convention committee on the same subject, of which the chairman was W. H. Miller, originator of the jitney enterprise in Kansas City. What was characterized as a preliminary report was made by Mr. Miller to the convention. It recommended that only one insurance proposal, that of the National Indemnity Exchange, seemed complete, and that this exchange be patronized by members (without prejudice to other insurance concerns) if it complied with the new Missouri law effective on June 18. The National Indemnity Exchange is the result of the efforts of John N. Trout, a local fire insurance agent in Kansas City, to provide jitney insurance. The plan is that of inter-insurance, and was developed by O. A. Reifel, manager of the automobile and liability department of the agency. One "old line" company had authorized the agency to write jitneys, but its rate was seemingly prohibitive. The rates of the exchange will be in the neighborhood of half of the stock company rates, and with additional coverage. For instance, a rate of about $250 by the stock company on a bus covering fire and theft and property damage compares with an estimate of about $130 with the additional covering against collision, by the exchange. The last-named item has, however, not been thoroughly worked out, and at the beginning only public, passenger and chauffeur liability; fire and theft and property damage will be covered. The managers of the exchange say that they have business of nearly $10,000 in premiums, with hundreds of cars in immediate prospect. Branch offices are now being opened in St. Louis, Joplin, Springfield and St. Joseph, Mo., and arrangements are being made to handle mail orders.

The most serious problem of the convention was in reference to insurance, and it was pointed out that ruin for the industry would result from inability to meet obligations growing out of the hazards of the service.

Another point emphasized was the necessity of the continuance in the business of the individual owner of the small car. W. H. Miller spoke as a bus owner on the subject, declaring that bus-line service must be supplemented by the small car during rush hours. Another speaker, warning against action prejudicial to the small-car owners, declared that the jitney industry would soon fall if the small car were eliminated. He said that as the jitneys were concentrated in a few hands, they could more easily be absorbed by street railway companies and other large interests.

ST. LOUIS SERVICE ORDER

Missouri Commission Fixes Service Standards, Defining Rush-Hour Periods, Transition Periods and Non-Rush-Hour Periods

The Public Service Commission of Missouri on May 4 handed down its findings in the cases of the complaints of the West End Business Men's Association and the Tower Grove Heights Improvement Association against the United Railways, St. Louis, Mo., in regard to service. The cases have been before the commission about a year, and the testimony at the hearings which have been held in connection with them has been summarized previously in the ELECTRIC RAILWAY JOURNAL. The order of the commission is of particular interest on account of the requirements which it fixes in regard to service standards. An abstract of the conditions sought to be imposed follows:

Sufficient cars are to be operated from 5.30 a. m. to 12 o'clock midnight so that there shall be supplied during any half-hourly period the average number of seats for each 100 passengers demanding transportation in a given direction at any point on the line, specified in the following table, except where the application of this standard would result in a headway in excess of six minutes within the district bounded by the Mississippi River, Arsenal Street, Grand Avenue and its prolongation to the river; and a headway in excess of seven minutes in that portion of the city not included in the district mentioned. This provision relative to headway is not to apply to the Chouteau, Spalding, Marcus and Tiffany lines. The requirement of the order regarding seats per 100 passengers follows:

Headway in Minutes	Non-Rush Period	Transition Period	Rush Period
1 and less	121	100	71
2	124	100	72
3	127	100	73
4	130	102	74
5	133	104	75
6 and over	136	106	76

The term "headway in minutes" is defined as the time spacing between cars on a line, expressed in minutes. For the application of the standards of service, the rush periods are designated as follows: For week days, including Saturday, the morning rush period is considered to exist from 6:30 to 8:30 a. m. For week days, Monday to Friday, inclusive, no mid-day rush period is recognized, but on Saturday the mid-day rush period is considered to exist from 12 m. to 2 p. m. For week days, including Saturdays, the evening rush period is considered to exist from 5 to 7 p. m. The transition periods are designated as follows: For week days, including Saturday, from 6 a. m. to 6:30 p. m., from 8:30 a. m. to 9 a. m., from 11:30 a. m. to 12 m., from 2 p. m. to 2:30 p. m., from 4:30 p. m. to 5 p. m. and from 7 p. m. to 7:30 p. m. Sundays and other periods not included in the above specified rush and transition periods are considered non-rush periods, except holidays and special occasions.

The standard of loading for each of the specified periods is to be applied by half-hourly periods, consisting of any two consecutive fifteen-minute periods, beginning on the hour or any fifteen minutes thereafter. The demand for service is to be determined separately for week days, Monday to Friday, inclusive, Saturdays and Sundays. The average count of passengers for two consecutive week days, excluding Saturday, is to be considered as the demand for service on week days, exclusive of Saturdays. The average count of passengers for two consecutive Saturdays is to be considered as the demand for service on Saturdays. The average count of passengers for two consecutive Sundays is to be considered as the demand for service on Sundays. These averages are to be drawn from the actual count of passengers for corresponding fifteen-minute periods during each of the specified rush, non-rush and transition periods. The demand for service is to be determined by actual count of passengers twice a year by the United Railways on all of its city lines. The commission is to notify the company when these checks are to be made. For holidays and special occasions, at such times as the traffic is distinctly greater than the normal, the company is to use all reasonable efforts to supply such service as will meet the standards of service specified for rush periods. During rush hours traffic supervisors with authority over trainment are to be stationed at important transfer intersections and such other points as will materially assist in the movement of traffic and the maintenance of schedules, and it is made the duty of the supervisors, as far as practicable, to limit the loads on individual cars to the maximum comfortable carrying capacity.

The commission also sets forth work of track construction to be completed by the company during 1915, 1916, 1917 and 1918.

The commission further orders that all cars must be equipped with forced ventilation heaters, or other equally satisfactory heating device, ready for service not later than Oct. 15, 1915. When the outside temperature falls to 35 deg. Fahr., or lower, a temperature is to be maintained, as near as may be, of from 45 to 70 deg. Fahr. inside the car while the same is carrying passengers or about to receive passengers. The temperature inside the car is to be ascertained by the reading of a Fahrenheit thermometer suspended at the middle of the car, at such height that the bulb of the thermometer shall be substantially 7 ft. above the floor of the car. The company is to keep such thermometer in the position described, and to see to it that the same is in working order and to have the 45-deg. point thereon marked in a conspicuous manner. All cars must be heated during the winter season before being placed in service. Air for heating and ventilating is to be taken from outside of the car and the ventilating device or means must provide and insure a complete change of the air contained in the car not less than from six to ten times per hour, when the car is moving at a rate of speed not less than 7 nor more than 8 m.p.h.

All cars with monitor type roofs must be equipped with not less than four 6-in. Globe ventilators or other equally satisfactory device. All cars with arch-type roofs must be equipped with not less than eight 6-in. Globe ventilators or other equally satisfactory device. The dampers in such ventilators must be kept open. All superisors and inspectors kept at the terminus of any line are personally to inspect each car on arriving or leaving the terminus, and report on the heating, ventilation, cleanliness and general condition of the car. All cars are to be fumigated on the inside, at least once a week. No passenger is to be permitted to stand or remain within the inclosure or space provided for the motorman. All cars in service are to display separate route and designation signs on the front and a route sign on the side of the car. Plans for all new passenger cars and for the remodeling of all old passenger cars are hereafter to be submitted for the approval of the commission.

The company is directed to prohibit smoking or the carrying of lighted cigars, cigarettes and pipes in or upon the cars or platform of the cars, except when the weather is sufficiently mild to keep the windows open. Smoking may then be permitted on the three rear seats on either side of the cars.

The order is to take effect on June 1, 1915, and the company has ten days in which to accept the conditions that are prescribed.

Car Capacity Order Extended—The board of health of New York has adopted resolutions prohibiting the carrying of more than one and one-half times the seating capacity in the cars operated by the Interborough Rapid Transit Company on its subway divisions except during the rush hours.

Temporary Single-Truck Trailers in Detroit.—The Detroit (Mich.) United Railway is now operating a small number of open single-truck trailers on Woodward Avenue. These trailers are a temporary measure and will not be used after the company's equipment has been increased by fifty modern trailers, orders for which the company is about to place.

Complying with Car-Step Order.—The Bay State Ctreet Railway, Boston, Mass., has asked the Public Service Commission of Massachusetts for an extension of time in which to comply with the order of the board in regard to lowering the steps of its cars. The work is well under way, but the company says it cannot be entirely completed within the time limit specified. The cost is put by the company at $200,000.

Near-Side Stop in New Jersey.—The Public Service Railway, Newark, N. J., has sent out notices to all the municipalities through which it operates that beginning on May 15 the near-side stop will be made by all of its cars at all street crossings. This is in accordance with a State law enacted recently. The near-side stop will be designated by a white band around the trolley poles and by signs reading "Station—Cars Stop Here."

Hearing in Regard to Packages on Cars.—A hearing was held before the Public Service Commission of the First District of New York on May 5 to consider protests lodged against the Interborough Rapid Transit Company in regard to restrictions placed by that company with respect to the size of packages to be permitted to be carried by its patrons in the subway. The case for the company was handled by A. D. Peacock, of counsel, who said that certain restrictions were absolutely necessary for the convenience of regular patrons of the company. The hearing was adjourned.

Fare Modification Sought.—The State Public Service Commission of Washington has decided to take under advisement the application of the Seattle, Renton & Southern Railway, Seattle, for a rate modification which would permit the company to do away with the transfer system and with commutation and school tickets. Last October the company applied for an increase of rates under the zone system. The city of Seattle resisted the application, and the Public Service Commission denied the increase, holding that the present rates were just and reasonable.

Cleveland Wage Adjustment.—On the night of April 4 the motormen and conductors of the Cleveland (Ohio) Railway decided by practically unanimous vote to accept the compromise offer of J. J. Stanley, president of the company, of an increase of 2 cents an hour in their wages. The men had demanded a flat rate of 35 cents an hour, but under the compromise one-year men will receive 29 cents an hour and the older men 32 cents an hour. The company will probably not insist on an open shop, and other questions that may come up will be submitted to arbitration. The City Council will be asked to approve the increased expenditure for this purpose, about $140,000 a year, and it is believed that Peter Witt, street railway commissioner, will urge favorable action. The increase will probably make the 1-cent transfer charge necessary for some time to come.

Additional Cars for Detroit.—The Detroit (Mich.) United Railway is taking steps to place orders for 100 center entrance motor cars for use in the Detroit city service. The motors of the new cars will be of sufficient capacity to pull trailers, fifty of which the company expects to place upon the lines this year. When the company and the City Street Railway Commission were negotiating for the assumption of the company's bonded indebtedness by the city in exchange for the lines within the one-fare zone, it was the desire of the commission that the company avoid expenditures for cars, additions and extensions. Under the new plan proposed for the municipalization of the lines, by which the price will be fixed by a court in chancery if desired by the electors, the company finds that objection to expenditure for cars and betterments has been removed. Consequently it has indicated its intention of increasing its rolling stock.

Printed Tariffs for Massachusetts Electric Railways.—The first official printed tariff of street railway fares and transfer privileges in Massachusetts has been filed with the Public Service Commission by the Middlesex & Boston Street Railway. The tariff has been worked out by C. Peter Clark, head of the rate bureau of the board, along lines applicable to the electric railways of the State generally. The Middlesex & Boston tariff is made up from the schedule of fares and transfers established in the decision of the board last October. The printed schedule eliminates the indefiniteness of previous blue-printed records, accurately describing the limits of all zones and overlaps. A valuable feature of the inside cover is the rules and regulations as laid down by the commission. The various classes of tickets, conditions of sale, territory covered by the different lines, class of ticket available for each territory, etc., are given in detail. The tariff folder contains eight pages.

Personal Mention

Mr. Carl N. Martin has been elected president of the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., to fill the vacancy caused by the death of Mr. Edward D. Toland.

Mr. John T. Kelly has resigned as eastern publicity manager of the Panama-Pacific International Exposition, to become editor of the "Electrical Prosperity Week" Campaign News Bureau. He will handle the general news service, besides assisting in the co-operative work with chambers of commerce. Before becoming an exposition official Mr. Kelly was a political writer on the New York *Evening World*. He had previously served in an editorial capacity on the Buffalo *Courier*, St. Louis *Republic* and Washington *Post*.

Mr. William A. Gilman, of the bureau of transportation, and Mr. George Sabin Brush, of the eighth division superintendent's office, Boston (Mass.) Elevated Railway, have returned from a 12,000-mile trip through the South and Pacific Coast, after an absence of ten weeks. The route included Florida, Louisiana, Texas, the San Diego and San Francisco expositions, with a side trip to Seattle, returning via the Grand Canyon, Denver, the Twin Cities and Great Lakes. Although the trip was for vacation purposes, much of the time was utilized in the study of traffic conditions on electric railways. Mr. Gilman expressed the opinion that the jitney bus cannot remain permanently in service at present rates, judging from observations on the Coast.

N. S. ALEXANDER

Mr. Norman S. Alexander has been appointed manager of the Fairmont Park Transportation Company, Philadelphia, Pa., which operates about 8 miles of electric railway in Fairmount Park and a pleasure resort, Woodside Park, in connection therewith. Mr. Alexander was born on March 30, 1888. He has been associated with Mr. A. H. Ford, now vice-president and general manager of the Cumberland County Power & Light Company, Portland, Maine, for about eleven years, serving in the capacity of secretary to Mr. Ford for the last eight years. Mr. Alexander was in Mr. Ford's office in New York in connection with Ford, Bacon & Davis and the American Cities Railway & Light Company and was with Mr. Ford during his entire connection with the Birmingham Railway, Light & Power Company, Birmingham, Ala. From January, 1905, to November, 1907, he was employed in a clerical capacity with Ford, Bacon & Davis in New York and New Orleans. The companies in which Mr. Alexander has been associated with Mr. Ford have controlled electric railway, electric light, transmission and gas properties, and he has shown unusual ability in grasping the problems presented in all of these various public utility interests.

Mr. Charles F. Wallace, who, as noted elsewhere in this issue, will reside in Dallas, Tex., as head of the Stone & Webster interests there, was born in California about forty-five years ago. He entered the Massachusetts Institute of Technology in 1888 to prepare himself for the profession of electrical engineer. In 1892, immediately after graduation, he entered the employ of Stone & Webster. For the last twenty-three years he has been engaged in designing, building and managing electric light plants, water-powers and street railways. He has had broad supervision over the affairs of the public utilities in Savannah and Columbus, Ga., Tampa, Pensacola and Jacksonville, Fla., and Baton Rouge, La., and several of the larger water-power developments under the management of Stone & Webster.

OBITUARY

David McLean Parry, formerly president of the National Association of Manufacturers, died on May 12 at his home in Indianapolis, Ind., in his sixty-fourth year. He was a prominent carriage and automobile manufacturer and besides had extensive traction interests. Mr. Parry was president of the Indianapolis, New Castle & Toledo Electric Railway, operated under lease by the Union Traction Company of Indiana.

Walter L. Sawtelle, manager of the lighting department of the Bangor Railway & Electric Company, Bangor, Maine, died at his home at Bangor on May 4, at the age of thirty-eight. Mr. Sawtelle was a native of Boston and was formerly in the employ of the Old Colony Railroad. Later he joined the staff of the Lewiston, Augusta & Waterville Street Railway. Mrs. Sawtelle is the daughter of Mr. John R. Graham, president of the Bangor company.

Thomas A. Leach, superintendent of the Blackstone division of the Worcester (Mass.) Consolidated Street Railway, died suddenly at his home in Worcester on May 5. Mr. Leach was born in Boston on April 12, 1852. He was educated in the public schools of Boston, and his first position in Boston was as a horse-car driver in the employ of the old Metropolitan Street Railway. Mr. Leach was one of twenty-four men who went to Worcester in 1887 at the instigation of former General Superintendent John Ackerman and entered the employ of the Consolidated Street Railway as a horse-car driver. Later he was made an inspector. Shortly after the Worcester Consolidated Street Railway electrified its system he was made superintendent of Division 1, which included the Worcester district. When the divisions were consolidated he was made superintendent of employment. A few years ago he was made superintendent of the Blackstone Valley division.

Dr. F. S. Pearson, who with Mrs. Peason was among those lost on the *Lusitania*, was the active head of the Pearson-Farquahar Syndicate and was one of the most prominent engineer is the United States. Dr. Pearson was born in Lowell, Mass., in 1861. He was educated in the public schools in that city and at Tufts College, from which he was graduated in 1879 as chemist and mining engineer. Later he re-entered Tufts and in 1883 was graduated as a civil and electrical engineer and for the next three years was instructor of mathematics and applied mechanics at the college. From 1886 to 1888 Dr. Pearson was engaged in mining engineering in various parts of the United States and Brazil, and in the latter year accepted a position as manager of the Somerville (Mass.) Electric Light Company. In 1889 he was appointed chief engineer of the West End Street Railway, Boston, Mass., then being equipped with electricity. The Brooklyn Heights Railroad, now included in the system of the Brooklyn Rapid Transit Company, shortly afterward decided to adopt electricity and Mr. Pearson was chosen as consulting engineer. For that company he designed the eastern district power station, the first large direct-connected plant in America in street railway service. In 1893 Dr. Pearson organized the Dominion Coal Company. As chief engineer of that company he had charge of the reconstruction of the shipping piers at Sydney and Louisburg, the coal-handling apparatus at Montreal, the building of the Sydney & Louisburg Railway and the operation and equipment of the company's mines at Cape Breton. In 1894 Dr. Pearson accepted the position as chief engineer of the Metropolitan Street Railway, New York, and supervised the equipment of this system with electricity and designed the electric power station of the company at Ninety-sixth Street and East River. He resigned from the company in 1898 to take a long trip abroad. Acting for Canadian capitalists, Dr. Pearson a few years ago went to South America to develop a railway, light and power scheme at Sao Paulo, Brazil, now controlled by the Sao Paulo Tramway, Light & Power Company. He also acted in an advisory capacity for the Mexican Light & Power Company. He was retained at various times as consulting engineer by the Toronto Railway, the Montreal Street Railway, the Winnipeg Street Railway, the St. Johns Street Railway, the Halifax Electric Tramways and the Montreal & St. Lawrence Light & Power Company. He was also chief consulting engineer for the Electrical Development Company of Ontario at Niagara Falls. Extending his foreign interest he took over a few years ago from Wernher, Beit & Company, London, control of the Mexico Tramways. Dr. Pearson was president and director of the Barcelona Traction, Light & Power Company, Ltd., Barcelona, Spain; president and a director of the Mexican Tramways, president and director of the Mexican Light & Power Company, Ltd., president and director of the Mexico Southwestern Railway and a director of the Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil. He was a member of the Institute of Civil Engineers, London, the American Society of Civil Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers and the American Society of Mechanical Engineers. He maintained residences at Great Barrington, Mass., Surrey, England, and Barcelona, Spain.

E. P. Shaw, Jr., general manager of the Boston & Worcester Street Railway, Framingham, Mass., with which company he had been connected since 1904, died on May 8 at the Carey Hill Hospital, Brookline, after an illness of about five weeks. Mr. Shaw was born in Newburyport, Mass., forty-six years ago. He attended the public schools there and entered early in life the employ of the Thomson-Houston Company, Lynn, now the General Electric Company. His first street railway experience was as manager of the Plum Island Company in Newburyport. He was manager successively of the Haverhill & Amesbury Street Railway, the Salisbury Beach Street Railway and the Citizens' Electric Street Railway Company, Newburyport. Later he represented Tucker, Anthony & Company, Boston, in various lines, notably the Norwich (Conn.) Street Railway and the New London (Conn.) Street Railway. Mr. Shaw organized and superintended the building of the line between Norwich and New London. He eventually became connected with the Worcester & Marlboro Street Railway and the Pawcatuck line between Watch Hill and Westerly, R. I. He was treasurer of the New England Street Railway Club. He is survived by his widow, two sons, E. Payson Shaw, third, and Randolph P. Shaw; two brothers, James F., now a resident of New York, and Samuel J. of Boston, and three sisters.

COURT HOLDS SEATTLE SERVICE REQUIREMENTS UNREASONABLE

The State Public Service Commission of Washington has been enjoined by the Federal Court from inforcing its order directing the Puget Sound Traction, Light & Power Company, Seattle, to furnish seats for all passengers on the Alki Point and Fauntleroy Park lines of the company. The injunction was granted on the ground that the commission's order was unreasonable. The court declared that "the furnishing of seats for passengers on street railway cars is an unsolved problem and will perhaps remain so as long as a considerable part of the population is habitually attracted in the same direction at the same time in the pursuit of business or pleasure." The commission's order was issued on March 24. It provided for taking effect immediately. The company at once obtained a temporary injunction against the commission inforcing the order, and because of the constitutional questions raised by the company the case was heard by United States Circuit Judge William B. Gilbert and District Judges Frank H. Rudkin and Jeremiah Neterer, sitting en banc. Regarding the furnishing of seats on the Alki and Fauntleroy lines the court said: "The order in this respect is unreasonable and void, in view of the severe penalty imposed by law for failure to comply therewith." On the parts of the commission's order directing that the company continue the operation of through service on the Ballard Beach line and requiring that the Alki Point and Fauntleroy lines be operated on First and Second Avenues as far north as Virginia Street, the court denied the petition of the company for an injunction. The opinion of the commission in this case, in which it held that the convenience of the public was limited only by the constitutional limit of confiscation, was quoted at length in the ELECTRIC RAILWAY JOURNAL of April 17, page 776.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Houston, Richmond & Western Traction Company, Houston, Tex.—Application for a charter has been made by this company in Texas to build an electric railway from Houston to Richmond, 25 miles. Surveys are to be begun immediately. Capital stock, $50,000. Incorporators: W. S. Jacobs, T. C. Dunn, Jr., Edward Kennedy, Chester H. Bryan and others, all of Houston. [April 10, '15.]

***Fulton & East Richmond Railway, Fulton, Va.**—Chartered in Virginia to build an electric railway from State Avenue and Williamsburg Avenue, Fulton, to Montrose Heights, about 5 miles. Capital stock, $50,000. Officers: Dr. E. F. Atwood, president, and R. B. Allport, treasurer, both of Richmond.

FRANCHISES

Edmonton, Alta.—The Edmonton, Stony Plain & Wabamun Railway has received from the Alberta Legislature an extension of time on its franchise to build the projected line to connect Edmonton, Stony Plain and Lake Wabamun. E. S. McQuaad, Edmonton, is interested. [May 24, '13.]

Los Angeles, Cal.—The Council has authorized the sale of two franchises in Los Angeles. One franchise to be offered will extend from Thirtieth Street and San Pedro Street, out San Pedro Street and South Park Avenue to Slauson Avenue, and the other will extend over the same line to Manchester Avenue.

Los Angeles, Cal.—Col. Lewis Ginger has received a franchise from the Council to build an incline railway in Griffith Park. The ordinance provides that the right shall extend over a period of fifteen years, but that the city may take it over at an appraised valuation at any time after the expiration of five years. The line will be 2300 ft. long. [Feb. 13, '15.]

New Haven, Conn.—The Connecticut company has asked for a franchise to double track its line on George Street from Norton Street to Broad Street, New Haven.

West Hartford, Conn.—The Connecticut Company has asked the Council for a franchise to double track its line in West Hartford on Farmington Avenue from the end of the present double track near Troop "B" Armory to West Hartford Center, a distance of about 3000 ft.

Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company has asked the Council for a franchise to extend its line on State Street, Fort Wayne, from the St. Joe River to the eastern terminus of the line.

Brockton, Mass.—The Bay State Street Railway has asked the Council for a franchise to extend its line from Perkins Avenue to East Street, Brockton.

Buffalo, N. Y.—The International Railway has received from the Council one year's extension of time on its franchise in which to begin work on its line on Delavan Avenue in Buffalo, and three years' extension of time in which to begin work on its Bailey Avenue line.

Oakwood, Ohio.—The Oakwood Street Railway has received a twenty-five-year franchise from the Council to build an extension of its line in Oakwood. The line will follow the Lebanon Pike about one-half the distance, and from the southern border of Lebanon Pike it will be constructed on private right-of-way now owned by the company.

Springfield, Ohio.—The Ohio Electric Railway has accepted the franchise granted by the Council to build an electric railway in Springfield.

Toronto, Ont.—The Toronto Eastern Railway has received from the Dominion Parliament an extension of time on its franchise in which to build the line from Toronto easterly to Cobourg, Ont., with branches as follows: From Cobourg or Port Hope northerly to Peterborough; from Scarborough to Markham, Stouffville or Uxbridge; from Oshawa northerly via Lake Scugog to Lindsay; from Oshawa southerly to Lake Ontario. [Feb. 6, '15.]

Windsor, Ont.—The Sandwich, Windsor & Amherstburg Railway has asked the Council to extend its franchise for twelve years. It is reported that the company has offered to build a line via Lincoln Road and Ottawa Street, to be in operation by Oct. 1, if the franchise is granted.

Montreal, Que.—The Montreal & Southern Counties Railway has received an extension of time on its franchise from the Dominion Parliament to complete various lines in Montreal. The extension from St. Cesaire to Granby, 16 miles, is nearing completion, and it is expected the line will be placed in operation during the summer.

Corpus Christi, Tex. — J. H. Caswell, San Diego, and associates have asked the Council for a thirty-year franchise to build an electric railway over certain streets in Corpus Christi and interurban lines to extend to Ward Island, Oso, Portland and Calallen. [Oct. 3, '14.]

Vancouver, Wash.—The Washington-Oregon Corporation has received from the Council a one year's extension of time on its franchise to build an extension of its line on Main Street, Vancouver, from a point where Third Street intersects Main Street, southerly on Main Street to the approach of the interstate bridge.

TRACK AND ROADWAY

***Lynn Haven, Fla.**—Plans are being considered for an electric railway from Lynn Haven to Panama City, via St. Andrews. Richard Tillis, Montgomery, Ala., is interested.

Atlanta & Carolina Railway, Atlanta, Ga.—Plans are being considered by this company to resume work soon on its line between Atlanta and Augusta. About 20 miles of grading has been done and several miles of track have been laid. Practically all the necessary rights-of-way have been given and the necessary surveys made. Work was suspended on account of financial conditions. [March 20, '15.]

Chicago (Ill.) Surface Lines.—This company has contracted with the Lorain Steel Company for 20,000 tons of rail for its 1915 requirements.

Aurora, Elgin & Chicago Railway, Wheaton, Ill.—Plans are being made by this company to double track its line on North Lake Street. A stretch of double track will be laid at once from the end of the present double track to a point north of Illinois Avenue.

Union Traction Company of Indiana, Anderson, Ind.—New ties are being placed by this company on East Lynn Street and on South Meridian Street, Anderson. The track is being entirely rebuilt along Lynn Street near the intersection of the Belt line.

Brandon (Man.) Municipal Railway.—The Council of Brandon has decided to extend this railway on Twenty-second Street, Brandon.

Bay State Street Railway, Boston, Mass.—Plans are being contemplated by this company to build a line between Lawrence and Lowell along the new river front boulevard.

Michigan Central Railroad, Detroit, Mich.—This company, which has been negotiating without success with the London & Port Stanley Railway Commission of London, Ont., to secure running rights over the newly electrified railway, now proposes to build a side line, west of the Michigan Central bridge at St. Thomas to connect with the line of the London & Lake Erie Railway & Transportation Company.

Muskegon Traction & Lighting Company, Muskegon, Mich.—New track is being laid by this company on its Pine Street line. A 73-lb. rail has been substituted for the light rail previously used.

Electric Short Line Railway, Minneapolis, Minn.—This company has placed in operation its line from Minneapolis to Winsted, 40 miles.

Metropolitan Street Railway, Kansas City, Mo.—Operation has been begun on this company's new crosstown line on Prospect Avenue from Fifteenth Street to Independence Avenue, Kansas City. The line will eventually be extended north to Lexington Avenue, connecting with the northeast tracks.

United Traction Company, Albany, N. Y.—This company plans to retrack its line on South Pearl Street in Albany at once.

New York, Westchester & Boston Railway, New York, N. Y.—Preliminary surveys have been completed and work will be begun soon on the extension of this company's line from White Plains, N. Y., to Danbury, Conn. The new line will extend from White Plains through Harrison, North Castle, Bradford, Pound Ridge and Lewisboro, Westchester County, to Greenwich, Ridgefield and Danbury, where it will connect with the main line of the New York, New Haven & Hartford Railroad.

Durham (N. C.) Traction Company.—This company reports that during the next few weeks contracts will be placed for material for its 2-mile extension in Durham.

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—This company has placed in operation its 7-mile line from Leavittsburg to Newton Falls.

Cleveland (Ohio) Electric Railway.—This company has been authorized by the Council to expend $500,000 for operating stations, tracks and overhead work in connection with its new carhouses and repair shops.

Springfield (Ohio) Railway.—This company will build an extension of its lines in Springfield on Kenton Street between Burt Avenue and Belmont Avenue, and on Belmont Avenue between Kenton Avenue and Sunset Avenue. An extension will also be built on East High Street.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Work has been begun by this company laying its tracks in Warren, East Youngstown and Struthers. The double track is also being extended in East Youngstown 1 mile eastward from the present city limits.

Lake Erie & Northern Railway, Brantford, Ont.—Work has been begun by this company south of Brantford, on its line to Port Dover. Track is being laid at Simcoe and Mount Pleasant.

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—Work will soon be resumed by this company on its line from Morrisburg to Ottawa. Construction will be begun about 3 miles south of Billings' Bridge and continue south to Morrisburg, leaving the 3 miles into Ottawa as the last link in the chain, the point of entrance of the line into Ottawa not having been definitely decided upon. [Jan. 23, '15.]

Portland, Ore.—A company has been organized and financed in Portland to build the proposed electric railway between Nicolai Street and the northern limits of Linnton and Portland. Richard Shepard, Portland, is among those interested. [May 1, '15.]

South Fork & Portage Railway, Johnstown, Pa.—Material has been received and work will be resumed at once on this company's line between South Fork and Portage, 7 miles. It is expected that work will be completed within six months. [June 6, '14.]

Chester & Lancaster Railway, Phoenixville, Pa.—Preliminary surveys have been made on this company's line for about 6½ miles. It is expected that the survey to Phoenixville, 16 miles from the Lancaster County line, will be completed in a short time. Plans are also being made to build an extension from Pughtown to Pottstown, 8 miles. John F. Shea and John J. Deery, Philadelphia, are interested. [April 17, '15.]

Somerset (Pa.) Street Railway.—This company reports that surveys have been made on its line from Johnstown to Rockwood, 36 miles, and grading will be begun within the next two months. G. C. Winslow, general manager. [May 1, '15.]

Three Rivers (Que.) Traction Company.—Work will be begun at an early date on this company's line in Three Rivers, Que. [March 20, '15.]

Newport & Providence Railway, Providence, R. I.—Plans are being made by this company to extend its line to Coaster's Harbor Island.

Texas Traction Company, Dallas, Tex.—This company has under consideration plans to extend its lines from Waco to Austin and San Antonio.

***Price, Utah.**—A proposition to construct an electric line from Price to various towns in Emery County will soon be presented to Eastern capitalists by J. H. Manson. The plan also contemplates the lighting of the towns of Emery County and the furnishing of power for various purposes.

Petersburg & James River Corporation, Petersburg, Va.—Surveys are being made by this company for a railway to be built between Petersburg and City Point. The company was recently refused a franchise by the Board of Supervisors of Prince George County to construct an electric railway between Petersburg and City Point along the county roads, but the company plans to build the railway on private right-of-way. Messrs. Plummer and Bohannon, Petersburg, counsel. [April 24, '15.]

Virginia Railway & Power Company, Richmond, Va.—This company plans to begin work at once on repairing its line on East Broad Street between Twenty-fourth Street and Thirty-second Street, Richmond.

West Virginia Traction & Electric Company, Wheeling, W. Va.—Material has been received and work has been begun on improving this company's tracks at Pleasant Valley. The track will be reballasted and new ties will be laid.

Marinette & Menominee Light & Traction Company, Marinette, Wis.—Plans are being considered by this company to extend its line from Pierce Avenue to Eleventh Street, Marinette.

SHOPS AND BUILDINGS

Iowa Railway & Light Company, Cedar Rapids, Ia.—Among the improvements planned by this company during this year is the building of a passenger station at the northwest corner of the intersection at Fourth Avenue and Second Street, Cedar Rapids.

Northern Massachusetts Street Railway, Athol, Mass.—This company has decided to close its carhouse at Westminster and make the headquarters of the Gardner division in the carhouse at East Templeton. It is also planned to close the carhouse at Orange and store the cars at East Templeton. The Westminster carhouse will be used for storing the summer cars in winter and the winter cars in summer. The dispatcher's office and the paymaster's office will be transferred to East Templeton.

Interborough Rapid Transit Company, New York, N. Y.—This company is preparing designs for six additional extending safety platforms for the downtown express track of the Fourteenth Street subway station. The plans will be ready for the approval of the Public Service Commission in about a month. Estimates also are being prepared for similar platforms for the Times Square station, though it is undecided as yet as to whether they will be installed at that station.

Virginia Railway & Power Company, Richmond, Va.—A one-story building will soon be erected by this company at Main Street and Vine Street, Richmond. The cost is estimated to be $3,750.

POWER HOUSES AND SUBSTATIONS

New Orleans Railway & Light Company, New Orleans, La.—Plans are being made by this company to enlarge its power plant on the river front at Market Street. It is estimated that the extension will cost about $25,000 and new machinery $100,000.

Cumberland County Power & Light Company, Portland, Maine.—This company is building a new substation on its branch that extends from Dunstan's Corner to Old Orchard.

Hagerstown & Frederick Railway, Hagerstown, Md.—This company has entered into a contract with the city of Walkersville to furnish electric lighting and to construct a transmission line from Frederick to Walkersville, 5 miles. The cost is estimated to be $4,000.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—This company plans to build a new power plant in Wahpeton. The plant will be located at the east end of the line.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company has authorized an expenditure of $85,000 to rehabilitate its wire systems. Other appropriations to provide for enlarging its power house at Blackwater Street in Lynchburg have also been made.

Manufactures and Supplies

ROLLING STOCK

Easton (Pa.) Transit Company is reported as having ordered three cars from The J. G. Brill Company.

Halifax (N. S.) Electric Tramway has ordered six closed city cars from the Nova Scotia Car Works, Halifax, N. S.

Jackson Railway & Light Company, Jackson, Miss., has ordered five 25-ft. single-truck steel cars from the Southern Car Company.

Interborough Rapid Transit Company, New York, N. Y., has issued inquiries for 974 motor trucks for elevated line service.

Connecticut Company, New Haven, Conn., has issued specifications for ninety-two new all-steel cars of a convertible type, over all length 43 ft. 4 in., body length 30 ft., with six transverse seats on each side in the middle of the car, and longitudinal seats at the ends.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction, Minneapolis, Minn., noted in the ELECTRIC RAILWAY JOURNAL as having ordered twelve trailer cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity	72
Bolster centers, length	38 ft.
Length of body	49 ft.
Length over platforms	57 ft. 4 in.
Width over sills	10 ft.
Width over all	10 ft. 4¼ in.
Height, rail to sills	3 ft. 7¾ in.
Height, sill to roof	8 ft. 11⅞ in.
Body	semi-steel
Interior trim	bronze, ozidized black
Headlining	3-ply whitewood
Roof	plain arch
Underframe	metal
Air brakes	West.
Car trimmings	J. L. Howard
Couplers	McConway & Torley
Curtain fixtures	Nat. L. W.
Curtain material	Pantasote
Hand brakes	Lindstrom
Journal boxes	Symington
Paint	Sherwin-Williams
Sash fixtures	O. M. Edwards
Seats	Brill "Winner"
Seating material	frieze plush
Springs	Wason
Step treads	Mason safety
Trucks	trail
Varnish	Murphy
Wheels	Midvale Rolled Steel
Ventilators	Globe

TRADE NOTES

Diamond State Fibre Company, Elsmere, Del., manufacturer of vulcanized fiber and insulating papers, has moved its Chicago factory to 619-631 West Washington Street.

Ellcon Company, New York, N. Y., has received an order from the Pullman Car Company for more than 140,000 castings of aero metal for use as interior car trimming in the 478 car bodies which are being built for the Interborough Rapid Transit Company.

Prest-O-Lite Company, Indianapolis, Ind., recently conducted a test at the Indiana State Fair grounds on April 19, where it demonstrated the practicability of illuminating a mile race course as bright as day for automobile racing at night, by means of lights generating more than 2,000,000 cp.

Westinghouse Lamp Company, New York, N. Y., announces a recent development in its incandescent lamp. The company has now put on the market Mazda C lamps in sizes from 200 to 1000 watts for 220 to 250 volts. Heretofore these Mazda C lamps have been supplied only for 105 to 125 volts.

Whiting Foundry Equipment Company, Harvey, Ill., has taken over the foundry equipment business of the Central Iron Works, Quincy, Ill., adding to its line of material the dust arresters and water cinder mills formerly manufactured by the latter company. The Whiting company has retained one of the engineers of the Quincy Iron Works on exhaust system equipment and will be prepared to furnish repairs for this equipment.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received a repeat order from the Oklahoma (Okla.) Railways for eight double No. 306-D motor equipment with Type K-35 control. The company has also received an order from the Dibert, Van Croft & Ross Company, Ltd., for two storage-battery locomotives for hauling and shipping in and about its sugar mill in Camaguey, Cuba. These are said to be among the largest storage-battery locomotives which have ever been built.

J. W. Macdonald has resigned as assistant transportation supervisor of the department of public service of Chicago, Ill., to devote his entire time to marketing the products of the National Formed Metal Products Company, 636 McCormick Building, Chicago, Ill. This company manufactures and sells the light-weight, threadless-flange conduit which was described in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1914, page 771. Mr. Macdonald is the inventor of this conduit, as well as a number of other metal car fixtures, also manufactured by this company.

ADVERTISING LITERATURE

Beaudry & Company, Inc., Boston, Mass., has issued a folder on its motor-driven hammers.

John Lundie, New York, N. Y., has issued a reprint from the *Railway Review* which contains an article by Warren Moore Osborn entitled "The Relation of Wheel Coning to Rails and Tie Plates." The reprint is supplemented with diagrams which clearly show the construction and principle of the Lundie tie plates. Owing to its camber, or concave under-surface, this plate presents an adjustable bearing in place of the rail as a wheel load passes over it. This construction is said to minimize tendency to accident by so-called track spreading and to reduce internal stresses in the rail, thus tending to eliminate rail fractures.

Kellogg Switchboard & Supply Company, Chicago, Ill., has issued Bulletin No. 82 on its railway telephone and electric signaling apparatus. The catalog aims to present these devices in sufficient detail so that the engineer and technical expert can form accurate impressions and to put the information in such form that the non-technical reader can readily determine the type of instrument best suited to his particular needs. This selective signaling system is designed to fall in line with the following requisites: (1) for a dispatcher to call and talk to all stations separately; (2) for any station to communicate with the dispatcher; (3) for a dispatcher to be sure that the bell is ringing at the station called, and (4) that the system shall provide a factor of absolute reliability and speed. The selector and telephone equipment for accomplishing the above requirements is carefully described in detail.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a pamphlet entitled "Radiator Type Transformers for the New Haven System," which is a reprint of an article in the *Electrical World* describing this newly-developed type of transformer which has recently been put into service on the New York, New Haven & Hartford Railroad. The transformer installation was called for by the increase in load on the Cos Cob power station of this system. For reasons of economy additional energy is being supplied the New Haven System by the United Electric Light & Power Company, New York City, and this transformer is used to transform the voltage of this supply to that suitable for the railway. The banks of the step-up transformers in the 201st Street station are each made up of a large unit rated at 5000 kva, connected in "T" with a similar unit of 1000 kva, rating connected as a "teaser." This bank receives energy at 66,000 volts, three-phase. The secondary winding steps up the voltage to 24,600 while the "teaser" steps it up to 12,300. This gives an unsymmetrical three-phase transmission voltage having the higher potential across the principal phase, and 17,400 volts across the other two phases.

Philadelphia Toboggan Company, Germantown, Philadelphia, Pa., has issued an attractive catalog illustrating its carousels and coaster cars for use as amusement features of electric railway parks. The carousels, as shown in the catalog, are artistically designed and decorated. The pole, framework, rods and machinery are entirely hidden from view by elaborate decorations, such as the dome ceiling. The company has also issued a booklet for the special benefit of carousel operators, which describes the Auchy friction drive and improved pole cap. The friction drive is designed to eliminate the possibility of stoppages on busy days. The pole cap permits the operation of the machine to continue in case it is necessary to get at the discs and roller bearings on top, instead of having to stop and jack up the machine.

Electric Railway Journal

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BIG CARS ON LONG SCHEDULES

If the jitney flare-up is illuminating any problem it is that of big cars and long schedules. The public does not patronize the jitney as much for its comfort or its actual speed as for the fact that it is there when the passenger wants transportation and it takes him with few stops to his destination. This condition applies even where a seat is available for every car passenger. Without question the public of the towns where the jitney has done big business will not remain satisfied with fifteen and ten-minute headways in city service. Few companies could afford to run more cars of the same type as those they have in service now. Naught will remain then than recourse to shorter and lighter cars. At this writing at least two types of one-man cars have been designed, each weighing between 300 lb. and 350 lb. per seat, this achievement being accomplished in part with the aid of the small wheel and the small motor. With the improvements available in the way of braking, door-control and fare-recording apparatus, there seems to be no hindrance from a mechanical or electrical standpoint to the use of the one-man car. The saving in cost of operation per car-mile by such a car is not confined to the transportation expenses but is reflected as well in the accounts of power, maintenance of way and maintenance of equipment. It can thus supply the demand for frequent headway at a minimum operating cost.

THE SHORT LIGHT CAR

It is of interest, in illustrating the great attention being directed to this subject of shorter headway, that the topic should have been considered during the past ten days at railway conventions in such widely-separated cities as Pittsburgh, Pa., and Galveston, Tex. The principal obstacle to the greater use of the one-man car, brought up at the Pittsburgh convention, was that of grade crossings. How is the one-man car to be flagged across a steam railroad track? Testimony presented at the meeting, however, indicated that this was not an insuperable obstacle. Electric railway companies are so accustomed to requiring one employee on a car to act as a lookout at places of this kind while the other employee operates the car over the track, that it is difficult at first to realize that any other procedure can be proper. It must be remembered, however, that practically every other vehicle that uses the road has only one operator, and the experience on the West Penn Traction lines indicates that a crossing can be safely passed even without the second employee. So far as other accidents are concerned, the experience of the same company was that they had been reduced, owing probably to the fact that there is no possibility of confusion in signals between the rear platform and the front platform. A one-man car, of course, is not synonymous with a short, light car, and there are many places where short, light cars could be used to advantage instead of long cars, yet where two employees per car would be desirable. The question is one primarily of headway, but it also involves schedule speed, because with a smaller number of passengers there will be fewer stops. Long cars will remain desirable for long runs and for the larger cities, but the smaller towns can well look into the merits of the short car.

WHO ARE JITNEY DRIVERS?

The first jitney drivers were men out of work who happened to own automobiles. To these have been added a number of men who, misled by the first glowing reports of jitney profits, forsook their jobs to invest (?) in this modern South Sea bubble. But detailed observations of jitney service by individual license numbers show that an astonishingly large part of the operators consist of still a third class, namely, those engaged in other work who "jitney" only during the rush hours. It is obvious that when 125 out of 400 jitneys in a city earn less than $1 a day, the operators must have some other occupation during the normal hours. The fact is that quite a number of jitney operators are car owners who display a sign to pick up a few nickels while going to or returning from their work. Observation that the same-numbered car was run by different men morning and evening also developed some remarkable partnership agreements. In one case two stationary engineers clubbed together to enter the jitney game. These men are employed on successive eight-hour shifts. One quits in the early morning in time to make a few revenue trips during the morning rush; the other, in like manner, is free for work during the evening rush. Of such material is a large fraction of the jitney operators. The men who really try to make a living out of the business will be cured by the chastening influence of time, but the others who are in it only for some loose change must learn that from time immemorial strict regulation of common carriers has been practiced and found necessary in the interests of the public. From observations made in many cities where jitneys are in use we are satisfied that an ordinance which specified no more than operation over a fixed route for sixteen to twenty hours a day would kill off 25 per cent to 50 per cent of these traction mosquitoes, while a $5,000 bonding requirement would place the jitney movement in the class of the dodo, the protohippus and "civilized warfare."

TRAMWAY LABOR IN LONDON

In our issue of May 1 we expressed a hope that the confidence in London in regard to the tramway employees being too patriotic to ask now for much higher wages would not be misplaced. It seems now that we were even more justified than we thought in thus placing a restriction on English trust. Practically all the motormen and conductors of the London County Council Tramways have gone out on strike because the Council refused a general 15 per cent increase in wages to offset the higher cost of living, and the latest cables state that the men have now pledged themselves not to return to work until a permanent increase in pay instead of merely a war bonus of this amount is granted. The situation is particularly exasperating because so many of the motor omnibuses in London have been commandeered for war service that the strike is certain to impose a severe stress upon the remaining transportation facilities. A vital criticism that has always been directed against municipal ownership of street railways in England has been based on the too powerful political and operating influence of the body of employees. In this time of national conflict it might reasonably be supposed that a spirit of patriotism would prevent a misuse of this power, but such has not proved to be the case. It may be that some advance should be granted the employees, in inverse ratio to the largeness or smallness of their present wages, but the insistence upon a 15 per cent permanent advance for all is as ill-timed as the amount is excessive. Never have the London tramway employees had a better opportunity to avoid coercive measures and to co-operate in a reasonable settlement fair to all parties concerned.

PROGRESS IN MOTOR VENTILATION

The interest aroused by R. E. Hellmund's article on motor ventilation, printed in the issue of this paper for May 1, indicates that the subject is more important than the lack of available reference literature would seem to indicate. In the issue of May 8 a valuable letter from E. D. Priest was printed showing that the number of ventilated motors in use is remarkable for the length of time that they have been available. Last week a series of diagrams depicting in graphical form the progress of motor ventilation was given, while this week there is a letter from a large user of ventilated motors. The readers of this paper have, therefore, in convenient form for reference and study the results of the accumulated experience of two large manufacturing companies and of a typical, progressive railway system. Taken together, these data permit the formation of a definite impression of the progress which has been made within a very few years. This progress is largely due to the struggle for light weight in car construction which has also been conspicuous during this period. It is remarkable for the fact that experimentation and successful commercial application have gone on simultaneously. A very interesting point made in Mr. Adams's communication is the necessity for careful cleaning of ventilated motors. Experience here bears out that obtained in the ventilation of stationary machines, where it has resulted in the washing of the cooling air in some extreme cases to eliminate dust. The motor armature with its longitudinal ducts is a natural centrifugal dust-separator. Hence it is only reasonable to urge that these ducts be kept clear if the minimum resistance to the air flow is to be secured.

EDUCATION FOR ELECTRIC OPERATION

One of the factors in the electrification of steam railroads which attract little attention, but which are quite important from the operating standpoint, is the preparation of men for duty on the electric trains. The problem is simplified, in a way, by the fact that the electric runs are "bid in" on a seniority basis. This fact at the same time complicates the instruction problem because, until the runs are advertised, it is not known who the successful bidders will be. The way in which the Pennsylvania Railroad is now working on the problem of preparing men for the coming electrification of the Paoli division is told in this issue by the man in charge of this preparation—an assistant road foreman of engines. On this division multiple-unit trains will be run, and it is assumed that the runs will be largely bid in by the present local enginemen. Although it is true that older men having through runs will have first chance at the new work, it is not likely that they will avail themselves of it as their present runs are presumably more desirable. The railroad is, therefore, familiarizing the men who will probably secure the runs with the nature of the equipment for which they will soon be responsible. From the general reputation of the employees of this great railroad system for intelligent service and fine esprit de corps, it may be inferred that the new service will start off with snap and enthusiasm. In fact, the interest in the new phase of the local transportation situation is such that many men who are only remotely liable to have to do with the electrical equipment have joined the classes.

The instruction which is being given is of a practical nature and is designed not so much to fill the minds of the men with indigested theory as to impart a knowledge of the electrical equipment commensurate with that which an engineman should have of his engine and boiler. An engineman is not expected to be a machinist, but he must be able to co-operate with the roundhouse men in keeping his machine in order. So the electric motorman need not be an electrician but he must know something of his equipment to operate it properly. In a recent paper W. S. Murray laid a considerable share of the troubles with the New Haven electric locomotives to the difficulty which steam enginemen have in appreciating the difference between steam engines and electric motors. While it is true that the ammeter is a safe guide to the power draft by the latter and while circuit breakers can be set to check heedlessness, yet there is much to be gained by careful controller handling. There is no fundamental principle in the electric equipment essential to intelligent operation which is beyond the grasp of a man with an intellect capable of comprehending the fundamental principles of the air brake.

THE DETROIT STRIKE

The recent short-lived Detroit strike affords a good illustration of the arbitrary way in which a small body of irresponsible men, in utter disregard of their pledged word, can subject the citizens of a large city to inconvenience and pecuniary loss. The contract between the Detroit United Railway and its employees specifically provides that in all cases of differences of opinion, the question at issue shall be referred to arbitration, and it describes the methods by which the arbitration board shall be appointed at the instance of either side. Yet last week this contract, so far as its binding effect on the men was concerned, became "a mere scrap of paper." Without warning, and without taking the preliminary steps required by the contract to insure arbitration, the men stopped work early on Thursday morning of last week and remained out all day. The absolute lack of good foundation for their position is shown by the fact that they reversed it at 8 o'clock on the following morning, a complete change of attitude in thirty hours.

A great deal is being said at present in international affairs about the sacredness of treaty obligations and the disregard by some nations of the rights of neutrals. Civilization cannot exist if either in international affairs or in affairs within a nation solemn agreements are to be lightly repudiated at the whim of either side. Between individuals such action is subject to a penalty enforceable at law, and such seems to be the only remedy in industrial and international disputes, and some authority must be found to enforce the penalty.

In this particular case the point at issue between the Detroit United Railway and its employees emphasizes the unreasonable attitude taken by the union in this dispute. It related to the discharge of a motorman who, according to the records, in less than five years had been reprimanded sixty-four times and had been laid off thirteen times, the offences committed by him being, for the most part, reckless operation. There has been no movement connected with transportation in recent years which has received more popular approval than that of "safety first." Both railways and public have awakened to the importance of putting forth the utmost care in the protection of life and limb, and prizes are awarded by a national society annually to the railway company, both steam and electric, which makes the best record in this regard. This safety movement has been strongly indorsed by the public, but it cannot be successful unless a railway management is supported by both the public and its employees in insisting upon the exercise of care in the operation of its cars. Yet here is a case, where, according to the record, a trainman had been involved in eight collisions, had run into open points eight times, had four times failed to report an accident, had been reprimanded numerous times because he had run his car ahead of schedule, and finally had derailed his car by operating it at high speed over tracks which were being reconstructed. It is no wonder that one of the Detroit papers, in speaking of the strike, says:

"As an instrument of public education the strike of the Detroit United Railway employees is almost worth its cost in dollars and cents. It has brought home to thousands of people who would discover it in no other way the exact meaning of a labor union clothed with unlimited power, responsible to no authority, unfaithful to its solemn word and covenant and indifferent to the welfare of the community that feeds it."

JITNEYS AND RAILWAY SERVICE

Phrased in various ways, a statement has been running through current newspaper editorials to the effect that jitneys have come into wide use only in those cities where the electric railway service has been inadequate. The "safe assumption" of such a cause for the existence of jitney competition is a very poor example of *a posteriori* reasoning. The successful inference of the correct cause for any given effect depends entirely upon the non-possibility of finding another cause that would be more likely to account for the effect. In other words, anyone who presents inadequate electric railway facilities as the real cause for jitney operation is convicted of careless and unreasoning thought when better causes are shown.

That such other causes are in existence, we insist. In Los Angeles, the birthplace of the jitney, for example, the railway service is admittedly of a very high grade. Here the jitney craze arose only through a combination of an extraordinarily large per-head ownership of low-priced automobiles, an excellent system of roads and most clement and constant climatic conditions. The rapid growth of jitney operation in Los Angeles and its spread to other cities then came as a result of the effervescence with which Americans hail all new ideas, the novelty of this means of transportation and its speed, the appeal of the affluence-denoting automobile to the vanity of the average citizen, and the ignorance of the individual operators of such equipment as to the unavoidable costs and the inevitable deficits.

These were the true causes of the origin and the expansion of the jitney movement—causes which by their very lack of stability were certain in time to prove ephemeral in their effect, as is evidenced by the now increasing stories of set-backs and collapses of the movement in many sections. In some cases, however, these real causes have had their effect heightened and rendered unnaturally continuous by auxiliary causes directly connected with the public relations problem of the electric carriers. That is to say, the railways of some cities, on account of the unsettled condition of certain questions affecting both the public and the companies, have been unable to make the public see the folly of supporting a temporary competitor. Thus, in Kansas City and Des Moines, the issue has been the provisions of a new franchise, while in other cases the question has been the fare or the rate of return on the investment. But urban transportation is essentially a monopoly, and the public is bound to become the principal sufferer in the establishment of any uneconomical plan of conducting it. Certainly it seems a poor way to secure further concessions from a railway company to lessen its ability to supply those which hitherto it has agreed to give.

Training Steam Railroad Men for Electric Operation

Great Interest Is Being Manifested in the Preparation for Electric Operation by the Men Connected with Local Operation at the Pennsylvania Railroad's Philadelphia Terminal—The Training Methods in Use Are Described in Detail

BY CLARENCE ROBERTS, ASSISTANT ROAD FOREMAN OF ENGINES, PHILADELPHIA TERMINAL DIVISION, PENNSYLVANIA RAILROAD

One of the essential steps in the process of electrifying steam railways is the training of men for electric operation. During the transition the men most affected are those connected with train operation, and ordinarily such men not only have no knowledge of the elementary principles of electricity and magnetism or the operation of electrical apparatus, but they are not even familiar with relative terms or phrases.

The features of instruction on equipment and electric train service have been given thorough treatment in connection with the Pennsylvania Railroad Company's Philadelphia-Paoli electrification, which is a single-phase, high-tension system, with overhead catenary construction, for multiple-unit train operation.

It is expected electric train service will be begun about June 1, 1915, when multiple-unit equipment will replace the present steam equipment in local passenger service between Broad Street Station and Paoli, a distance of about 20 miles. Through passenger, freight and yard service in electrified territory will continue to be handled with steam locomotives. Approximately twenty crews are employed in the previously-mentioned local passenger service, comprising an engineman, fireman, conductor, baggagemaster and one or two brakemen. Nearly all of these men, except the firemen, who will not be required for multiple-unit service, apparently desire to qualify for electric train service.

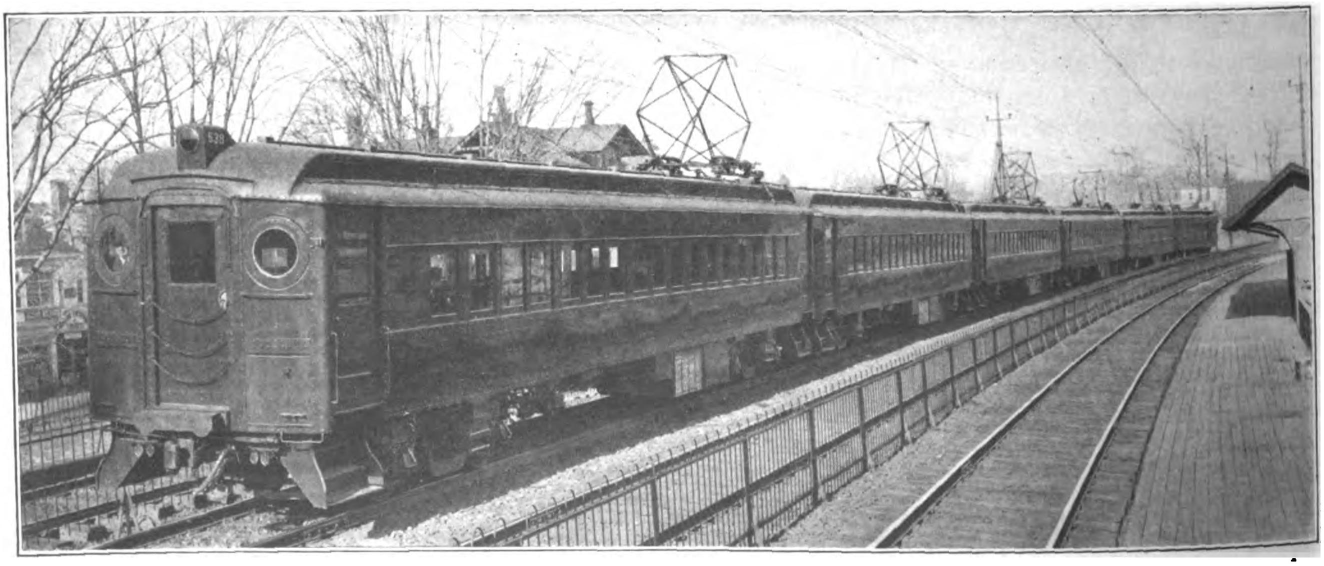
Facilities have been provided for all employees interested to become familiar with the electric equipment and its operation. Two multiple-unit cars have been stationed at convenient places, one at Broad Street Station, the other at the West Philadelphia shops, with instructors in attendance during schedule hours, for instruction purposes. The car at the shops is blocked up off its trucks, covers are removed from the motors and other apparatus so that all working parts are exposed, and all appliances and devices on both cars bear designating tags. Instruction trains are now being run on a short section of main track between Overbrook and Bryn Mawr, electrified in advance, in order to give enginemen posting for motormen necessary practical experience in handling the new equipment and also to break in the latter.

The Pennsylvania Railroad Department Y. M. C. A., Philadelphia, the membership of which is composed of employees of the company and its affiliations, has co-operated with the company in this work of instruction. In fact, it anticipated the present situation by establishing in 1911 a course of study known as the "Practical Railway Electricity" class which has continued since.

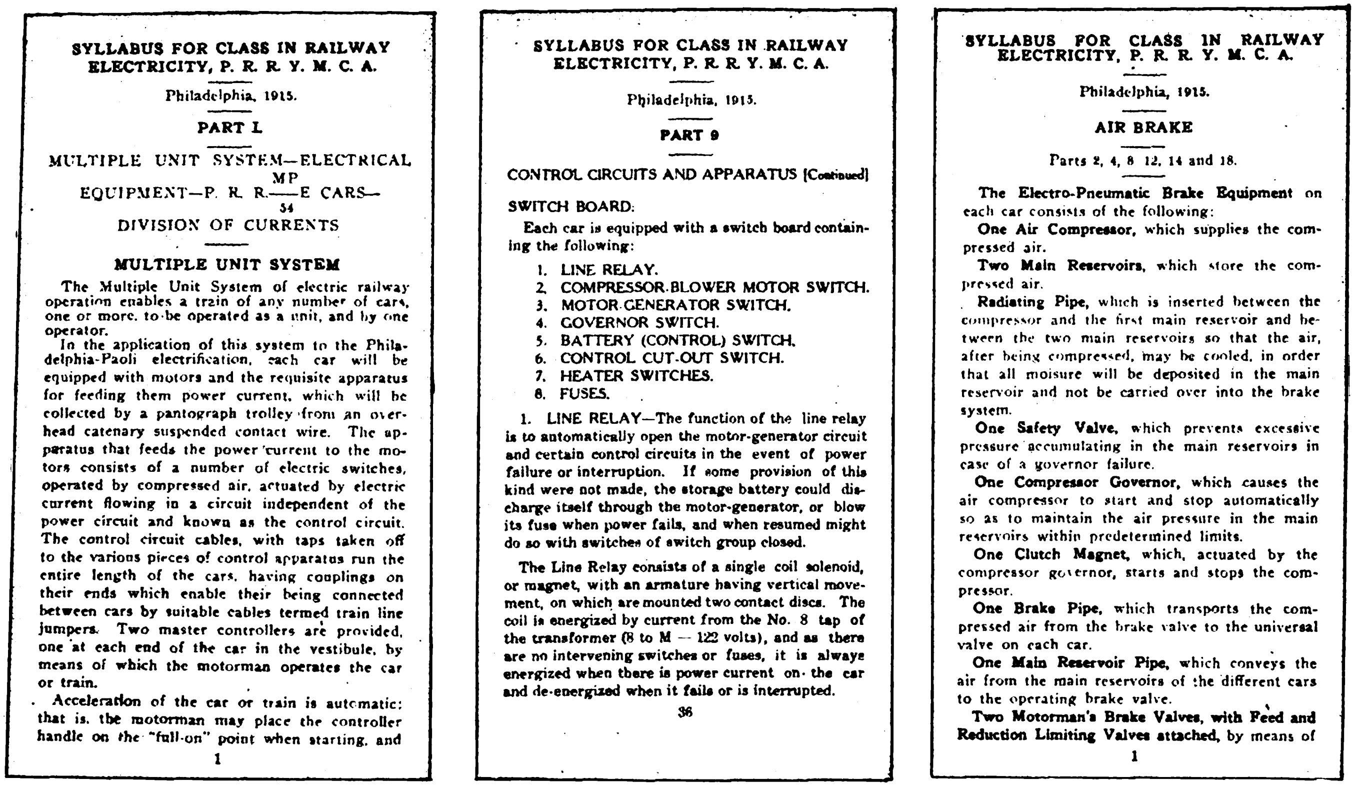
At first the nature of instruction was general, the idea being to familiarize the men with the various electrical terms, phrases, etc., and to outline in a practical way the principal features of power generation, transmission and utilization, and systems of unit-switch control. A car instruction plant was erected, equipped with standard multiple-unit apparatus, and operated for demonstration purposes.

But this season the "Practical Railway Electricity" course of the association has treated specifically the multiple-unit equipment and electric train service of the Philadelphia-Paoli electrification. A series of twenty lectures has been arranged, covering a period of the same number of weeks. Sessions are held one evening per week for men employed in daytime, and the same lecture is repeated the following morning for the night men.

A set of syllabi was prepared, containing a description of the electric equipment and line, and relative operating features, with necessary diagrams and charts.



TRAINING STEAM RAILROAD MEN—COMPLETE M. U. TRAIN AT NARBETH STATION, MAIN LINE, PENNSYLVANIA RAILROAD



SYLLABUS FOR CLASS IN RAILWAY ELECTRICITY, P. R. R. Y. M. C. A.

Philadelphia, 1915.

PART I.

MULTIPLE UNIT SYSTEM—ELECTRICAL EQUIPMENT—P. R. R. $\frac{\text{MP}}{54}$ E CARS—DIVISION OF CURRENTS

MULTIPLE UNIT SYSTEM

The Multiple Unit System of electric railway operation enables a train of any number of cars, one or more, to be operated as a unit, and by one operator.

In the application of this system to the Philadelphia-Paoli electrification, each car will be equipped with motors and the requisite apparatus for feeding them power current, which will be collected by a pantograph trolley from an overhead catenary suspended contact wire. The apparatus that feeds the power current to the motors consists of a number of electric switches, operated by compressed air, actuated by electric current flowing in a circuit independent of the power circuit and known as the control circuit. The control circuit cables, with taps taken off to the various pieces of control apparatus run the entire length of the cars, having couplings on their ends which enable their being connected between cars by suitable cables termed train line jumpers. Two master controllers are provided, one at each end of the car in the vestibule, by means of which the motorman operates the car or train.

Acceleration of the car or train is automatic: that is, the motorman may place the controller handle on the "full-on" point when starting, and

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SYLLABUS FOR CLASS IN RAILWAY ELECTRICITY, P. R. R. Y. M. C. A.

Philadelphia, 1915.

PART 9

CONTROL CIRCUITS AND APPARATUS [Continued]

SWITCH BOARD:

Each car is equipped with a switch board containing the following:

1. LINE RELAY.
2. COMPRESSOR-BLOWER MOTOR SWITCH.
3. MOTOR-GENERATOR SWITCH.
4. GOVERNOR SWITCH.
5. BATTERY (CONTROL) SWITCH.
6. CONTROL CUT-OUT SWITCH.
7. HEATER SWITCHES.
8. FUSES.

1. LINE RELAY—The function of the line relay is to automatically open the motor-generator circuit and certain control circuits in the event of power failure or interruption. If some provision of this kind were not made, the storage battery could discharge itself through the motor-generator, or blow its fuse when power fails, and when resumed might do so with switches of switch group closed.

The Line Relay consists of a single coil solenoid, or magnet, with an armature having vertical movement, on which are mounted two contact discs. The coil is energized by current from the No. 8 tap of the transformer (8 to M — 122 volts), and as there are no intervening switches or fuses, it is always energized when there is power current on the car and de-energized when it fails or is interrupted.

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SYLLABUS FOR CLASS IN RAILWAY ELECTRICITY, P. R. R. Y. M. C. A.

Philadelphia, 1915.

AIR BRAKE

Parts 2, 4, 8, 12, 14 and 18.

The Electro-Pneumatic Brake Equipment on each car consists of the following:

One Air Compressor, which supplies the compressed air.

Two Main Reservoirs, which store the compressed air.

Radiating Pipe, which is inserted between the compressor and the first main reservoir and between the two main reservoirs so that the air, after being compressed, may be cooled, in order that all moisure will be deposited in the main reservoir and not be carried over into the brake system.

One Safety Valve, which prevents excessive pressure accumulating in the main reservoirs in case of a governor failure.

One Compressor Governor, which causes the air compressor to start and stop automatically so as to maintain the air pressure in the main reservoirs within predetermined limits.

One Clutch Magnet, which, actuated by the compressor governor, starts and stops the compressor.

One Brake Pipe, which transports the compressed air from the brake valve to the universal valve on each car.

One Main Reservoir Pipe, which conveys the air from the main reservoirs of the different cars to the operating brake valve.

Two Motorman's Brake Valves, with Feed and Reduction Limiting Valves attached, by means of

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TRAINING STEAM RAILROAD MEN—SAMPLE PAGES FROM INSTRUCTION SYLLABI

The following is a list of the subjects covered in the syllabi and the lectures:

1. General description of the multiple-unit system; electric equipment of P. R. R. M. P-54-E (multiple-unit) cars; definition of car circuits.

2. Air brake; description of the A. M. U. E. (Westinghouse automatic motor-driven electric) brake equipment.

3. High-tension power circuit; catenary suspension of trolley wire; a.c. voltage of trolley wire; pantograph trolley; oil circuit breaker (line switch); transformer (car); low-tension, or secondary power circuits; secondary voltages.

4. Air-brake, U. E. (universal electric) valve.

5. Motor circuits; sequence of unit switches, scheme of current flow in motor circuits.

6. Air brake, ME-23 brake valve and brake circuits.

7. Control circuits and apparatus; switchboard; master controller and switch group.

8. Air brake; compressor; governor; signal whistle.

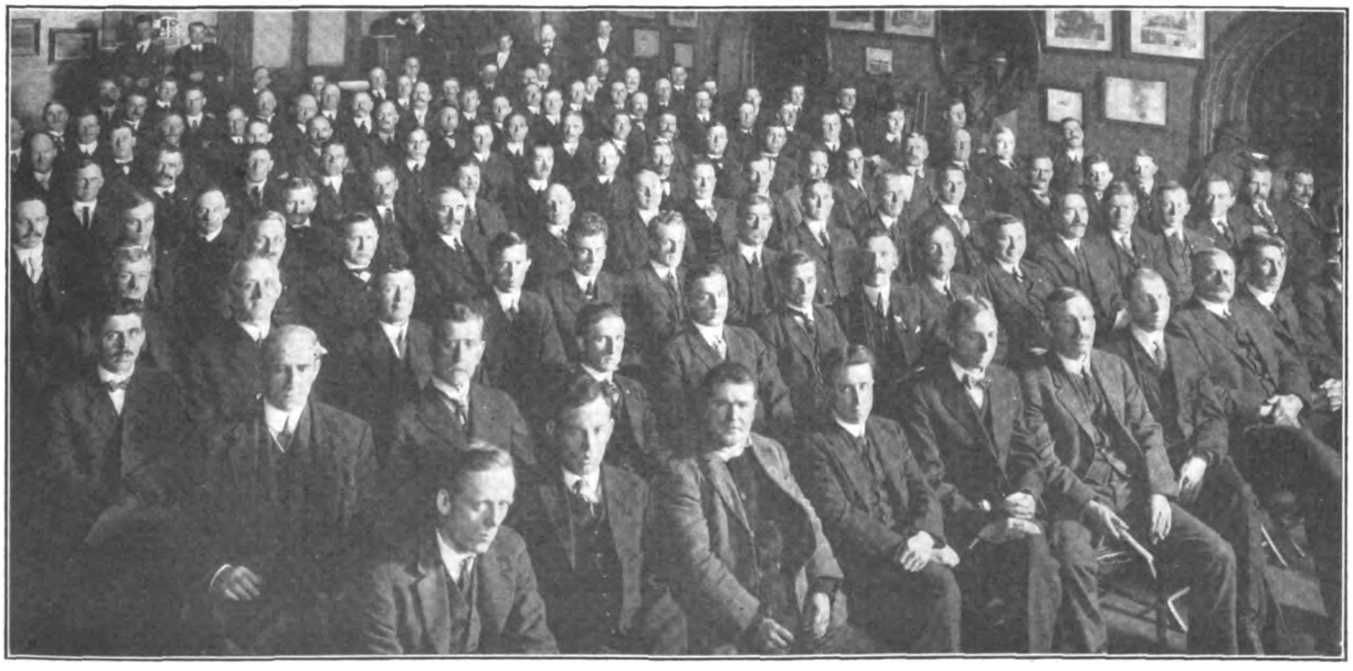
9. Control circuits and apparatus (continued); reverser; line relay; train cables and jumpers.

10. Air brake; by-pass and limiting valve.

11. Control circuits and apparatus (continued); current-limit relay.

12. Air brake; U. E. valve (continued).

13. Low-tension circuits; compressor-blower motor; motor-generator; heaters; lights; storage battery.



TRAINING STEAM RAILROAD MEN—MEN EXPERIENCED IN STEAM RAILROAD WORK IN TRAINING FOR ELECTRICAL OPERATION

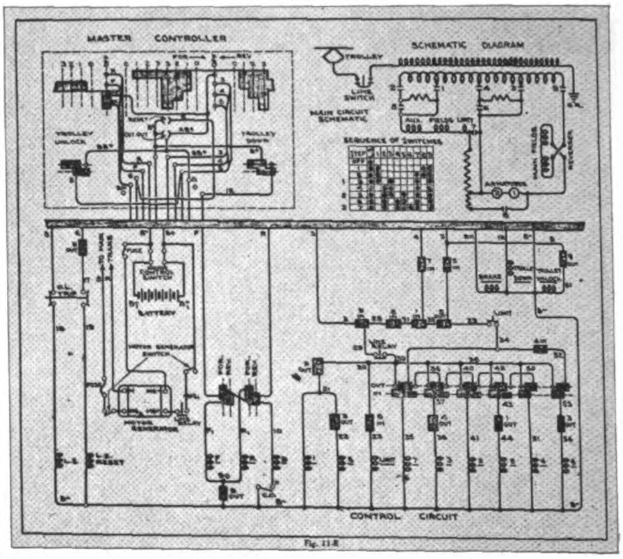
14. Air brake; U. E. valve (continued).
15. Preparation of train for start; operation of train.
16. Air brake; ME-23 brake valve and brake circuits (continued).
17. Disorders of electric equipment; rules for personal protection.
18. Air brake; compressor; governor; signal whistle (continued).
19. Review of the multiple-unit system.
20. Review of the air-brake system.

Enrollment in the "Practical Railway Electricity" class is open to both members of the association and non-member employees of the company. A nominal fee is charged, to cover the cost of preparing the course. This term there has been an enrollment of 280 men divided as follows:

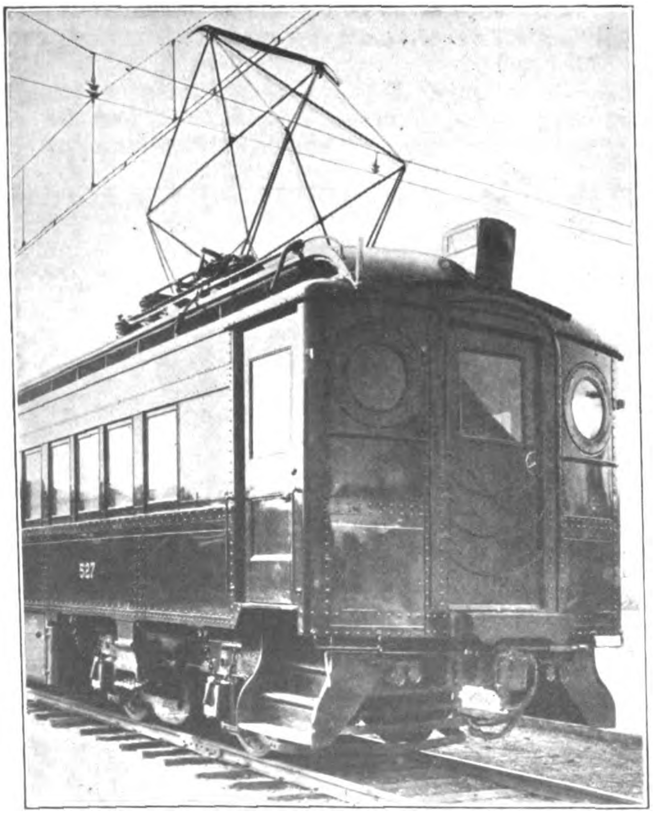
Enginemen	76	Yardmasters and assistants	5
Firemen	35	Master mechanics	2
Conductors	9	Foremen	19
Trainmen	38	Machinists	17
Road foremen of engines and assistants	4	Inspectors	25
Instructors of firemen	7	Electricians	5
Trainmasters and assistants	3	Clerks	6
Train dispatchers	4	Laborers	1
Station masters	1	Car cleaners	1
		Miscellaneous	22

Attendance at the association course of instruotion is voluntary, though the course is approved by the company, but men desiring to qualify for electric train service are required to attend the instruction cars and finally to pass an examination on the equipment and its operation.

Employees qualifying for electric train service, or whose duties are in any way connected with the operation and maintenance of the electric equipment are furnished a copy of a book, "Electric Train Service Instructions," which describes and gives rules for operating the electric equipment, the A. M. U. E. brake, and the train signal applied to the multiple-unit cars. Motormen are required to familiarize themselves with the name, location and purpose of all apparatus, and the principles of operation, and the mode of procedure in case of failure. Trainmen are also required to familiarize themselves with the name, location and purpose of all apparatus on the car.



TRAINING STEAM RAILROAD MEN—SAMPLE DIAGRAM FROM INSTRUCTION SYLLABI



TRAINING STEAM RAILROAD MEN—END VIEW OF M. U. CAR ON PENNSYLVANIA RAILROAD, SHOWING PANTAGRAPH DETAIL

Every employee working in the electric territory or incidentally coming in contact with it has been provided with a copy of a pamphlet, "Special Instructions," specifying the electrified tracks, calling attention to the danger of coming in contact with high-tension circuits, to the action to be taken in the event of disorder to them, to "first aid hints," and to the methods of resuscitation from electric shock.

The men to be employed in electric train service; trackmen, signal repairmen, electric repairmen, telephone repairmen, yardmasters and others, whose duties require them to work in electrified territory, conductors and enginemen of steam trains running over electrified tracks, and trainmen and firemen in passenger shifting service, all have been required to take instructions on methods of resuscitation from electric shock. In the instructions on resuscitation personal demonstrations are made, that is, each person instructed is used as a subject and he in turn performs the method on another.

In view of the thorough manner in which employees are being instructed in the equipment and its operation, train service requirements and safety features in connection with the entire Philadelphia-Paoli electrification, it seems reasonable to expect electric train service to be introduced in safety to the public and employees, with a minimum amount of delay and on a fairly efficient basis.

Damaged Automobiles Repaired by Street Railway

The Union Electric Company, Dubuque, Ia., finds it more economical to repair automobiles damaged in collisions with cars than to have the work done by some outside concern. Many settlements have been made with automobile owners by offering to put the automobile in good repair. It is estimated that about 50 per cent of the cost of having this work done outside is saved, and the practice has tended to gain the good-will of those whose cars have been struck. This company operates nine automobiles which its shop force keeps in repair. The management concluded that if it is cheaper to keep the company's cars repaired in this manner, damaged privately owned automobiles can also be repaired by the regular shop force.

Meter Results on Chicago & Milwaukee Line

Economies Effected by Ampere-Hour Meters on This High-Speed Interurban Railway Produce a Net Return at the Rate of $12,000 Per Annum, the Necessary Investment Amounting Only to One-Fifth of This Amount

Probably one of the first complete installations of car meters on an electric system in this country was that made on the cars of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. During the last few years the possibilities and limitations of the car meter have attracted the serious attention of electric railways, probably to a greater extent than ever before. Greatly increased operating expenses on this road made economies in all departments necessary, and the management naturally was interested in any device that could actually effect economies in power consumption or in equipment maintenance. The car meter, which was not a new device, having been in successful use in Europe for a number of years, appeared to afford this means. The meter selected was of mercury-flotation type which overcame the difficulties pertaining to the earlier types, due largely to the meter mechanism which was not constructed ruggedly enough to withstand severe service. During the test period of three months none of these meters failed either mechanically or electrically.

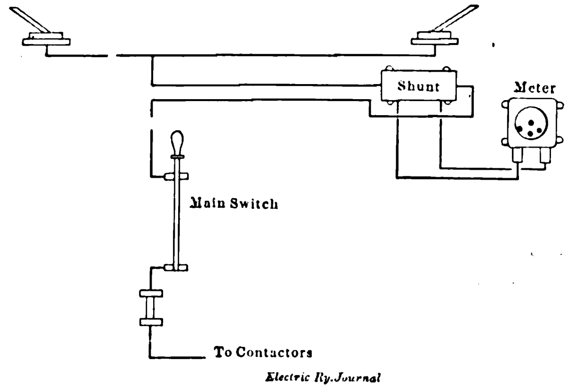
Since reliable results with meters must be based on the average of the innumerable varying conditions of electric-railway traffic, it follows that comprehensive tests are necessary for satisfactory comparisons. The excessive costs of tests, including the expense of extra test cars with special instruments and the cost of maintaining these devices, has deterred many managers from seriously investigating meters. On the other hand, tests of short duration with a few meters accomplish nothing and often create an unfavorable opinion of these devices. While it is true that comprehensive tests are necessary and that all or a large percentage of the cars of any system must be equipped with meters, thoroughly satisfactory results were obtained by this company for an expenditure slightly in excess of the relatively small initial investment in the meters.

The Chicago & Milwaukee Electric Railroad has both city and interurban traffic, operating a high-speed hourly limited service between Evanston, Ill., and Milwaukee, Wis., a distance of 73 miles; a fifteen and thirty-minute service between Evanston and Waukegan, Ill., a distance of 25 miles, and city service in Waukegan and Milwaukee. Initially, all of the motor cars, a total of sixty-six, were equipped with Economy ampere-hour meters furnished by the Sangamo Electric Company of Springfield, Ill. The data which follow were not obtained from an elaborate, expensive test, but represent the savings resulting from the use of these meters, together with a simple and inexpensive system of record keeping. There were no special test cars used for instructing the motormen in car operation, and no expensive tests of acceleration were made. In fact, the instructions were given for the most part verbally and were accompanied by constant disciplining of careless and indifferent motormen. Therefore, the savings described should be considered as an average, rather than as the maximum possible economy which may be effected under similar conditions on other roads.

The installation was completed Jan. 3, 1915, at a cost of $4.06 per car, exclusive of the cost of the meters. This may appear high but was due to the fact that all cars were double-ended, and the interurban cars, having Type M control, necessitated considerable extra wiring and labor. The diagram on this page, which shows the meter wiring diagram for the interurban cars, gives some idea of the ease of installation, while the half-tone view on page 976 shows a representative installation of a meter and illustrates its accessible position, so that it is easy for a motorman to take readings. During the installation period the dials were masked with paper on the inside of the cover, so that the motormen could not see the readings and practise economy before the test started. Since the value of one revolution of the large dial may be varied by changing the meter register gear ratio, a value greater than the maximum consumption between any two consecutive readings was selected. The car-house men check up the totals on the four small totalizing circles every night.

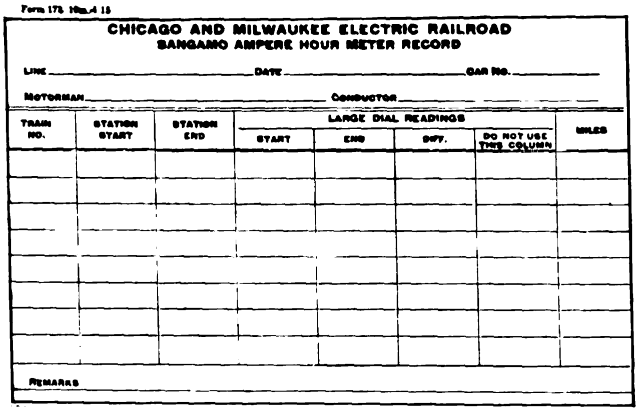
INSTRUCTION IN CAR OPERATION

Commencing Jan. 7, 1915, notices were posted that the meters were to be read at designated places, when the motorman went on and off duty, etc., and that these readings should be recorded on the daily record slips, of which a reproduction is published. Verbal instructions were also given the men that energy could be saved by practising moderately rapid acceleration, by coasting whenever possible, and by anticipating stops. The management had taught the men proper air-brake operation, so it was unnecessary to dwell again upon that subject. With these three simple rules instilled in their minds, the motormen set to work to reduce the average energy consumption. The management, believing that experience was the best teacher, permitted the men to satisfy themselves as to the correctness of the rules, and immediately they began experimenting.



CHICAGO & MILWAUKEE METERS—DIAGRAM SHOWING METHOD OF CONNECTING METERS

The interest taken in the meters and the pride the men took in their records were remarkable. Of course, there is always a small percentage of the men that take no interest in improvements, and this percentage was not lacking among the Chicago & Milwaukee trainmen. Certain men, upon finding that the meters ran slower on series points than on the others, tried to run on series as much as possible, but after reading the meter at the end of the run found they were in error. Others, believing that more rapid acceleration meant lower energy consumption, tried accelerating their cars too



Form 178 10m-4-15

CHICAGO AND MILWAUKEE ELECTRIC RAILROAD
SANGAMO AMPERE HOUR METER RECORD

LINE ______ DATE ______ CAR NO. ______

MOTORMAN ______ CONDUCTOR ______

TRAIN NO.	STATION START	STATION END	LARGE DIAL READINGS				MILES
			START	END	DIFF.	DO NOT USE THIS COLUMN	

REMARKS

CHICAGO & MILWAUKEE METERS—METER RECORD FILLED OUT DAILY BY MOTORMAN

TABLE I—CHICAGO & MILWAUKEE ELECTRIC RAILROAD—CARS AND SERVICE

Car-Class Data

Car Class	Car Number	Weight, Pounds	Motors, Number and Type	Total Horse-power	Gear Ratio
Express	6 and 18	60,000	4-73	300	2.41
20	23 to 28 inclusive	67,160	4-74	260	2.42
30	29 to 38 inclusive	50,000	4-70	160	2.74
130	117 to 403 inclusive	76,000	4-73	300	2.41
500	500 to 509 inclusive	52,000	4-216	200	4.06

Service-Class Data

Symbol	Route	Miles Per Trip One	Frequency of Service	Average Number Stops Per Mile	Average Schedule Speed
A	Evanston-N. C. Jct. & Waukegan Local	24.39	15 and 30 min.	2.5	18
A-2M	Evanston-N. C. Jct. & Waukegan Local, two motor car multiple-unit	24.39	rush hours	4.0	18
B	N. C. Jct.-Milwaukee Local	51.49	2 hours	.5	24
B-2M	N. C. Jct.-Milwaukee Local, two motor car multiple-unit	51.49	rush hours	4.0	24
C	Evanston-Milwaukee Limited	72.74	hourly	.3	31
C-2M	Evanston-Milwaukee Limited, two motor car multiple-unit	72.74	rush hours	.3	31
D	Libertyville	8.00	hourly	.5	24
E	Electric Park	1.25	15 and 20 min.	3.5	11
F	North Avenue	4.00	15 and 30 min.	3.0	11
G	Milwaukee City	3.35	15 and 20 min.	7.0	7

quickly, but soon found that by so doing they would use more ampere-hours per mile. It was not long, however, before the men had satisfied themselves regarding these various questions, after which they began to school themselves in other methods of economy. Owing to the fact that the first week was largely experimental and also because it took time to teach the men to hand in their records properly, records previous to Jan. 15 were not computed.

SYSTEM OF RECORD KEEPING

To compare the men fairly on the basis of their average consumption rates in the different services and with the different types of cars, all cars were separated into classes. Service conditions were also divided into several classes, and the results of each man in each service-car class were checked for ampere-hours and mileage on the daily meter record slips. Data on the service and car classes are shown in Table I. At the end of the reckoning period the total ampere-hours and mileage for each man for each service-car class were computed from the daily tickets. The totals were posted in the proper columns on the semi-monthly record sheets, reproduced, in part, on this page. This method of keeping records avoided transferring all except the totals to the record sheet and gave a summary of the results of all the men on two easily readable sheets.

After all the tickets had been totalled and posted on the record sheet, the total ampere-hours and miles for each service-car class were obtained. The service-car class average in ampere-hours per car-mile was obtained by dividing the former by the latter. The car-mile basis was used because it saved labor, and besides the results on a ton-mile basis would be no more accurate or valuable. The ampere-hours that each man should have used, had he performed at average efficiency, is shown in column "K" of the semi-monthly report. These figures were obtained by multiplying the service-car class average ampere-hours per car-mile by each man's mileage in that class, and so on for each class. The ratio of the man's "K" to his total ampere-hours in any one class represents his percentage of efficiency, or index number, in that class. It also follows that the ratio of his total "K's" to his total ampere-hours in all of the classes would be his system percentage of efficiency, or index number. While this record may appear to be complicated, it required the service of only one clerk who worked eight hours per day to handle all of the daily tickets and the semi-monthly record sheets.

FAIRNESS OF SYSTEM OF RATING

Originally, there arose considerable doubt as to whether the motormen could be rated fairly on the basis of average consumption per car-mile, without taking into consideration the number of stops and slowdowns. It was found, however, that by extending the test over a sufficiently long period and by classifying the different conditions as before described, all men had about an equal amount of heavy and light traffic. They also made practically the same number of the different kinds of stops, so that the variable representing the number of stops was eliminated. Of course, men running only under peak-service conditions should not be compared with men running through light-traffic hours, but such exceptions can easily be allowed for, and as a general proposition these extra men make an inappreciable amount of mileage.

Table II shows the index numbers of motormen for five consecutive periods and clearly illustrates how stable are the men's numbers. It also shows how gradually certain men increase their efficiency figures

CHICAGO & MILWAUKEE ELECTRIC RAILROAD COMPANY
AMPERE-HOUR CONSUMPTION FOR THE LAST HALF OF JANUARY, 1915

Motorman	CLASS A-2M			CLASS C-2M			CLASS A-130			CLASS B-130			CLASS C-EXP.			CLASS C-130		
	A. H.	Miles	K	A. H.	Miles	K	A. H.	Miles	K	A. H.	Miles	K	A. H.	Miles	K	A. H.	Miles	K
Bagley	....	......	....	.....	....	.....	725	104.85	826	8,998	1,437.73	8,995	.....	....	.....	1,287	273.08	1,399
Baker	....	......	....	435	111.76	556	8,750	1,068.27	8,418	.....	....	.....	.....	....	.....	3,560	677.89	3,470
Bancroft	25	2.37	24	193	27.02	135	7,375	917.77	7,240	1,212	195.10	1,217	665	138.78	741	160	27.02	139
Batcher	420	37.90	379	144	27.02	135	6,225	766.27	6,038	1,018	164.10	1,025	355	71.74	380	403	72.74	373
Woyce	6,725	605.66	6,056	.....	....	.....	10,908	1,285.24	10,130	9,787	1,546.10	9,640	.....	....	.....	295	66.44	343
Zell	.....	......	....	.....	....	.....	3,245	431.83	3,408	2,105	347.33	2,160	.....	....	.....	279	40.53	208
TOTALS	20,292	2,032.70	2,032	27,084	5,436.76	27,132	240,562	30,550.96	240,807	97,686	15,665.94	97,714	10,155	1,904.05	10,148	138,267	26,997.77	138,052
Av. amp.-hr. per car-mile		10.00			4.98			7.88			6.24			5.33			5.12	

CHICAGO & MILWAUKEE METERS—PART REPRODUCTION OF SEMI-MONTHLY RECORD OF AMPERE-HOURS AND MILEAGE

TABLE II—CHICAGO & MILWAUKEE ELECTRIC RAILROAD SYSTEM INDEX NUMBERS OF MOTORMEN FOR FIVE CONSECUTIVE PERIODS

Motorman	Jan. 16 to 31	Feb. 1 to 15	Feb. 16 to 28	Mar. 1 to 15	Mar. 16 to 31
Bagley	1.014	1.039	1.048	1.027	1.002
Baker	.975	.996	.949	.950	.957
Bancroft	.988	1.007	1.040	.976	.988
Batcher	.969	.951	.959	.955	1.016
Blank	.918	.963	.928	.965	.965
Brown	.974	.979	.962	.939	.959
Burke	1.005	1.059	1.014	1.035	1.040
Byrne	1.080	1.107	1.096	1.079	1.076
Collins	.959	.986	1.007	.961	1.037
Cox	.982	.986	.979	1.025	1.044
Curley, M.	1.010	.942	.997	.993	.976
Curley, T.	1.008	1.041	1.103	1.011	.987
De Long	1.051	.920	1.055	.934	....
Ensign	.972	.937	.983	.901	.922
Geisler	....	....	1.103	1.097	1.102
Gilkison	1.014	1.036	1.045	1.024	1.019
Grabbe	1.014	.997	1.005	.980	1.008
Ives	.987	.969	.975	1.022	.970
Knapp	1.110	1.126	1.102	1.094	1.091
Kranz	1.000	.920	.996	.931	.906
Kushawa	.996	.936	.981	.987	1.001
Lenfosty	1.004	.988	1.003	.998	.986
Litchfield	1.071	1.073	1.081	1.121	1.054
Ludwig	1.044	1.057	1.016	1.027	1.050
Mansfield	1.953	.966	.996	1.032	1.053
Marcy	1.037	1.065	1.054	1.032	1.055
Marks	.943	.914	.631	.815	....
May	.948	.949	.919	.953	.884
McDonald	.959	.961	.935	.916	.933
Mead	1.095	1.069	1.094	1.107	1.031
Melville	.964	1.029	.989	1.001	1.004
Merriman	1.066	1.029	1.076	1.062	1.008
Miller	1.031	.965	.991	....	....
Miner	....	1.012	1.037	1.024	1.015
Moran	1.004	1.059	1.020	.999	.980
Murphy	1.021	1.076	1.046	.994	1.044
Olinger	.904	.942	.957	.957	.970
Oppe	.996	.949	.992	.942	.960
Peters	1.063	1.041	1.019	1.016	1.012
Radke	1.037	....	....	.991	1.010
Rettig	1.050	1.036	1.032	1.014	1.063
Roehlen, Joe	1.036	1.064	.976	1.008	1.022
Roehlen, John	.927	.978	....	.925	.918
Ringberg	.919	....	.916	.939	.949
Snyder	1.030	1.068	1.058	1.056	1.058
Sprague	.909	.966	.919	1.051	1.018
Steffen	....	.969	.974	.918	.964
Stephens	1.088	1.048	1.092	1.053	1.076
Strong	1.017	1.005	.991	.970	1.015
Syson	.996	.991	.978	1.002	.967
Wagner	1.009	1.000	.977	1.030	.999
Webster	1.027	1.045	.924	.958	.918
Wicklander	.954	1.028	....	....	.985
Williams	1.003	.983	.993	.994	1.021
White	1.035	1.030	1.034	.998	1.018
Whiting	.956	.977	1.029	.938	.926
Wright	1.014	.990	1.019	.994	1.055
Woyce	.964	.940	.930	.937	.950
Zell	1.036	1.018	.951	1.034	1.020
Average d.c. kilowatt-hour station output per car-mile	4.45	4.61	4.14	4.16	4.11

TABLE III—CHICAGO & MILWAUKEE ELECTRIC RAILROAD—ESTIMATED POWER SAVINGS FOR 1915

Investment:	
Cost of 66 amp-hr. meters	$2,015.00
Cost of installation, labor and material	267.96
Total investment	$2,282.96
Yearly Charges:	
Depreciation at 15 per cent	$342.44
Interest on investment at 6 per cent	136.98
Maintenance and testing	150.00
Clerical labor	1,200.00
Stationery	40.00
Total yearly charges	$1,869.42
Estimated 8 per cent saving on 1915 power bill	$14,056.40
Deduction for yearly charges	1,869.42
Actual net saving for 1915	$12,186.98

by practising economical operation. A man with an index number of unity has done his work at average efficiency. A man with an index number above unity has performed better than the average, and a man with an index number which is below unity is careless and wasteful.

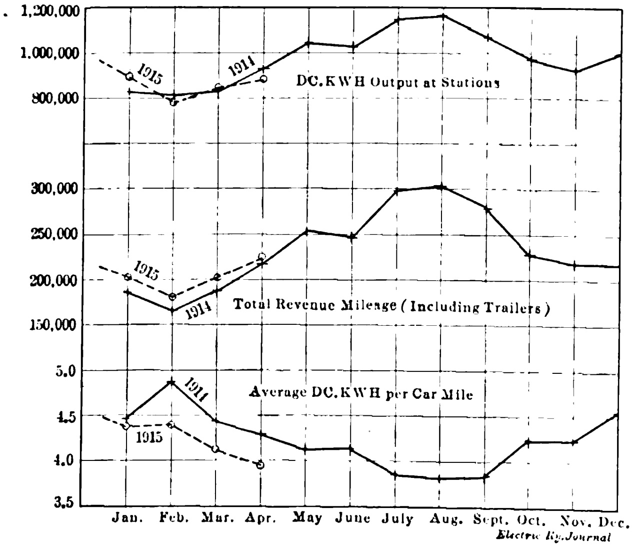
It would seem that eventually, as the men become more and more efficient in car operation, the range of the men's index numbers would be reduced and the numbers would tend to approach unity. So far, experience on the Chicago & Milwaukee Electric indicates no such tendency, and the range of numbers is practically the same at the last period as it was at the first. Assuming that the good men have approximated the best possible efficiency, it is also apparent that the inefficient men may raise their index numbers more rapidly than the men above unity. At first thought, it might also appear that the high men would be discouraged at seeing their index numbers decrease despite their efforts to raise them. It is to be remembered, however, that the high men will continue to top the list even though their actual index numbers show a decrease over the previous period, and very probably the constantly decreasing gap between them and their fellows would tend to spur them to greater economy.

It is believed that this system is superior to the "bogey" system of comparison, in that it rates the men on a basis of the average results of all the men. In this way it is unfair to no one, and it is simple and easy to explain to the men how their averages are made. It may also be possible that the "bogey" system will attain greater economy for the management by driving the men to reach a mark often obtained under most favorable conditions. On the other hand, the ultimate success of any merit system depends largely upon the degree of enthusiasm with which the men accept it and continue interest in it, and the company believes that continued economy and the employees' good-will are far more to be desired than economy that must be obtained by continuous driving.

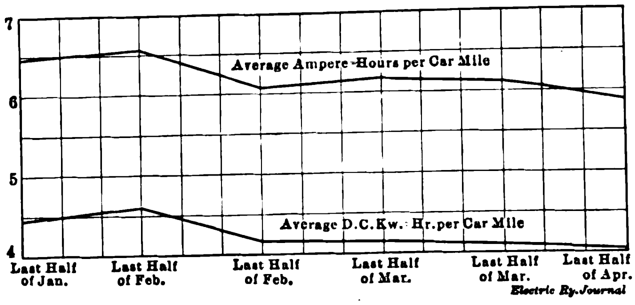
POWER SAVINGS EFFECTED

It is to be noted that the diagram showing mileage and consumption curves for the years 1914 and 1915 compares results under exactly the same conditions. The marked decrease in kilowatt-hours per car-mile through the summer months of 1914 was due to the increased use of trailers. All conditions are practically the same for the months of January, February and March of the years 1914 and 1915, except that the traffic of 1915 increased approximately 10 per cent over that of the year 1914, and the mileage increased accordingly.

The value through November and December, 1914, tends toward a greater rate of increment than for the previous year end. It is reasonable to assume that the average kilowatt-hours per car-mile for the month of January, 1915, would have been much higher than that of January, 1914, had not the meters been used. February, 1914, was a month of bad weather, and February, 1915, was not without its storms. The first week of this month required an average of 4.8 kw-hr. for every car-mile operated. The decrease in kilowatt-hours per car-mile for the months of February, March and April, 1915, over the corresponding months of 1914, averages 8 per cent. On the whole, therefore, the saving is quite satisfactory, considering, as before



CHICAGO & MILWAUKEE METERS—DIAGRAM OF MONTHLY FIGURES ON MILEAGE AND POWER

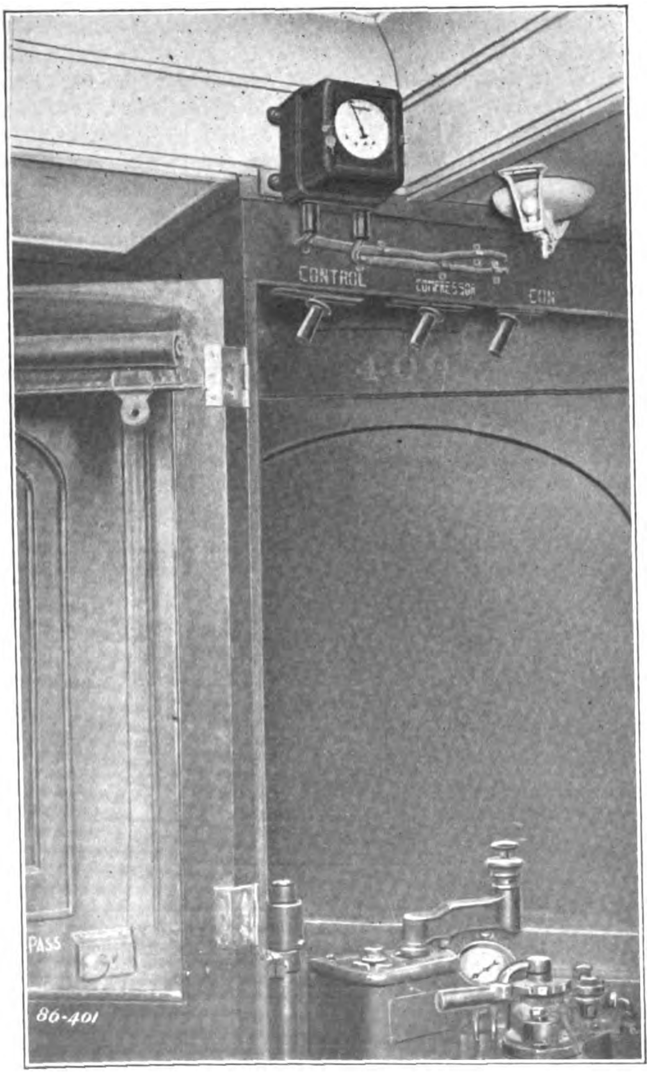


CHICAGO & MILWAUKEE METERS—POWER CONSUMPTION PER CAR-MILE IN AMPERE-HOURS AND KILOWATT-HOURS

stated, the difficulty of obtaining reliable comparative records.

POSSIBLE ECONOMIES IN DIFFERENT CLASSES

The decreases in ampere-hours and kilowatt-hours per car-mile for the system are also shown in graph form. The power savings in the different classes, however, varied quite widely. For instance, the A-2M class required considerably more power per mile than the A-130 class. This was because the multiple-unit service was operated only during the peak-traffic period. Likewise, the savings in the multiple-unit classes were not as consistent as those for the other classes, due to weather and other greatly varying demands on this service.



CHICAGO & MILWAUKEE METERS—VIEW OF METER MOUNTED OVER MOTORMAN'S CAB

Class A-130, representing about 30 per cent of the total mileage for the system, showed a decrease of 6 per cent at the end of the three-month period, while Class C-130, representing almost as much mileage, showed a mean decrease of about 14 per cent. Milwaukee city cars in Class G-500 showed the greatest consistent decrease of all the classes, with a 20 per cent saving. However, none of these decreases should be compared with the results from the last half of January, without taking into consideration that a very appreciable saving was realized immediately after the men were ordered to read the meters. The average motorman has considerable latent efficiency in him that is bound to show as soon as there is a check on his efforts.

The possibilities of saving by switching different types of cars in different services have also been brought out. For instance, in the first half of April a Class 30 car was used in the Libertyville service, with the result that a saving of about 30 per cent was made over the average for the D-20 class. Also, though operating conditions do not permit of doing so extensively, Class 20 cars are used whenever possible in the A service, with a saving of about 14 per cent per car-mile.

SAVINGS IN EQUIPMENT

Unless the motor sizes are far too small for the service, or the gear ratio is radically wrong, there should be less heating of equipment due to reasonably rapid acceleration and to increased coasting time. This would reduce the time the current was on and would increase the period of radiation, which in turn should result in decreased maintenance charges on equipment. Also, because less energy is wasted in braking, there should show a considerable decrease in brakeshoe wear. The savings during the three months in these two items were very noticeable, but as maintenance charges naturally decrease through the spring months, it was not thought advisable even to approximate the economy. There is every reason to expect, however, that maintenance charges for the present year will show a substantial decrease over those of 1914, and this can largely be attributed to the use of meters.

EFFECT ON VOLTAGE REGULATION

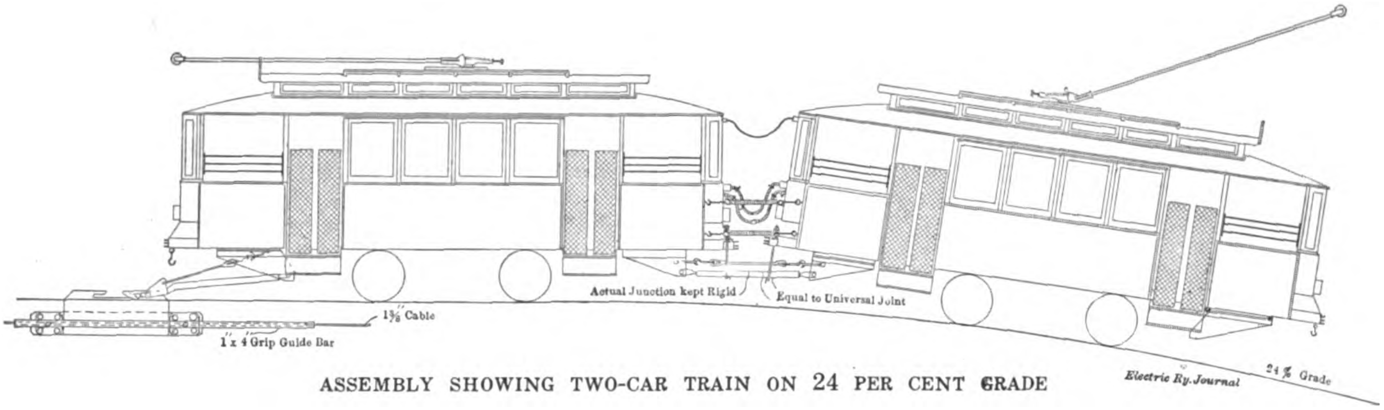
One other interesting fact was brought out, and that was that the voltage at the car was far better as a result of using power only when necessary. Obviously, this is equivalent to increased trolley-wire cross-section, especially where full voltage is necessary to make the scheduled time. In 1914 the limited trains could not maintain schedule time just south of Milwaukee, due both to an exceedingly severe schedule and to the fact that they had a number of meeting points where the power distribution also was not very good. This year, with the same schedule and all other conditions the same, there has been a marked absence of delays. This is attributed principally to the fact that while the motormen are still unable to coast to any great extent, the heavy drafts of current are less continuous which results in more voltage at the car.

The transportation of potatoes is the latest innovation of the Grosse Berliner Strassenbahn on account of the war. A potato train consists of a motor car and two open trailers, the benches of the latter being loaded with sacks of potatoes. The potatoes are taken from municipal farms to the public markets, at several of which special sidings are provided. All of these potatoes are sold directly by the city.

Two-Car Trains on 25 Per Cent Grade

Many Difficulties Overcome to Handle Exposition Traffic Over the Steepest Grades

In handling exposition traffic over its Fillmore Street line, the United Railroads of San Francisco have to operate over the steepest grades on the entire system. For two blocks on the hill the grades are 24 per cent and 25.4 per cent, respectively. This part of the line has long been operated by means of a heavy cable attached to two cars, one ascending and the other descending, while both use power. Until recently the capacity of this line has been about 6000 passengers per hour, but changes have just been effected whereby the maximum capacity becomes 8000 passengers per hour, and the factor of safety in the weakest part of the system is not less than eight. To accomplish this has necessitated a larger cable, new design of grip, rebuilding the cars and rearranging motor control and brakes for two-car train operation.



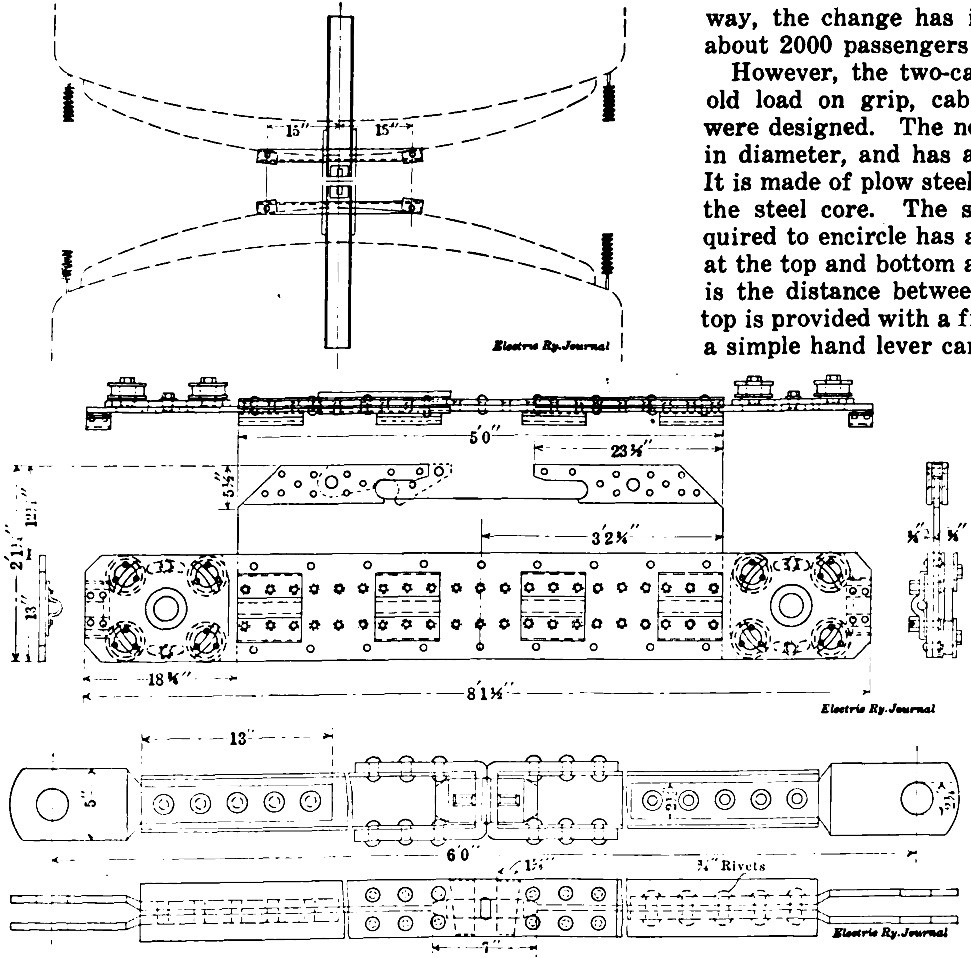
ASSEMBLY SHOWING TWO-CAR TRAIN ON 24 PER CENT GRADE

The standard cars of the system operate over the Fillmore Street line up to a point seven blocks from the terminus at the exposition entrance and at the top of the grade. These seven blocks have heretofore been served by small single-truck open cars that could be safely operated by cable on the steep grade. The difficulty with these cars has been that during rush hours the large number of passengers that crowded aboard not only prevented the collection of fares but materially reduced the safety factor under which the cable line operated. A count made during several rush-hour periods showed that as many as 150 passengers sometimes rode up the 25.4 per cent grade on a car with a seating capacity of twenty-eight.

It was therefore decided to remodel the car bodies to the pay-as-you-enter type, and as this would reduce the capacity of the line it was planned to operate the cars in two-car trains. Thus, on a two-minute headway, the change has increased the actual capacity by about 2000 passengers per hour.

However, the two-car train imposes about twice the old load on grip, cable and couplings, and new ones were designed. The new cable, 1750 ft. long, is 1⅜ in. in diameter, and has a breaking strength of 86.4 tons. It is made of plow steel and has seven strands, including the steel core. The smallest sheave this cable is required to encircle has a 5-ft. radius. The main sheaves at the top and bottom are 11 ft. 6 in. in diameter, which is the distance between track centers, and that at the top is provided with a friction brake band through which a simple hand lever can bring the cars to a full stop on the steepest grade if occasion should arise.

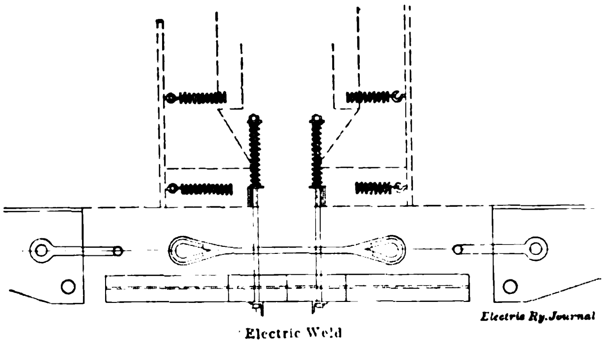
The greatest difficulty in designing the new grip was to provide adequate strength in a device that would operate in the small underground duct that had been built for lighter equipment. The old grip was about 3 ft. long, while the new grip is over 8 ft. long and has a total bearing on the cable of 32 in. The grip consists of an 8-ft. steel plate 1¾ in. x 13 in. in section and provided with swivel trucks at each end to prevent its binding in the conduit. The narrow quarters in which this device works will be understood when it is said that there is less than ½-in. clearance between its projections and the walls of the conduit.



PLAN OF DRAWBAR SUPPORTS; ELEVATION, PLAN AND SECTION OF GRIP; DETAIL OF DRAWBAR

It is interesting to note that some time ago the old grip was remodeled by substituting two wheels at each end for the four previously used. This reduced the binding to such an extent that the wear on bushings was reduced to one-sixteenth the previous amount and the oil consumption per week fell from 5 gal. to 1 pint. The grip is permanently fastened to the cable and is connected by a link bar to the car.

The vertical curves on the hill required so much clearance in the coupling that a new type was designed, arranged to allow play in a wide angle in both vertical and horizontal planes. This was effected by the use of clevis and hinge joints at the rear end of the drawbars, each of which is 3 ft. long, while the joint between the two drawbars of different cars is made firm and rigid by two tapering keys. Thus, although there is freedom and motion in the coupling, the two drawbars themselves are connected by a rigid joint. To simplify and safeguard the act of coupling the cars, the outer end of each drawbar is supported by a long bolt threaded through coil springs in such a way as to allow wide latitude for vertical and horizontal play, the drawbar at the same time being returned to normal position when released.



SIDE ELEVATION OF DRAWBAR SUPPORT

The electrical control of the cars for this service has been modified so that one of the Type K controllers on each car can be used, by the aid of jumpers, for either two or four-motor control. In rebuilding the cars they have been fitted with a complete air-brake equipment of standard design with regulation hose connections between cars. The weight of the rebuilt cars, which have the same GE-1000 motors as before, is 22,000 lb. each, empty. The seating capacity of each car is now twenty-six.

When the last cars on the line are ready to go to the carhouses for the night, a flat car loaded with sand is used as a balance for bringing them up, and the flat car is left at the bottom of the hill to counterbalance the first train down in the morning.

The redesign of the Fillmore Street hill equipment was made by W. B. Farlow, chief draftsman, under the supervision of B. P. Legare, chief engineer of maintenance of way and construction.

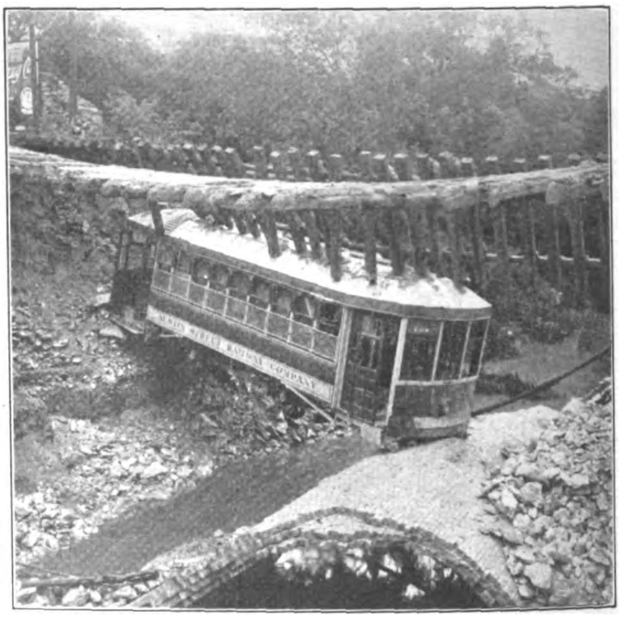
At a meeting of business men and owners of property on High Street, Columbus, Ohio, with Mayor Karb, the question of eliminating trolley poles on High Street, between Livingston Avenue and the Union Station, was discussed. W. C. Campbell, assistant general superintendent of the Columbus Railway, Power & Light Company, said the company is willing to undertake the expense of anchoring the supporting lines of the trolley wire to the structures abutting on the street by the use of rosettes, similar to the plan followed in many European cities, if the consents of all the owners of the buildings can be obtained.

An Unusual Accident

Floods caused by an excessive rainfall on the night of April 22 swept through Austin, Tex., and neighboring cities, drowning a score of people, wrecking houses and washing out bridges. A total of 10 in. of rain fell during the storm, 8 in. being precipitated in seven hours. Several creeks running through the city overflowed their banks, causing property damage that is estimated at $500,000. One of these creeks, which crosses the boulevard leading to the newly-completed Austin dam on the Colorado River, is normally dry and no water flows in it except after a rain. This passed under the boulevard in a heavy brick-arch culvert over which the earth roadway was carried. The culvert was washed out completely in a very few minutes and one of the cars of the Austin Street Railway which was passing at the time dropped into the washout, as indicated in the accompanying illustration.

Notwithstanding the extraordinary strains to which the car was subjected by its long drop, and its final position across the creek, the damage was almost negligible, the platform knees only being bent slightly upward. The car, it may be said, is of semi-steel construction with side girders extending up to the belt rail. The weight of the car less electrical equipment was reported as 11,000 lb. when the car was designed. It was built by The J. G. Brill Company, and is mounted on one of that company's 11-ft. radiax trucks, the body being 23 ft. between corner posts and 34 ft. over all. In connection with this it is interesting to note from the illustration that the car hardly swerved from a straight course notwithstanding the fact that the rails evidently tipped over as the car left them.

Unfortunately, on the second day after the washout and before the car could be removed from its perilous position, another extraordinarily heavy rainstorm occurred and the flood that resulted carried the car downstream into the remaining portion of the culvert, finally forcing it clear through under the arch. As the headroom was insufficient for the car to pass intact through this space, the car roof was smashed down against the seats inside of the car and a great deal of other damage was done. If this last piece of ill-luck had not happened, however, the car could have been put back into service as soon as the broken glass had been replaced and the motors dried out.



ONE RESULT OF A RECENT FLOOD IN TEXAS

Pennsylvania Association Spring Meeting

Conclusion of Report of Pittsburgh Meeting Held May 11 and 12, with Abstracts of President Tingley's Remarks, of the Papers on Workmen's Compensation and One-Man Cars, and of the Question Box Are Printed This Week

In the issue of the ELECTRIC RAILWAY JOURNAL for May 15 the minutes of the spring meeting of the Pennsylvania Street Railway Association, held in Pittsburgh on May 11 and 12, were given. Included was an abstract of a paper on "Organized Safety" by Lew R. Palmer. Abstracts of the other papers and of the question box discussion follow.

PRESIDENT TINGLEY'S REMARKS

In opening the meeting C. L. S. Tingley, vice-president American Railways, president of the association, congratulated the association upon the past year's work, reviewing particularly that of the last six months. The committee on schedules of rates and tariffs had done valuable work and he was disappointed in not being able to report the adoption of their suggestions by the Public Service Commission. The same was true of the report of the committee on overhead crossings, which was being printed. In the latter connection Mr. Tingley pointed out the difficulty of harmonizing the specifications of the manufacturers of wire and reducing these to a standard. He had hoped that the Legislature would adjourn before the meeting, in which case he could have given a report on the legislative acts relative to street railway work. He was able to assure the members that very little adverse legislation was likely to become law, although one piece of legislation had been passed which the association had opposed vigorously. This gives to a lawyer a lien, for his fee, upon any settlements made in negligence cases. Mr. Tingley thought that this would lead to a harvest of blind cases. The association had once defeated this measure but it was revised and finally passed.

The workman's compensation act was still pending, and might be voted upon. Mr. Tingley stated that he had made a careful study of this matter for six or seven years and was in a position to state that the proposed legislation was not of a drastic nature. He hoped, however, that some of the recommendations which the association had made would be incorporated in the act. A number of bills had been introduced to amend the public service laws, some good and some bad. None had passed and it seemed doubtful if any would.

In the speaker's opinion the most vital thing affecting the industry at present is the jitney bus, although he believed it to be transitory. A number of bills to regulate it have been proposed, the best being the Jones bill, which was unfortunately defeated in the Legislature, largely due to failure to arouse local interest. Mr. Tingley did not believe that any independent motor-driven vehicle has yet been designed which can successfully compete with the electric railway, in the development of which the best engineering minds of the world have been engaged for years. With a small investment the jitney operator has been able to skim the cream from the electric railway traffic during the rush hours and then, when the business threatened to cease being profitable, he has been able to find some gullible person to whom he could sell his outfit, thus causing a loss to the railways and to the people. This matter will doubtless come up again for action by the Legislature and will receive more careful attention and consideration from the lawmakers and the people of the State.

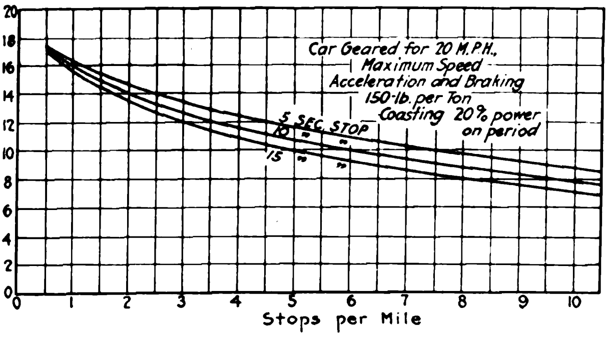
ECONOMIES IN OPERATING SMALL CARS

BY J. F. LAYNG, GENERAL ELECTRIC COMPANY

An excellent perspective of what is involved by the introduction of small cars may be obtained from the following table, taken from the census bureau figures and showing for all the electric railways in the United States the various primary expense accounts in percentages of operating revenues:

General expense	9.53 per cent.
Power	9.00 per cent.
Maintenance of way	8.17 per cent.
Maintenance of equipment	7.06 per cent.
Transportation	24.42 per cent.
Total	58.18 per cent.

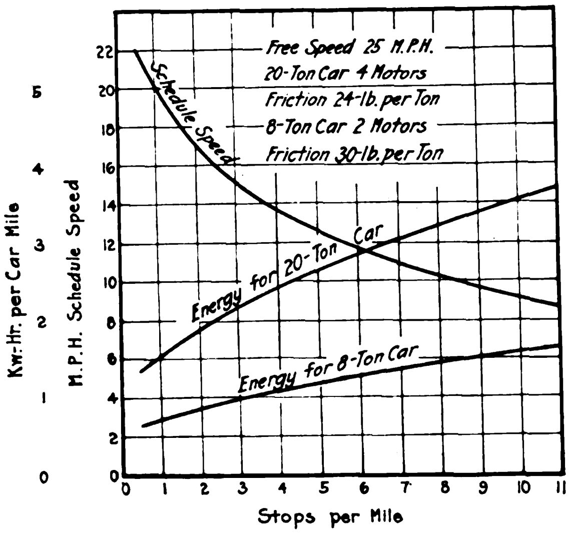
Of these expenses the largest is the cost of conducting transportation, which is more than 24 per cent of the gross receipts. Practically all of this represents expenditures for platform wages. With the present plan or system of fare collections for the larger cities, and where travel is heavy, there does not seem to be any way of materially reducing this item, because all of the progressive railway companies have already increased schedule speeds to the maximum with this end in view. However, the time spent in stops is important, and one of the accompanying curves shows the effect of decreasing the length of stop with different numbers of stops per mile, the car being geared to a free-running speed of 20 m.p.h. This curve shows the highest possible schedule speed that may be obtained on level track under favorable conditions, although when making calculations and considering practical schedules, it is best to increase the running time by 10 per cent to allow for the slower schedule speed which will be caused by curves, grades and obstructions by vehicles which are encountered in actual service.



ECONOMY IN SMALL CARS—EFFECT OF STOPS ON SCHEDULE SPEED

The next highest item in the expense of operation is power, which constitutes 9 per cent of the total. For the purpose of the present discussion, it will be assumed that all possible savings are being made by the proper application of power and brakes, limiting the consideration to the question of car weights. Some railway officials say that this is a negligible figure and do not consider that a few hundred pounds more or less on the car affects the cost of operation. Others figure weight at 30 cents per pound. However, the generally-accepted figure of 5 cents per pound per year has a good bit of justification.

When power alone is considered savings can be made almost in proportion to reduction in weights of cars. This is indicated in a second diagram which shows the relative power consumed by a heavy and a light car. With regard to weight, the first successful storage-battery cars were a great object lesson because of their reduction in weight of car body, and trucks and improvements in electrical design. One of the next steps in weight reduction was the realization that two-motor equipments would give satisfactory service where grades did not exceed 5 per cent and where trailer operation was not required. Following this a great advance was made by P. N. Jones and his assistants when they put 24-in.-wheel equipments in service on the Pittsburgh Railways. With these cars and others of this character which have since been built, the weight per seated passenger was decreased to approximately 600 lb., although the preceding types of cars using four-motor equipments had a weight equal to 900 lb. or 1000 lb. per seated passenger. With the small diameter of wheel, smaller truck strains are obtained which, coupled with the less weight of wheel, gives trucks that are, roughly speaking, 33 per cent lighter than the trucks formerly used for this same class of service. Since the Pittsburgh Railways put cars with 24-in. wheels in service, a number of other companies have also purchased the same class of equipment, and all indications are now that an entirely new field of development has been started by the small-diameter wheel. With single-truck cars it is possible to have a much longer wheelbase with no greater binding on curves than is found with relatively short wheelbases and large-diameter wheel.



ECONOMY OF SMALL CARS—RELATIVE POWER CONSUMPTION OF HEAVY AND LIGHT UNITS

Recently the jitney competition has caused operators again to review general car design to determine if it is feasible to develop a light-weight one-man car. J. M. Bosenbury, Illinois Traction System, has designed a single-end car as well as a double-end one-man car, each of which seats thirty passengers. The single-end car, completely equipped, will weigh 10,000 lb. and the double-end car 15,000 lb. These weights are equal to 333 lb. and 500 lb. respectively per seated passenger. C. O. Birney of the Stone & Webster Engineering Corporation also has designed a single-end, one-man car which will weigh 9000 lb. completely equipped and will seat twenty-nine passengers, equivalent to 310 lb. per seated passenger. Of course, these types of cars will require motors smaller than those now considered standard for railway service, but if there is a real demand for this class of car the manufacturers of apparatus can be depended upon to supply equipments which will meet the requirements in every respect.

Again referring to the census figures on the expenses of operation, the next item to be considered is 8.17 per cent for maintenance of way and structures. With very light cars this figure will become less, but the amount of the reduction is difficult of determination. The last figure is 7.06 per cent for maintenance of equipment. With small, light-weight cars this also would be reduced from 10 per cent to 20 per cent.

Summed up it may be said that from a purely engineering standpoint there is not the slightest doubt but that the light-weight car should be used for practically all service. With the small one-man car as compared to the larger cars used at present, practically the same service can be given with a large reduction in expense; that is, when a frequency of service is given that would be required in any case.

WORKMAN'S COMPENSATION IN PENNSYLVANIA

BY D. A. REED, CHAIRMAN INDUSTRIAL ACCIDENT COMMISSION

As would be inferred from the topic of his address, Mr. Reed discussed the subject in view of the pending legislation in Pennsylvania. He stated that the subject is being very generally discussed throughout the State and that most people think that the advocates of compensation favor some sort of a labor agitation scheme which is to benefit only the employees. There is a general impression that any man who has been hurt, whether through his own fault or through no fault, gets the equivalent of a large verdict and, further, that those back of the movement want to put in schemes of reform that would be hopelessly impractical.

Mr. Reed stated that under present conditions an injured employee must look forward to a delay of from two to five years in the adjudication of his case and to a court trial. He must engage a lawyer who, if successful, will take approximately one-half of the amount recovered. In deserving cases this is a poor system of procedure, while in undeserving cases the good liar with an unscrupulous lawyer can usually get the same judgment as one honestly deserving. The employer, too, has to keep up a claim department the cost of which is almost as large in caring for fake cases as deserving ones. During a trial a number of men are taken away from their work and time is thus wasted. The purpose of the workman's compensation laws is to prevent all of this waste. After all, most accidents are equally the fault of employer and employees, and even where neither is to blame the loss can be shared equally.

Mr. Reed then discussed the schemes adopted in twenty-nine other states and in foreign countries, stating that every country in Europe, with the exception of Spain and the Balkan States, has compensation laws. All of Pennsylvania's neighbors excepting Delaware have such laws, which are working satisfactorily in most of them. The West Virginia law is defective in that it provides for the management of the whole matter by the State. The result is the introduction of politics into the scheme with resulting inefficiency. The same fault can be found with the New York State law, which provides that every case shall be taken up with the State commission. The result is that at present the work is very greatly congested.

In the Pennsylvania legislation the settlement of compensation cases will be left entirely to the employer and the employee. They are to make direct settlements, and they do not have to pass the payment through any State office, which would only cause delay.

In conclusion Mr. Reed stated that compensation acts sometimes result in giving compensation to the man who does not deserve it. On the other hand, the employer is protected by making a moderate payment in cases where under the present arrangement he might have to pay a very large award. He believed that experience in the other twenty-nine states warrants confidence in the success of compensation laws. If this act is successful in Pennsylvania it will be interesting to see if it is not possible to apply the same method to all transportation accidents. It would be a tremendous relief to the courts and to the railways if a system could be worked out so that the expense now involved in claim departments could be applied to recompense the victims of accidents and relieve the railways of trouble and worry.

QUESTION BOX

Six topics were covered in the question-box discussion conducted by W. A. Heindle, superintendent Southern Pennsylvania Traction Company, Wilmington, Del. These related to lightning protection for signal and car equipment; car cleaning practice; renewal of car axles, and, of course, the jitney bus.

On lightning protection, Q. A. Brackett, engineer Westinghouse Electric & Manufacturing Company, advocated separate grounds for lightning arresters. Grounding on rail is permissible only when trouble from electrolysis is not anticipated. The pipe ground is adequate and an additional lead wire to the rail is not objectionable. A simple arrester is desirable for cars, one not disturbed by vibration.

Four types of arrester are available, multipath, magnetic blowout, electrolytic, and condenser. The first, of which the carborundum block arrester is typical, is simple and, in ordinary lightning disturbance, gives a high degree of protection at low cost. An objection to the circuit-breaker type of arrester is the difficulty of keeping it in good operating condition. The moving parts suffer from car vibration, developing friction in the tripping mechanism. The electrolytic arrester finds its field of application where strong protection is needed. It is troublesome to maintain and must be well inclosed. If power is off the line for a time the film dissolves and a short-circuit may develop when it comes on again. On high-voltage d.c. lines condenser-type arresters carry off the "static." These operate on the principle that a condenser is practically a short-circuit for high-frequency disturbances, but d.c. power cannot follow. The Piedmont Traction Company has used them successfully. For 600 volts the multipath arrester is recommended, and for higher voltages and better protection the condenser type. Electrolytic arresters are furnished for d.c. as well as a.c. circuits, and are recommended for high voltages.

Continuing the discussion, J. W. Welsh, electrical engineer Pittsburgh Railways, said that the first consideration is the setting of the arrester as near the operating voltage as possible. By tests he had found that carborundum arresters break down at a great variety of voltages while the electrolytic arresters can be set close to a given voltage.

C. B. Fairchild, Jr., executive assistant Philadelphia Rapid Transit Company, called attention to an arrester in which a fuse held the device in the closed position, a charge of pyrene being sprayed on the arc to extinguish it when the arrester operates.

In further support of the electrolytic arrester W. E. Boileau, general manager Scranton Railway, said that in the severe storms over Missionary Ridge in Tennessee trouble was experienced on the lines of the electric railways of Chattanooga until this type was installed. Transformers had previously been burned out and No. 0000 wires burned off. The ground for the electrolytic arrester was made on a 2-in. pipe sunk 6 ft. in the ground and bedded in coke. Every car in Scranton, except two which have condenser-type arresters, are equipped with electrolytic arresters. Mr. Boileau believed that where arresters are on the cars the "static" is being drained off continually and the least trouble occurs on the lines where there are most cars. On the Missionary Ridge lines the blocks are three-quarters of a mile apart and two arresters are put in on each. One is midway between signals and the other between the trolley and the signal. All are equipped with choke coils before the lines enter the signals. On lines for which the new condenser-type arresters were planned there are some of the old arresters placed every half mile. It is planned to put one condenser-type arrester at the end of the 3-mile line and the other two at equal intervals. Another will be put in the car yard to drain the lines and to protect a large meter there which was "blown up" when protected by the old-type arresters.

F. R. Phillips, superintendent of equipment Pittsburgh Railways, considered that the location of the arrester, connections to it and care taken in its selection were more important than the type. As a result of tests his company now requires that arresters be furnished to discharge between 1000 and 2000 volts. At the beginning of the winter season, when lightning troubles were not liable to occur, the cars were stripped of arresters and the latter were carefully tested, with good results. Mr. Phillips also discussed the subjects of grounding and electrolysis, expressing the opinion that the presence of the earth ground to the rail will in no way influence electrolytic corrosion.

H. R. Stadelman, Nachod Signal Company, Philadelphia, Pa., stated that from the standpoint of the contact-signal manufacturer any arrester with a good ground is satisfactory. The ground should be made not only upon the rail but at an independent point. Experience has shown that the rail does not furnish a proper ground for the signal system. He described a method of installing the arresters which would furnish a direct path to ground. He advocated the use of the horn gap in connection with the line, as the "static" would take the gap rather than reverse its direction to follow the line.

On the subject of cleaning cars, E. L. Green, master mechanic York Railways, said that his cars are sprinkled with disinfecting liquid, before sweeping, daily. Windows are cleaned daily, and twice a week the cars are cleaned outside. C. B. Fairchild, Jr., reported that the Philadelphia Rapid Transit Company had cars cleaned inside with excellent results by women. The women clean the windows, but otherwise have no heavy work outside.

In discussing axle renewal, F. R. Phillips stated that if the load on an axle does not too closely approach the elastic limit the life is indefinite, aside from journal wear. While axles must be examined for flaws this feature has been over-emphasized. His company cleans axles with gasoline, dips them in French chalk, suspends them from two loops and strikes them with a sledge. Fractures are visible through discoloration of the chalk. An attempt to renew axles on a mileage basis often results in throwing away an axle better than the one which replaces it. W. B. Rockwell, manager Eastern Pennsylvania Railways, agreed with this, stating that his company has eighteen-year-old axles which are better than some used only six months. Taking up general principles another speaker mentioned the stresses to which axles are subjected. Alternating stresses, even within the elastic limit, will eventually lead to "detailed cracks." These may start after the axle has been in use for some time. In heat-treated parts, hair-line cracks are often developed by the heat treatment. These may be too small for detection by the microscope. By supporting the axle on its journals and dropping a weight of perhaps 1000 lb. on the center from a height of a foot or two defects can be made visible. Mr. Rockwell stated that it is difficult to classify the many causes of axle failure. Usually the axle breaks against the gear, and in one case an axle broke at the center of a solid gear.

The last topic of discussion was the jitney bus. W. A. Heindle said that in Chester, where there are seventy-six or more jitneys, the experience is serious. In one case a truck used during most of the day for ice delivery takes thirty to forty men to and from work. Jitney riding is a popular diversion. The traffic is controlled by saloonkeepers, aldermen and others with political influence. President Tingley gave data as to the effect of the jitney upon railway revenues in a number of Western cities. He demonstrated the congestion which would result if the people depended entirely upon the jitney, reminding the audience of the slogan, "Who pays the bills the jitney kills?"

Another speaker considered "jitneyitis" a disease not yet correctly diagnosed. An important question for the railways is this: "Is the jitney bus a true step in the solution of the transportation problem?" If it is, the railways must take a different attitude from that of the past. The immediate problem is one of regulation in two parts: liability and taxation.

Indemnity to cover jitney liability involves an attorney's task to determine the form of bond, and it is a serious question as to how the insurance companies are to take care of it. The electric railways are paying about 10 per cent of their gross income for the privilege of doing business, about $20 per seat. At the same rate a five-passenger car should pay $100 per annum.

Mr. Rockwell said that he does not fear the jitney as public sentiment is turning against them and it is almost a disgrace to be seen in one. The experience of the Fifth Avenue bus line in New York City shows that bus service at a 5-cent fare is impracticable. The jitney need not be feared unless it steals its right-of-way The jitney is a common carrier and must be compelled to obey the laws relating to such.

R. P. Stevens, president Mahoning & Shenango Railway & Light Company, stated that the jitney is a menace to the street railway. The direct or indirect interest of alderman in the bus business, in his territory, made it difficult to get suitable legislation. Vigorous advertising resulted in the passing of a satisfactory ordinance. He thought it might be well for the railways to go into the jitney business. His company met the situation by doubling up service during rush hours and decreasing it at other times, with the result that aldermen were impressed with the fact that the jitney does curtail electric railway receipts.

The first of a series of educational addresses which are to be delivered to employees of the Louisville Railway Company was made before an audience of 500 employees in the chapel of the company at the central offices by H. C. DeCamp, representative of the Westinghouse Electric Company. Mr. DeCamp spoke on modern electrical apparatus and on advanced methods for insurance of safety, speaking to two different groups of operatives. The night men heard the lecture in the morning and the day men attended in the evening.

Heavy Electric Traction Discussion

At Chicago Meeting New Features of St. Paul Electric Locomotives Were Described

Three interesting addresses on the mechanical and electrical characteristics of the modern electric locomotive were presented at a meeting of the Chicago section of the American Society of Mechanical Engineers on May 14. A. F. Batchelder, chief engineer locomotive department, General Electric Company, presented a number of views; Dr. W. F. M. Goss, past-president of the society and chief engineer of the committee investigating smoke abatement and electrification of Chicago railway terminals, contributed a paper which dwelt on the significance of mechanical engineering in the designs of electric locomotives, and A. H. Armstrong, General Electric Company, discussed the electrical engineering problems of locomotive designs and the reason for the present methods of rating them.

Mr. Armstrong said that at first continuous rating of motors on street and interurban cars was unimportant because of light loads and frequent stops. On the other hand steam road electrification and heavy freight haulage on some of the electric lines had made the continuous rating of motors of vital importance. He then referred to the recent order from the Chicago, Milwaukee & St. Paul Railroad and said that the locomotives for this line would have an output of 3200 hp and a tractive effort of 72,000 lb. at 15¾ m.p.h. This surpassed the best modern steam locomotive. Mr. Armstrong also stated that the "bogie" guiding trucks were introduced because the Chicago, Milwaukee & St. Paul locomotives were designed for both passenger and freight service. All parts of the passenger and freight locomotives are identical except the gear ratio. This should result in reducing the cost of locomotive maintenance to a minimum. These locomotives are also arranged so that they may be split at the articulated joint, and it is possible, Mr. Armstrong remarked, that the halves will be used in switching service.

Mr. Armstrong then took up the advantages of electric braking by stating that his company anticipated that a very considerable proportion of all of the energy taken from the line on the up-grade would be returned to it on the down-grade. The benefit of electric braking, however, was not obtained so much in the power returned to the line as in more efficient braking. Electric braking eliminated the danger incidental to automatic air braking because car wheels were not heated and brakeshoes were not broken. Regarding the efficiency of modern electric locomotives, Mr. Armstrong stated that the New York Central locomotives were from 93 per cent to 94 per cent efficient. This was high because there were no losses in transmission through gears. The Chicago, Milwaukee & St. Paul could not use the gearless type of locomotives, however, because of the heavy grades. This would reduce their efficiency to approximately 84 per cent.

Regarding progress on this electrification, Mr. Armstrong said that the overhead on the first engine division of 113 miles between Three Forks and Deerlodge was complete and that on the second engine division was well under way. He also stated that twin-conductor trolley wires suspended from alternate hangers would be used on this electrification to eliminate the detrimental effect of sparking at the hangers. In this connection a new type of current collector is being designed for these locomotives and will include a rocker arm with two contact pans. The combination of this current collector and the twin conductors will, it is believed, eliminate all difficulties experienced in collecting current.

Oklahoma Association Meeting

At the Fourth Annual Convention of the Gas, Electric & Street Railway Association of Oklahoma, Held in Oklahoma City on May 12-13, Discussion Centered on Oil and Gas as Fuels, Public Relations and Appraisals

Nearly 150 delegates attended the fourth annual convention of the Gas, Electric & Street Railway Association of Oklahoma, held at the Lee-Huckins Hotel, Oklahoma City, on May 12 and 13. Mayor Edward Overholser welcomed the delegates at the opening session, and was followed by President George W. Knox, general manager of the Oklahoma Railway Company, who presented his official address.

In this, Mr. Knox analyzed the living expenses of the average family and showed that the lowest average expenditures are made for the items of light, heat and car fare. Still, it is upon the industries which furnish these that almost the whole cost of regulation is placed. Furthermore, while the prices of other things have risen, the cost of light, heat and car fare have all decreased.

Most of the troubles of the utility corporations, declared Mr. Knox, could have been averted by a unified, honestly-conducted campaign of public education by the companies, throwing open all records and giving unrestrictedly all information asked by the public. In twenty-five years' experience in handling public properties he had yet to find a single instance where the utility companies had not received fair consideration by the public and its servants after the true situation had been explained and understood.

If, with the existing rates and amount of business, a company finds that it is not coming out on the right side of the ledger and making fair returns, he advocated a frank explanation to the public. Although it may be a little difficult to demonstrate that the company should have an increase in rates, it will be granted eventually. The public is amenable in such matters.

A public utility should not make the mistake of fighting regulation. All efforts should be directed toward the correction of those measures of regulation which make it impossible to conduct the business successfully. Every management should be fully prepared to show those servants of the people who have the carrying out of the regulatory measures enacted exactly where it stands and why, and there need be no fear that the company will not finally win their confidence and fair consideration.

NATURAL GAS AND OIL AS FUEL IN BOILER PLANTS

Following the president's address, a number of papers were presented on power-plant operation, two of these being abstracted elsewhere. The discussion centered around the correct way of burning gas to obtain the best results. Several members reported having had serious trouble with tubes burning out when gas-fired boilers were run at overload. L. G. Purtee, chief operating engineer Oklahoma Railway Company, stated that he had had the same difficulty until he did away entirely with baffle walls or checker walls, for he had always found hot spots above such structures when the boilers were operated at overloads. Other members spoke of having tile projections extending toward the front and on top of baffle walls and checker walls to prevent this hot-spot projection on the tubes. The determination of the correct amount of air was another topic of discussion. It was stated that some manufacturers of gas burners recommend open spaces around the burners, but the inadvisability of having air-feed spaces over which the engineer has no control was urged against this.

J. J. Johnson, assistant general manager of the Oklahoma Railway Company, followed with a paper on "The Jitney Situation." This paper also is abstracted elsewhere in this issue.

UTILITY APPRAISALS AND PHYSICAL EQUIPMENT

The closing paper of the convention was on "Utility Appraisals Under Order No. 774 of the Corporation Commission of Oklahoma," presented by George B. Saunders, Oklahoma City. This is abstracted in another column. Harold Bozell, consulting engineer, led the discussion and brought up the point that the commission does not call for a full appraisal bringing the plant to "present value," as claimed by Mr. Saunders, but that the meaning of the commission is that the report should be only the "original cost," which includes the real overhead charges such as engineering, franchise cost, organization, legal, accidents or liability insurance, taxes, interest and miscellaneous general expenses. The commission has not asked for the intangibles, and there is no place for them in the accounts provided for the commission. The commission, however, does not expect to omit these items in a valuation for rate purposes, but they are matters of doubt, whereas the original cost is theoretically a matter of record. It is for a complete list and cost sheet of all property now in use for the public service that the commission asks. In event of a rate case involving any property, there would have to be settled the questions of depreciation, working capital, bond discount, going-concern value, etc. Mr. Mussen, engineer for the commission, stated that it was perfectly proper for an owner to make claim, in an attached exhibit, for the inclusion of such intangibles as he considered belonged to the property, in the event of a rate-case coming up later, adding that the percentages might be added which it was thought should be added in such a case. The position of the commission is that it feels that the history of the plant has considerable weight in its present value for rate purposes, and that this is the reason the commission is calling for this original-cost report and asking for the actual figures expended wherever they can be produced.

ELECTION OF OFFICERS

The following officers were elected: President, W. J. Dibbens, Guthrie; first vice-president, Hugh J. Cooper, Weatherford; second vice-president, C. H. Kretz, Okmulgee; secretary-treasurer, H. V. Bozell, Norman, Okla.

On Thursday evening the convention banquet, with about one hundred in attendance, was held at the hotel. H. J. Cooper, commissioner of public utilities at Weatherford, acted as toastmaster. Included in this lively program were talks by P. M. Gallaway, Tulsa; M. J. Wolfe, St. Louis; A. T. Schnaible, Lafayette, Ind.; V. L. Crawford, Pittsburgh, Pa.; C. S. Thompson, Oshkosh, Wis.; O. A. Parrish, Weleetka, Okla.; W. J. Murphy, Chicago; N. R. Gascho, Alva; W. R. Thomas, St. Joseph, Mo.; F. W. Insull, Oklahoma City; C. W. Ketterman, Dayton, Ohio; M. F. Sterret, Dallas, Tex., and Corporation Commissioner Humphrey, Oklahoma City, who spoke on the friendly relations between commission and utilities.

On Friday afternoon the delegates were the guests of the Oklahoma Railway Company on a tour around the city with visits to points of interest. In the evening the Jovian Order held a supper and rejuvenation, which was largely attended.

FUEL VALUES OF COAL, OIL AND GAS

BY E. H. HUNTER, ENGINEER OF POWER STATIONS OKLAHOMA GAS & ELECTRIC COMPANY

Fuel oil is that part of crude oil or petroleum which remains after it has gone through the refinery and the gasoline, naphtha, etc., have been removed.

It makes a most excellent fuel for the production of electric energy, but there are some disadvantages in its use. There is considerable noise in the furnace which might be unpleasant, and also a certain amount of vibration of the boiler doors and setting in general which in time open cracks and permit air to be drawn into the furnace, thereby decreasing the efficiency of the boiler. However, this vibration can be overcome to a large extent by the proper manipulation of the draft.

Natural gas is very closely related to petroleum, and is found in all oil fields to a greater or lesser extent. This fuel is the ideal one for the production of electric power because it is easy to handle and requires no storage bins or tanks. It is clean and is very economical, because of the small amount of labor required for its use and because of the chemical properties, 1 cu. ft. of gas requiring only about 10½ cu. ft. of air for its combustion. There are several good makes of gas burners on the market, and the secret of most of them is proper manipulation to get the right mixture of gas and air. Natural gas requires a furnace of somewhat different design than is used in burning oil, checkered walls being sometimes used, although this is not essential. Considerable vibration exists with burning gas, as in the case of oil, but this may be controlled to a large extent.

Comparing the three fuels, coal, oil and gas, as to their relative value the following approximate figures may be given: 1 lb. of coal will evaporate 9 lb. of water; 1 lb. of oil will evaporate 15 lb. of water, and 1 lb. of natural gas will evaporate 20 lb. of water. In general, 4800 cu. ft. of gas will equal 1 barrel of oil and 4⅛ barrels of oil will equal 1 ton of good coal.

FUEL VALUES OF COAL, OIL AND GAS

BY L. G. PURTEE, ENGINEER OF POWER STATIONS OKLAHOMA RAILWAY COMPANY

With hand-fired coal-burning boilers the combined furnace and boiler efficiency will run above 60 per cent only in the best-handled boiler rooms. With mechanical stokers, however, the efficiency will run from 70 per cent upwards, the CO_2 determination approaching 18 per cent.

When gas is used the best efficiencies are obtained when the CO_2 ranges from 8 per cent to 10 per cent. Oil gives about the same results, the reason for the reduced CO_2 being the greater proportion of hydrogen in the fuel which results in the generation of superheated steam and its condensation in the gas-sampling machine. Oil and gas should give the same boiler and furnace efficiency as coal that is fired with mechanical stokers, and this increased furnace efficiency accounts for the reduction of fuel cost that occurs when a change is made in a hand-fired coal-burning plant to the use of gas or oil. The economy is not effected because oil or gas is the cheaper fuel.

In Oklahoma the coal averages at least 13,500 B.t.u. and costs about $2.50 per ton. Each ton of 2000 lb. will contain 27,000,000 B.t.u. At 10 cents per 1000 cu. ft., $2.50 will provide 25,000 cu. ft. of gas, which, according to the claims of the dealers, contains 900 B.t.u. per cubic foot. Therefore $2.50 expended in gas will provide 22,500,000 B.t.u., or 16 2/3 per cent, less heat than can be obtained from a ton of coal. It will be seen, therefore, that if good stokers are installed the results with coal should be over 16 per cent better than can be obtained with 10-cent gas.

The same $2.50 will buy about 4½ barrels of oil at the present price of 55 cents per barrel. One barrel of oil contains about 285 lb., which at 19,000 B.t.u. per pound equals 5,415,000 B.t.u. per barrel, or 24,367,500 B.t.u. in 4½ barrels. Compared with 10-cent gas, oil at 55 cents is over 7 per cent cheaper when considered strictly on a B.t.u. basis, but oil requires approximately 5 per cent of the steam generated to operate the oil burners, so that the saving of 55-cent oil over 10-cent gas is so small as to hardly be appreciable in the final results.

With small, hand-fired, power plants, however, such as most members of the Gas, Electric & Street Railway Association of Oklahoma have to operate, a substantial saving can generally be effected by substituting gas or oil for fuel instead of coal. The saving is not due to the fact that either gas or oil is cheaper than coal but to an increased furnace efficiency.

UTILITY APPRAISALS

BY GEORGE B. SAUNDERS, OKLAHOMA CITY, OKLA.

Attention is directed to Order No. 774, covering gas and electric companies. Appraisals under this order are made by essentially the "reproduction cost new—less depreciation" method of valuation. The subject of overhead costs is a feature of the order. The greatest stumbling block is encountered by utility heads when this subject is considered. Well-known engineers admit that items under this head are nearly always in dispute. This would indicate the necessity of utility managers in Oklahoma co-operating to adopt a uniform report on these points. It has been suggested by many eminent engineers that, wherever convenient, the overhead charges should be assigned to the units and included in the unit costs, while such overheads as (1) legal, (2) administration and supervision, (3) engineering, (4) insurance during reproduction, (5) taxes during reproduction, (6) interest during reproduction, (7) contingencies, and (8) omissions and oversights, should be treated as gross sums. These percentages in the structural cost are "definite and essential factors in the assembling of the physical property." Under the classification of "organization," the order is not so specific as in the case of other commission rulings.

It is interesting to refer to a paragraph by L. R. Nash regarding the aggregate of all the overhead costs as compared with the structural cost. He says:

"The successive addition of percentages applying to the physical property gives a cost of reproduction from 129 per cent to 158 per cent of the structural cost. The further addition of percentages connected with the organization of the company gives totals of from 131 per cent to 163 per cent of the structural cost. The final addition of percentages to cover development costs gives an undepreciated fair value from 141 per cent to 188 per cent of the structural costs. It thus appears that it is by no means inconceivable that such fair value in certain cases may be double the structural cost if the development costs are fully considered."

Reproduction cost new, as required by the order, should be interpreted as including the actual physical property value, going-concern value, good-will value, franchise value and earning value, although such is not specified in the order. The appraisal of a public utility property under the order, including as it does physical and intangible values, is a troublesome and long-drawn-out ordeal. It is feared that intangible values are not given full consideration by all utility men in appraisals.

The subject of depreciation is becoming more and more important as rate cases develop. Special stress upon the necessity of distinguishing between depreciation and the depreciation reserve is urged. Most authorities agree that rates of return shall be based upon the present or depreciated value of the property, but if depreciation has not been earned or unless unearned depreciation and other losses have been properly included in development costs, the present value is inadequate. The Board of Supervising Engineers of the Chicago traction system states that the depreciated value of well-maintained utilities is estimated at from 75 per cent to 85 per cent of the cost of reproduction.

As to the subject of "franchise value," there is little to be said so far as Oklahoma utilities are concerned. The commission simply rules that "this account shall include only actual money paid to municipalities or to persons from whom franchises are acquired." Most franchises in Oklahoma are obtained by a vote of the people, and the corporation agrees to pay a certain per cent of its gross income annually to the city. Most states hold against including a franchise value in an appraisal, claiming that it is fictitious and improper. All court decisions say that there can be no "good-will" value where a utility has a monopoly.

After the total physical and intangible values of a property and the rate of return are ascertained, the net income is looked at to see whether it exceeds the sum obtained by multiplying the value of the property by the assumed rate of return. Most protests relative to rates are based upon the theory that a decrease in price or a lowering of rates means an increase of profits because of increased sales. An increase of sales, however, requires an increase in plant to produce the same and distribute them—that is, in the case of increased sales, there is more property upon which to pay a return, requiring a higher amount of net revenue to pay it than was the case before the increase. Thus profits from increased sales would have to be applied first to pay a return upon the increased assets and not to pay a return upon existing assets or to make good a loss of revenue on present sales resulting from a reduction in the product's price.

THE JITNEY SITUATION

BY J. J. JOHNSON, ASSISTANT GENERAL MANAGER OKLAHOMA RAILWAY COMPANY

The jitney craze in a modified form struck Oklahoma City the latter part of last January, and for a time two cars were operated. Later on a few more were added until about a dozen cars were in operation at one time. Without waiting for the matter to go any further, the people of Oklahoma City made a personal matter of it, and after a mass meeting, comprising representatives of retail and wholesale interests, insurance men, real estate dealers, bankers and others, the City Commissioners were induced to pass a drastic ordinance effectually regulating the jitneys. The arguments were that the railway company helped to build the city and that the citizens wished the company to continue to expand, which they believed would be impossible if they had to tolerate competition with the jitney bus.

The friendly public policy of this company and the courteous treatment accorded its patrons undoubtedly were the important factors in overcoming the jitney nuisance. Of course, it would be difficult to determine the exact degree in which dissatisfaction with a street car company's methods might inure to the benefit of the jitneys, but this is certainly a factor in many places. In the cities where the jitneys appear to be doing the most thriving business the attitude of the people toward the street car companies is generally antagonistic because proper consideration for the people generally has not been shown.

The policy of railway companies of taking the public into their confidence, listening to complaints and suggestions and allowing the people really to feel that their interest is desired and appreciated, has been productive of so much good it is surprising to note that some roads apparently have not adopted this policy, but on the other hand have done things to aggravate the situation. Indeed, the best way to fight the jitney, if after all it is deemed necessary to hasten its disappearance faster than it is accomplishing its own demise, is to give the very best service possible, provide clean, comfortable cars, carefully maintain schedules and have trainmen and other employees that are courteous and accommodating under all circumstances.

American Railway Association Meeting

The spring session of the American Railway Association was held at the Biltmore Hotel, New York City, on Wednesday, May 19. There were present 250 members, represented by 180 delegates. The executive committee reported that the membership now comprises 206 members, operating 278,200 miles, an increase of two members and 190 miles. The associate membership now comprises 206 members, operating 12,500 miles, an increase of five members and 229 miles.

There was little of electric railway interest at the meeting because the committee on electrical working presented only a progress report. It said that several matters were still under consideration by it with the engineering associations, and that until they were settled there was nothing further to report.

A. W. Thompson, third vice-president Baltimore & Ohio Railroad, was elected second vice-president of the association. This was the only executive office whose term expired with this meeting. Chicago was selected as the place for the next regular session, which will be held on Nov. 17, 1915.

New Railway in Argentina

The firm of Anastasio Lopez & Company, of San Luis, Argentina, has secured a concession from the government of the province of Mendoza to construct and operate a 71-mile main line from General Alvear to San Rafael, province of Mendoza. The concession includes branch lines to Las Malvinas and Cuadro Nacional, about 30 miles of track in all, and such other branches up to a distance of 6 miles from the main line as may be necessary to connect the system with centers of production needing an outlet. Those additional branch lines are estimated at another 30 miles for the present. The region traversed is said to be well irrigated and under intensive cultivation. The system adopted for the new line is that of the so-called economical secondary railway with a 75-cm. (2.46 ft.) gage. Steam traction will be used at first, but it is planned to electrify the line at a later date. Work will be begun in about six months with the material of an 18-mile line belonging to the company. It is expected that the purchase of further material and equipment will begin in about eight months.

American Association News

Conclusion of Power Distribution Committee Meeting Report—Brief Reports of Section Meetings and Other Committee Meetings to Be Amplified Next Week

COMMITTEE ON POWER DISTRIBUTION

Following is the conclusion of the minutes of the meeting of the Engineering Association committee on power distribution, held in New York on April 29 and 30. See page 938 of the issue for May 15.

A tentative set of specifications for overhead material was considered. After consideration the specifications were returned to the sub-committee for revision and later determination as to whether these specifications will be recommended as standard, recommended practice, or miscellaneous practice.

On April 30 G. N. Brown, representing the block signal committee, met with the power distribution committee to assist in the consideration of the block signal clearance diagram. Certain detail changes in the overhead line construction specifications were approved.

The A. I. E. E. standardization rules, as they relate to the work of this committee, were considered and no criticisms were made except that the desirability of pointing out a definite dividing line between the transmission systems, the substation, and the distribution system was suggested. This is important in connection with the classification of accounts.

The committee then considered the revision of existing standards, and detailed revisions, too numerous for abstract here, were approved. The following subjects were then suggested for reference to succeeding committee: Further consideration of concrete poles, including deflection formulas and tables for tapered sections; further specifications for overhead line material, including especially a standard thread for pins and insulators and a specification for structural steel cross-arms and fittings; consideration of the use of aluminum cable, with specifications; collection of data preparatory to possible later standard specifications for high-voltage direct-current and catenary trolley construction. It was also decided to recommend to the association that the specifications for the joint use of poles as printed on pages 82 to 91 inclusive of the 1914 proceedings of the American Association be printed under the head of miscellaneous methods and practices in the Engineering Manual, preceded by a precise statement of the action of the American Association in connection therewith.

EQUIPMENT COMMITTEE

An important meeting of the equipment committee was held in New York on May 17. There were present, W. G. Gove, Brooklyn, N. Y., chairman; F. R. Phillips, Pittsburgh, Pa.; L. M. Clark, Indianapolis, Ind.; W. E. Johnson, Brooklyn, N. Y.; W. W. Brown, Brooklyn, N. Y.; F. W. Garrett, Boston, Mass.; R. H. Dalgleish, Washington, D. C. R. C. Bird of the National Fire Protection Association also attended the meeting during the presentation of the reports of the sub-committee on wires and cables. The minutes of the meeting will be given in next week's issue of the ELECTRIC RAILWAY JOURNAL.

MILWAUKEE SECTION

At the meeting of the Milwaukee Electric Railway & Light Company section, to be held on May 25, the topic for discussion will be "The Purchase, Storage and Distribution of Material and Supplies."

COMMITTEE ON POWER GENERATION

The Engineering Association committee on power generation meeting was held at the Fort Pitt Hotel in Pittsburgh, Pa., on May 18. Those in attendance were J. W. Welsh, Pittsburgh, Pa., chairman; G. H. Kelsay, Anderson, Ind.; W. H. Roberts, Akron, Ohio; E. H. Scofield, Minneapolis, Minn.; E. D. Smith, St. Louis, Mo., and A. B. Stitzer, New York, N. Y. On account of lack of space the minutes of the meeting will be put over to next week's issue.

MANUFACTURERS' ASSOCIATION

Secretary H. G. McConnaughy will leave again for the Pacific Coast on Monday, May 24, to complete the arrangements for the convention, particularly with regard to hotels and other accommodations en route. Special attention will be given to arrangements at the two parks which are to be visited. His trip will require about a month. Announcements will soon be made as to the features of the visits to typical railway properties in the cities included in the tours. Mr. McConnaughy goes on one of the special N. E. L. A. trains and will have the opportunity to benefit by the experience of the transportation committee of that association.

PUBLIC SERVICE SECTION

The regular meeting of this section was held on May 20, the subject being the power generating equipment of the Public Service Electric Company from which the power supply for the railway is secured. The speaker was Dudley Farrand, vice-president of the Public Service Corporation and general manager of the Electric Company. He gave a comprehensive, illustrated lecture and showed by comparative data how the demands for electric railway power had increased since 1903 when the corporation was formed. The generating capacity in 1903 was roughly 40,000 kw while it is now more than 170,000 kw. The lighting and industrial power load has grown faster than the railway until last year the two were equal. The latest power plant, now under construction, will ultimately produce 150,000 kw.

Joint Committee on Line Construction

A meeting of the national joint committee on overhead and underground line construction was held in New York on May 12, with a large attendance of members and several visitors. Important sub-committee meetings were held on the preceding day. These sub-committees are compiling information received as a result of circular inquiries addressed to various operating companies and consulting engineers with a view to revising the specification in due course. The committee is experiencing some difficulty in obtaining definite and specific criticisms of particular paragraphs in the old specification, the kind of information which will prove most instructive to it. The committee meeting was taken up with general discussion of the work of the sub-committees. At the next meeting, to be held on July 14, it is hoped that all replies to the inquiries will have been tabulated and analyzed and the committee will continue the adoption of additional paragraphs in the proposed specification.

COMMUNICATIONS

Investment Per Passenger

STONE & WEBSTER
BOSTON, MASS., May 17, 1915.

To the Editors:

I have read with much interest the article prepared by D. J. McGrath for the ELECTRIC RAILWAY JOURNAL of May 8.

It seems to me that Mr. McGrath's article is a valuable one and that there is distinct merit in his suggestion of comparing the investment in street railway properties on the basis of the number of revenue passengers carried. We have in the past, as suggested in his article, compared investment on the basis of per mile of track and per dollar of gross annual revenue. Each basis has some advantages, but neither has been particularly satisfactory. The investment per mile of track varies very largely, depending on local conditions in different cities. Paving requirements, subways, the volume of travel, and, consequently, the weight of rail, track foundations, and amount of rolling stock required, all vary much between large cities and small and also in different sections of the country between cities of approximately the same size. Comparisons of investment per dollar of gross earnings have been somewhat more satisfactory, but such comparisons are affected by varying rates of fare as well as by other local conditions. Adopting the number of revenue passengers as a standard removes some of these difficulties and offers a new basis of study, which will, I think, be very useful in throwing light on the street railway problem.

In making such studies it must, of course, be borne in mind, as Mr. McGrath has pointed out in his article, that we cannot expect to find any uniform investment per total revenue passenger, and we may find, as is indicated in the figures which he submits, material variations due to differences in local conditions. One would naturally expect a greater investment per revenue passenger in large cities than in the small, and this seems to be borne out by the figures which he presents. This increase in investment per passenger in the large cities, combined with a greater operating cost per passenger, because of the longer average haul, is largely responsible for the rather serious situation which street railways are now facing in most of these cities.

The public in such cities must, of course, have ample transportation facilities, and this transportation service must be furnished as far out from the center of the city as is called for by the building up of the outlying districts, but such service cannot be permanently maintained with adequate compensation to the street railway.

The problem before the large street railway companies at this time is to present their case properly to the public. It must be made clear that there is a limit beyond which a street railway cannot profitably carry its passengers for a 5-cent fare, and unless some plan is developed to enable the company to obtain adequate pay for the service which it renders, investors will refuse to furnish new capital necessary to keep pace with the growing demands of the community for service. Just how the street railway fare may best be readjusted to meet this condition is a problem which deserves careful thought and discussion, so that the relative merits and disadvantages of each plant may be fully brought out.

The plan suggested by Mr. McGrath of comparing investment on the basis of the total revenue passengers should give information which will be helpful in considering the broader problem.

HENRY G. BRADLEE.

Future Central Station Development

PENNSYLVANIA STATE COLLEGE
STATE COLLEGE, PA., May 13, 1915.

To the Editors:

The completion of the Seventy-fourth Street power plant of the Interborough Rapid Transit Company of New York City marks another milestone passed in the development of steam turbine engineering. The plant is unique particularly in its having some of the largest steam turbine generators ever built and in its having the most modern types of auxiliary equipment. Tests will doubtless show that this plant produces a unit of electrical energy with a smaller amount of coal than any other. In fact, we may say the equipment represents the last word in the design of coal-steam-electrical power plants. Then, naturally, the question is asked: What are we to expect of the future in the way of further development? Obviously the next step will be to use steam turbine generators of 50,000-kw capacity. In fact, designers are already working on the details of designs of this size. I should not be surprised if in less than two years contracts were let for 50,000-kw units.

The really important development of the future will be the combination of mercury and steam turbines,* by the method of vaporizing mercury at about 10-lb. to 25-lb. gage pressure in boilers of about the same size as those now used for steam. The mercury vaporized in these boilers would be expanded in the nozzles of a turbine and then passed on to a suitable mercury condenser of the surface type, in which the cooling or circulating water would be vaporized into steam at a temperature of about 400 deg. Fahr., corresponding to the boiling point of the mercury at a vacuum of about 28½ in. when referred to a 30-in. barometer. The steam thus formed would then be passed on and expanded in a turbine of one of the usual commercial types, also discharging into a condenser where a 28½-in. vacuum is maintained. By the installation of this equipment the fuel consumption of the power plant should be at least 30 per cent less than in the best steam turbine practice as illustrated in the Seventy-fourth Street station.

In this plant there seems to be a very marked substitution of steam pumps driven by steam turbines for those previously operated by electric motors. The high-speed centrifugal boiler feed pumps have certainly many advantages, and their operation with high-speed steam turbines is the obvious method. The kind of drive for auxiliaries is always a live topic for discussion. In many plants there seems to be a tendency toward more electric drives. In most American plants we have had too many steam-driven auxiliaries for the best economic results. There is usually more exhaust steam at atmospheric pressure from these auxiliaries than can be used in a feed-water heater and much heat is wasted in the steam escaping from the exhaust heads. The ideal arrangement as regards best economy is to have steam and electrically-driven auxiliaries selected in such a combination that the number of each is so adjusted as to give very little excess of exhaust steam above what the feed-water heaters can use. In regard to the application of this principle, the Seventy-fourth Street plant is, however, an exception on account of having a compound type of steam turbine with the receiver between the high and low pressure sections. By this arrangement any excess of steam from the auxiliary can be discharged through the "thermal" valve† into a low-pressure section where the heat energy it contains is utilized very efficiently.

J. A. MOYER.

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*Proceedings American Institute of Electrical Engineers, Vol. 32, page 2133, ELECTRIC RAILWAY JOURNAL, Vol. 43, page 575.

†ELECTRIC RAILWAY JOURNAL, April 17, 1915, pages 747-748.

Use of the Gas Flame in Removing Pinions

THIRD AVENUE RAILWAY COMPANY
MECHANICAL DEPARTMENT
NEW YORK, May 19, 1915.

To the Editors:

Since my article appeared on page 675 of the ELECTRIC RAILWAY JOURNAL for April 3, recommending the use of a gas flame in removing pinions, as well as hot water in installing them, I have read two comments in the columns of the JOURNAL opposing the use of the gas flame, one in the issue for April 24, page 800, from A. A. Ross of the General Electric Company and one in the issue for May 15, page 942, by R. H. Dalgleish, of the Capital Traction Company, Washington, D. C. In view of the adverse criticism by these writers I feel that I should add a postscript to my article by way of rebuttal.

There is not a great deal more to say that I did not cover in my two articles, but since the one on the gas flame in particular was published I had the pleasure of a visit from an eminent gear and pinion specialist who had also objected to the use of gas in the removal of pinions, and he and I went more deeply into the subject.

I showed him that, with the equipment illustrated in the JOURNAL, a pinion could be removed with the heat on the pinion for less than one minute, the pinion loosening with one smart but not hard blow from a medium-sized hammer. As stated in the article in question, the pinion was not hot enough to melt the gear grease, and the hand could be touched to the pinion without discomfort.

His comments at that time were to the effect that this method of removing pinions was excellent, handled in the manner in which we did it, his only fear being that all shops might not do as well. He also remarked to a companion that, if he were in charge of a shop, he would certainly adopt that method. Now, if the method is satisfactory when handled intelligently is there anyone who will admit that he cannot handle it as well as we do, or that his men do not possess the necessary intelligence?

Going into the question from the particular point of view of the destruction of the heat treatment, I wish to say a few words which may put things in a different light. There is but a small percentage of pinions removed which go back into service with up-to-date motors. On an old type of motor one is apt to find any conditions, and on those motors there never was difficulty experienced in removing pinions. But on the types of motors on which heat-treated pinions are used, the motor bearings and other wearable parts will outwear any pinion. Therefore, when the pinion comes off it is scrap, or in most cases should be. At any rate, how much of the heat treatment do you imagine remains at this time?

On those few pinions which do go back into service, if a temperature which will not burn the fingers or which will not melt the gear grease will destroy that property which gives the manufacturers a right to charge a high price for the pinion, heat treatment is too delicate a proposition for a railway motor.

I stated in one article that the removal of a pinion by a puller which would really pull, would be superior to any other means. I have not yet seen one which would any more than begin to meet requirements, even after reading Mr. Dalgleish's article.

However, the main point is not, after all, to save the pinion. Getting it off without damage to the other parts is more important. The percentage of good pinions which must be removed is small and the cost of pinions is low in comparison to the cost of straightening or renewing armature shafts, building up and cutting new threads, replacing bearings and frame heads destroyed by attempts to remove the pinion by means which save the pinion at the cost of something else.

Two facts, however, remain: 1, Saving the pinion is not the primary point; and, 2, the gas flame handled by men of at least ordinary intelligence will not destroy the heat treatment.

R. H. PARSONS, Electrical Foreman.

The Passing of a Great Engineer—Dr. F. S. Pearson

PEARSON ENGINEERING CORPORATION, LTD.
NEW YORK, May 17, 1915.

To the Editors:

With the sinking of the *Lusitania* there was lost a man whose name has been known among engineers and financiers the world over for twenty-five years as a matchless technical and financial director of great engineering enterprises. That man was F. S. Pearson, D.Sc., slain in the prime of life by the cruel act of a German submarine. His loss is all the more strangely fateful for the Germans, for many firms in that country have had huge orders from his enterprises and more would naturally follow.

Dr. Pearson was a man who shunned publicity, although many times it was forced upon him by well-meaning friends and one or two ill-advised alliances. Consequently he was not so well known as some less successful men, nor were his great benefactions to the people of several foreign countries or his personal characteristics so much talked about as some of his spectacular projects. It is safe to say that his enterprises, principally public utilities, such as electric light and power, gas, telephone and railway, benefit immeasurably a combined total of 5,000,000 people, equal to the population of New York, composed mostly of Spaniards, Portuguese and Mexicans, and have brought them the comforts of modern life which they had not before.

Where lesser men failed to do more than scratch at the surface, he stepped in, saw the possibilities, predicted the success of acquirement, consolidation, development and operation under American management and by American ways, won the confidence of the bankers of several countries, raised the funds, and notwithstanding the handicap of a foreign language and great distance from the source of supplies and engineering direction, found the experts to do the things properly and, at the cost of many millions of dollars, succeeded in establishing business enterprises thoroughly sound at the core and, except under war or revolutionary conditions, paying propositions. Such are the Sao Paulo Tramway Light & Power Company, the Rio de Janeiro Tramway Light & Power Company, the Sao Paulo Electric Company, all now merged with various gas and telephone companies into one great company—the Brazilian Traction, Light & Power Company, the companies in and around Mexico City, and those in and around Barcelona, Spain; the great electric companies in Niagara Falls and Toronto, Ont.; the Winnipeg, Man., companies; and the railroad, milling and mining companies in northwestern Mexico.

Dr. Pearson was an American but largely resided abroad of late owing to the necessity of being near the financial centers of London, Paris and Brussels. He was a self-made man but had such a thorough grounding in chemistry and electricity and such courage, inventive genius and foresight that he, early in his career, inspired confidence in great financiers and owners of street railway properties in the belief that electric railways could be made to pay when the art was in its infancy. He was ahead of the manufacturers in all his demands, and many of the great engine, generator and motor companies owe their early development and expansion to him. In the electrification of the Boston, Brooklyn and New York street railways he was the great dynamic force that overcame obstacles, built great power plants and electric systems of transit and set the pace and standards for the world.

Dr. Pearson was so full of energy, so rapid in his thoughts and calculations, so masterful in combination and in the development of the natural resources of the earth that he early sought the field of foreign countries where there was given to him a freer hand to do anything he pleased, which was always for the immediate and lasting benefit of the people and ultimately for the stockholders. He inspired confidence in foreigners of many nations, got wonderful concessions, and cheapened the cost of fuel, light and power greatly wherever he went. The coming of his companies into great foreign cities brightened the dark spots, induced cleanliness and sanitation, and resulted in better water supply and sewerage systems. To him nothing was formidable. The highest water falls in the most inaccessible regions were his by the magic of his organization, push and "get there" qualities. Mountains were eaten away, tunnels bored, precipices scaled with ease wherever he chose to go. Canadian capital was the first to invest in his enterprises, but later, English, French and Belgian men furnished much of the money, and Dr. Pearson himself became a millionaire and large owner in all the companies. At the time of his death he was president or chairman of the board of directors as well as consulting engineer of a dozen large companies and many small ones.

Dr. Pearson became a thorough master of every subject he attacked, whether engineering, financing, music, art or farming. In farms he possessed one of 12,000 acres in the adjoining States of Massachusetts and New York, and had much blooded stock and flocks and herds of every description.

In music and art he was thoroughly informed, having some of the greatest treasures in his several homes in this country and abroad. He was to have built in his London house the finest and largest organ in Europe, combining every combination and variation of musical sound and imitation of all the great musical instruments, ancient and modern.

Dr. Pearson was only fifty-four years old, yet he had compressed a whole lifetime of achievement into the last twenty-five years. Evidently his work was done and was to be passed on to others. The strain of the revolutions in Mexico and the great war in Europe were, in their effect on Dr. Pearson's companies, cutting off as they did all sources of funds for new development, very great. His resourcefulness may best be illustrated by the fact that he overcame the difficulties of exchange with Brazil and meeting of liabilities for purchases and payments of dividends by buying shiploads of coffee in Brazilian money and selling them to New York or Europe for dollars and sterling, and used the same ships to transport back to Brazil coal, machinery and merchandise for the various companies in which he was interested which needed them.

Dr. Pearson gathered around him a great number of strong, competent, dependable men, engineers, managers, superintendents and experts in various lines, who are using foreign tongues in operating his properties and doing it successfully under great difficulties, and they and their families will miss his guiding and helping hand.

He was a continuous reader in all lines of thought and practice. His travels by sea and land day and night were so extensive that few could keep his pace, yet he was constantly in touch by telegraph with the staffs of all his offices and companies and settled great financial and technical questions with the data which he always kept at his fingers' ends.

Dr. Pearson was a member of all the great technical societies here and abroad, but seldom was heard in any of them. Some of these are: American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Electrical Engineers, American Society of Naval Engineers, Institution of Electrical Engineers of England, American Institute of Mining Engineers, American Electro-Chemical Society, New York Railroad Club and American Forestry Association.

His alma mater, Tufts College, is greatly indebted to him, as are many societies and individuals, and his place can never be filled. His enterprises will live, however, and will benefit unnumbered generations to come and will extend along the lines already shown to be so correct in principle and practice. It is to be regretted that many great communities which sought his advice will never see the fruition of plans which he had for their development. Many of them were postponed by the great war, which has now taken the great engineer.

HOWARD P. QUICK,
Designing and Mechanical Engineer.

The Vienna-Pressburg Electrification

THE CONNECTICUT COMPANY
NEW HAVEN, CONN., May 7, 1915.

To the Editors:

I have been interested in the details of the overhead construction of the Vienna-Pressburg electrification described in the issue of the ELECTRIC RAILWAY JOURNAL for May 1. This appears to be very similar to the Fischer-Jellinek construction used at Budapest and on at least one other Austrian road.

In studying this construction I find it difficult to believe that there will not be serious wear at the loose connections between contact wires and hangers, although as a matter of fact there is a somewhat similar sliding connection between the slip and the copper feeder in the New Haven duplex-wire scheme, which has given no trouble at all.

The use of compensating weights seems to be quite common on the Continental lines, but the success of our American catenaries, none of which so far as I know employs this expedient, raises in my mind a question as to the real good to be obtained by the foreign complication. After all if the contact wire is reasonably uniform in the character of the resistance which it offers to the collector, and if the contact wire does not make any marked changes in direction, it does not matter very much whether it is maintained in an absolutely straight line or hangs in a series of festoons. Of course, there must not be a bend at the hangers so abrupt as to cause hammer action.

CHARLES RUFUS HARTE,
Construction Engineer.

THE ARCHBOLD-BRADY COMPANY
SYRACUSE, N. Y., May 5, 1915.

To the Editors:

I have noted with interest the description of the Vienna-Pressburg electrification in the issue of the ELECTRIC RAILWAY JOURNAL for May 1, which shows a number of contrasts with American practice. The slip hangers on the catenary used on the Northfield cut-off of the Northern Ohio Traction & Light Company system have given the best results of any kind of catenary support with which I am familiar.

There appears to be no advantage in the triangular hangers used on the Austrian railway, as straight hangers such as are used in this country are simpler and just as flexible. The pole construction appears to be very light for the length of span and, while the article does not give the sizes of the members in the poles, the number of wires carried would seem to make the use of a bridge rather than a pole desirable.

It is interesting to note that the strain from snow and ice is so much more than that calculated that the weights on the tension take-ups have been anchored, so that there is apparently no longer any adjustment in them. While some take-up scheme would seem to me a good thing theoretically, good operation on the lines with which this company has had to do has indicated that there is no necessity for it.

W. K. ARCHBOLD, President.

Mating Gears and Pinions

THE DENVER TRAMWAY COMPANY
DENVER, COL., May 11, 1915.

To the Editors:

I notice with interest the letter of Mr. Cooper in your issue of May 8 and his suggestion that your readers might like to hear further from me in regard to the other factors which might have caused, or partly caused, the difference in wear in the gears mentioned in my previous article.

The gears and pinions, whose wear was illustrated on page 803 of your issue of April 24, were on a one-way car, and our experience has been that on a one-way car all parts of the No. 1 motor, including gears, pinions, armature and axle bearings, show less wear than those of other motors on the same car. The reason for this is that the No. 1 motor is less exposed to the dust and dirt gathered from the street.

The excess wear on the gear train of the No. 1 motor, shown in the illustration, was not due to improper meshing, resulting from excessive bearing wear, as the top of the gear tooth was wearing clean on the bottom of the pinion tooth and the axle and armature bearings were not worn excessively. In fact, they showed less wear, if anything, on No. 1 motor than on the others of the same car. The gears and pinions on both Nos. 1 and 2 motors were meshed properly.

We are not surprised at the lack of wear on the gear and pinion of the No. 2 motor as they were of case-hardened, or high-grade, material running together, and on the same type and class of service we expect an ultimate life of at least five times that shown in the illustration in the issue of April 24.

The abnormal wear on No. 1 motor in our opinion was simply to have been expected as a result of dissimilar grades of material working together.

The car in this case made 30,582 miles in city service, about seven months' work, and we believe, and it is quite reasonable to suppose, that practically the same attention as regards gear lubrication was given to each motor during this long period. It is hardly possible that there could have been any great difference in the work done by the No. 1 motor for that length of time without its attracting attention. It has been our experience that increased wear results where gears and pinions of different materials are worked together as in this case; hence the extraordinary wear in No. 1 motor is to be expected. It is possible, though not decidedly apparent, that the face of the teeth of the soft pinion shows a slight roughness such as might be expected if grit had mixed with gear lubricant.

I would like to add that this case was not an experiment on our part; it was simply a mistake in matching up the gears, as explained in the original article. We did some experimenting with the same results some two or three years ago.

W. H. MCALONEY,
Superintendent of Rolling Stock.

Motor Ventilation

CHICAGO SURFACE LINES
CHICAGO, ILL., May 6, 1915.

To the Editors:

The article by Rudolph E. Hellmund describing some of the advantages and limitations of railway motor ventilation, which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for May 1, was very instructive, and it might be interesting further to record some of the results obtained from the use of ventilated motors in Chicago during the past three years.

The point mentioned in Mr. Hellmund's article regarding the elimination of the wearing edge, where the laminations are separated to form the air spaces in the armature core of an inclosed type of motor, is well taken. We not only find this condition to hold but we also find the continuous core to be an additional improvement in that the under sides of the armature coils are not exposed to dirt and moisture as in the inclosed motor with armature spaces. Where the coils are so exposed it is difficult to properly clean and repaint the bottom of the coil where it crosses the ventilating space.

The question of dust deposit is of considerable importance and, although we are not having any appreciable difficulty due to dust being deposited on the live parts of the motor, we find it necessary to blow out the armature air passages frequently. The dust which accumulates in the armature duct is deposited on the side of the duct farthest from the center where it is thrown by the revolving armature, and where it not only cuts down the area of the air passages but also acts as an insulator between the cooling air and the armature coils, thus cutting down the efficiency of the ventilation. For this reason a lack of attention in regularly blowing out the motor would soon result in greatly reducing the advantages of ventilation.

We have had some difficulty due to the ventilating fan becoming loose, and any design should take this factor into very careful account. As a general observation it is probable that the commutators in our ventilated motors are wearing slightly faster than in the inclosed type, although this point is not sufficiently marked to warrant attaching any considerable importance to it.

In so far as the effect of weather conditions is concerned, we have found no more difference in the operation of the ventilated motor for varying weather conditions than with the inclosed type. On a large property such as we have in Chicago it would not be possible to change from the ventilated to the inclosed type of motor to meet changes in weather conditions.

Although we have a class of service which necessitates frequent stops, our schedule speed is comparatively high and our average voltage is close to 550, so that in spite of the frequent stops we get the advantage of high schedule speed and voltage in making the armature fan more effective than where the average voltage and schedule speed are lower. Our specifications on recent equipments also call for a comparatively low temperature rise, namely, 65 deg. Cent., which makes the use of ventilated motors a necessity. It is probable that by keeping our maximum temperature down we are offsetting any slight increase in maintenance due to the open nature of the motor.

H. H. ADAMS,
Superintendent of Shops and Equipment.

The Bay State Street Railway's passenger department and free trolley information bureau has been removed from 309 Washington Street, Boston, to 15 Milk Street, on the ground floor. The new location is just off Washington Street, opposite the Old South Church, and on the site of the birthplace of Benjamin Franklin.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

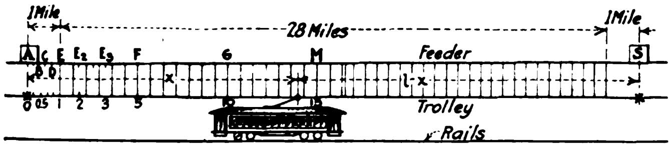
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

The Effects of Remote Feeder Taps on Schedule Speed

BY NICHOLAS STAHL, RAILWAY AND LIGHTING DEPARTMENT WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Recent editorials and communications in the ELECTRIC RAILWAY JOURNAL* emphasize the importance, in the successful operation of substation machinery, of locating feeder taps sufficiently far away to minimize both the liability and severity of flash-overs on the occurrence of short-circuits on the trolley system. The editorial particularly commends the strong stand taken in this direction before the recent convention of the Illinois Electric Railways Association by C. H. Smith, who has thus done the railways suggestively a good turn, of which many more will doubtless soon take advantage, especially when the question of relative costs involved is considered.

The principal argument against the suggested practice, advanced by those roads which have not yet adopted it, is the cost of the additional copper required to produce the same average trolley voltage—and hence to maintain schedule speeds—or, if this extra copper is not provided they direct attention to the reduction in speed and the extra line losses.



FEEDER TAPS—FIG. 1—DIAGRAM OF FEEDER TAPS BETWEEN SUBSTATIONS

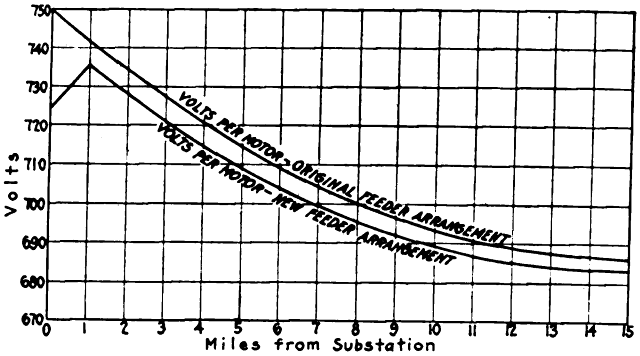
To obtain a general perspective view of the economic value of such an argument in comparison with the cost of protecting "service apparatus and men against the damaging effects of flashing and buck-overs"—the exact cost of which each general manager can doubtless appraise for his own road out of painful experience—let us examine figures for a concrete case.

Assume a 1500-volt, d.c. road, with substations 30 miles apart, 80-lb. rails bonded, No. 0000 trolley, and one No. 0000 feeder throughout, but tapped first onto the trolley a mile from each substation, in front of which is a section break. A single 40-ton car, with average load and equipped with four 110-hp standard motors, is to operate between substations.

Two aspects of the problem will be investigated: *Case I*—Under the above feeder arrangement, (*a*) the average or integrated voltage drop, as compared with that occurring when the feeder is tapped directly at the substations, (*b*) the decreased schedule speed resulting therefrom, and (*c*) the relative line losses. *Case II*—The size and arrangement of additional feeder necessary to keep the integrated trolley voltage, schedules and line losses the same as with original feeder tapped directly to trolley.

A single car is assumed to simplify the calculations, and because the same argument can readily be extended to more complex schedules, no assumptions on which, moreover, would meet all actual operating conditions. For the same reasons the car is assumed to be making a steady run, without stops, because stops, from the present viewpoint, only mean that the current consumption is undergoing cyclic variation, which is commonly evaluated to the root-mean-square for the entire run, and any results with (substantially) steady current can be interpreted to include the variable current case.

Fig. 1 shows diagrammatically the conditions for Case I. From the symmetry of the figure it will only be necessary to consider the problem while the car is passing from the section break at *A* to the section midpoint *M*. The condition when feeders are tapped to trolley at *A* will be called the "original" position or arrangement, and when feeders are tapped at *E* the "new" arrangement.



FEEDER TAPS—FIG. 2—EFFECT ON VOLTAGE OF TAPPING NEAR-BY FEEDERS 1 MILE FROM SUBSTATIONS

To simplify the calculations the current taken by the car throughout the run between substations will be assumed constant, which, while only approximately true, will not at all vitiate the conclusions, since we are interested here not so much in knowing the exact current, or the balancing speed, at any point of the run, as in evaluating the difference between the speeds at a given point under two different feeder arrangements.

Tables I and II on page 992 give the basis on which calculations were made for the voltage curves shown in the two graphs, Fig. 2. I is the total current taken by the car, say 100 amp, I_1 is the current coming from substation A, and I_2 that from substation S. The distance of the car from substation A is designated by x.

The graph brings out very clearly the very slight additional voltage drop occasioned by the "new" feeder arrangements. The integrated value of the voltage per motor in the original arrangement is 707.3, while in the new arrangement it is 702, or a decrease of only 5.3 volts, or 0.75 of 1 per cent on the average.

To investigate the error involved in assuming the current taken by the car and the balancing speed to be constant, we note that at 750 volts per motor the balancing speed is 54 m.p.h. and the balancing amperes 48, while at 600 volts per motor the balancing speed is 46 m.p.h. and the balancing amperes 44. If we prorate these values for the integrated voltages given

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*See issues of March 27, page 627; April 3, page 659, and April 24, page 799.

TABLE I—ORIGINAL ARRANGEMENT: FEEDERS TAPPED TO TROLLEY AT SUBSTATIONS

Position	x	$l - x$	I	I_2	Line drop to car, including feeder, trolley and rails	Volts at car	Volts at motor
A	0	30	100	0	0	1500	750
B	.25	29.75	99.1	.9	4.2	1495.8	747.9
C	.50	29.50	98.3	1.8	8.4	1491.6	745.8
D	.75	29.25	97.3	2.7	12.4	1487.6	743.9
E	1	29	96.7	3.3	16.4	1483.6	741.8
F	5	25	83.3	16.7	70.8	1429.2	714.6
G	10	20	66.6	33.3	113.5	1386.5	693.2
M	15	15	50	50	127.5	1372.5	686.2

TABLE II—NEW ARRANGEMENT: FEEDERS TAPPED TO TROLLEY 1 MILE FROM SUBSTATION

Position	x	$l - x$	I	I_2	Line drop to car, including feeder, trolley and rails	Volts at car	Volts at motor
A	0	30	*96.7	3.3	51.1	1448.9	724.5
B	.25	29.75	*96.7	3.3	45.6	1454.6	727.2
C	.50	29.50	*96.7	3.3	40.1	1459.9	729.9
D	.75	29.25	*96.7	3.3	34.5	1465.5	732.8
E	1	29	96.7	3.3	29	1471	735.5
E_2	2	28	93.3	6.7	44	1456	728
E_3	3	27	90	10	57.6	1442.4	721.2
F	5	25	83.3	16.7	81.6	1418.4	709.2
G	10	20	66.7	33.3	122	1378	689
M	15	15	50	50	134	1366	683

*Represents current flowing in the feeder; to the drop from this source must be added that of the *total* current flowing in trolley from *E* toward *A*.

above, we find at 707.3 volts a balancing speed of 51.71 m.p.h. and a balancing current of 46.85 amp, while at 702 volts the respective values are 51.43 m.p.h. and 46.72 amp. The error is but 0.29 per cent.

For ordinary trolley and feeder arrangements a convenient approximate rule is that for a given percentage drop (x) in voltage, the balancing speed will drop $0.75x$ per cent, and the balancing amperes $0.4x$ per cent.

As to the reduction in schedule speed, practical operators know that a difference of more than the 5.3 volts here indicated is frequently found on substation busbars, due to careless setting of the shunt field rheostats (even with rotary converters). To put the matter in concrete terms, let us assume that the car in question is on an express run with a schedule speed of 30 m.p.h., or that the run of 30 miles between substations, with the original arrangement, requires just one hour. With a schedule speed decrease of 0.54 per cent under the new arrangement the car arrives at the end of its run just 18 seconds late.

Electric traction will be in a much higher state of perfection than at present when operating officials need to worry over such delays, especially when so much can be accomplished to save time by proper attention to accelerating, coasting, braking and the "snappiness" of stops, namely, unnecessary waiting at stations.

The relative cost of line losses is actually, for the case cited, in favor of the new arrangement, since the car runs steadily and draws less current, the penalty being the negligible loss in speed. With many stops and a close schedule, lower voltage would require that power be kept on somewhat longer to maintain the schedule exactly, and the determination of the relative total kilowatt-hours involved would require special study for each case, but surely the above simple problem shows how near the vanishing point would come the difference between the respective line losses, whether in a given case they were greater or less for the new arrangement than for the original one.

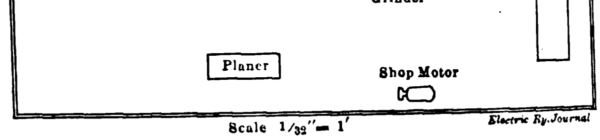
Case II. On the assumption that the new arrangement would show a very detrimental effect on voltage, schedule speed and line loss, it was proposed to inquire what would be the additional cost of copper to restore the original voltage and speed, but in view of the results shown, is it not sufficient to point out that since the detriment is actually shown to be negligible it is idle to talk of spending any money on it at all?

A wealth of testimony is certainly in favor of the new arrangement as protecting substation apparatus from dangers that are very real. The fact is that even one "buck-over" may shut down a station for hours, tie up or at least cripple a considerable section of the road, with consequent loss of prestige in the public eye, quite apart from the wasted time expense of idle train crews. The actual cost of repairs may be and often is a very large part of the total substation charge. To eliminate such sources of waste of time, money and effort, with no appreciable concomitant disadvantages and practically without expense, is certainly well worth the thoughtful attention of every electric railway operating official.

The Special Work Shop for Electric Railways

BY S. GAUSMANN, BROOKLYN, N. Y.

While some electric railways have shops capable of turning out almost any piece of special work required, most of the jobs are usually confined to the making of repair parts, bending of rail, etc. Even for such purposes almost any investment will prove a paying one. However, unless equipped at large expense a railway track shop cannot be expected to turn out all classes of special work. Its greatest value lies in preventing delays in installation, particularly in doing emergency work, while avoiding the necessity of carrying in stock a large quantity of repair parts. With a home shop force almost any emergency job can be handled in three or four days. In fact, not more than five or six hours may be required to get out a small piece urgently wanted. Orders thus may be filled in less time than it takes to make out a formal requisition on the purchasing agent and to have him transmit the order to the manufacturer, to say nothing of the time consumed in making and delivering the goods.



PLAN OF SHOP FOR TRACK SPECIAL WORK, EXCLUSIVE OF SWITCHES

It might seem that much of the track work could be made by the car maintenance department, but in practice it is found better to employ workmen who will not be distracted by jobs outside of their regular routine. Moreover, it cannot be reasonably expected that one department will give preference to jobs from another before it has its own work well ahead. Therefore, on all but the smaller properties, it is best to have a track shop under the head of the way department.

To build and equip a shop, 50 ft. x 100 ft., with rail bender, planer, drill press, shaper, rail saw and grinder, with minor miscellaneous tools, electric belt drive, steam pit for rail heating in winter, etc., should not cost more than $7,500. If the railway has an unoccupied building the cost could be reduced to $2,000. This cost could be lowered still more by the purchase of second-hand machinery, which, with the possible exception of power rail bender, saw and grinder, can be secured at very reasonable figures from dealers in such machines. The accompanying sketch shows the layout of the machines proposed.

A shop of this size can be operated with a force of one foreman and fifteen men at the following rates per diem:

One foreman	$3.50
Five machine operators, each	2.50
Eight helpers, each	2.00
Two helpers, each	1.75

At these rates the cost would be $35.50 a day, and by excluding all Sundays and ten holidays, a total of $10,756.50 for a year of 303 working days.

This force will turn out much work and at a lower net cost than outside buying even if the workmen have to be gradually trained to this class of service. As the result of specializing, they are soon continually on the lookout for ways to turn out a cheaper and better product, particularly if the foreman in charge is of progressive character.

A comparison of the costs of various kinds of work turned out by men of this class over a period of three years is interesting. In this comparison fluctuations in the prices of material are not taken into consideration, it being assumed that the prices do not change. Where the cost is the same a like amount of material has been used, but where it is not the difference is due to using the material to better advantage or changing the construction slightly without sacrifice of strength.

Bending 9-In. Rail, per Foot

	Guard	Tram
First year	$0.1282	$0.1106
Second year	.1051	.0962
Third year	.0732	.0654

Bending 7-In. Rail, per Foot

	Guard	Tram
First year	$0.1004	$0.0902
Second year	.092	.084
Third year	.0712	.0621

9-In. Frogs

	Labor	Material	Total
First year	$18.90	$39.07	$57.97
Second year	17.95	39.07	57.02
Third year	17.57	36.45	54.02

9-In. Mates

	Labor	Material	Total
First year	$22.64	$36.52	$59.16
Second year	20.32	36.52	56.84
Third year	16.03	32.98	49.01

9-In. Double-Track Crossings

	Labor	Material	Total
First year	$185.12	$294.35	$479.47
Second year	172.35	294.35	466.70
Third year	165.05	294.35	459.40

9-In. Crossover: Exclusive of Switch Castings

	Labor	Material	Total
First year	$79.96	$428.20	$508.16
Second year	78.25	428.20	506.45
Third year	74.75	431.30	506.05

While the labor cost does not decrease to any great extent the successive jobs receive more attention so that the third year's product is fully 30 per cent better than that of the first year. In addition to making up the foregoing material, fully 35 per cent of the labor charge would be expended in the manufacture of compromise plates, special work centers and other things which are occasionally required, and often wanted in a hurry.

While some railway shops may turn out cheaper work the figures given are less than the lowest prices of manufacturers. In some cases the length of service may be in favor of the manufacturer, but not enough to warrant the additional cost.

It would not be well for a shop of this size to attempt to make switches, as it has no facilities for doing so. Such an attempt would result only in a crude and unsatisfactory product.

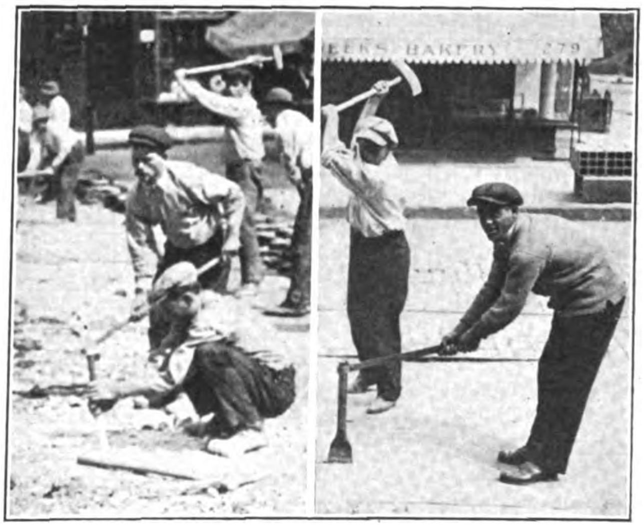
Finally, in the equipment of a shop of this kind the transport of the material from tool to tool or to laying-out floor should receive proper attention. To oblige the men to handle heavy pieces with no other facilities than rail tongs or bars will prove very costly. This way of handling work takes up too much time in addition to making the men unfit for a while to proceed with the machine work from which they have been taken. As the pieces turned out are not very heavy they can be handled by means of light inexpensive cranes between the different machines and the laying-out floor. The cost of channel-bar crane tracks carried from a properly reinforced roof has been included in the figure already presented. Such a transport system would pay for itself in six months, as one man could do the work usually performed by four in any other way.

While the shop described might be too large for some roads, it must not be thought that one of just this size is absolutely necessary. No matter if the shop has but little more than a power bender, the equipment if once installed will soon be increased and found indispensable.

A Safe and an Unsafe Way of Cutting Concrete

BY G. H. M'KELWAY, LINE ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

The safety-first movement has become such an important one that nearly every issue of any technical magazine will be found with at least one article describing some form of device designed to decrease the liability to accident or to minimize the damage when one does happen. In view of the care exercised by many companies and the ingenious devices employed by them it is surprising to note the indifference toward accidents displayed by others, and sometimes even different departments of the same company show different degrees of interest in the subject.

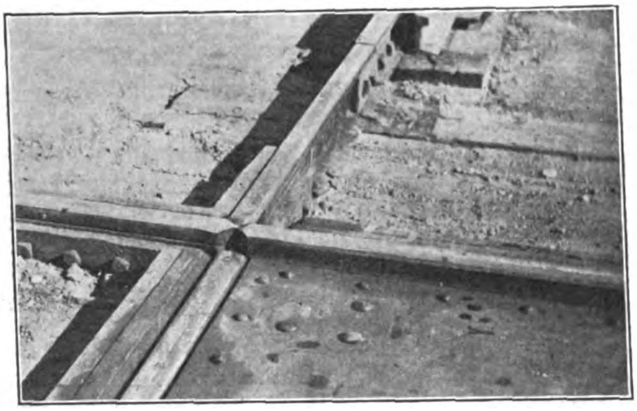


SAFETY-FIRST IN CUTTING CONCRETE PAVING FOUNDATION

Nearly every railway using city streets has to do more or less cutting of the concrete foundation of the street pavement, yet very many companies use the old form of chisel, shown herewith, held in the hand of one man while another strikes it with a sledge hammer. Occasionally the aim of the striker will not be as true as it should be and the hammer will glance off of the head of the chisel, perhaps doing no damage, or perhaps crushing a finger or one of the bones of the hand of the man holding the chisel. While such accidents very seldom happen, yet they do occur from time to time and there is no excuse for them. The handle shown in the second illustration is very cheaply and easily made, and once in use will prevent all danger of accident.

A Shockless Railroad Crossing

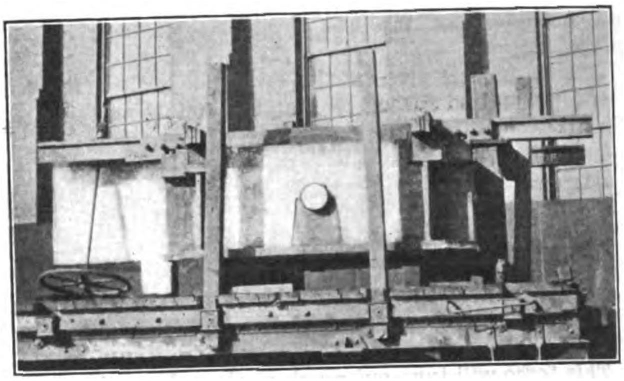
There have been in operation on the Pacific Electric Railway for a period sufficiently long to demonstrate their entire practicability, two Cobb railroad crossings of the shockless or noiseless type. One crossing has been in continuous service for more than six months and the other for more than six weeks. The officials of the railway have been much pleased with the result. At the particular intersection where they are located an interlocking tower is in use, controlling the switches, derailers and semaphores, and these two crossings are likewise controlled from the same interlocking tower. The crossings have been subjected to a daily electric traffic of more than 15,000 tons, consisting of 360 high-speed heavy cars made up in 240 trains, and steam railroad traffic, made up of heavily-loaded freight cars for the most part and a few passenger trains, amounting to 5000 tons more.



SHOCKLESS RAILROAD CROSSING—FIG. 1—CLOSE VIEW OF SHOCKLESS JOINT AFTER FIVE MONTHS' SERVICE WITH DAILY LOAD OF MORE THAN 20,000 TONS

The general principle underlying this device is that the rails which are not in use are depressed by a suitable mechanism, leaving the through rails at grade so as to give a continuous bearing surface. The ends of the movable rails are framed at an angle with each other so as to form an interlocking joint. The general appearance of this shockless crossing is shown in Figs. 1, 2 and 3.

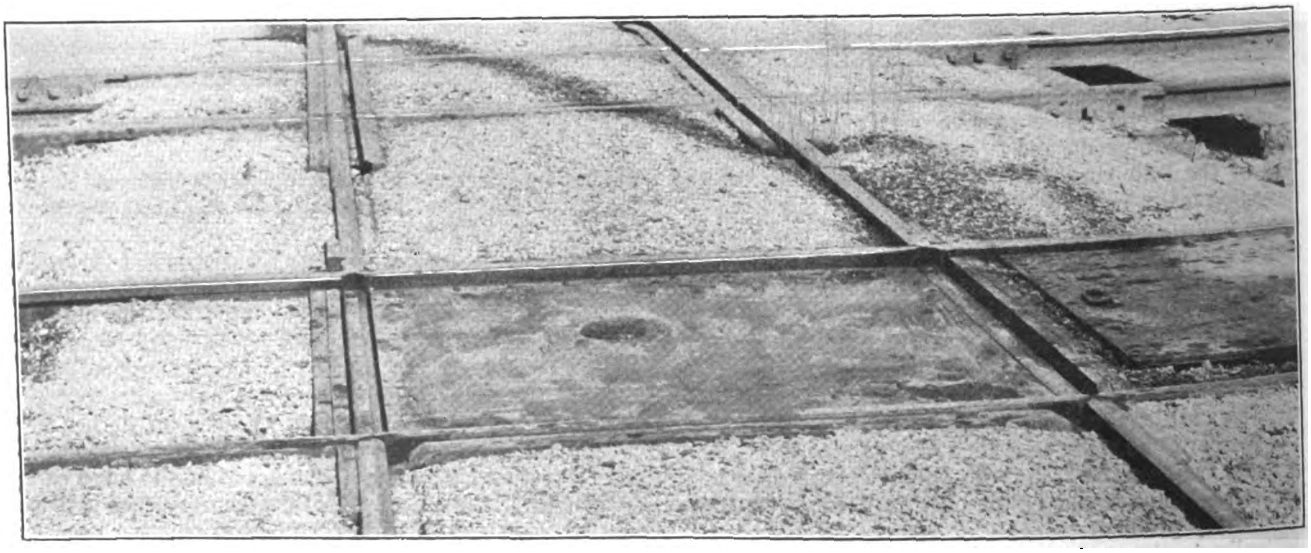
Before taking up the details of the operating mechanism it may be well to point out some of the reasons for the development of this shockless crossing. For many years there has been a strong demand for such a crossing, one of the important sources being the general public in cities which objects to the noise incident to crossings as built at the present time. Another source has been railway officials who, while not particularly interested in the noise produced by the intersections, considered as noise, are vitally interested in the cost of upkeep of crossings, special work and the adjacent roadbeds, and in the high depreciation of wheels, axles, brakes, wiring and the general fittings of rolling stock due to frequent shocks and consequent crystallization of metal. In this period of high-speed service, as interlocking systems come into more and more general use, the demand for a practical and safe shockless crossing has increased until now such a crossing seems to be a necessity.



SHOCKLESS RAILROAD CROSSING—FIG. 3—COMPLETE CROSSING READY TO DROP INTO PLACE

Coming now to the operating mechanism by which the rails are raised and lowered through a distance of about 1¾ in., attention may be directed to Fig. 4. This shows a side elevation of one rail section together with the operating devices, vertical and horizontal cross-sections of the same, and details of the operating wedge.

The rail section is bolted on a hardwood stringer, preferably creosoted, the ends of the rails being chamfered as shown. On the under side of the stringer, at each end, is a casting with an under, sloping, finished surface. The weight of the structure so far described rests upon two cast-iron wedges, one at each end, which in turn rest upon wrought-iron guide plates rigidly supported from the cast-iron box which incloses the operating mechanism. The wedges are held in proper alignment by means of wrought-iron plates, one on each



SHOCKLESS RAILROAD CROSSING—FIG. 2—SHOCKLESS AND ORDINARY CROSSINGS OF DOUBLE ELECTRIC AND SINGLE STEAM TRACK side. Projections from these at the top and bottom serve to draw the movable section downward when the wedges are drawn inward.

As will be evident from the above, the movable member is raised and lowered by the motion of the wedges which results from the rotation of a shaft carrying a rocker arm, each end of which is connected to a wedge by means of a pair of links. A half revolution of the shaft in one direction serves to lower the rail section, the reverse operation serving to raise it. Suitable guides, not shown in the illustration, serve to constrain the motion to a vertical direction. When in the extreme outward position the wedges extend to the outer extremities of the rail, and support it rigidly just as the piers of a bridge support the bridge. The wedges under the several rails of a crossing are so connected that when one pair of rails is raised to an operating position the other pair is drawn downward to its lowermost position.

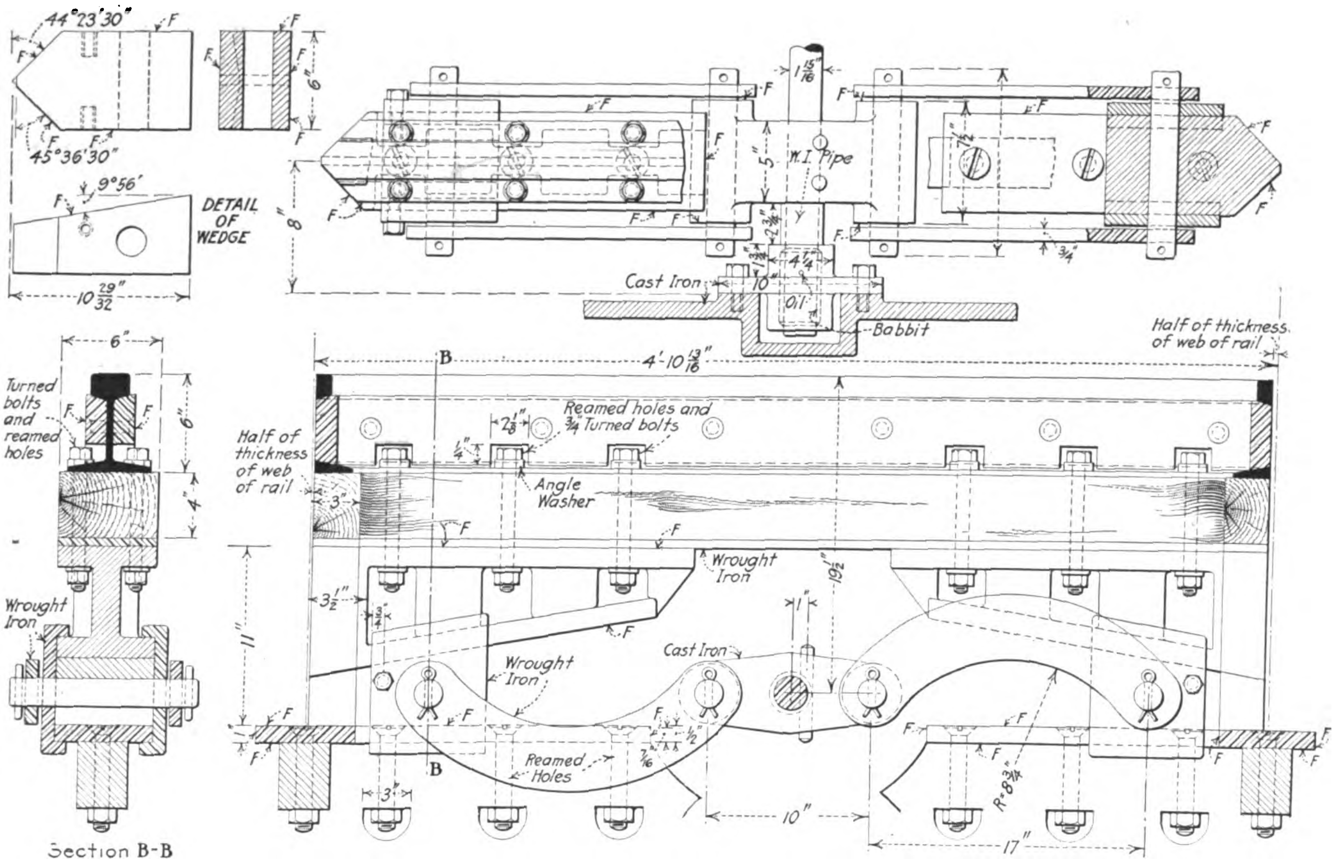
By means of this ingenious arrangement of wedges it has been possible to produce a construction in which there are no moving parts, except the wedges, which are subjected to any load or strain due to traffic. The wedges are of such form and proportion as to give long and safe service. Obviously, when the weight of any rolling load comes upon the rails and wedges all parts are locked in a fixed position.

These crossings can be operated by means of an electric motor, by a compressed-air mechanism, by hydraulic mechanism, by hand, by chain or rod, or by switch throw, the only requirement being that the main driving shaft shall make a half revolution in one direction to bring one pair of rails into effective position and then a half revolution in the opposite direction to bring the other pair of rails into the effective position. In the photographs, the small box shown between the rails is water-tight and contains an electric motor for operating the crossings. This operation requires about three and one-half seconds and a test made on an intersection which had been in use long enough for the bearings to become gummed up with dust from a near-by road showed that 6 amp at 110 volts provided ample power.

With these fundamental principles in mind some further structural and operating features of the crossing may prove of interest. When it is to be used in city streets, the covers can be made suitable for filling with the same paving material as that used in the remainder of the street surface. Under such conditions it would present no more metallic surface to view than would an ordinary intersection. The fact that there is no mechanism outside the intersection itself makes it very suitable for use in paved streets. The rails used in the intersection may be of any cross-section, and therefore of the same cross-section as those used in the adjacent tracks. These rails do not wear any faster than those along the main lines of the track because they are subjected only to rolling wear, the intersections providing a smooth rolling surface from the main road on one side to the main road on the other side. Furthermore, there are no places where foreign material can become compressed between any two surfaces, and when the intersections are constructed in accordance with the general design shown there is no way for foreign substances to get at any of the working parts.

During the six months in which the first intersection has been in operation it has neither caused a moment's delay in train service nor cost a cent for repairs or maintenance. It has received only the same general supervision and lubrication given to the mechanism for operating the split switches and the semaphores. Moreover, the experience of the past six months has not developed the necessity for changing a single feature of the design.

It is claimed that the cost of installing these intersections is no greater than that of installing an ordinary



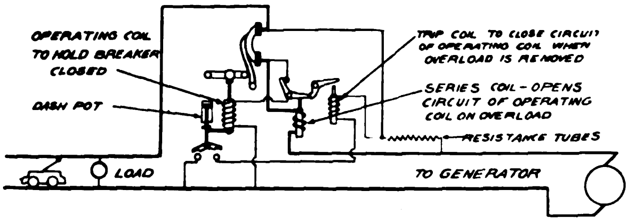
SHOCKLESS RAILROAD CROSSING—FIG. 4—SECTIONS OF ONE ELEMENT OF INTERSECTION

intersection, and when once installed properly all of its main foundation portions need never be disturbed. The rails or any of the other wearing parts can be replaced in a few hours without disturbing the paving. The cost of manufacturing the intersection is only slightly greater than that of the ordinary one, the additional expense for most installations being that represented by the cost of installing the operating mechanism.

By way of summary and on the basis of the experience mentioned the inventors of this intersection feel that they have a device which actually prevents shock and noise with consequent saving in wear-and-tear on equipment and objections from the public. The construction is simple so that the intersection can be made in any shop without special equipment. It can be operated by any plan which works in with the other equipment of a railroad. Many other advantages bound to result from the elimination of shock will occur to the reader from the description given. The patents on these crossings are controlled by the Cobb Shockless Railroad Crossing Company of Los Angeles, Cal.

A Reclosing Circuit Breaker

A novelty in d.c. circuit breakers has recently been placed upon the market. This might be termed an automatic circuit controller, as it opens the circuit in case of trouble and automatically closes it when the trouble is removed, thus reducing to a minimum the loss of time and danger in case of line trouble. The new circuit breaker interrupts the current instantly in case of a short-circuit or a predetermined overload. It remains open for a few seconds regardless of the cause for opening, and at the end of the short time-interval it closes, provided the short-circuit or overload has been removed. In case of a persistent short-circuit the breaker remains steadily open until the short-circuit is removed and then it closes automatically.


OPERATING COIL TO HOLD BREAKER CLOSED
DASH POT
LOAD
TRIP COIL TO CLOSE CIRCUIT OF OPERATING COIL WHEN OVERLOAD IS REMOVED
SERIES COIL - OPENS CIRCUIT OF OPERATING COIL ON OVERLOAD
RESISTANCE TUBES
TO GENERATOR

DIAGRAMMATIC CIRCUITS FOR RECLOSING CIRCUIT BREAKER

The obvious advantages are the saving in time and the elimination of the danger involved by the fact that an operator of a manually-controlled circuit breaker has to guess when the trouble is removed or else must wait until he receives instructions. However, aside from these, the special claims made for the device are that it enables substations to be operated without an attendant; that it protects the generator from the strains produced by closing the circuit on a dead short; that it affords protection for branch circuits so that trouble is localized to the branch on which the trouble occurs without interrupting service on remaining lines; that it protects motors from being started under full voltage with all resistance out of the armature circuits; that it reduces the fire hazard; that it gives operators or repair men absolute control of the power from any point along the line, thus saving a great deal of time and providing a remarkable degree of safety in case of accident.

Special apparatus has been developed for use in railway substations. There is one installation at the present time on the lines of the Indiana Railways Company at Indiana, Pa. This company is using the breaker on a small substation so that the substation operator can attend to other duties. While it is probable that there are instances where a breaker of this type would not be desirable for street railway service, there seems to be a considerable field for it, especially in small substations. The breakers for railway work can be set so that they will either automatically reclose at the expiration of a certain time limit regardless of the condition of the line, or so that they will not reclose so long as a short-circuit exists on the system. Also they may be made to reclose at any desired line voltage when they are feeding into a distributing network.

The accompanying illustration shows diagrammatically how the automatic reclosing feature is effected. From this it will be seen that the main contact brush is moved to the closed position and held closed by the operating coil. In case of an overload the armature of a series coil is raised and this opens a contact which breaks the circuit of the operating magnet, the latter being held open by a latch until the trip coil operates. After opening the main contact a small index current is permitted to flow around the breakers with high resistance. So long as the resistance of the load circuit is low the index current will be shunted around the trip coil, but if it is increased, enough current will be forced through the low-resistance trip coil to operate the latch and allow the contact arm to close the circuit of the operating coil, thus closing the breaker.

The device is manufactured by the Automatic Reclosing Circuit Breaker Company, Columbus, Ohio. It is regularly made in capacities ranging from a minimum of 100 amp to a maximum of 1200 amp, larger sizes being manufactured especially if required.

Roller-Bearing Trolley Wheels

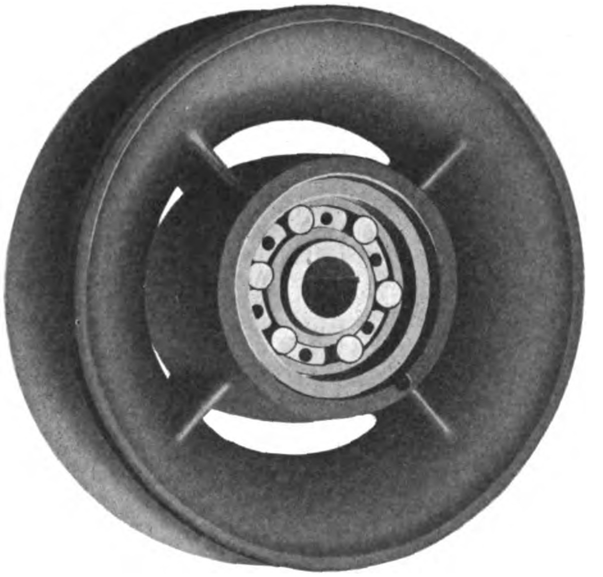
After a period of development lasting for several years the American Roller Bearing Company is now offering roller bearings for trolley-wheel service. The bearings consist of four principal parts: the inner sleeve, or casing; the load-carrying rollers; the spacing rollers; and the outer casing, or container. This forms a complete unit, all cones and rigid or stationary separators being omitted. Exhaustive tests showed that the latter parts were unreliable and also were the source of much expense, as they required frequent adjustments and replacements.

The load rollers of the bearing operate within a track that is ground on the inner sleeve and they are separated at all times by the spacing rollers. These always maintain a position parallel to the load rollers and turn in an opposite direction. They effectively prevent the load rollers from touching each other and eliminate any sliding contact so that friction is practically avoided and the heat and wear are negligible. All of the load is taken by the load rollers, the spacing rollers being used only as separators.

One of the most desirable and commendable features of roller bearings for trolley-wheel service is the fact that they require no lubrication, the elimination of friction making the use of oil or grease unnecessary. This feature reduces maintenance expense and dispenses with considerable labor at the carhouse.

Roller bearings have been tried on wheels of all sizes from 4 in. to 10 in. in diameter and they are being used for both local and high-speed interurban service. Records of many thousands of miles of operation in actual service indicate that the life of the wheel (as distinct from the removable roller bearing) is increased from two to three times, due to the fact that the wheel is maintained in a constantly vertical position. It has been impossible, however, to determine the ultimate life of the bearings themselves, as the original ones are still in continuous operation. Every bearing in service has outworn several wheels without showing any signs of undue wear.

As shown in the accompanying illustration, the wheel is bored out to admit the bearing, which is then pressed into place. The outer and inner sleeves of the bearing are insulated from the wheel by means of insulating tubes. Both ends of the bearing are insulated by means of insulating washers, thus protecting the bearing at all points. When the wheel becomes worn, the bearing, together with the insulating parts, is removed and pressed into a new wheel, the operation being completed in a few minutes.



ROLLER-BEARING TROLLEY WHEEL

The American Roller Bearing Company, Pittsburgh, Pa., the manufacturer of these bearings, has been specializing in the production of anti-friction, non-lubricant roller bearings for all kinds of heavy machinery and equipment for several years. Bearings for trolley-wheel service were developed a few years ago, during which time they have been under continuous test and observation, and the company is now prepared to manufacture them in large quantities and after designs adapted to all types and makes of trolley wheels.

New Combination Welding Outfit

A novelty in oxy-acetylene welding and cutting outfits has recently been brought out, the change-over from the welding equipment to the cutting equipment being easily effected by the addition of a simple attachment which diverts a certain part of the oxygen supply at the hose connection and introduces it as excess oxygen behind the oxy-acetylene flame. This arrangement is illustrated in the accompanying halftones, which show the welding torch and the various tips used for welding work of all kinds and with the cutting attachment removed, and also with the welding head removed and replaced by the cutting head.

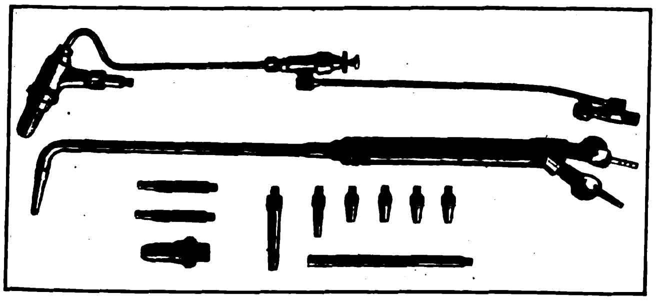


FIG 1—WELDING TORCH WITH CUTTING ATTACHMENT REMOVED

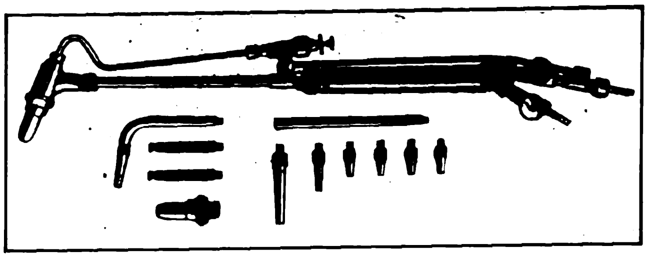
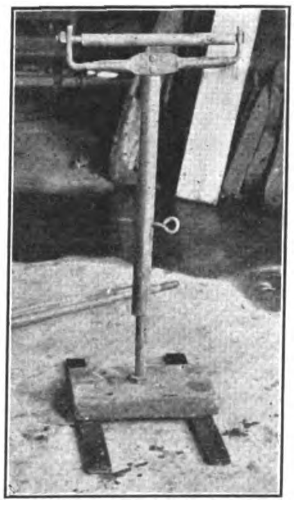


FIG. 2—CUTTING ATTACHMENT IN PLACE ON TORCH

By means of specially designed regulators correct mixing of the gases is assured, and the accurate control of the supply effects a very great saving in gas consumption. At the same time there is provided a long, white, incandescent welding flame that is entirely free from carbons and oxides. It welds anything in any metal. The cutting attachment has a multi-jet tip and is able to cut iron and steel up to 4 in. in thickness, a recent accomplishment being a cut 19 ft. 6 in. long through ⅜-in. boiler plate in twenty minutes. The outfit is manufactured by the Imperial Brass Manufacturing Company, Chicago, for general use not only in railway repair shops but also for yard and track work, and is furnished complete with torches, portable tanks, regulators, hose, goggles, welding rods, flux, etc. A two-wheeled truck for the tanks is furnished if desired by the user.

Adjustable Stand for the Forge Shop

In the repair shop of the Blue Hill Street Railway, Canton, Mass., a convenient, home-made, adjustable stand for blacksmith service is utilized. As shown in the halftone, the stand consists of the usual pipe carried on a horizontal rod at the top of a yoke to act as a roller, the latter being supported on a 1½-in. sleeve that is slipped over a spindle which in turn is supported on a wide base. The pipe at the top rolls easily on its bearing and is ¾ in. in diameter and 15 in. long. The yoke and sleeve are riveted together, the sleeve being drilled at eight points to permit vertical adjustment by a ⅜-in. horizontal pin which passes through one of the holes in the sleeve and through a corresponding hole about midway between the top and the bottom of the spindle. The range of height above the floor at the pipe roll is from 27 in. to 44 in. The sleeve is 22 in. long and the spindle is of 1-in. stock, being clamped by nuts on either side to a 13½-in. x 8-in. oak block about 2 in. thick. The latter is screwed at four points to two 2-in. x 2-in. x ⅜-in. iron straps, which give a bearing on the floor. The stand is used frequently to hold the outer end of bars that are being heated in the forge or formed on the anvil instead of the customary non-adjustable stands, and the range in height available is found to be a great convenience. The stand was built complete from scrap stock and at a nominal cost.



HOME-MADE STAND FOR FORGE SHOP

News of Electric Railways

THE DETROIT STRIKE

Precipitate Action of Detroit Employees Followed Quickly by Vote to Arbitrate

Notwithstanding a written agreement between the Detroit (Mich.) United Railway and the motormen and conductors in its employ, as organized in Division No. 26 of the Amalgamated Association of Street & Electric Railway Employees, to arbitrate all differences between them, the trainmen went on strike on May 13, at 6 a. m. and remained out until the following forenoon, May 14, when they voted to accept arbitration and return to work immediately. The specific cause of the strike was the discharge by the company of Motorman Peter Whaling, a member of the executive committee of the union, for careless operation. The employees on the interurban and city lines in other communities than Detroit served by the Detroit United Railway went out at the same time, and no interurban cars were operated on the Flint, Pontiac and Orchard Lake interurban lines, and the city service in Flint and Pontiac was cut off by the strike. The Rapid Railway, which runs to Port Huron, and the Detroit, Jackson & Chicago Railway, which operates to Jackson, were not affected by the strike as the men on these lines maintain organizations distinct from the Detroit division of the union. The Detroit, Monroe & Toledo Short Line Railway, operating to Toledo, also was not affected as no union organization is maintained on that line.

Following the decision of the men, by a vote of 1160 to 81, to strike, Mayor Marx with the assistance of the three members of the municipal street railway commission and members of his cabinet started separate conferences with the union heads and with F. W. Brooks, general manager of the company, in an endeavor to establish a basis of settlement. The conferences lasted all Thursday afternoon, and finally late Thursday night an agreement was made, subject to the vote of the strikers, that the Whaling case would go to arbitration within forty-eight hours. The men assembled at 8 o'clock on the morning of May 14 and voted unanimously to accept the arbitration offer and then returned to work immediately. The agreement also included a stipulation on the part of the company that it would take up with the proper officers of the union any differences or grievances, whether covered by the existing agreement or not, concerning the relations between the company and its employees and endeavor to adjust the same without delay, with a provision for further arbitration in the event that a settlement was not reached in conferences between the company and the officers of the union. James Couzens, chairman of the street railway commission, was named as third arbitrator in the agreement and the company selected S. T. Crapo, a prominent business man, as its party to the arbitration. The union named J. V. Cunningham, State labor commissioner.

Immediately following the calling of the strike, the company issued statements covering the record of the discharged motorman, the agreement between the company and the union and its side of the controversy. The record showed that in less than five years' service Whaling had been reprimanded sixty-four times and had been laid off thirteen times. He was in eight collisions. Once he was laid off for leaving his car to engage in a fight with a man on the street. Eight times he ran into open points, seven times he missed his run, four times he failed to make a report of accidents and twice he copied the schedule wrong. There were in the record numerous instances where he had been reprimanded for running his car ahead of schedule. The whole record, from the company's view, was cumulative testimony to the effect that Whaling operated at too great speed. His discharge followed the derailment of a car which he operated at high speed over tracks which were being reconstructed.

In its official statement to the public the company, in charging the union with violation of its agreement to arbitrate all differences, cited the exact terms of the agreement, which provides in such cases as the Whaling matter that the union may appeal to the president of the company as a board of review; then, if dissatisfied appeal to a conference of the president of the company and the president of the international union, and finally if necessary call for a board of arbitration. None of these methods was tried, notwithstanding information conveyed to the union that the company would take up the matter in the regular way. The company pointed out that this plan had been in effective use for more than fifteen years and had never before been questioned or in any way deviated from in any disciplinary matter, although hundreds of cases had been handled satisfactorily to both sides within that time.

The reply of the local union to the charge of breaking the agreement was to the effect that the company had not always lived up to the terms of its agreement with the men, although specific cases of violation were missing from the union's statement. William D. Mahon, international president of the union, whose home is in Detroit, was called to the union meeting about 2:30 o'clock on the morning of May 13 and, according to the newspapers, pleaded against the strike but without success. Later Mr. Mahon announced that the international union would support the local, one newspaper stating that "the men swept Mr. Mahon into the position of supporting them."

The company was taken by surprise, and the whole city was astounded by the action of the men. Notice of a strike vote to be taken by the men had been given in the newspapers, but it was generally believed that the men would vote to follow the regular course and arbitrate the question in dispute.

Arrangements had been made by the company for the operation of some of its cars on Woodward Avenue by men other than the strikers when the agreement to arbitrate was accepted. It was planned to start some cars on the afternoon of May 14, but when the union men decided to return to work the company telegraphed the street car operators it had engaged not to come to Detroit.

Following the strike it was stated in Detroit newspapers that several hundred of the union men who operate outside of Detroit were not notified of the meeting and were given no voice in the matter. Newspapers in Flint and Pontiac reported dissatisfaction by some of these men because recognition had not been shown them. These statements have not been denied by the union.

One of the interesting phases of the strike is the fact that at the meeting at which the strike vote was taken the plan of arbitration, as provided in the agreement, had few supporters while only a few hours later the men voted unanimously to arbitrate.

The strike proved a harvest for the jitneys, the prices of transportation running from 10 cents to whatever the drivers could get. In very few instances did the drivers stick to a 5-cent fare. Practically every motor car in the city was in service during the short period of the strike, but within an hour after electric railway service was resumed nearly all the automobiles engaged in transportation disappeared. There are only three regular jitney buses in the city.

STRIKE IN LONDON

Practically the entire London County Council Tramway was tied up by a strike of the employees, who quit work on May 16 when the County Council of London, England, refused their demand of a 15 per cent increase in wages in the form of a war bonus because of the increased cost of living. Only forty cars out of the 1500 usually operated on the system were run on the first day of the strike, most of these on the suburban line which runs to Woolwich Arsenal, on the north side of the Thames opposite Woolwich. In the districts to the north of the Thames, comprising old London, Westminster and the outlying sections, the omnibus still reigns supreme save for the competition of the underground railway system. None the less, omnibus service has already been much restricted and hampered by the commandeering of buses for war service, and the tram strike has in consequence affected the city's transportation service much more seriously than in normal times.

THE SYRACUSE ARBITRATION

Negotiations Reviewed in the Three-Cornered Empire United Controversy

Under the terms of the settlement by which the trainmen in the employ of the Empire United Railways, Syracuse, N. Y., returned to work, as noted in the ELECTRIC RAILWAY JOURNAL of April 17, page 767, the company started to negotiate a contract with the Amalgamated Association. It was then served with written notice by the Brotherhood of Locomotive Engineers and the Order of Railway Conductors that no contract could be entered into with the Amalgamated which would not violate the Brotherhood contract. For a time this notice held up the negotiations, but after a week or so the negotiations were resumed. The demands of the men, however, precluded their being accepted by the company, and as the terms under which the men returned to work contained an arbitration clause, it was agreed that the representatives of the company and of the union meet and present their arbitrators.

In the meantime a new situation developed over about 8 miles of line between Auburn and Port Byron, at which point connection is made with the main line of the Empire United Railways between Rochester and Syracuse. The line between Auburn and Port Byron was formerly an independent corporation, known as the Auburn & Northern Railroad, but when the Empire United Railways was organized the Auburn & Northern Railroad was absorbed and became part of the Rochester division of the Empire United. The Brotherhood had contracts on the Empire United, but had not exercised them on the Auburn & Northern division. Subsequent to the date of the Brotherhood contract, an Amalgamated union was organized on the Auburn & Syracuse and as the men operating the former Auburn & Northern branch lived in Auburn they joined the Amalgamated union. As a result a controversy developed between the two organizations, both of which claimed jurisdiction over the Auburn-Port Byron branch. The fact that only four men were involved in this controversy, however, did not mitigate the fierceness with which this question of jurisdiction was contested.

The Brotherhood agreed in the fall to waive its rights to this piece of track until May 1, 1915. The settlement of the strike controversy left everything in statu quo, pending the adjustment of the differences. The company felt that it could not force the withdrawal of the Amalgamated men from the line and turn it over to the Brotherhood without violating the truce which was established pending the arbitration. On the night of April 30 the Brotherhood men operating on the Rochester Division voted not to take out the cars on the morning of May 1. They made good their threat and the first cars were not taken out. The company was therefore left with the alternative of a strike on the Rochester division, if it did not comply with the demands of the men on that division, or a strike of the Amalgamated on the Auburn & Syracuse division, if it did. The company finally decided to allow the Brotherhood men to operate the cars into Auburn. There was considerable disturbance at Auburn, but after a protest by the company calm was restored, the company making arrangements to have the through cars between Auburn and Rochester operated by Brotherhood men and the local or so-called stub cars, running only between Auburn and Port Byron, operated by the Amalgamated men.

As both sides agreed to arbitrate the entire issue there will be a three-cornered arbitration, involving the Amalgamated, the Brotherhood and the company. The company is particularly interested in this matter because under the present arrangement of dual operation it has to pay two sets of men for the work which one set would ordinarily do.

The company appointed R. A. Dyer, Jr., formerly general manager of the United Railways, as its arbitrator, and the Amalgamated appointed William B. Fitzgerald, member of the executive board, as its arbitrator. These two arbitrators on May 13 rendered their decision. It gives a contract to the Amalgamated on the Syracuse-Oswego division of the Empire United Railways and on the Syracuse & South Bay Electric Railroad. This contract is practically a duplicate of the Brotherhood contract and gives the men the same wages and working conditions which have prevailed heretofore as covered by the contract with the Brotherhood. On May 14 the Auburn & Northern matter was still to be arbitrated. It was expected that in this arbitration James M. Lynch, State labor commissioner, would take an active part.

In Rochester, where the Empire United Railways have entrance contracts with the New York State Railways, the Buffalo, Lockport & Rochester Railway and the Empire United Railways have been operating their cars with Brotherhood crews and they have established joint terminals for both freight and passengers. The men employed on the local lines in Rochester recently demanded that the New York State Railways compel the two foreign roads to disembark their crews at the city limits and that the cars of the interurban lines while operating within the city be manned by Amalgamated men furnished by the New York State Railways. This action has still further complicated matters.

FIVE NEW PENNSYLVANIA COMMISSIONERS

Governor Martin G. Brumbaugh of Pennsylvania sent to the Senate on May 19 his nominations for members of the Public Service Commission. He retained only two of the old members, Samuel W. Pennypacker and M. J. Brecht. The new members of the commission are John S. Rilling, Erie, nine-year term; William A. Magee, Pittsburgh, eight years; John Monoghan, Philadelphia, six years; Edgar R. Kiess, Williamsport, five years, and William D. B. Rainey, Montrose, four years. Chairman Pennypacker is named for the ten-year term and Mr. Brecht for seven years. The recalling by Governor Brumbaugh of the nominations to the commission made by his predecessor was noted in the ELECTRIC RAILWAY JOURNAL of April 24, page 810.

CLEVELAND CARHOUSE CONTRACT CONTROVERSY

Following the presentation of charges to the City Council of Cleveland, Ohio, by Roderick D. Grant on May 10 to the effect that he had been offered $12,000 by one of the prospective bidders a year ago to withdraw his bid for the construction of the Harvard Avenue carhouse, Attorney Harry Crawford stated that, since such charges had been made, the Cleveland Railway courts the widest and fullest investigation. Peter Witt, street railway commissioner, asserted that his office had been open to all since he had occupied it, and that the Council would be expected to investigate the charges.

On May 17 the Council adopted a resolution to make such an investigation and the committee to whom the duty will fall will have power to administer oaths, subpoena witnesses and compel them to attend the hearings. The company and Mr. Witt insisted upon such power being granted to the committee.

Councilman Koch has introduced an ordinance to increase the allowance of the company for operating purposes ½ cent per car-mile to provide for the increase of 2 cents per hour in the wages of motormen and conductors. A resolution has also been introduced in the Council to create a line between the Public Square, Cleveland, and the new passenger steamer docks at the foot of East Ninth Street. The distance is only a few squares and for this reason the fare is fixed in the resolution at 1 cent. In making a recommendation for 1-cent fare, Mr. Witt said that the greater part of the business of the line would require the use of transfers and this would be the same as where a penny each is paid for the transfers, but it will save the passengers and the conductors the trouble of bothering with the slips.

On May 17 Judge Vickery's decision that the city had authority to grant the Cleveland Railway a franchise for an extension of the Euclid Avenue line between East Twenty-second and East Fortieth Streets without consents of property owners was sustained by the Court of Appeals. The case will be carried to the Supreme Court at once. This is the suit in which Frank Billings and twenty-three other residents of that section of Euclid Avenue, known as "Millionaries' Row," sought an injunction to prevent the construction of tracks and operation of cars on the street. The company has never occupied the section of Euclid Avenue in question.

DECISION IN INDIANAPOLIS EXTENSION CASE

In the Marion County Circuit Court on April 28, Judge Ewbank declared void the order of the Public Service Commission of Indiana directing the Union Traction Company to permit the Indianapolis Traction & Terminal Company to use the Union Traction Company's tracks in College Avenue between Fair Grounds Avenue and Forty-sixth Street, and ordering the Traction & Terminal Company to construct near Forty-sixth Street tracks for turning its cars at that point and extend its city service in College Avenue between Fair Grounds Avenue and Forty-sixth Street. Some time ago a petition was presented to the Public Service Commission, asking that the city company be directed to extend its service as far as Forty-sixth Street over the interurban tracks of the Union Traction Company of Indiana. The commission, upon hearing, ordered this extension, and part of the order provided that the Indianapolis Traction & Terminal Company should pay the Union Traction Company the sum of 1½ cents for each passenger carried in College Avenue between Fair Grounds Avenue and Forty-sixth Street, unless the companies should agree on a different compensation. Commenting on this point, Judge Ewbank said that there was nothing to show that the rate fixed by the commission was just and equitable between the companies. Complete control over the operation of street cars and the laying of tracks lies with the city of Indianapolis, Judge Ewbank said, and the Public Service Commission exceeded its authority in issuing the order for the extension of the city service in College Avenue, the Common Council of Indianapolis having taken no action in the matter as provided by law. The decision is of interest as similar orders by the Public Service Commission are under consideration in other cities in Indiana.

NEW OFFICERS OF A. I. E. E.

At the annual meeting of the American Institute of Electrical Engineers, held at New York, May 18, preceding the award of the Edison Medal to Dr. Alexander Graham Bell, the report of the tellers' committee announced the election of officers as follows:

President, J. J. Carty, chief engineer American Telephone & Telegraph Company, New York; vice-presidents, William McClellan, consulting engineer, New York; Comfort A. Adams, Harvard University, Cambridge, Mass., and J. F. Stevens, consulting engineer, Philadelphia; treasurer, G. A. Hamilton; managers, C. E. Skinner, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; John Taylor, General Electric Company, Schenectady, N. Y.; F. B. Jewett, Western Electric Company, New York, and Harold Pender, University of Pennsylvania, Philadelphia.

The report of the board of directors, presented at the meeting, showed that the Institute on April 30 had 8054 members, of whom 448 were fellows, 1079 were members and 6522 were associates. The Institute now has thirty-one sections and fifty-two branches.

WAGE CONFERENCES AT SPRINGFIELD

Conferences have been held between officials of the Springfield (Mass.) Street Railway and representatives of the employees' union relative to the establishment of a new scale of wages. The men recently asked the company for increases varying from a minimum of $1.40 to a maximum of $2.10 a week, desiring that the present daily minimum of $2.30 be raised to $2.50 and the maximum from $2.85 to $3.15 a day. The request of the men applies to both the Springfield and Worcester systems, which are connecting properties operated by the New England Investment & Security Company. At Springfield payment by the day is in force, and in conference with the union the company offered to establish payment on an hourly basis, suggesting a maximum rate of 28.5 cents after three years' employment, with a graduated scale having a minimum of 23 cents. The proposed scale of hourly payment is now in force on the lines of the Worcester Consolidated Street Railway. After the conferences last week it was stated that the men would not agree to the Springfield company's offer, but that arbitration would be resorted to in the event of failure to come to terms. The rates finally established are to take effect as of June 1, 1915, according to the present understanding between the parties.

A long conference between the companies and the men was held at Worcester on May 17, but no agreement was reached. Both sides are at present deadlocked over the wages question. The men insist on a flat day rate with a 20-cent increase over the Worcester minimum and an increase of 30 cents over the Springfield maximum. By such a change the Worcester men would gain an hour's pay over the present rate plus the increase requested by the men in both cities. The Springfield employees receive as much pay in nine hours as the Worcester employees do in ten in view of the fact that the latter are paid by the day. Officials of the Springfield company stated that it is out of the question to consider an increase in wages at this time. In Springfield the company has been obliged to undertake extensive repairs and jitney competition is severe, now cutting the earnings by more than $200 a day, with prospective further cuts in the coming summer. A further conference was scheduled for May 20.

Action on New York Service Board Charges.—It was stated at the executive chamber in Albany on May 19 that action was expected before May 24 on the charges preferred against the members of the Public Service Commission for the First District.

Municipal Ownership in Pekin.—The Pekin (Ill.) Street Railway was formally transferred to the city on May 4 and is now being operated in the interest of the municipality. The property consists of more than a mile of track, a storage-battery car and a charging station. The line is to be rebuilt, re-equipped and extended by the city.

New Tennessee Line Opened.—The Nashville (Tenn.) Traction Company has opened for regular service a 3-mile section of its road extending from Fifth Avenue and Church Street, Nashville, to Mulberry Street, to Second Avenue, to Lafayette Street, to the Murfreesboro pike, north of the tracks of the Tennessee Central Railroad.

Cincinnati Will Accept Company's Offer.—The Cincinnati, Newport & Covington Railway has proposed to pay into the treasury of Cincinnati, Ohio, $65,000 in settlement of the city's claim of $105,000, now pending. This is the amount agreed upon in the franchise that was defeated in a referendum vote some time ago. The city will ask that judgment be rendered for the amount offered and this will close the matter.

Important Ohio Supreme Court Decision.—In the case of Police Chief William H. Jackson against Saul Berger, who as agent of the Roth Shoe Company, Cincinnati, was prosecuted for discharging Edward Schroeder because he was a member of the shoe workers' union, the Ohio Supreme Court rendered a decision on May 4 sustaining the right of an employer to discharge employees for this cause. This decision is in line with the decision of the United States Supreme Court in the Coppage case which was rendered on Jan. 25, 1915.

Emergency Lighting System Disapproved.—The Public Service Commission for the First District of New York has disapproved plans for emergency car lighting submitted by the Long Island Railroad in conformity with the commission's order for auxiliary lighting apparatus in cars used in the tunnel on the Atlantic Avenue Division. The commission's objection was that the lights would not be automatically turned on in case the power current was shut off, and its order contemplated an emergency system which would automatically supply light when the power current failed.

Fenders for New York Buses.—The Public Service Commission for the First District of New York has approved the design of a fender with which the Fifth Avenue Coach Company proposes to equip its motor omnibuses. The fenders are to be attached to the sides of the vehicles in front of the rear wheels, so as to prevent pedestrians from falling under those wheels. The motormen of such vehicles can guard against accidents in front, but it has happened that without his knowledge persons have run into the sides of the buses and been injured by the rear wheels. The proposed fender is designed to prevent such accidents.

Chicago Seeks Merger Enabling Act.—The local transportation committee of the Chicago City Council has approved a bill to obtain authority from the State to merge the surface and elevated railways. Although this plan was approved by the elevated railroads of Chicago and the Chicago Surface Lines two years ago, this is the first definite action taken by the city to bring the merger about. The enabling act is necessary because the five elevated railroads were organized under the steam railroad act, the Chicago Railways under the horse and dummy act, and the Chicago City Railway under a special charter which was granted by the State.

The Bauer Bill.—Governor Willis and leaders in the House and the Senate of Ohio have assured the Cincinnati people that the Bauer rapid transit bill, making a municipal loop possible, will not be killed because some of the members of the Legislature from Cincinnati and Hamilton County failed to support administration measures. Governor Willis has also assured the Cincinnati officials that nothing will be done to embarrass the city in the renewal of the canal water leases, as was feared a week or two ago. All leases will contain a clause voiding them automatically when the city is ready to take over the property and comply with the conditions defined in the statute enacted especially for the city.

Power Brake Order Extended.—The Coney Island & Brooklyn Railroad has been granted an extension of time by the Public Service Commission for the First District of New York to Oct. 15, 1916, in which to equip certain of its cars with power brakes as ordered by the commission. The extension was granted in accordance with the report of Clifton W. Wilder, electrical engineer of the commission, with the understanding that during the summer of 1915 there will be only 153 double-truck cars and during the summer of 1916 only sixty-seven double-truck cars of the company operating without geared hand brakes. The company has already equipped its heavy cars with air brakes, as required by the commission's order.

Power Contract Declared Unreasonable.—The Railroad Commission of California has rendered a decision in which it declared the existing rate between the United Light & Power Company and the San Francisco-Oakland Terminal Railways for electric power to be unjust and unreasonable. The commission finds that when the rate was established in 1911 the same interests dominated both the United Light & Power Company and the San Francisco-Oakland Terminal Railways, known as the Key Route System. The commission finds that through the medium of the unjust rate the railroad has been improperly deprived of $183,000. In conclusion the commission says: "The parties responsible for this contract have not yet undone the wrong which the making of the contract involved. It should be stated that the contract in question was made under a former management and not by the present operating head of the San Francisco-Oakland Terminal Railways."

The Queens County Mandamus Proceeding.—The Public Service Commission for the First District of New York has notified the New York & Queens County Railway that it will consent to an adjournment of the mandamus proceeding against the company until the proceeding in regard to the declaration of abandonment of certain of the company's lines in Queens is finally disposed of, on the condition that the company will expedite the latter proceeding and will promptly obey the writ of mandamus if it is issued. The mandamus proceeding was brought to compel the company to construct and operate its street railroad in Flushing Avenue between Jackson and Ehret Avenues. The company recently filed a declaration of abandonment of portions of its franchise routes, including the stretch in Flushing Avenue mentioned. The commission refused to approve the declaration, and the company asked for a suspension of the mandamus proceeding until the abandonment question is finally decided.

Report on Municipal Ownership in Montreal.—That it would cost Montreal $49,000,000 to build itself a municipal tramway system, exclusive of the cost of acquiring all or part of the present system of the Montreal Tramways, is the principal feature of a report submitted to the Board of Control by Comptroller Thomas Cote. If the existing lines were taken over an outlay of $30,000,000 would still be necessary. The report, which was prepared by G. R. MacLeod, one of the city engineers, says: "It is extremely difficult to determine just what mileage of tracks would be necessary, because many of the new lines would have to compete with existing lines of the Montreal Tramways, and would, therefore, operate at a disadvantage. Routes, aggregating about 100 miles of track (single) or 50 miles of double track, supplemented by 10 miles of subways for the more central parts of the city would probably be required. The total cost of this system is estimated at approximately $49,000,000.

Annual Meeting of the Society for Electrical Development.—The annual meeting of the Society for Electrical Development, Inc., was held in New York on Tuesday, May 11. Henry L. Doherty, president of the society, presided. The following men were unanimously re-elected directors of the society for the ensuing four years: For director to represent the central station interests, J. F. Gilchrist; for director to represent manufacturing interests, W. A. Layman; for director to represent contracting interests, J. R. Strong; for director to represent jobbing interests, F. S. Price; for director-at-large, Charles W. Price. J. M. Wakeman, general manager, read his report of the year's work. H. W. Alexander, director of publicity, supplemented Mr. Wakeman's report with a few brief statements of the work of the publicity department. Mr. Wakeman said that the suggestion had been approved by the board of directors that the society should maintain a representative on the Pacific Coast, that the board of directors had approved of the plans for "Electrical Prosperity Week," and that in no case had any section of the society expended in its work the full amount appropriated in the last year's budget.

PROGRAMS OF ASSOCIATION MEETINGS

New York Electric Railway Association

At a meeting of the executive committee of the New York Electric Railway Association held at the Transportation Club in New York City on May 17 it was decided to hold the thirty-third annual meeting of the association at the Hotel Oriental, Manhattan Beach, N. Y., on Tuesday and Wednesday, June 29 and 30. The following members of the executive committee were in attendance. James F. Hamilton, Schenectady; John J. Dempsey, Brooklyn; James P. Barnes, Rochester; S. Walter Mower, Cooperstown; Wilbur C. Fisk, New York; W. O. Wood, Long Island City; and C. C. Dietz, Brooklyn.

Pan-American Financial Conference

At least fifty-seven delegates, representing eighteen of the twenty Latin American Republics—Haiti and Mexico alone having no delegations—will meet in the hall of the Americas of the Pan-American Building, Washington. on May 24. The opening address of welcome at the Pan-American Financial Conference will be made by the President of the United States. This conference has been born of immediate and pressing practical questions which have emphasized the neglect of the financial and trade relations between the United States and Latin America, despite the uninterrupted growth of friendly diplomatic and social intercourse of the nations of America. Practical results will be the aim of the meeting. Secretary McAdoo and Prof. L. S. Rowe of the University of Pennsylvania, who has been appointed secretary-general of the conference, have devised methods to permit of intimate and definite discussion of the problems of Latin-American countries. The secretary's plans for the program contemplate devoting the greater part of the week to separate conferences between the delegates of each of the eighteen Central and South American nations and representatives of the United States. He will appoint eighteen committees, composed of delegates of the United States, to confer with the respective visiting delegations. There also will be some general meetings to discuss questions of common interest to all the American republics.

Financial and Corporate

ANNUAL REPORTS

New Orleans Railway & Light Company

The comparative statement of income, profit and loss of the New Orleans Railway & Light Company, New Orleans, La., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Operating revenue:		
Railway department	$4,398,507	$4,401,152
Electric department	1,427,294	1,335,186
Gas department	1,186,322	1,158,094
Total	$7,012,124	$6,894,432
*Operating expenses:		
Railway department	$2,341,420	$2,439,154
Electric department	561,227	555,308
Gas department	526,224	425,107
Total	$3,428,871	$3,419,569
*Net operating revenue	$3,583,253	$3,474,863
Net revenue—outside operations	8,012	11,791
*Total net revenue	$3,591,265	$3,486,654
Revenue deductions:		
Taxes	$761,223	$724,535
Uncollectible consumers' accounts	9,000	6,661
Total	$770,223	$731,196
*Net operating income	$2,821,042	$2,755,458
Miscellaneous income	45,551	34,763
*Gross income	$2,866,593	$2,790,221
Income deductions	1,753,848	1,731,879
Net income before deducting charges for renewals and replacements	$1,112,745	$1,058,342
Charges for renewals and replacements	189,618	180,813
Net corporate income	$923,127	$877,529
Less dividends on stocks of subsidiary companies held by others	4,013	4,770
Balance of net income carried to surplus	$919,114	$872,759

*Not including charges for renewals and replacements.

During the year the operating revenues increased $117,692 or 1.71 per cent, the railway department showing a loss of $2,645 and the electric and gas departments gains of $92,109 and $28,227 respectively. The total operating expenses increased only $9,302, the large decrease of $97,734 in the railway department being this much overbalanced by the increase of $5,919 in the electric department and $101,117 in the gas department. The net operating revenue of all departments increased $108,389 or 3.12 per cent, while the net income increased $46,355 or 5.31 per cent.

The report states that the increase in the net income is very gratifying, particularly when it is considered that the operating expenses in the gas department were largely increased by the higher price of gas oil, and that the gas rates were reduced on April 1 and the electric rates on Dec. 1. On April 26 the fare on the West End and Spanish Fort line was reduced from 15 cents round trip to 5 cents each way. This materially benefited the revenue on this line and effected a marked reduction in the cost of operating Spanish Fort Resort.

The actual charges for maintenance during the year amounted to $750,768. In addition to this amount, there was expended $221,628 for renewals and replacements, making a total charge of $972,396. There was reserved from income for renewals and replacements $189,618, making the net charge to the reserve $32,009.

The capital expenditures for construction, improvements and betterments during 1914 were as follows: Railway roadway and line, $210,641; electric line system and accessories, $94,347; gas distribution system and accessories, $145,145; plant equipment, $18,708; rolling stock and miscellaneous equipment, $15,283; buildings and structures, $191,791, and engineering and miscellaneous, $64,271, a total of $740,188.

The following table shows comparative traffic and operating statistics for 1905 and 1914:

	1914	1905
Track mileage—all track reduced to single.	205.92	190.92
Motor passenger cars	534	466
Other passenger cars	46	36
Work cars, wreckers, sprinklers, etc	62	50
Revenue passengers carried	87,249,918	65,021,214
Transfer passengers carried	22,979,988	6,641,193
Percentage of passengers using transfers	26.3	10.2
Average fare per passenger—cents	3.96	4.57
Car mileage	19,625,411	16,753,874

Northern Ohio Traction & Light Company

The statement of income, profit and loss of the Northern Ohio Traction & Light Company, Akron, Ohio, for the year ended Dec. 31, 1914, follows:

Gross earnings:	$2,817,271
Passengers	643,977
Light and power	7,627
Car mileage	88,259
Freight, etc.	49,795
Parks	16,377
Interest and discount	12,779
Miscellaneous	
Total	$3,636,085
Operating expenses:	
Maintenance of way and structure	$358,974
Maintenance of equipment	299,389
Operation of power plants	402,171
Conducting transportation	652,893
General	524,002
Total	$2,237,429
Net earnings	$1,398,656
Interest on funded debt and notes payable	606,898
Net income	$791,758
Profit and loss credits:	
Profit and loss surplus, Dec. 31, 1913	$1,041,324
Miscellaneous profit and loss credits—net	1,325
Total	$1,042,649
Profit and loss gross surplus	$1,834,407
Profit and loss charges:	
Refinancing costs, including discount on bonds and capital stock sold at less than par	$29,597
Expenses account of injuries and damages and taxes in excess of amounts charged to operating expenses	118,768
Reservation for depreciation of cars and equipment	37,500
Reservation for doubtful accounts receivable	7,500
Dividends on preferred stock	182,364
Dividends on common stock	450,000
Total	$825,729
Profit and loss surplus, Dec. 31, 1914	$1,008,678

The gross revenue for 1914 was $3,636,085 as compared to $3,284,533 in 1913, an increase of $351,552 or 9.7 per cent. During the year the operating expenses and taxes increased $217,775 or 10.7 per cent, while the net earnings increased $133,777 or 10.5 per cent. The gross earnings per mile were $12,637 in 1914 and $12,291 in 1913, and the net earnings per mile were $4,444 in 1914 and $4,457 in 1913. The operating ratio in 1914 was 61.53 as compared to 61.49 in 1913.

The average mileage in operation during 1914 was 236.777. During the year the mileage of the system was increased 3.55 miles. The total expenditures for additions and improvements during 1914 amounted to $740,896. Five interurban coaches and sixteen city cars of the pay-as-you-enter type were added, and sixty-two city cars of the Akron line were rebuilt for pay-as-you-enter service. A material increase in production of power was effected in the company's various plants, the output being 74,739,133 kw-hr. in 1914 and 57,903.294 kw-hr. in 1913.

On Dec. 31, 1913, there were pending in the courts 135 claim cases against the company, but at the end of 1914 the number had been reduced by forty-seven cases. In pensions and relief money $7,184 was distributed during the year. Twenty retired employees are now receiving pensions. During the year the company's number of stockholders increased from 1509 to 1813.

Westinghouse Electric & Manufacturing Company

The gross sales of the Westinghouse Electric & Manufacturing Company in the year ended March 31, 1915, amounted to $33,671,485, as compared to $43,733,646 the year before. From this total $2,009,744 was saved as net income available for dividends, as compared to $4,058,809 in 1914. Stockholders received $1,707,259 in dividends, and as the profit and loss account was charged with $444,498 for depreciation and adjustments and $126.257 for miscellaneous reserves, the net revenue was not sufficient by $268,000 to offset the debits against it. The total surplus at the end of the year was $7,473,411, as compared to $7,659,130 for the preceding period.

The sales billed show a large reduction for the year caused chiefly by the unfavorable business conditions during the period, but partly by the month's strike last summer in East Pittsburgh. All of the extraordinary expenses caused by the strike, as well as the factory and general expenses during the strike, were charged against the income for the year. The value of unfilled orders on March 31, 1915, was $8,951,410, as compared to $7,951,385 at the close of the previous year. The average number of employees during the year was 15,145, as compared to an average of 18,635 during the previous year.

The report shows that the book value of the company's investments in foreign countries on March 31, was $10,433,765; in traction and power companies, $1,241483; in miscellaneous companies, $1,010,037, and in miscellaneous investments, $316,710, a total of $13,001,995.

UNITED RAILROADS DECISION

California Railroad Commission by Own Accounting Finds Deficit of $4,000,000 Instead of Surplus—Dividends Frowned On Until Solano Note Is Adjusted

In a bulky decision handed down on May 18 the California Railroad Commission, in commenting upon the $1,096,000 withdrawn by note from the treasury of the United Railroads of San Francisco by Patrick Calhoun for use in the Solano project, said that in the absence of restitution or the presentation of a plan that would bring about the restoration of the funds, it would not look with favor upon disbursements in the form of dividends to stockholders. This decision was on the investigation begun by the commission last August. Previous reference to the Calhoun note was made in the ELECTRIC RAILWAY JOURNAL of June 6, 1914. The commission now states that it has traced $888,412 of the amount withdrawn, but $207,588 remains unaccounted for.

The commission declares that instead of a surplus of $1,018,632, as shown by the books of the company as of June 30, 1914, there was in reality a deficit of approximately $4,000,000 on that date. The difference arises from a lack of agreement as to the proper method of accounting, the company asserting that sinking fund assets are proper offsets to the liabilities which they secure. The commission intends to submit to the company a list of the items constituting the deficit and invite the company to give testimony showing that the deficit was on June 30, 1914, or is now less than the amount determined by the commission.

In its decision the commission reviews the financial history of the company since the fire and expresses the opinion that President Lilienthal is eager to rehabilitate its finances. The total indebtedness of the company is placed by the commission at $41,700,000, but judging by similar systems, the commission states that the value of the physical property of the company will not reach this figure.

The company is ordered to set aside $550,000 annually for three years for betterments and improvements. An amount of $250,000 may be spent annually for building up the property, and $300,000 annually for acquiring additional facilities, making extensions and meeting franchise obligations. The latter expenditure is under the supervision of the commission.

TAXATION VALUES IN UTAH

The Utah State Board of Equalization has announced for the purposes of taxation the valuation of public service corporations of the State. The total valuation of $55,443,448 is an increase over last year of $1,394,235. The value of railroads is $31,785,760; of interurban railways $5,698,823, and of light and power companies $2,757,736. The properties controlled by the Electric Bond & Share Company have the highest values, the Utah Power & Light Company being assessed at $2,586,297 and the Utah Light & Traction Company at $4,095,218.

Albuquerque (N. Mex.) Traction Company.—On May 8 George Roslington was appointed receiver for the Albuquerque Traction Company upon the petition of the First Savings Bank & Trust Company, trustee. The bank asserted that the conditions of the deed of trust had been violated, no interest having been paid for more than two years on the $116,000 of outstanding bonds, and taxes having been allowed to become delinquent.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has sold to N. W. Harris & Company, Perry, Coffin & Burr and Merrill, Oldham & Company, Boston; Harris, Forbes & Company, New York, and Harris Trust & Savings Bank, Chicago, $190,000 of Boston & Northern Street Railway and $160,000 of Old Colony Street Railway 4 per cent first mortgage gold bonds, due on July 1, 1954. These are being offered at 83 and interest, to yield about 5 per cent. They are underlying issues of the Massachusetts Electric Companies, being parts of outstanding issues of $7,635,000 and $6,352,000 respectively.

Carolina Power & Light Company, Raleigh, N. C.—The comparative operating figures of the Carolina Power & Light Company, the Yadkin River Power Company and the Asheville Power & Light Company, the last two of which are controlled by the first, are as follows for the fiscal year ended Dec. 31: Gross earnings—1914, $1,284,985; 1913, $1,121,849; operating expenses and taxes—1914, $673,589; 1913, $573,579; net earnings—1914, $611,396; 1913, $548,270; balance after fixed charges and dividends—1914, $132,464; 1913, $96,707. The Carolina Power & Light Company, which operates a street railway service in Raleigh, carried 2,298,854 passengers in 1914 as compared to 2,294,201 passengers in 1913, while the street railway track in operation increased from 13.5 miles in 1913 to 13.7 miles in 1914. The Asheville Power & Light Company, which operates a street railway in Asheville and suburbs, carried 5,457,180 passengers in 1914 as compared to 4,973,949 passengers in 1913. The miles of track in operation for this company remained at 19.2 for the two years.

Charleston (W. Va.) Interurban Railroad.—The Charleston Interurban Railroad has sold to Baltimore bankers $750,000 of three-year 6 per cent secured notes. The proceeds will be used to extend the lines of the company from St. Albans to Montgomery, a distance of 24 miles.

Charlotte (N. C.) Electric Railway.—The capital stock of the Charlotte Electric Railway has been reduced from $1,250,000 to $1,000, an amendment to the company's charter having been allowed by the Secretary of State. Since the Southern Public Utilities Company took over the operation of the local street railway, no further need was felt for the local corporation. It was not dissolved entirely, however, because of several bond issues not yet matured.

Chicago (Ill) Elevated Railways.—The National City Bank, New York, is offering two-year 5 per cent secured gold coupon notes of the Chicago Elevated Railways at the market price, to yield about 7 per cent. These notes are redeemable as a whole on any interest date at 100 and interest at thirty days' notice, and are secured by a specific pledge of all the outstanding stocks, $36,292,500 par value, of the Northwestern Elevated Railroad, the Metropolitan West Side Elevated Railway and the South Side Elevated Railroad. The cash investment junior to these notes amounts to $23,000,000.

Chicago (Ill.) Surface Lines.—The City Council local transportation committee has approved an amendment to the traction merger ordinance covering the formation of the Chicago Surface Lines. According to General Counsel Gurley, the adoption of this provision would put it beyond the power of a single stockholder, or two or three stockholders, to hold up any merger of the Chicago rapid transit lines. The proposition gives to a minority stockholder the alternative of agreeing to the merger or getting out with a fair cash price for his holdings. This provision is in effect in some other states.

Des Moines (Ia.) City Railway.—A committee composed of A. J. Frame, president Waukesha (Wis.) National Bank; W. N. Pelouze, president Pelouze Manufacturing Company, Chicago, and Chester Corey, of the Harris Trust & Savings Bank, Chicago, has been formed for the protection of the bondholders' interests in the Des Moines City Railway. This move follows the recent interest and sinking fund default on the company's 5 per cent refunding mortgage gold bonds, as noted in the ELECTRIC RAILWAY JOURNAL of April 17. The committee asks that the $2,408,000 of bonds outstanding, which are due on April 1, 1921, be deposited not later than June 18 with the Illinois Trust & Savings Bank, Chicago.

Detroit, Almont & Northern Railroad, Detroit, Mich.—The Detroit, Almont & Northern Railroad has applied to the Michigan Railroad Commission for permission to issue $400,000 of bonds to pay the Detroit United Railway for $200,000 already advanced to build the line from Romeo to Almont and $200,000 to be advanced by the latter company to build the line from Almont to Imlay City. The petitioning company is under the control of the Detroit United Railway.

Federal Light & Traction Company, New York, N. Y.—The directors of the Federal Light & Traction Company have deferred the quarterly dividend of 1½ per cent on the preferred stock. The last payment was made on Sept. 1, 1914. While the company is said to be in a stronger financial position at present than ever before, having $200,000 of cash on hand, with no floating debt except a small secured loan for payment of which provision has been made and with all financial requirements for the current year provided for, the board felt that it would not be prudent to disturb this strong financial position by taking any part of these funds for making any payment of dividends at this time.

Fort Wayne & Springfield Railway, Decatur, Ind.—The Fort Wayne & Springfield Railway property was bid in at receiver's sale on May 4 by John Koenig of St. Marys, Ohio, and Charles Dirkson, Decatur, for $85,000. John H. Romer, Fort Wayne, was the only other bidder. The sale is subject to confirmation by the Adams Circuit Court. The buyers are among the original promoters of the road. The line is 22 miles long.

Interborough-Metropolitan Company, New York, N. Y.—C. H. Venner & Company has issued a circular against the plan to reorganize the Interborough-Metropolitan Company. The circular, sent to preferred stockholders, contained requests for proxies to be used at the special meeting called for June 1. It is charged that the directors are trying to reorganize the company for the benefit of the common stockholders. A director of the company is reported to have said that the directors hold ten times as much of the preferred stock as of the common. The acceptance of the plan seems assured, and the number of assents received from holders of preferred stock actually outnumbers the assents from the common by 5 per cent.

Interstate Railways, Camden, N. J.—The income from dividends, interest, loans, etc., of the Interstate Railways for the fiscal year ended Jan. 31, 1915, amounted to $569,924, from which there was deducted interest charges of $431,064 and expenses (including taxes) of $5,427. The resulting surplus was $133,432, which permitted a payment of $60,000 in preferred dividends and left a net surplus of $73,432 for the year. The total amount of money expended on the several properties controlled by the company, from the date of the respective leases to Sept. 30, 1914, totaled $4,295,459. It is estimated that the various operating companies around Wilkes-Barre, Reading, Wilmington and Trenton, which the Interstate Railways controls by lease through the United Power & Transportation Company, will receive an annual income amounting to $953,541 in 1915 and $1,075,000 in 1926 and thereafter.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—The Maine Public Utilities Commission has authorized the Lewiston, Augusta & Waterville Street Railway to issue $750,000 of notes in $1,000 denomination, dated July 1, 1915, and payable on June 1, 1918, with interest at 5 per cent. The company was also authorized to execute an indemnity with the Fidelity Trust Company, trustee, for the notes.

Los Angeles (Cal.) Railway Corporation.—The California Railroad Commission has issued an order authorizing the Los Angeles Railway Corporation to issue $250,000 of first and refunding mortgage 5 per cent gold bonds. As noted in connection with the application for this issue in the ELECTRIC RAILWAY JOURNAL of April 10, the bonds are to be used in refunding a similar amount of first mortgage 6 per cent bonds of the Los Angeles Traction Company that fell due on May 1.

Northern Electric Railway, Chico, Cal.—It is reported that the bankers' plan for refinancing the Northern Electric Railway was well received at a recent meeting of creditors in San Francisco. The committee headed by A. Bonnheim reported that 214 of the 400 creditors had subscribed to the plan. A meeting of the underlying bondholders is to be held in order to secure their opinion in the matter. With the support of these, Mr. Bonnheim declares that the plan will be a success and the company saved from a foreclosure sale.

Northern Massachusetts Street Railway, Athol, Mass.—The Massachusetts House has passed to be engrossed a bill authorizing the Northern Massachusetts Street Railway to consolidate with, or purchase the franchises and property of, the Connecticut Valley Street Railway. The application to the Legislature was noted in the ELECTRIC RAILWAY JOURNAL of April 10.

Pacific Gas & Electric Company, San Francisco, Cal.—The California Railroad Commission has authorized the Pacific Gas & Electric Company to issue $1,960,000 of common stock to holders of its common stock as a dividend, equivalent to 6 per cent of their present holdings. It is expected that the board of directors will soon meet and issue this stock as two dividends of 3 per cent each, one payable now and the other later in the current year.

Portland Railway, Light & Power Company, Portland, Ore.—The government has taken title to the canal and locks of the Portland Railway, Light & Power Company around the Willamette Falls at Oregon City, for a consideration of $375,000. The Fidelity Trust Company, Philadelphia, trustee under the Portland Railway, Light & Power Company first and refunding mortgage, and the Bankers Trust Company, New York, trustee under the Portland General Electric Company first mortgage, formally consented to the release of the property from the lien of mortgages. This transfer opens the upper Willamette River to free transportation.

San Francisco (Cal.) Municipal Railways.—It is reported that the operation of the municipal railway system of San Francisco during 1914 resulted in a profit of $216,541 after all expenses of operation had been provided for, due allowances being made for depreciation and interest on outstanding bonds. The total receipts were $1,159,438, while the total money paid out was $828,656. The net operating revenue was $330,781, to which was added $6,125 received in interest on bonds purchased out of the earnings, making the total income $336,906.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The California Railroad Commission has authorized the San Joaquin Light & Power Corporation to issue $1,582,000 of series C 6 per cent first and refunding forty-year bonds. The company is also authorized to issue interest coupons calling for 1 per cent additional interest to any holders of the $2,924,000 of series B 5 per cent bonds now outstanding who will pay a premium of $100 on each $1,000 bond held. Of the new series C bonds $1,532,000 are to take the place of a similar amount of series B bonds held in the treasury of the company or pledged as collateral. The order provides that the first $300,000 of the series C bonds shall be sold at a price to yield not less than 94 and interest, and the remainder not less than 95 and accrued interest. The proceeds of the series C bonds and the premiums which may be paid on the series B bonds will be used in retiring $954,000 of two-year notes maturing on Aug. 1, and in paying outstanding notes representing amounts borrowed for capital expenditures aggregating $838,300. The bonds authorized by the commission have been purchased by N. W. Halsey & Company, New York, who are offering them at par and interest. The commission has requested the company to submit within ninety days a plan for future supplemental financing to secure any necessary funds for extensions and betterments otherwise than by the sale of bonds.

Scranton & Binghamton Railway, Scranton, Pa. — T. J. Foster, president; W. L. Connell, vice-president and treasurer, and Jacob Griffith, of Pittston, director, have disposed of their interests in the properties of the Scranton & Binghamton Railway to Mortimer B. Fuller, president International Salt Company; E. J. Lynett, owner of the Scranton *Times*, and M. W. O'Boyle, coal operator and manufacturer, Pittston. In a short time there will be a reorganization of the board of directors. R. W. Day will continue to manage the properties of the company.

Union Traction Company of Indiana, Anderson, Ind.—The Public Service Commission of Indiana has entered an order permitting the Union Traction Company of Indiana to issue $50,557 of notes to cover the purchase of new motors and other equipment for use on the company's property.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 75 cents, common.

Chicago (Ill.) Railways, 4 per cent, participation certificates, series 1; 2 per cent, participation certificates, series 2.

Manhattan Bridge Three-Cent Line, New York, N. Y., 1½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Apr., '15	$414,818	......	......	......	......
1 " " '14	445,493	......	......	......	......
4 " " '15	1,681,632	......	......	......	......
4 " " '14	1,708,099	......	......	......	......
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., Mar., '15	$14,854	*$9,029	$5,825	$2,088	$3,737
1 " " '14	14,227	*9,938	4,289	2,088	2,201
12 " " '15	180,223	*112,593	67,630	25,033	42,597
12 " " '14	168,550	*108,663	59,887	25,232	34,655
CITIES SERVICE COMPANY, NEW YORK, N. Y.					
1m., Mar., '15	$347,372	$12,315	$335,057	$40,833	$294,224
1 " " '14	348,447	11,309	337,138	29,167	307,971
12 " " '15	3,941,425	131,272	3,810,152	455,000	3,355,153
12 " " '14	2,869,854	92,120	2,777,734	210,562	2,567,172
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE					
1m., Mar., '15	$188,728	*$110,258	$78,470	$62,964	$15,506
1 " " '14	182,628	*119,754	62,874	63,543	†669
12 " " '15	2,543,661	*1,441,273	1,102,388	756,302	346,086
12 " " '14	2,388,970	*1,367,661	1,021,309	734,602	286,707
GRAND RAPIDS (MICH.) RAILWAY					
1m., Mar., '15	$93,284	*$69,168	$24,116	$13,706	$10,410
1 " " '14	103,555	*66,575	36,980	13,629	23,351
12 " " '15	1,276,581	*835,091	441,490	161,998	279,492
12 " " '14	1,299,756	*819,257	480,499	162,918	317,581
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.					
1m., Mar., '15	$478,806	*$199,064	$279,742	$211,369	$68,373
1 " " '14	488,361	*198,348	290,013	207,130	82,883
3 " " '15	1,396,419	*586,472	809,948	633,103	176,845
3 " " '14	1,426,692	*590,906	835,786	623,192	212,594
LEWISTON, AUGUSTA & WATERVILLE RAILWAY, LEWISTON, MAINE					
1m., Mar., '15	$53,132	*$35,603	$17,529	$15,663	$1,866
1 " " '14	48,720	*39,858	8,862	15,503	†6,641
12 " " '15	691,967	*461,458	230,509	187,048	43,461
12 " " '14	674,232	*446,630	227,602	182,207	45,395
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.					
1m., Mar., '15	$175,946	*$108,397	$67,549	$41,964	$25,585
1 " " '14	182,565	*121,025	61,540	41,337	20,203
12 " " '15	2,226,710	*1,307,423	919,287	490,464	428,823
12 " " '14	2,218,531	*1,392,028	826,503	476,534	349,969
NEW YORK (N. Y.) RAILWAYS					
1m., Mar., '15	$1,111,940	$725,774	$386,166	$374,842	‡$63,338
1 " " '14	1,043,284	717,176	326,108	365,592	‡†6,979
9 " " '15	9,999,586	6,394,715	3,604,870	3,371,100	‡610,345
9 " " '14	10,336,128	6,553,235	3,762,894	3,336,717	‡735,721
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Mar., '15	$280,780	*$178,949	$101,831	$51,901	$49,930
1 " " '14	274,198	*168,811	105,388	50,331	55,056
3 " " '15	822,069	*525,913	296,156	153,014	143,142
3 " " '14	793,165	*494,979	298,185	149,361	148,361
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY					
1m., Apr., '15	$1,971,560	$1,140,510	$831,090	$816,022	$15,068
1 " " '14	2,042,320	1,206,899	835,421	808,317	27,103
10 " " '15	19,776,807	11,486,176	8,290,631	8,101,462	189,169
10 " " '14	20,016,913	11,829,473	8,187,441	8,012,337	175,104
PORTLAND (MAINE) RAILROAD					
1m., Mar., '15	$76,179	*$48,678	$27,501	$27,375	$2,126
1 " " '14	74,798	*51,131	23,667	22,038	1,629
12 " " '15	1,050,983	*642,717	408,266	255,139	153,127
12 " " '14	1,037,467	*666,515	370,952	218,046	152,906
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.					
1m., Feb., '15	$437,854	*$247,296	$190,558	$182,551	$8,007
1 " " '14	538,236	*259,989	278,247	174,880	103,367
12 " " '15	6,079,892	*3,235,308	2,844,584	2,189,429	655,155
12 " " '14	6,760,919	*3,318,019	3,442,900	2,051,234	1,391,666
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Mar., '15	$64,394	*$42,239	$22,155	$23,409	†$1,254
1 " " '14	68,923	*45,163	23,760	23,015	745
12 " " '15	834,580	*545,756	288,823	276,465	12,358
12 " " '14	838,619	*555,646	282,973	273,199	9,773

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

Jitney Conditions in St. Louis—The Fort Worth Ordinance Sustained—Jitney Ordinances in Augusta, Birmingham and Providence

While no regulatory ordinance has been adopted in St. Louis to govern the operation of the jitneys, the number of automobiles in operation in that city on May 14 was estimated at about 150, compared with a maximum of 250 in operation at one time. Street Commissioner Talbot drew up a proposed ordinance some time ago, but this died with the last Municipal Assembly. The first measure was really nothing more than a safety-first proposal. It did not require any indemnity bonds, fixed routes or schedules, and no taxes other than the regular State and city license were to be imposed under the terms of the measure. Mr. Talbot is now at work on another ordinance.

A pressing question in St. Louis is the increasing number of automobile accidents. According to the police records there were 677 automobile accidents from Feb. 1 to May 1, 1915, the period that jitneys have been operating, as compared with 393 during the same months of 1914. This is an increase of 284 accidents, or 72.26 per cent. Companies have been formed in St. Louis to write indemnity bonds, but the jitney drivers do not care to take out policies. The policy offered is a mutual one and the jitney driver is responsible for the first $200 damages.

Crimes having their origin in jitney operation are multiplying in St. Louis and one, the assault on a Belleville stenographer, has resulted in a call upon the part of the daily papers for a regulatory ordinance. Following the revelations in this case the St. Louis *Republic* received a letter from another girl who had almost the same experience as the young woman from Belleville. The editor, in an effort to find out if the practice had become common of subjecting to insult young women who used the jitneys, asked other girls to write about their experiences. In consequence the St. Louis papers are now printing two columns of letters daily from feminine readers who have suppressed their modesty in order that the facts may become public.

The failure of the attempt made in St. Louis to increase the fare on the jitneys from 5 cents to 10 cents is considered very significant. An organization of independent jitney drivers on the south side, under the name of the Lafayette Motor Service Company, was formed last month to raise the fare from 5 cents to 10 cents. W. A. Sears, managing director of the Motors Service Company, the original jitney organization, was present and urged the drivers to join his association and stick to the 5-cent fare. He said that the increase to a dime would kill the business. When the owners voted unanimously to raise the fare to 10 cents, Mr. Sears said that he would send cars over to the south side route and charge only a nickel, even if to do so he had to divert autos from the regular routes which he operated. How successful he was in this venture is indicated by the fact that less than a week later announcement was made that his organization, too, would adopt the 10-cent fare. This was attempted, but the number of passengers fell off so perceptibly that the 5-cent fare was restored.

The city ordinance of Fort Worth, Tex., regulating the operation of jitneys has been held to be constitutional by the Court of Criminal Appeals in the case of I. W. Sullivan, the court denying a writ of habeas corpus and remanding the applicant. According to the record, Sullivan was convicted in the Corporation Court of Fort Worth on a complaint charging that he violated Ordinance No. 488 of that city, regulating motor buses, in that he failed to pay the license fee of $10 required for operating a jitney before doing so; that he so operated it without first procuring an indemnity contract from some solvent insurance company; that he was fined $10 in the Corporation Court; that he appealed therefrom the County Court, where he was again fined $10, from which no appeal lies. He was held in custody by the sheriff under a proper commitment under the conviction. Sullivan attacked the ordinance as unconstitutional in that it imposed restrictions on jitneys to which other vehicles were not subject and that it was class legislation because it required a bond to be taken out with an indemnity insurance company.

The court held that there was nothing in the ordinance that would make it obnoxious to the constitution or to any statutory provision preventing monopolies, but that the very reverse was true. The court stated that there could be no doubt that the city under the charter provisions as presented not only had the power and authority to enact and enforce proper ordinances prescribing reasonable regulations on the subject embraced in those ordinances, but that "it was imperative for it to do so." The agreed facts in the case showed that from the traffic conditions and large number of accidents from the operations of the jitneys, the Commissioners of the city deemed that the passage and enactment of the ordinance was imperative and necessary. The applicant conceded that under its charter power the city could pass and enforce all reasonable regulations. The argument against the ordinance rested chiefly on the contention that the measure was not reasonable, especially in regard to the indemnity contract feature. On this point the opinion states: "Even if the requirement of such indemnity or insurance is a new feature in the regulation of the carriers in the cities, it is not any presumption that it is not a proper, reasonable or valid regulation as conditions now exist."

If injury is caused by the jitney operator's negligence or fault, it is held that the indemnity contract inures fully to his own benefit. If he causes such damage he ought to pay for it or be made to pay for it. If he is insolvent or irresponsible so that he could not be made to pay for it, the more necessity there is for requiring him to provide for indemnity insurance so that the insurance company can be made to pay for it or prevent his operating a jitney. There cannot be any question, in the opinion of the court, but that the jitneys are common carriers. On this point the opinion reads:

"They, as common carriers, subject themselves to all reasonable regulations in the matters mentioned. Being common carriers and subjecting themselves to such regulations the public unquestionably has rights in the premises. . . . If they are to operate as common carriers then the public has the right to know when and where they will operate and to require them to do so with promptness and regularity. . . . They have no more right to shift from time to time and place to place than the street car carriers would have to do so."

The City Council of Augusta, Ga., has passed an ordinance regulating the jitney and the measure is now before the Mayor for his signature. The ordinance requires that the operator of a jitney shall, before receiving a license from the collector and treasurer, file a bond of $5,000 to secure passengers and pedestrians against injury. The application for a license is to contain a detailed description of the jitney, the make, factory number, motor number and the number of passengers and pedestrians against injury.

The much-discussed jitney ordinance has been adopted by the City Commission of Birmingham, Ala. The provisions of the ordinance come largely within the province of the powers conferred on the policing authority. There is no provision requiring a bond.

The Pennsylvania Senate has passed the House bill permitting street railway companies to operate motor buses. The measure is now before the Governor.

Prospects of a struggle between Philadelphia City Councils and the supporters of the jitney traffic are indicated in the decision of the Philadelphia Jitney Association to appeal to the public in the event that the law committee of Councils should refuse to alter the "rigid" provisions of the jitney ordinance now in its hands. In its present form the ordinance sets forth the requirement of a $5,000 bond being furnished to cover damages, and in addition the imposing of a license fee of $75. Under such regulations, say the jitney drivers, the business will be "regulated out of existence." The jitney association expresses itself as willing to furnish a $1,000 bond and pay a tax of $15. Select Councilman Louis Hutt, father of the proposed ordinance and chairman of the law committee, has promised another public hearing on the bill.

One of the jitney bus concerns which incorporated in Louisville about three months ago with much fanfare and elaborate prospectuses, the Jitney Service Company, through its president has applied for a receiver to wind up its affairs. It is set forth that the company operated only thirty days and since then the cars of the company have been in storage for which garage owners now demand pay.

By a unanimous vote the Board of Aldermen of Providence, R. I., on the afternoon of May 13 non-concurred in the jitney ordinance passed previously by the Common Council, and then by vote of nine to one adopted a substitute measure different in many points from the original ordinance. The license fee remains at $5 per passenger seat, except that no bus shall pay more than $50 for a license. The provisions of the original ordinance limiting the number of passengers to be carried to the seating capacity and requiring a bond of $500 per passenger seat are retained. A section permitting jitneys to wait for passengers within three-fourths of a mile of the City Hall has been stricken out and a section substituted allowing the buses to wait as long as desired for passengers anywhere except in a small specified downtown district. In this district they may wait not to exceed five minutes. An additional clause provides that the police commission shall name public places near the center of the city where, during specified hours, jitneys may park for an indefinite period. The section providing that the police commission shall provide routes for the jitneys is stricken out and the machines are allowed under the new ordinance to run anywhere, with the understanding that later if some routing rule is necessary the jitneys must submit to it. The provision requiring that all jitney drivers shall be at least twenty-one years of age is changed to make the minimum age twenty years. The section requiring lights for the rear seats of the buses has been recalled.

The Virginia Railway & Power Company, Richmond, Va., is at present operating thirty-seven Briscoe automobiles in jitney service in that city. Statements made in the daily papers to the contrary notwithstanding, it is not the intention of the company to increase the number of jitneys operated by it at the present time. A number of the independent jitneys operated in Richmond have already discontinued. This is regarded as due largely to the fact that the jitneys of the railway are being operated in the territory that was most profitable to the independents.

Conrad H. Syme, corporation counsel, has reported to the Commissioners of the District of Columbia in regard to his observations of the jitney. Mr. Syme visited New Orleans, Los Angeles, San Francisco, Kansas City and St. Louis recently. In his report he relates the local situation in each of these cities in regard to the jitney as he saw it. His conclusion follows in part:

"In view of my observation of what the jitney service is doing in other cities, and of its possibilities with reference to short-haul transportation in the business section of a city, I am strongly inclined to the opinion that any further extension of street railway tracks in or near the business section of the city may be very unwise. In this day when flexible transportation instrumentalities are more and more demanded, the inflexible street car service in business sections may become an anachronism in a very short time. The movement to supply transportation by cheap motor vehicles is manifesting the practicability of this form of transportation as a commercial fact, and the public demand for a more convenient and elastic transportation system in the business sections of cities has made its commercial success possible. The service is now crude, sporadic and unorganized. By its intelligent organization and systematic application to traffic conditions, it will, I believe, become an important factor in urban transportation."

In the Superior Court at Los Angeles, Cal., Judge Hewitt has held to be valid the ordinance passed in Venice City providing that jitney bus drivers must pay a yearly license fee of $3 to $12, put up a $10,000 indemnity bond, and use a definite route.

A call for a meeting to be held in Rochester, N. Y., on June 3, to form a State organization of jitney drivers and owners has been sent out by William Cross, president of the Rochester Jitney Association.

The bill before the General Assembly of Massachusetts to regulate the jitney was defeated by the House on May 12. It provided for a bond of $2,000 for each vehicle. Attorney-General Atwill declared that the bill as drawn and as subsequently amended was unconstitutional in that it was class legislation because it did not apply to taxicabs and similar vehicles.

REHEARING IN ALBANY CASE

The rehearing ordered by the Appellate Division of the Supreme Court of the State of New York of certain provisions of the order of the Public Service Commission of the Second District to the United Traction Company for improved service in Albany will begin on May 25, according to the announcement made by the commission. An informal statement from the commission says:

"The order of the Appellate Division confines the rehearing to two points: The financial ability of the company to purchase immediately twelve new modern cars seating forty passengers and thirty more such cars as early as possible, and certain modifications in the emergency telephone system prescribed by the commission's order. As the time for compliance with Clauses 3, 4, 5 and 11 of the commission's order have expired, the court also includes in the subjects for the rehearing a new time to be set for compliance. Clause 3 orders increase of service on the Belt line, Clause 4 increase of service on the Delaware Avenue line, Clause 5 orders transfers to and from the Schenectady cars and Clause 11 relates to the emergency telephone system. The increases of service was ordered for Feb. 15 and the Schenectady transfers 'immediately,' that is, Dec. 11, and the telephone system was ordered installed by April 1.

"The principal point of argument on the rehearing, however, will undoubtedly be the financial status of the United Traction Company and its ability to borrow money during the present conditions, due to the war. In this connection the order of the Appellate Division says: 'Such rehearing shall be confined to the claimed impossibility or difficulty to raise the money that is necessary to carry into effect the provisions of the order by reason of the foreign war now in progress, and as bearing upon such question the present financial condition of the relator (United Traction Company) may be shown.'"

Fare Suspension Date Extended.—The Public Service Commission of Massachusetts has issued an order further suspending until June 15 the proposed increase in passenger fares asked for by the Blue Hills Street Railway, Canton.

Giving Publicity to the Code of Principles.—The United Railroads, San Francisco, Cal., printed on the front page of *Transit Tidings* for May 10 the first of the ten principles included in the code of principles adopted by the American Electric Railway Association, the intention presumably being to publish the others in subsequent issues. *Transit Tidings* is published by the company for distribution in its cars.

C. E. R. A. Map.—The Central Electric Railway Traffic Association has just received from the press a revised map of the interurban railways and steam railroad connections in the states represented by the association's membership. The revisions include principally track extensions to the various interurban systems. A new feature incorporated in the map is a list of all the stations, both steam and interurban, printed on the back with a key letter and number to indicate their position on the map.

Michigan Connection Bill Enacted.—The action of the United States Supreme Court in upholding the State Railroad Commission of Michigan in its case against the Michigan Central Railroad has resulted in the Legislature of Michigan passing a bill regarding physical connections between railroads, in which the commission is empowered to order such connections between steam and electric railroads at its discretion. The decision of the Supreme Court in the Michigan Central case was referred to in the ELECTRIC RAILWAY JOURNAL of March 13, page 532.

B. R. T. to Manage Its Own Advertising.—The Brooklyn (N. Y.) Rapid Transit System, which, upon the expiration of its recent contracts with the Inter-City Car Advertising Company, determined to handle the car advertising, vending and news privileges through its own representatives, has announced that it has appointed as its managing director Joseph P. Day, of Manhattan, the well-known real estate man. Mr. Day will have associated with him in the enterprise Stanley Eaton Gunnison, who for the last ten years has been connected with the advertising firm of Ward & Gow.

Fares Apportioned in Transfer Case.—The Public Service Commission for the First District of New York has adopted an order apportioning the fares in connection with the transfer arrangement it recently ordered between the Van Brunt Street & Erie Basin Railroad and intersecting lines of the Brooklyn Rapid Transit System. The order allows the Van Brunt Street line 1½ cents and the connecting line of the Brooklyn Rapid Transit system 3½ cents out of every nickel collected by either company for a transfer fare. The Van Brunt Street & Erie Basin Railroad Company operates only 3 miles of line. It purchases current from the Brooklyn Rapid Transit System.

A Joker Discovered.—The street railways in Kansas City, Mo., under the "new franchise," which is really not yet operative but which as to its provisions for caring for traffic is operative, carry free children under eight years accompanied by an adult. Conductors have been nonplussed but without recourse recently upon discovering that a young woman and a party of thirty or forty children evidently have the right to ride for 5 cents. Under the franchise 5 cents for the adult evidently pays for all the children under eight years. The board of control hopes to solve the problem before the period of the big Sunday school picnics.

Safety-Zone Ordinance in Kansas City.—A safety-zone ordinance is pending in the City Council of Kansas City, Mo., under which 6-ft. poles set in the street 5 ft. from the car tracks where cars stop in the downtown district, would mark a space about equal to the car's length 5 ft. from the nearest line of the cross street. In this area patrons would be safe while boarding or alighting from cars, and vehicle traffic would be allowed to move past this area while cars were loading or unloading passengers. Under the present arrangement in Kansas City, motor cars and other street traffic must wait 10 ft. from a standing car.

New Michigan Road Completed.—It is expected that the new line of the Michigan Railway between Kalamazoo and Grand Rapids and between Kalamazoo and Battle Creek will be opened for regular service within a few days. Westbound limiteds out of Detroit over the Detroit, Jackson & Chicago Railway will make connections at Battle Creek and Kalamazoo with the limited cars leaving those cities for Grand Rapids. East-bound limiteds will meet the cars from Grand Rapids at Gull Lake Junction so that passengers coming from Grand Rapids or other points on that line will transfer to the Detroit limiteds at the junction.

Annual Picnic of I. T. S. Employees.—The fourth annual picnic of the employees of the mechanical, bridge and building and the stores departments of the Illinois Traction System, Decatur, Ill., will be held on June 24, in Washington Park, Springfield, Ill., and employees and their families will travel from Decatur to Springfield in special cars, provided by the management, for the day's outing. The first event on the program is a baseball game in the morning between the shop's team and a team from the general offices at Springfield. After dinner thirteen other athletic events are to be run off. Prizes will be offered.

Railway Vaudeville at Grand Rapids.—A ten-act vaudeville show was staged by employees of the Grand Rapids (Mich.) Railway at the Press Hall on the evenings of May 3 and 4. The show was given as a close to the winter program of dance and card parties enjoyed by the employees. Motion pictures, singing, both vocal and quartet, reading, rope throwing and selections by the railway band were among the numbers on the program. A special act in which a full-sized street car was used upon the stage, was a feature. The arrangements for the performance were under the direction of L. J. Delamarter, secretary of the company.

Special Rate No Criterion for Regular Rate.—That special rates put into effect for charitable purposes by railways cannot be made a basis for an attack on the entire rate schedule has been decided by the Railroad Commission of California in the case of Richmond W. Armstrong and others against the Pacific Electric Railway, which operates lines between Los Angeles and various beach resorts. The complainants alleged the rates between Los Angeles, Venice and Santa Monica were excessive, and asked that a round-trip rate of 25 cents be made effective between these points, claiming that such a rate had been put into effect on various occasions.

Reduction in Wages Suggested in Rhode Island.—The board of trustees of the Rhode Island Company, Providence, R. I., has submitted to officials of the union of employees a new working agreement, which provides a reduction in wages of approximately $60,000 a year. The Rhode Island Company, by the proposed schedule, would restore the rates that were in force prior to the increase granted two years ago. At that time the company said the advance would mean an expenditure of $60,000. The present rates of pay per hour and the proposed new rates are as follows: First six months—old 23 cents, new 22 cents; one year—old 24½, new 22½; second year—old 26, new 23; third year—old 27, new 24¾; fourth year—old 28½, new 27.

Jurisdiction of Ontario Railway Board.—The Ontario Railway Board insists upon its jurisdiction over electric street railways, whether they cross a steam railway line or not, and the net result is that the Hamilton, Grimsby & Beamsville Electric Railway will have to install sanitary conveniences upon its cars. The matter came up a month ago upon the application of residents in the district and the Ontario Railway Board ordered the conveniences. The company questioned the jurisdiction of the board and quoted a section of the railway act to show that since its line crossed the Grand Trunk Railway on Main Street, Hamilton, Ont., it came under the jurisdiction of the Dominion Railway Board. Chairman McIntyre and his colleagues gave judgment on May 10 against the company.

"Watts Watt" in Portland.—The new weekly publication of the Portland Railway, Light & Power Company, Portland, Ore., the founding of which was noted in the ELECTRIC RAILWAY JOURNAL of March 27, page 651, went into the eighth issue with the edition for April 30. For four issues the clever little fellow struggled along without a name. Then he blossomed forth as *Watts Watt*. E. F. Dodson got $15 for the christening. Second, third, fourth and fifth best selections by the judges were in this order: Between Us, Shake, The Pup and Sketch. While much of the material contained in the various issues has had for its sole purpose putting the reader in good humor with himself, the opportunity has not been lost each week to touch upon some one utility problem of interest to the public, keeping all the while a long way from the shallow "I am holier than thou" waters. Clever without being fresh, courageous without being bold, *Watts Watt* is taking its place in the sun as a Portland booster to the extent of 50,000 copies a week distributed on the street cars.

The Baltimore Pension System.—The recent annual pamphlet report of the United Railways & Electric Company, Baltimore, Md., contained the following reference to the pension system of the company: "The pension system inaugurated on Jan. 1, 1914, has been in successful operation for a year, all expenditures under the system being borne by the company. In addition to his pension, each man upon the honor roll was presented with a service certificate and book of travel over the company's lines. It is believed that the adoption of this plan has tended to increase the loyalty and efficiency of employees, inasmuch as it encourages them to remain in the service, with the knowledge that when disabled or having reached an age necessitating relief from duty they will still be carried on the company's payroll."

Experimental Suburban Fare Reduction.—L. H. Bean, manager of the Tacoma Railway & Power Company and general manager of the Puget Sound Electric Railway, Seattle, Wash., recently announced the reduction of the fare between Tacoma and Puyallup, via the Puyallup, short line, and to intermediate points. The new rate will become effective on June 1. The reduced fare to suburban points is an experiment. Suburban commutation tickets will be issued in books of twenty-five single-trip tickets, unlimited as to time of use, at a 25-cent reduction from regular fares. The suburban tickets will be sold to points between Tacoma and Puyallup, on the Tacoma end, and between Seattle and Renton on the Seattle end of the line. The reduction will make the rate 15 cents each way to Puyallup, against the present rate of 20 cents, with corresponding reductions to intermediate points.

Accidents in New York in April.—According to the report of accidents due to vehicular traffic for April, made by the National Highway Protective Society, twenty children were killed in the streets of New York City. Automobiles killed nine, wagons seven, and trolleys four. Six were killed jumping on and off trucks. The total of persons killed in the month was thirty-eight. Of these, twenty-one were killed by automobiles, seven by wagons, and ten by trolleys, compared with sixteen by automobiles, fifteen by wagons and fourteen by trolleys in April, 1914. In the State of New York, in streets and highways outside of New York City, twenty were killed by automobiles, two by trolleys, and one by a wagon, compared with nine by automobiles and four by trolleys in April, 1915. In New Jersey twelve were killed by automobiles and seven by trolleys. At railroad grade crossings in New Jersey four persons were killed and in New York State five.

Encouraging Employees to Save.—Fully realizing the value of thrift, Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., has made the following proposal to the employees of the company to encourage saving among them: "I could arrange to have someone in the company's employ attend when wages are paid, give a receipt for any amount that the employee might direct and see to it that that amount was deposited to the credit of the employee in any savings bank that he might name, or, if he preferred, in some savings bank that the company would select. The savings bank pass book would, of course, be taken in the name of the employee, and I am only suggesting this method to save the employee trouble and to give him the benefit of our greater experience in financial matters. It goes without saying that the turning over of these moneys will be entirely voluntary and that each man will have the right to determine the matter for himself. I am simply making the suggestion and offering to provide the machinery and save you time and trouble."

President Belden on the 5-Cent Fare.—D. A. Belden, president of the Massachusetts Northeastern Street Railway, Haverhill, Mass., discussed the question of 5-cent fares on electric railways recently in the Haverhill *Gazette*. Mr. Belden thinks that the 5-cent fare will be discarded as a unit. He said the proper fare for a company to charge was the one upon which it could exist and render satisfactory service to the community or communities which it serves. He said that a company must have a living wage or "it would soon begin to shirk its duty, dodge its creditors, and finally resign or be fired." The article was about four columns long and dealt with the matter more particularly from the standpoint of the company with which Mr. Belden is connected. He concluded his summary with this statement: "I believe the people on the whole desire these companies to be prosperous; that they are interested in a square deal for them; and that once they are convinced a company serving them is honestly financed and managed, and is making faithful efforts to furnish safe and reliable service, they will be quite willing that the company shall charge fares adequate not only to meet its expenses and furnish satisfactory service, but to return in dividends a fair profit on the money invested."

Bonus System for Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has notified the employees of the transportation department that commencing on June 1 it will inaugurate a bonus system for these employees and pay them for the individual efficiency attained in the operation of cars, freedom from accidents and improvement in speed. It is planned to lay aside a fixed percentage of the operating receipts from the street railway business to cover the expense of damages and after deducting an estimated amount for additional expense involved in the maintenance of the individual records, to divide the saving equally between the employees and the company. J. D. Mortimer, president of the company, concluded a statement which he issued as follows: "Just what the bonus may amount to in the way of earnings cannot be forecasted with any accuracy. Based, however, on our experience with somewhat similar plans in other departments of the company's business, we anticipate that the bonus earnings will, for the more careful men, soon reach substantial amounts each month. All the bonus earnings will not be paid in cash as it is planned to induce the men to save a part of their surplus through investment in their savings and loan association."

Personal Mention

Mr. C. H. Sanborn has been appointed acting superintendent of the Blackstone division of the Worcester (Mass.) Consolidated Street Railway to succeed the late Thomas A. Leach.

Mr. Clinton White, of the Massachusetts Public Service Commission, who retired from the board on May 18, was presented with a loving cup on the last day of his service by his associates in the office of the commission.

Mr. W. C. Myers, who for some time past has been assistant superintendent of the East St. Louis & Suburban Railway, East St. Louis, Ill., has been appointed superintendent of the company to succeed Mr. A. J. Purinton, resigned.

Mr. W. J. Dibbins, manager of the Guthrie Gas, Light, Fuel & Improvement Company, Guthrie, Okla., has been elected president of the Gas, Electric & Street Railway Association of Oklahoma to succeed Mr. George W. Knox, vice-president and general manager of the Oklahoma (Okla.) City Railway.

Mr. Harold W. Clapp, who has had charge of the physical operation of the properties of the East St. Louis & Suburban Railway, East St. Louis, has been elected vice-president in charge of operation, a new office, relieving Mr. L. C. Haynes at his own request of the responsibility for this branch of the business.

Mr. C. C. Moyer, for the last four years chief dispatcher of the Columbus, Delaware & Marion Railway, with headquarters at Delaware, Ohio, has been promoted to the office of trainmaster. Mr. Moyer has been with the Columbus, Delaware & Marion Railway for the last thirteen years. He served seven years on the road as conductor, two years in the dispatcher's office and four years as chief dispatcher.

Sir Edgar Speyer has resigned as chairman of the Underground Electric Railways, London, England. He contemplates retiring from all his public positions, and has written to Prime Minister Asquith to accept his resignation as a Privy Councillor and to revoke his Baronetcy. Sir Edgar says that he considers it due to his honor as a loyal British subject and to his personal dignity as a man to retire from all his public positions.

Mr. W. H. Sawyer, vice-president of the E. W. Clark & Company Management Corporation, which has general supervision over the East St. Louis & Suburban Railway and affiliated properties at East St. Louis, Ill., will, it is announced, as personal representative of President S. G. McMeen, co-operate with both Mr. Harold W. Clapp and Mr. L. C. Haynes in concerted efforts toward increased efficiency of the railway and light properties in their service to the public.

Mr. Carl H. Fuller, formerly engineer of maintenance of way of the Macon Railway & Light Company, Macon, Ga., is the author of an entertaining short story entitled "The Hunger Strike," which appeared in the *Black Cat Magazine* for May, 1915. The setting of the story is drawn from the hitherto rather surprisingly untrammeled field of fiction, the street railway business. The thread of the plot is woven around the bitter competition between a corruptly operated municipal 3-cent fare line and a privately-owned 5-cent line.

Mr. Alexander Mackenzie has been elected president of the Brazilian Traction, Light & Power Company, Ltd., to fill the vacancy created by the death of Dr. F. S. Pearson. Mr. Mackenzie has also been elected president of the Rio de Janeiro Tramway, Light & Power Company, Ltd., the Sao Paulo Tramway, Light & Power Company, Ltd., and Sao Paulo Electric Company, Ltd., by the boards of these companies. Mr. Mackenzie has been prominently identified with the Brazilian companies since their inception, and was for many years general counsel and resident vice-president of the companies in Brazil.

Mr. J. T. Harmer, who succeeded Mr. L. S. Storrs in 1911 as president of the New England Investment & Security Company, Springfield, Mass., has offered his resignation. Mr. Harmer has been in charge of the electric railways centering at Worcester and Springfield since the departure of Mr. Storrs for Connecticut and is a railroad man of extended experience, having been connected at various times with the Mexican Central, Santa Fe and New Haven systems. It is understood that he intends to retire from active business life, and that the present labor questions with which the company is involved had no bearing upon the decision to leave the service.

Mr. Stanley Eaton Gunnison, who will be associated with Mr. Joseph P. Day in the management of the advertising for the Brooklyn (N. Y.) Rapid Transit System, was connected with the advertising firm of Ward & Gow, New York, N. Y., for ten years. Mr. Gunnison is the son of Mr. Walter C. Gunnison, principal of Erasmus Hall High School, Brooklyn, and is a nephew of Mr. Herbert F. Gunnison, for fifteen years manager and a director of the Brooklyn *Daily Eagle*. Mr. Stanley Eaton Gunnison is a resident of Brooklyn and was graduated from Adelphi College of that city and from St. Lawrence University. He is active in civic matters in New York and Brooklyn.

Mr. Samuel T. Murdock, who has been prominent in the promotion of Indiana traction lines, was the guest of honor at a dinner given on May 13 at Lafayette, Ind., by 150 of the leading business and professional men of the city. It was a farewell dinner in which the city and Purdue University joined hands in bidding Mr. Murdock farewell and wishing him well in his new home at $ndianapolis, to which he has removed. Mr. Murdock recently purchased the Van Camp mansion at Indianapolis with the intention of making that city his future home. He is president and managing director of the Indiana Lighting Company, secretary of the Chicago, South Bend & Northern Indiana Railway, and is interested in other traction and public utility companies in Indiana.

Mr. Joseph P. Day, well known in real estate circles thoughout the country, has been appointed managing director in charge of advertising privileges of the Brooklyn (N. Y.) Rapid Transit System. Mr. Day was born in New York City on Sept. 22, 1873. After completing his school course he became interested in real estate and at the age of twenty-one established himself in the real estate and insurance business. In 1898 he negotiated the heaviest accident policy ever written, covering insurance against accident resulting from the change in motive power on the Third Avenue Railroad in New York and on the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad. In recent years he has been especially prominent in the sale of real estate at auction, in which he is perhaps the recognized leader in the United States. He was auctioneer in the now famous Ogden estate sale in New York, the largest absolute partition sale of improved city real estate in the history of the country. In the three years ended Dec. 31, 1909, Mr. Day sold at auction more than $100,000,000 of real estate in and around Greater New York. He is recognized as one of the foremost experts on values. He sold the Third Avenue Railroad, New York, on March 1, 1910, at foreclosure. Another of his notable sales was that of the Yerkes mansion in New York, the property of the late Charles T. Yerkes.

OBITUARY

George H. Russel, treasurer of the Detroit (Mich.) United Railway, died on May 17. He was president of the People's State Bank, founder of the Russel Wheel & Foundry Company and a recognized power in the financial world in the Middle West. He was a native of Detroit and was sixty-seven years of age. He was a brother-in-law of Mr. J. C. Hutchins, president of the Detroit United Railway.

Calvin Whiteley, Jr., formerly chief engineer of the United Railways & Electric Company, Baltimore, Md., died at the Union Protestant Infirmary in that city on May 4, following an attack of apoplexy. Mr. Whiteley was born in Baltimore on Nov. 2, 1859. He was educated at St. Timothy's School and Stewart Hall, Baltimore, and was graduated from the University of Virginia as a civil engineer in the same year that President Wilson matriculated. Before being appointed chief engineer of the United Railways & Electric Company he was assistant chief engineer of the company. Previous to that he was chief engineer of the Virginia Railway & Power Company for eleven years. He was also at one time employed as division engineer by the Baltimore Traction Company, one of the constituent companies of the United Railways & Electric Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Willimantic & Manchester Street Railway, Willimantic, Conn.—Incorporated in Connecticut to build an electric railway from Willimantic, south of the tracks of the Central Vermont Railroad, where connection may be made with the tracks of the Connecticut Company, through Pleasant Street and connecting streets to Columbia, extending through to the towns of Andover, Coventry, Bolton and Manchester to a point in Manchester near Manchester Green, where connection can be made with the tracks of the Connecticut Company. Capital stock, $50,000. Headquarters, Hartford. Incorporators: T. J. Spellacy and Joseph I. Kopelman, Hartford, and Edward M. Yeomans, Andover. [April 10, '15.]

FRANCHISES

Meriden, Conn.—The New Britain, Kensington & Meriden Street Railway has received from the Council an extension of time on its franchise in which to complete the construction of its line between Meriden and New Britain. E. A. Moore, New Britain, president. [March 27, '15.]

Cedar Rapids, Ia.—The Iowa Railway & Light Company has asked the Council for a franchise to build an additional track on Fourth Avenue between Second Street and Third Street and also a track on the parking in the same block in Cedar Rapids.

Kansas City, Kan.—The Metropolitan Street Railway has asked the Council for a franchise to extend its Thirteenth Street line in Kansas City.

Methuen, Mass.—The Bay State Street Railway has received a franchise from the Council to alter, relocate and extend some of its tracks in Methuen.

Worcester, Mass.—The Worcester Consolidated Street Railway has asked the Council for franchises to build various turnouts in Worcester and also for a franchise to relocate its tracks on Main Street near Mills Street, Worcester.

Syracuse, N. Y.—The New York State Railways have received a franchise from the Council to build a single-track line on Elm Street from Shuart Avenue to Burnet Avenue, Syracuse.

Hamilton, Ont.—The Brantford & Hamilton Electric Railway has been granted an extension of time by the Dominion Parliament in which to build its extension from Langford to Galt, Ont.

Hamilton, Ont.—The Hamilton Mountain Electric Railway has received from the Ontario Legislature an extension of time on its franchise to build the projected electric line from the Hamilton Mountain Road, Ancaster, at the crossing of the Brantford & Hamilton Electric Railway, to Mount Albion, Barton, and from the northerly boundary of Hamilton and Caledonia Road to Ryckman's Corners, 3 miles. T. H. Crerar, Hamilton, is interested. [March 13, '15.]

Toronto, Ont.—The Toronto, Barrie & Orillia Electric Railway has received from the Ontario Legislature an extension of time on its franchise in which to build its projected line in Barrie, Ont., northerly to Orillia and southerly to Toronto. [March 20, '15.]

TRACK AND ROADWAY

***Cove, Ark.**—J. P. Harpending and associates are considering plans to build an electric railway from The Narrows, Okla., to Cove, Ark.

Marin County Electric Railway, Mill Valley, Cal.—The California Railroad Commission has issued a supplemental order authorizing this company to begin construction on its 1-mile line from the Northwestern Pacific Railroad depot, Mill Valley, to the Cascades, to be known as the "Throckmorton Avenue Line." [April 17, '15.]

Bristol & Plainville Tramway, Bristol, Conn.—This company has decided to relocate its track on Park Street from the south side of the street to the center of the street. Work will be begun at once.

Danbury & Bethel Street Railway, Danbury, Conn.—Extensive improvements are being made by this company on the roadbed of the Main Street line. New ties are being laid and track is being reset.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—This company has placed in operation its 3-mile line from Lewiston, Idaho, to Clarkston, Wash. [Jan. 19, '15.]

Chicago (Ill.) Railways.—Plans are being made by this company to extend its line on Chicago Avenue from North Clark Street, Chicago, to the lake front.

Chicago (Ill.) Surface Lines.—The local transportation committee of the Chicago City Council has approved the program of track rehabilitation and extensions for 1915 submitted by this company. The program provides for 30 miles of track rehabilitation and 25 miles of track extensions in the outlying districts of Chicago. The rehabilitation work includes track, new overhead, poles and pavement.

La Salle County Electric Railroad, Chicago, Ill.—Representatives of this company advise that the difficulties experienced in financing, due to the business depression, are about to be overcome. Considerable grading has been done and material delivered on this proposed electric line between Ottawa and Mendota, Ill. O. D. Weaver, Jr., formerly treasurer of the company, has been elected president and may be reached at 37 South Wabash Avenue, Chicago, Ill. [July 4, '14.]

Rockford City (Ill.) Traction Company.—Work on the Preston Street extension of this company's line has been practically completed and operation will be begun at once.

Clinton (Ia.) Street Railway.—Plans are being considered by this company to extend its lines to South Clinton.

Tri-City Railway & Light Company, Davenport, Ia.—This company contemplates 2 miles of track extensions and 3 miles of track reconstruction during 1915. This track will be laid with 7-in. 70-lb. rail, continuous joints and oxy-acetylene welded bonds. Creosoted red oak ties laid on a crushed-rock ballast have also been adopted as standard for this work.

Arkansas Valley Interurban Railway, Wichita, Kan.—Work has been begun by this company on its extension from Halstead to Hutchinson and it is expected that the line will be completed by July 1.

Wichita Railroad & Light Company, Wichita, Kan.—Plans are being considered by this company to extend its lines to McLean Park, where it is expected a motor speedway will be built.

Louisville & Interurban Railway, Louisville, Ky.—Several matters in controversy between the city of Shelbyville and this company, having to do with the extension of its lines past First Street, have been referred to a committee, consisting of the Mayor, the city attorney and two councilmen, for consideration. The city has variously asked for removal of these tracks and for rental. Clarence Dallam, representing the company, said it was ready to remove the tracks, but pointed out that in rush periods this would reduce probability of good service. The railway was willing to agree not to interfere with the entrance of any other interurban railway over these tracks, and would give such company free use of the tracks as far as the First Street intersection.

***Rayville, La.**—Plans are being considered to build an electric railway from Rayville to Alto and Mangham. Among those interested are T. J. Coenen, T. H. McGregor, W. T. Oliver and Charles Titche, president Chamber of Commerce of Monroe.

Holyoke (Mass.) Street Railway.—The Gorge Scenic Water Ride Company, Norfolk, Conn., has been granted a permit by the city engineering department to build a new roller coaster for this railway at Mountain Park. The estimated cost of the coaster is $10,000. Work has been started on the foundation for the structure.

Springfield (Mass.) Street Railway.—Plans are under consideration for the extension of this company's line on St. James Avenue, Springfield, to East Street, Chicopee.

Worcester (Mass.) Consolidated Street Railway.—Work will be begun at once by this company on its extension from Union Street to the Adams Street freight and express station, Leominster.

St. Paul City Railway, Minneapolis, Minn.—This company is considering the suggestion of the Seven Corners Commercial Club to extend its lines on the west side of the city to connect with the Seventh Street and Hill Street lines at Seven Corners via the High Bridge; also a car line on Main Avenue from Seven Corners to Tenth Street and on Rice Street from Rondo Street to University Street.

Southern Railway & Light Company, Natchez, Miss.—Improvements estimated at $6,000 are being made by this company on its tracks in Natchez.

Metropolitan Street Railway, Kansas City, Mo.—The park board of Kansas City is grading the right-of-way on which this company will build temporary tracks through Swope Park, the line to be ready for use by July 4. There is a fill which precludes permanent improvement of the line, and no decision has yet been reached as to paving or sodding between the tracks. The tracks will extend through a grassed section, and there will be no roadway for vehicle traffic. Two boulevards are crossed and at these points there will be macadam pavement. Following the extensive improvement and reconstruction work on Walnut Street, the company will reconstruct tracks on Delaware Street and Wyandotte Street. Temporary tracks will be laid on top of the present pavement next to the curb while the rails and pavement of the permanent improvements are being laid.

Manchester Traction, Light & Power Company, Manchester, N. H.—Among the improvements planned by this company is the placing of feed wires underground in Manchester. An agreement was reached with the city some time ago by which the company is to spend $25,000 a year for five successive years, and twice that amount in the last of the five, in putting its wires underground.

Brooklyn, N. Y.—Bids will be received until May 28 by the Public Service Commission for the First District of New York for the completion of certain finish work in the Fourth Avenue Subway. This work will not delay the beginning of operation, which is scheduled for next month.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has completed the work of laying 2320 ft. of new double track on West Eighth Street, Erie. The construction consisted of 6-in. 100-lb T-rail on oak ties with 6-in. concrete base. The pavement between rails and 2 ft. outside was constructed of red shale brick. The company now has under construction 8900 ft. of single track on the East Buffalo Road, Erie. This construction will consist of 80-lb. A. S. C. E. T-rail on oak ties with a 6-in. concrete base. Continuous rail joints will be used and three switches will be laid on this section. The pavement will be the same as on West Eighth Street. The work will be completed at an early date.

Interborough Rapid Transit Company, New York, N. Y.—The Steinway Tunnel, extending under the East River from Manhattan to Long Island City, will be placed in temporary operation about June 15. Transfers will be given to and from the existing subway.

***Olean, N. Y.**—Plans are being made by the Chamber of Commerce to build an electric line from Olean to Hinsdale and possibly to Cuba. Rights-of-way from Olean to Hinsdale were secured some time ago.

Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y.—This company advises that it will rebuild its track in Wappingers Falls for a distance of 0.88 mile, using crushed-rock foundation, creosoted ties, Lorain section 72-64, 7-in. T-rail. The streets will be paved with Tidewater paving block, with 5-in. concrete base and 2-in. sand cushion.

Cleveland (Ohio) Railway.—This company recently contracted with the Algoma Steel Company of Canada for 1100 tons of steel rails. About 3000 tons of rails have been purchased for this year's requirements.

***Sapulpa, Okla.**—Plans are being made to build an electric railway from Sapulpa to the Cushing oil fields. C. N. Haskell, Tulsa, is interested.

Toronto (Ont.) Civic Railway.—Bids will be received until May 25 for the supply of cedar ties for the extension of this railway on Lansdowne Avenue, Toronto (contract No. 53). Specifications and forms of tender may be obtained at the Works Department, City Hall, Toronto.

Toronto, Ont.—A committee of residents from West Toronto, consisting of J. A. Anderson, G. Agnew, Rev. Mr. Morley and Aldermen Ryding and Weir, have asked Commissioner Harris to build a civic car line on Pacific Street and Annette Street, West Toronto, to connect with the line on Bloor Street.

Butler & Grove City Railway, Grove City, Pa.—Work has been begun by this company on its line between Butler and Grove City and it is expected that by October the line will be completed as far as Slippery Rock.

Johnstown (Pa.) Traction Company.—In connection with improvements to be made in Franklin this summer, this company plans to build an extension of its lines on River Street from the Franklin trolley bridge to the Woodvale bridge. T-rail will be used for the track construction.

Lewistown & Reedsville Electric Railway, Lewistown, Pa.—This company advises that it will replace at once its rail on Market Street, Lewistown, with standard T-rail.

Nashville (Tenn.) Traction Company.—This company has completed, on Fifth Avenue, 2 miles of track, which can readily be connected with other lines which the company is constructing.

Dallas (Tex.) Southwestern Traction Company.—Surveys of this company's line from Dallas to Brownwood have been completed and plans are being considered to include the cities of Stephenville and Dublin in the proposed route. [May 1, '15.]

Pier Railway, Port Arthur, Tex.—Work has been practically completed on this company's line from Proctor Street and Austin Avenue to the end of the causeway on the pleasure pier in Port Arthur, and operation will be begun at once.

Roanoke Railway & Electric Company, Roanoke, Va.—This company has placed in operation its extension on Belmont Street, Roanoke.

Tacoma Railway & Power Company, Tacoma, Wash.—Work will be begun by this company at once on the reconstruction and improvement of its tracks in Tacoma.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Improvements are being contemplated by this company to the amount of $500,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being considered by this company to extend its line on Asylum Avenue, Racine.

Sheridan (Wyo.) Railway.—This company plans to build a 1-mile extension of its line in Sheridan.

SHOPS AND BUILDINGS

St. Johns Electric Company, St. Augustine, Fla.—Plans are being made by this company to build a new carhouse in St. Augustine. The cost is estimated to be $7,000.

Boston & Worcester Street Railway, Boston, Mass.—J. W. Bishop Company, Worcester, has been awarded the contract by this company to build its new carhouse at Framingham to replace the one destroyed by fire at Westboro. The structure will be 121 ft. x 121 ft. with an extension 58 ft. x 78 ft., one story high, and will be built of brick, mill construction. The cost is estimated to be $100,000.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—Plans are being made by this company to build an interurban passenger station at Grand Haven in the near future. It is estimated that the cost will be about $115,000.

POWER HOUSES AND SUBSTATIONS

Manchester Traction, Light & Power Company, Manchester, N. H.—Among the improvements planned by this company is the construction of a new substation on Brook Street, Manchester, and an auxiliary steam power plant at Kelley's Falls. The substation at Brook Street is the main distributing point of the system, and the company plans to erect a new building which shall be adequate for its needs.

Manufactures and Supplies

ROLLING STOCK

Holyoke (Mass.) Street Railway is considering the purchase of two Universal side-dump cars.

Eastern Wisconsin Railway & Light Company, Oshkosh, Wis., is reported as inquiring for six cars.

Cleburne (Tex.) Street Railway is reported as having ordered six new cars. This item has not been confirmed.

East Liverpool Traction & Light Company, East Liverpool, Ohio, is reported as expecting to purchase fifteen cars.

Corning & Painted Post Street Railway, Corning, N. Y., has issued inquiries to car builders for six one-man single-truck cars.

Butler & Grove City Railway, Grove City, Pa., has placed an order for internal combustion locomotive equipment with the Internal Combustion Locomotive Company, Wilmington, Del.

Otsego & Herkimer Railway, Cooperstown, N. Y., has ordered one express car body from the Cincinnati Car Company through the W. R. Kerschner Company, Inc., Eastern agent.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., has ordered five all-steel car bodies from the Cincinnati Car Company through the W. R. Kerschner Company, Inc., Eastern agent.

Brooklyn (N. Y.) Rapid Transit Company is preparing tentative designs for one sample articulated center-entrance car, 62 ft. over bumpers, to be constructed by combining two of its 20-ft. body single-truck cars with a center section of about 14 ft. length, bids on which will be asked of carbuilders, though the section will be assembled at the railway shops. Although the details are as yet undecided it is planned to follow closely the design of the Boston articulated center-entrance car. The center-entrance section will have an all-steel underframe, with two air-operated sliding doors on each side. The car will be equipped with four motors, one for each axle, and air brakes. If the operation of this car proves successful, the company may in future reconstruct ninety-two of its single-truck cars into forty-six articulated cars with the view of reducing platform costs and securing additional safety by the installment of the prepayment feature. The drawings will be completed in about a week.

TRADE NOTES

Ellcon Company, New York, N. Y., has moved its office to Room No. 374, 50 Church Street, New York.

U. S. Metal & Manufacturing Company, New York, N. Y., has been appointed general Eastern sales agent for the Union Fibre Company of Winona, Minn., manufacturer of insulation "Linofelt" for refrigerator cars and "Feltlino" for steel cars.

General Electric Company, Schenectady, N. Y., has received an order for motors for the third lot of 100 cars which were ordered by the New York Municipal Railway from the American Car & Foundry Company. The motors are duplicates of the previous order.

Barney & Smith Car Company, Dayton, Ohio, which some time ago formed a committee of its stockholders for the purpose of formulating a plan of reorganization and lifting of its receivership, reports that a definite plan for reorganization is expected to be in shape to submit to the stockholders within a short time.

O. M. Edwards Company, Syracuse, N. Y., writes that its window fixtures and trap doors are used on the steel parlor cars for the Waterloo-Cedar Rapids & Northern Railway, described on pages 932-933 of last week's issue. By an oversight credit for the supply of this equipment was omitted from the article.

G. Drouvé Company, Bridgeport, Conn., was the manufacturer of the sash operating device used in the power station of the Havana Electric Railway, Light & Power Company, described in the last issue of this paper. The same company also furnished the sash operating device for the carhouse and shop of the Holyoke (Mass.) Street Raiway, an article on which also appeared the last issue of this paper.

ADVERTISING LITERATURE

Fibre Conduit Company, Orangeburg, N. Y., has issued a price list of its fiber conduit.

Templeton, Kenly & Company, Ltd., Chicago, Ill., have issued a folder in regard to their Simplex emergency jacks.

Indianapolis Switch & Frog Company, Springfield, Ohio, has issued a folder illustrating the accessories and parts of its Indianapolis electric welder.

Ray D. Lillibridge, New York, N. Y., has issued in pamphlet form a brief history of his business which appeared in the *Electrical Review* for April 17. It describes his work, beginning as advertising manager with a manufacturing company and later of handling the advertising accounts of a number of concerns, non-competitive with each other, based on the principle of a salary or per diem charge instead of the former method of a commission. On this basis, Mr. Lillibridge has built up since 1899, when he undertook the work, a large clientele, especially among electrical companies, although he does not limit his business by any means to companies of that character. Since 1909 the business has been conducted as a corporation under the title, Ray D. Lillibridge, Inc.

Dayton Fare Recorder Company, Dayton, Ohio, has issued a folder illustrating its fare recorder equipment as installed in an interurban car. The equipment includes a two-way and double-dial fare indicator, the novelty of construction and operation of which are designed to attract the attention of passengers and make more effective the system of inspecting and checking the fare registrations. Enclosed with the folder is a photographic reproduction of a record made on a 12-fare Dayton recorder, which shows how a detailed registration is obtained of the fare collections on each trip and the classified total registrations for the run, or the entire period of work for each conductor. A "register total" column shows the consecutive registration of all fares and serves to check the registrations from day to day between conductors.

Prepayment Car Sales Company, New York, N. Y., has issued a catalog of highly-artistic embossed cover design which describes and illustrates its manually-operated door and step devices for electric railway cars. The types of equipment described include details of single and double-shaft door and two and three-arm folding step mechanism, also conductor's and motorman's control-stand details. The mechanism is equipped throughout with a special type of universal self-aligning ball bearing which eliminates friction so completely as to enable the conductor to open or close the doors and steps with very slight effort. The weight of the folding step board is counterbalanced by a special spring construction, which can be so accurately adjusted as to have the step stand in whatever position the operator leaves it. The controlling devices are so designed as to lock the doors in either the open or closed position by a "knuckling" or over-center movement.

NEW PUBLICATION

Disturbed Dublin; the Story of the Great Strike. By Arnold Wright. Longmans, Green & Company, London. 1914. 337 pages. Cloth. Price 3 shillings, 6 pence.

The famous labor troubles in Dublin, Ireland, which occurred in 1913 were a good example of the evils which can be brought upon both capital and labor by unionism gone mad. Through the Transport Workers' Union, James Larkin built up an all-powerful organization in Ireland, entirely distinct from the British labor union both in organization and aspirations. Then by a system of sympathetic strikes, the industries of Dublin were soon thrown into a turmoil. For some time a combination of political, social and industrial conditions seemed to favor the Larkinites. But in William M. Murphy, of the Dublin Tramways, the Larkinites met their match. The efforts of the leaders of the Larkin movement seriously to disturb the conditions on the tramways failed, and later, through a committee of which Mr. Murphy was chairman, the employers fought the grotesque organization, masquerading under the title of unionism, which had grown up in Dublin. The details of this struggle and the final overthrow of Larkinism are told in an interesting way in the volume in question.

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PROMOTING UTILITY PUBLICITY

Two very notable contributions on the subject of better public relations are the recent explanation of the Pennsylvania Railroad in regard to its publicity methods, given at the hearings before the United States Commission on Industrial Relations, and the address made recently in Canada by Edward Hungerford on railroad advertising. A digest of both of these statements appears elsewhere in this issue. On the trained newspaper or publicity man their lessons will not be lost, but we are not so sure about their effect on the executive officers of all public utility companies. In altogether too many organizations the publicity man, where there is such an official, is looked upon as a sort of interloper, a kind of unnecessary appendage to the organization. Even where he is a permanent part of it, his work often attracts little interest on the part of his associates and he functions for long stretches without the management being aware of the service which he performs. If his work is important, and it must be or he would not have been appointed, this condition ought not to prevail. Mr. Hungerford says that the publicity or advertising man should insist upon recognition. But the truth is that in too few cases he secures recognition only when some problem of public relations has become acute. Then, when heroic treatment is resorted to and fails, the publicity man is likely to be condemned because his best efforts, applied in a desperate last resort, miscarry. The only logical plan is to keep him so closely in touch with the policies of the company that he can act before the "last resort" treatment becomes necessary.

PUBLICITY AND THE JITNEY

There has perhaps been no time when the electric railways in the country stood in greater need of publicity assistance than at present. This has been vividly illustrated during the spread of the recent jitney contagion. Many of the companies were sorely tried, and any number of them floundered around pitifully in their efforts to sense the public pulse. Numerous uncontradicted and misleading statements in the public press regarding the jitneys and the attitude of the electric railways toward them complicated the situation for the companies, and many companies which wanted to explain their position did not know how to do so in a newspaper way and therefore remained silent. Several notable exceptions occur to us, but in very few cases did the railways adequately present their side to the public. Where they did, it was because the companies had trained advertising men in their employ, or the managers, realizing the advantages of publicity, were already on friendly and intimate terms with the newspapers. The hermit managers reaped as they had sown. Fortunately, this particular situation is passing, but the lesson remains. It is simply that the companies must get accustomed to telling their story to the public in times of peace, to telling it frankly, fully and often and with a view to its being understood and carrying conviction. This is the policy of a few companies and, if judiciously applied by all, will not fail to remove even severe causes of distrust. The mystery of seclusion can only prove a fertile ground for an abundant crop of suspicion.

BAY STATE ARBITRATION ARGUMENT

Considerable space has been given in the columns of this paper to the testimony presented by the Bay State Street Railway in its arbitration case, because of its especially thorough character. This quality is illustrated in the final argument, published in abstract elsewhere in this issue. In this concluding presentation the company might have contented itself with the reiteration of facts brought out in the sixty days of public hearings which signalize these proceedings as among the most exhaustive of which we have knowledge. Instead, its statement of the case reviews every phase of the testimony on both sides which was deemed of interest to the board and subjects the contentions of the men to a systematic analysis. This final review involved such problems as the discussion of the adequacy of wages at the previous arbitration of 1910 and as related to the supplementary agreement of 1912; the money which would have been earned by the men had the compromise offer of President Sullivan been accepted in conference; examination of treatises by expert economists discussing the classification of skilled and unskilled labor; long and painstaking setting forth of the defects in the union evidence; summarizing the features of modern equipment and organization which make the work of the platform man easier than before; contrasting the present and past positions of the union with respect to the relative difficulties of city and country operation; bringing out the inconsistencies of individual testimony by selected employees, and drawing clear distinctions between mere demands on the part of the union and requests based upon concrete and demonstrated conditions. Wherever the evidence of the union failed to demonstrate its object, the brief puts its finger, and in its detailed explanation of the manner in which the company investigated the cost of living throughout its great system, officers of other roads will find the statement of the company an economic classic.

GRAPHICAL RECORDS AND THEIR USE

Readers of the Electric Railway Journal have, no doubt, been impressed by the increasing use in its columns and elsewhere of graphical forms for representing data of one kind and another. Take, for example, the issue for May 15. In the article by F. W. Doolittle two forms were employed, one showing variation of numbers of passengers carried during a week and during a year, the other showing three variables: passengers per car, distance from end of line, and time of day. In the same issue the history of motor ventilation was epitomized in a single chart. In last week's issue operating data of the Chicago & Milwaukee Electric Railroad were presented in chart form, curves of schedule speeds from J. F. Layng's Pennsylvania Street Railway Association paper were reproduced, and Nicholas Stahl showed graphically the results of tapping in feeders at a distance from a substation.

Our observation leads us to conclude that electric railways are using graphical records very effectively, and in no part of the organization more effectively than in the maintenance departments. To convince himself of this the reader need only glance back through the files of this paper for the last few years. What is true in electric railway work is illustrated in other lines; in fact, in every line where future progress is determined intelligently from accumulated data. During the present week there was held in New York a meeting of a joint committee on standards for graphic presentation representing seventeen societies and appointed at the instance of the American Society of Mechanical Engineers. As the name indicates, the purpose of this committee is to promote as much uniformity in graphic presentation as possible, in other words, to influence the development of a "style" in this line analogous to literary style. The very existence of this committee indicates the growing importance of the subject.

We do not advocate the indiscriminate adoption of graphical methods of recording data, but in many cases such presentation may put life and vitality into statistics whose study otherwise would be largely neglected. An examination of present practice leads to the conclusion that where data are filed merely for reference at long intervals they may be more compactly recorded in tabular form. Where the purpose is to arouse interest and co-operation on the part of those who have it in their power to reduce costs or to improve performance the graphical form is, by all odds, preferable. Just as the "eye-gate" is a much readier entrance to the mind than the "ear-gate," so the diagram or picture appeals to the mind more graphically than does a number represented by figures.

In order to comprehend a magnitude symbolized in figures it is necessary for the mind to construct a scale of measurements in terms of familiar objects. The statement that a car is 50 ft. long over corner posts conveys no impression to the mind until a mental picture of some familiar car is constructed, and its length is mentally scaled off for comparison with the length stated. This is a roundabout although familiar process. The appeal of the diagram to the mind is more effective because more direct, as it greatly simplifies this mental process.

If a foreman wishes to show a workman what he wants done on a certain piece, he demonstrates his wishes on the piece itself if it is available. Otherwise he seizes chalk or pencil and makes a sketch which, however crude, appeals to the workman's imagination. When a master mechanic realizes that the number of cars "pulled in" in a given time is greater than it should be, he is apt to get information together and plot some charts showing the facts on his road compared with those on similar properties. He studies the rate at which cars have been pulled in per month for a number of years and decides that something must be done. Instinctively he calls his foremen together and shows them the charts, enlisting their interest at once. They resolve to improve conditions, the improvement to be shown by future additions to the diagrams.

Three elements in this matter of graphical records appeal to us as important, namely, the selection of material to be graphically recorded, the devising of methods for presenting it, and the use to be made of the diagrams after they are plotted. As outlined above there is no advantage in making records which are not to produce some effect, either in impelling toward improvement or in indicating unusual conditions. In using the graphical records the method adopted on some properties of making them the basis for special or regular conferences is to be commended. The task is to be sure that the diagrams appeal effectively to the individuals most directly concerned.

POWDERED COAL FOR STEAM BOILERS

Considerable publicity was given some weeks ago to a statement that, by the use of powdered coal with its smokeless combustion, the electrification of the Chicago railroad terminals promised to be pushed far into the future if not entirely dismissed from consideration. The basis for this prophecy was the fact that powdered coal is largely used in cement plants and the alleged fact that, until recently, its application to steam locomotives has received little or no attention. If we remember rightly, this matter was under rather extended consideration at least fifteen years ago, and notwithstanding the lapse of time the state of the art in question has changed but little in the meantime. Even commercially the burning of powdered coal is just about where it was at the end of the last century, for it was then, as it is now, full of magnificent promises but hardly anything else.

For steam boilers the combustion of coal that has been reduced to an impalpable dust offers splendid theoretical possibilities. The basic principle involved is simple: When particles of matter are reduced in size, their volumes (and their weights) are technically reduced in proportion to the cube of their diameters. The exposed surface of each particle, however, is reduced only in proportion to the square of the diameter, so that the weight decreases much more rapidly than the area exposed to the atmosphere. Carried to its logical conclusion the progressive powdering of any material reaches a point where the individual particles appear to float in the air, the ratio of area to weight of each being so great that they follow any air current no matter how slight it may be. A familiar example is found in the "motes that dance in the sunbeam." They are not really lighter than air but they are so small that they are more responsive to movements of the surrounding medium than to the attraction of gravitation. Left for a time in a tightly-closed room they sink to the floor as dust.

Powdered fuel makes use of this principle, and in addition it utilizes the fact that combustion takes place only upon the surface of the burning material. As the ratio of surface area to weight for each particle increases, the rapidity of combustion increases also. In fact, progressive powdering may be carried to the point where the powder, mixed with air, will burn so quickly as to acquire the explosive qualities of gunpowder or vaporized gasoline. Flour for domestic use is, in its barrel, perfectly innocuous, but when ground fine enough and mixed with air it can explode, and has been known to explode, with sufficient violence to wreck a mill building.

Here, then, are qualities which place powdered fuel, in so far as its combustible characteristics go, fairly alongside of the volatile oils, and certainly no better fuels than these can be well imagined. With a sufficient air supply the combustion can be made smokeless. Is it any wonder that the possibilities of the plan, which is by no means new, have always appealed to the engineer? However, the practical difficulties that militate against its success with locomotive boilers are numerous. Several are more or less obvious.

Foremost among these is the establishment and maintenance of a proper mixture of air and coal dust. The locomotive boiler, although it may not look the part, is really a rather delicately balanced piece of apparatus when it is working hard. The amount of air admitted for each pound of coal that is burned on the grates must be kept close to the theoretical requirements even at the expense of the formation of carbon monoxide. Once let only 50 per cent of excess air through the fire (as is good practice in stationary plants) and the smoke-arch temperature becomes prohibitively high. Delicacy of adjustment with a minimum air supply is essential, and this does not seem to have been attained as yet with powdered fuel. At the same time there is the necessity for a hot furnace, and refractory linings in locomotive practice involve objections on the grounds of both installation and repairs. Yet if the lining is omitted there is the probability of burnt sheets due to the direct impingement of the intensely hot dust in process of combustion. On top of it all is the lack of a simple and easily-managed means for producing and handling the impalpable dust before it gets into the firebox.

Although stationary boilers possess little in common with those of the locomotive they are, in a general sense, much more easy to operate so that it would seem that powdered fuel if it comes into use for power purposes at all should find its most accessible field in stationary practice. Smokeless power plants are just as desirable as smokeless locomotives and if the combustion of powdered coal can be commercialized its opportunity is ready-made in stationary practice on these grounds alone. That it has not been able to take advantage of this fact is significant.

Of course, none of these more obvious difficulties appears to be altogether insurmountable. But, on the other hand, all of them have been recognized for a score of years without any great degree of advancement toward their successful disposal, and in the light of that fact it is not very likely that they are going to be overcome *in toto* in the near future. If electrification for terminals was opposed only by the possibility of the use of powdered fuel, its outlook would be rosy indeed.

REAL ECONOMY IN TRACK MAINTENANCE

Too often the track, whether in paved streets or on the private right-of-way, is made the butt of false economy by deferring track maintenance in periods of retrenchment. Unfortunately a road may continue operation, with a certain degree of safety, under such a policy. The standard of track maintenance, however, must be greatly lowered and the cost of restoring the track to its original physical excellence will be greatly increased. Some of the results of deferred maintenance were described by Charles H. Fuller in an article printed in the ELECTRIC RAILWAY JOURNAL of April 24, 1915. In this the cost of negligent maintenance of good materials was discussed. The rate of track depreciation, or, in other words, its real cost of maintenance, was shown to grow rapidly with any effort to economize by the neglect of ordinary repairs.

Frequently the financial condition of the company is offered as an excuse for delaying renewals. Real track economy is not dependent upon the financial condition of the company. Where it can be shown that the savings to be gained from a renewal will more than pay interest on the investment in the new materials and labor, unless a company's credit is impaired, only one course appears reasonable. Some properties whose credit is not questioned practice this kind of false economy, either because a scientific analysis of the problem has not been made or because the management fails to realize the difference between a capital investment and an operating economy.

The old adage "A dollar saved is a dollar earned" applies in this case, but one must discriminate between saving the cost of renewals and ultimate economy in operation. "Prudence at the spigot and neglect at the bung" is a trite metaphor to apply to a policy of this kind. When track is repeatedly called upon to stand the major proportion of a retrenchment policy, its service life is shortened with the result that the management is ultimately forced to make complete renewals oftener than traffic demands. On the other hand, the "stitch in time" policy applied to any type of track construction represents genuine track economy and will prolong its life in service.

Low-Floor California-Type Car

The Use of Low-Floor Motors with 24-In. Wheels, Together with Steel Side-Girder Construction, Has Enabled the United Railroads of San Francisco to Reduce the Car Weight to 34,180 Lb.

BY W. B. FARLOW, CHIEF DRAFTSMAN UNITED RAILROADS OF SAN FRANCISCO

The United Railroads of San Francisco have lately completed at their Elkton shops an experimental car that will no doubt be of interest, owing to the ever-increasing demand for low steps and light-weight cars. The general plan is largely identical with that of the cars built for this company in 1913, which were described in the ELECTRIC RAILWAY JOURNAL of Aug. 9, 1913. However, the floor has been lowered and the step at the end sill has been omitted, this being made possible by the use of "low-floor" motors and 24-in. diameter wheels.

The management decided some time ago that the "California-type" car was the one best suited for the climate of San Francisco, and consequently has directed all its recent attention and study to the questions of low steps and light weight, notwithstanding the fact that the topography of the city is such that low steps were once thought to be impossible. However, by the careful location of the trucks and the design of the underside of the steps, it has been found possible to place the first step 15⅛ in. above the street. This distance is further decreased with spring compression and wheel wear to 12½ in. above the street, making the bottom side of steps 11 in. from paving. This has been found to be the absolute minimum clearance.

The principal dimensions of the car are as follows:

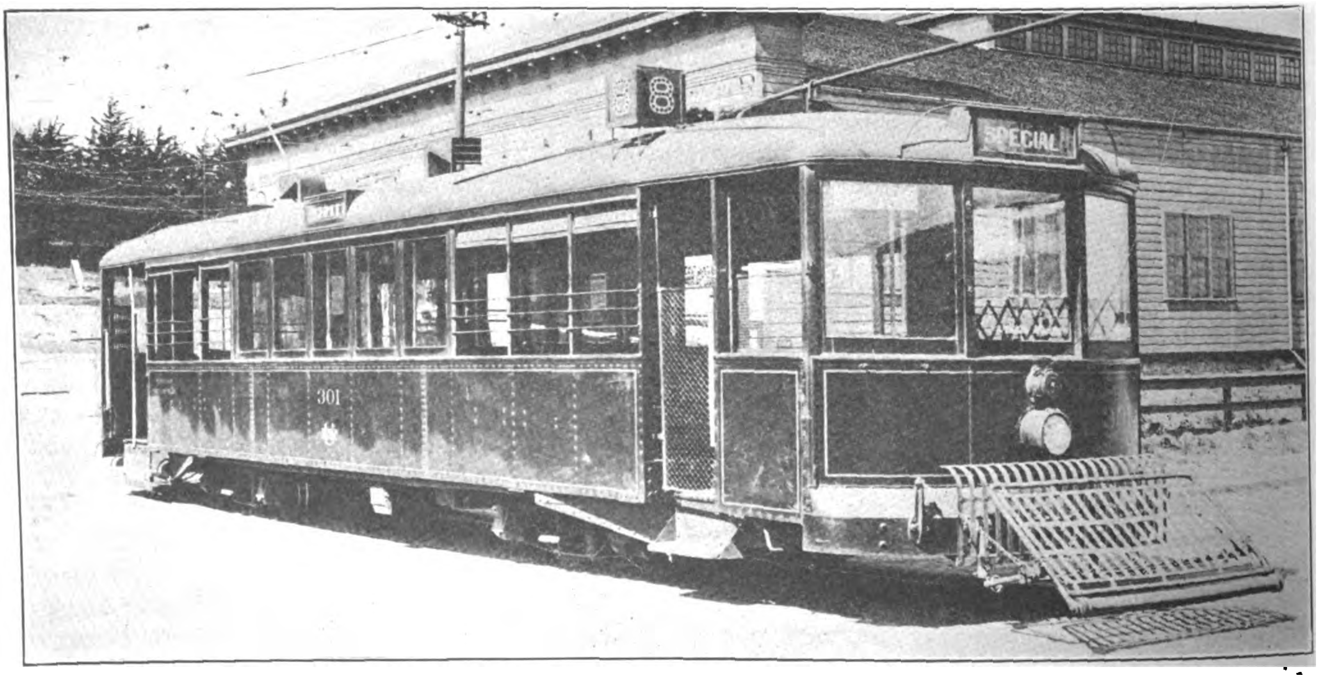
Length over bumpers	47 ft.
Length over corner posts	32 ft. 4 in.
Outside length of closed section	15 ft. 6¼ in.
Width over drip rails	9 ft. 2 in.
Height of roof above rails	10 ft. 5¾ in.
Truck centers	21 ft. 3 in.
Truck wheelbase	5 ft. 6 in.
Height of floor above rails	2 ft. 7⅝ in.

STEEL CONSTRUCTION

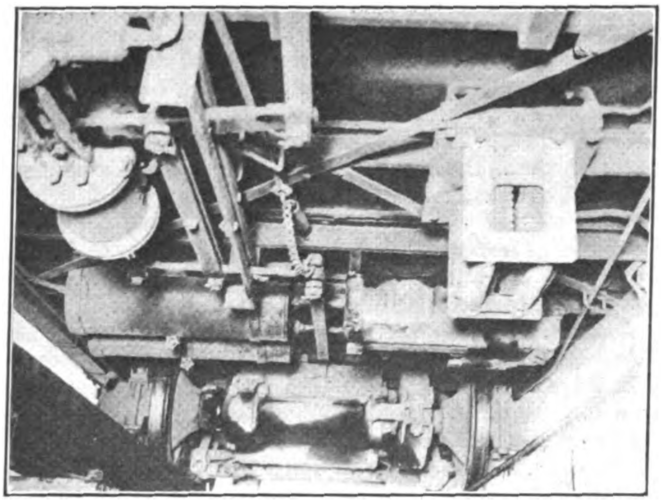
For the underframing, steel was generally used, but in a number of instances wood was substituted where this was found to be lighter and of equal strength. The side sills are of 2½-in. x 2½-in. x ¼-in. angle iron, extending in one piece from end sill to end sill. Crossings of 4-in. 5¼-lb. channel iron were used for the main portion of closed section. The design of the end sills involved a great deal of study, as it was necessary to have the bottom of the end sills flush with the bottom of the side sills to facilitate connections, and at the same time to have the end sill below the floor level at center, on account of the omission of the usual end-sill step. Diagonal bracing of ¼-in. x 2-in. flat steel is used at three points in the underframing. Each brace was fitted with a turnbuckle which greatly assisted in lining up the members.

The platform knees are built up of ¼-in. plate reinforced with 2½-in. x 2½-in. x ¼-in. angle iron at the top and bottom. These knees support the entire platform and they are 12 in. deep, directly below the end sill. The bumpers are composed of an 8-in. 11¼-lb. channel iron reinforced with a 3-in. x 3-in. x ¼-in. angle to take the load of the 2-in. x 5-in. oak center platform knees. To this 3-in. x 3-in. x ¼-in. angle iron is attached a ¾-in. rod which continues back to the end sill, close to and on a direct line with the main platform knees. This method of construction transfers the drawbar pull directly to the bolster and at the same time prevents the platform from being pulled out of line.

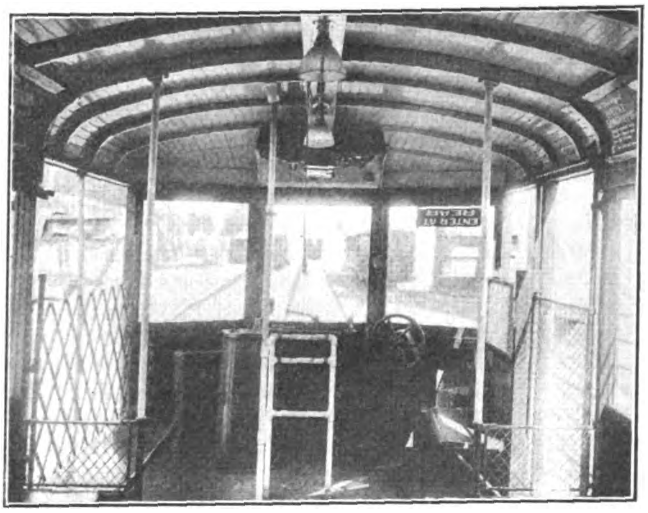
The plate-girder type of design was used because of its strength and light weight. It is not dependent on side posts in any way for strength, which permits the use of light side posts and roof construction. In addition an over-truss rod of ¼-in. x 2½-in. flat steel is used. The designer wishes here to apologize to the various opponents of the over-truss rod, agreeing with them that the side-plate construction does not require the over-truss rod. Nevertheless it will be found of



SAN FRANCISCO CAR—GENERAL VIEW, SHOWING WIDE BODY AND FLAT ARCH ROOF



SAN FRANCISCO CAR—VIEW OF UNDERSIDE, SHOWING SMALL MOTORS AND 24-IN. WHEELS



SAN FRANCISCO CAR—VIEW OF PLATFORM GATES AT FRONT END

great advantage during the replacing of damaged side plates, as it obviates the necessity of blocking up the car body while making plate replacements and prevents the side frame from getting out of line. In this case the over-truss rod is fastened to the side posts and not to the side plates.

The general platform arrangement of the 1913 San Francisco car was adhered to except in the method of folding up the step on the blind side of the car. The step of the 1913 car was operated by changing the position of the conductor's railing. This arrangement was not entirely satisfactory, and on the present car the step is operated by the raising or lowering of the long folding seat. This change makes it impossible for the step to be in the wrong position as it is necessary to raise the folding seat (which operates the step) before the collapsible pantograph gate can be operated.

After careful study it was decided to use side posts of straight-grained ash, 2-in. x 3-in., grooved out for curtains at the open section and rabbetted for the sash in the closed section. The top plate is of long-leaf pine 1¾-in. x 2½-in. in one piece between the corner posts of the vestibules.

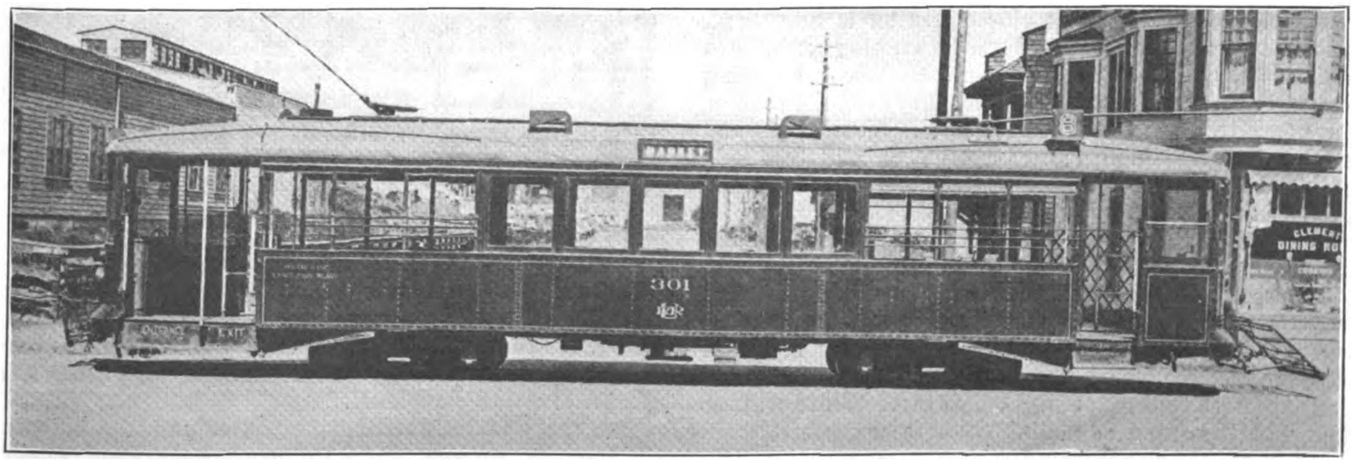
Carlines were of steam-bent 1-in. x 1½-in. oak. Considerable trouble was experienced while bending the carlines to the 12-in. radius at the ends, a number of them breaking along the grain. This difficulty was finally overcome by sawing into them at about 1 ft. in from each end. All carlines over the side posts are bound with ¼-in. x 1½-in. steel bent angle-iron fashion at the top plates and bolted through the plate and cast-brass angle brackets which occur on each side of all side posts.

The roof boards are of 5/16-in. tongued, grooved and beaded cedar, surfaced on the underside to act as the ceiling. No ceiling finish is used except backing for the advertising rack and a portion of the ceiling in the closed section. In this case the finish extends up to the vertical stanchions, and permits a neat finish around the ventilator opening. Wybrolite (alder veneer) ⅛-in. thick was used for the ceiling.

STEPS AND SEATS

The long folding steps as mentioned previously are operated by the platform seats. The short exit steps are stationary. The first step is 15⅛ in. above the street and this is followed by a step of 12⅛ in., making the platform 27¼ in. high. This allows the bumper to be the same height as most other cars operated by the company, which is of great advantage in the event of slight collisions. From the center of the platform to the king pin of the trucks, the floor has a ramp of 4⅜ in. which is so slight that it is not noticeable.

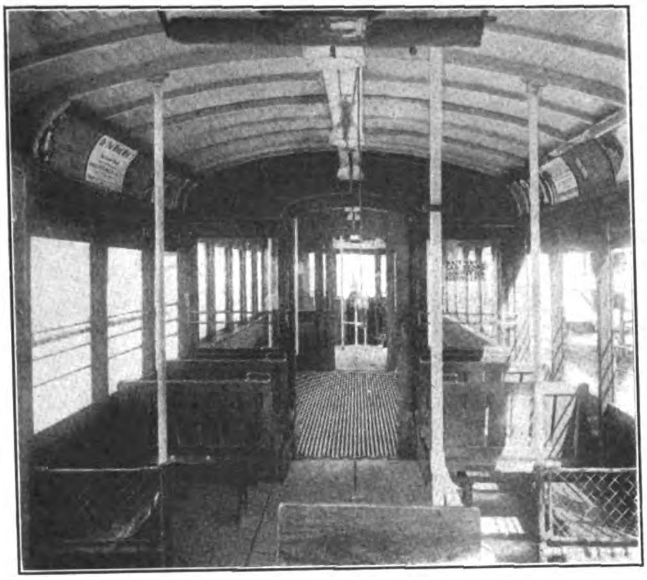
The seats for the open sections are of slat construction, pivoted but not throw-over. Considerable trouble was experienced with the seat backs in the open section of the 1913 car, the dampness causing the slats of the backs to swell and push the top rail out of place, sometimes as much as 1¼ in. This was overcome in a back designed by the company, in which the slats were placed in a vertical position with an open space of ¾ in.



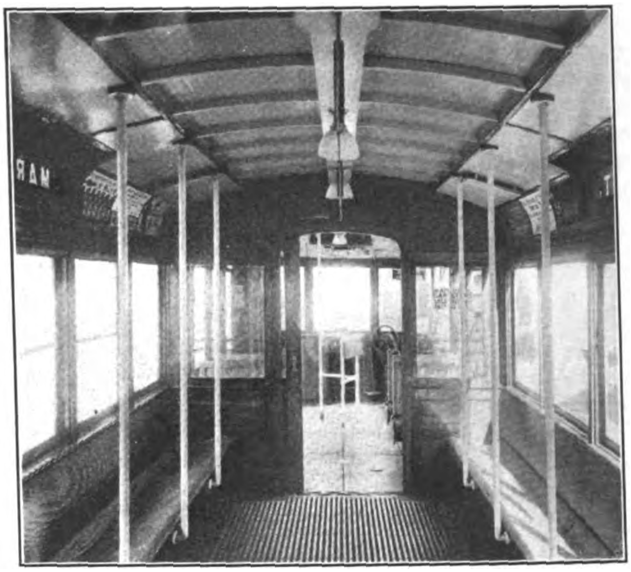
SAN FRANCISCO CAR—SIDE VIEW, SHOWING ARRANGEMENT WITH OPEN SECTIONS AT ENDS OF CAR between each two slats. The construction permits all members to swell crosswise to the grain without doing any damage, a theory which has proved to be correct during the last few months of rainy weather.

Two different seating arrangements were used in the closed section of the 1913 car, partly in the nature of an experiment, and it has developed that the ideal arrangement for this type of car includes longitudinal seats on both sides with vertical hand rods spaced for two people. Each platform is provided with two folding seats, giving an extra seating capacity for six people. The seats are used on the front platform only.

Special attention is called to the interior view of the open section which shows a very roomy car with the cross-seats fastened directly to the 3/32-in. side plates, the seat cushions being 17 in. x 34 in., and providing a clear aisle of 2 ft. 11¾ in. between seat ends. The careful placing of stanchions and grab handles makes this car very easy to walk through while in motion. One rather old patron of the company remarked to the motorman, during her first ride on this car, that it was the first street car through which she had been able to walk while it was in motion.



SAN FRANCISCO CAR—INTERIOR VIEW IN OPEN SECTION



SAN FRANCISCO CAR—INTERIOR VIEW IN CLOSED SECTION

The seats in the closed section are identical in shape with those of the 1913 car, being constructed of thin slats, ½-in. felt backing and finished with canvas-backed rattan.

INTERIOR EQUIPMENT AND FINISH

As the car has two open sections it requires but little ventilation. Although the closed section is but 15 ft. long, four roof funnels are used, two acting as intakes and two as outlets. In addition there are ventilating panels in each end of the closed section over the sash at the opposite side of the door pockets. Ventilators and intakes are high above the street level, and this is a great advantage over intakes in the floor or side of the car close to the floor, as it eliminates the odor of hot, oily air from the trucks of the car and the dust of the street.

All stanchions, grab handles and conductor's railings are enameled white, and one radical change in painting was made by painting the ceiling dead white. The color was chosen because of its bright and clean appearance and its effectiveness for night lighting. White will, no doubt, be the standard ceiling color in the future.

All wires above the floor of the car, except those used for signals, are run in a wood box fastened to the car-lines directly on the center line of the car, continuing from end to end. At each end of the car directly over the motorman is located a switchboard to which all switches, circuit breakers, fuses, etc., are fastened.

Nine 56-watt Mazda lamps with the Safety Car Heating & Lighting Company's velvet-finish, prismatic reflectors provide the lighting. These lamps are fastened directly to the cable box.

POWER EQUIPMENT

Straight air brakes with emergency valves are used. In addition to the air brakes the car is equipped with a Lord differental staffless hand brake on one end and a Peacock vertical-wheel, geared brake on the opposite end. It was found that the car could be brought to a dead stop from full speed in about two car lengths without the motorman leaving his seat.

The car is equipped with four G.E.-247 railway motors with a rating of 30 hp at 500 volts. The control is designed to eliminate resistance losses, to secure three economical running speeds and to give uniform heating of all four motors, the controllers being of the modified K-36 type. Resistance is used only on the first point and for balancing connections on subsequent steps.

The company made a number of tests to determine the power consumption of this type of equipment in comparison with others, resulting in the following figures:

Equipment	Kw-hr. per Car-Mile
G. E.-80	4.657
G. E.-90	3.974
G. E.-247	2.892

This saving was, of course, largely due to the decreased weight, and during the construction of the new car every detail was carefully watched, and wherever possible every ounce of surplus material was eliminated. The result was that when it was completed and ready for operation, the car weighed, including all such movable fixtures as fare box, motorman's and conductor's seats, sand in boxes, fenders, etc., 34,180 lb., or 683.6 lb. per seated passenger. If more cars are built, we believe they will not weigh more than 33,500 lb., due to slight changes that were found possible after the sample car was completed.

The car was designed by the writer and was built in the company's shops at Elkton by J. M. Yount, master mechanic.

Bay State Arbitration

Résumé of Company's Arguments Not Previously Emphasized in These Columns—Company Asserts Employees Have Living Wage—Wants Award to Men Predicated on Increased Fare

Arguments before the arbitration board in the Bay State Street Railway wages proceedings were concluded at Boston, Mass., on May 22, three days having been devoted to the presentation of briefs. James M. Swift represented the company, and Philip Mansfield and Fred Fay the employees' union. Mr. Mansfield held that the company should petition the Public Service Commission for authority to establish a 6-cent fare unit if it cannot afford to increase wages with its present revenue. The following résumé presents various points of the company's brief not heretofore emphasized.

POSITION OF PARTIES ON ISSUES

1. The union asserts that the wages of motormen and conductors should be 30 cents an hour for the first year and 35 cents an hour thereafter, and that the graduated scale be reduced to a two-year scale. The company asserts that the wages of these men should be reduced to the 1912 scale, and the graduated scale left as at present.
2. The union asserts that the amount of extra compensation for regular men for outside time beyond twelve hours should be 25 per cent for the thirteenth hour and 50 per cent thereafter. The company asserts that it should be no more than 10 and 25 per cent respectively.
3. The union asserts that the amount of extra compensation for extra men for outside time beyond fourteen hours should be 25 per cent for the fifteenth hour and 50 per cent thereafter. The company asserts that it should be no more than 25 per cent for the fifteenth hour and thereafter.
4. The union asserts that seven hours should be the guaranteed minimum day's work for extra men. The company asserts that a minimum of not more than five hours should be guaranteed.
5. The union desires a time allowance for morning extras of two and one-half hours and a time allowance for the crews required for the morning report of two and one-half hours. The company asserts that a period of one and one-half hours is sufficient.
6. Various increases (omitted for lack of space at this time) are demanded by the union for employees in other than the transportation department. The company states that these wages should be as fixed by the 1910 agreement.

WORKING CONDITIONS

Since the agreement of 1910 and the supplementary agreement of 1912, the men have had better hours, more satisfactory working conditions and higher wages, in spite of great industrial depression and distress. The financial condition of the company is such that it cannot afford to pay any increase in wages without encroaching upon its very moderate dividends, to the serious impairment of its credit.

In the 1908 arbitration the union representatives said that the wages were then meeting the increased cost of living. The prior arbitration board must be presumed to have fairly adjusted wages to January, 1909. The company's charts and tabulations in the present case, dated from 1909, show the increased cost of living thereafter as compared with the increase in wages and demonstrate that the fixation of wages in 1912 was not below the living wage.

The men demand an increase varying from 25 to 40 per cent above the present compensation and from 40 to 59.1 per cent above the 1909 basis. Since the 1909 award went into effect the cost of living has increased only 10.5 per cent. The company contends, therefore, that the present demands have no basis in reason. The rates demanded appear to be a standard which the union is seeking to have established throughout the country, without regard to local conditions. No evidence was offered of any company paying such rates.

Relative to the men's contention that they perform skilled labor, it appears from the testimony of A. M. Huddell, the expert witness chosen by the union to represent the trades and crafts, that such a term is not recognized in labor circles. The average period of ten days required for the motorman or conductor to learn to perform his work acceptably bears a ratio of 1 to 109.5 compared with the three-years' apprenticeship period required in many trades. General Superintendent Seibel, widely experienced in contracting and building, described platform work as largely simple, uniform, made up of habitual, mechanical motions, not trying and laborious, and not imposing any special strain on mind or body. Prof. F. W. Taussig, "Principles of Economics," Vol. II, page 134, classifies motormen in a group immediately above day laborers and below the skilled workmen.

GRADUATED SCALE

Of the thirty-one roads operating in Massachusetts not one has a graduated scale with a two-year maximum, and of the thousands of men employed only twelve men are on a flat-rate basis and only forty-six are working under a scale of less than four years. In substance, the plan proposed by the union is a flat-rate system for all but the apprentices or first-year men. Experience, however, has taught street railways that the flat rate, instead of encouraging continuity of service, increases the number of "floaters." The average length of the Massachusetts graduated scale is 6.3 years, and the company contends that the board should not reduce its scale below the six-year limit. No evidence proves that the graduated scale creates discord among the men. The old men do not leave the service because of it, nor do men refrain from applying for re-employment on this account. Between 1911 and 1914, 14.3 per cent of the men who resigned during that period, with full knowledge gained through past experience with the graduated scale, applied for re-employment and were accepted. In 1908 30 per cent of the employees were receiving the maximum pay, while at present 41 per cent are in this class. The average length of service in this period has risen from six to 7.53 years. One of the primary purposes of the graduated scale is to secure a continuity of service. One phase of the scale insufficiently considered by the union is the increased pay resulting from its operation. This year 522 first-year men will receive automatically an increase of 4.15 per cent, 495 second-year men an increase of 4 per cent, 206 fifth-year men an increase of 3.85 per cent, and 95 seventh-year men an increase of 3.7 per cent.

INCREASE OF WORK

The company contends that the work has not increased sufficiently to justify an advance in wages. Cars are of the same size as in 1909. The equipment may be more complex but it is easier to operate because it is more automatic. Electric switches and automatic signals have appreciably lessened the work. Between 1910 and 1914 the minutes per mile of running time have decreased 0.02 while the allowed time has increased 0.01. Since 1909 the schedule speed has decreased 1.3 per cent. Since 1910 the layover time has increased 0.03 minute per mile operated. Four-motor cars have increased in number, but to meet winter conditions rather than to increase speed. Since 1906 the average car has been 10 per cent lighter in weight, and from 8 to 10 per cent of the cars owned before 1906 have lightened. Between 23 and 30 per cent of the present cars are lighter in weight than in 1906 and none are heavier.

The traffic has increased only four revenue and transfer passengers per car-hour, or 0.5 passenger per car-mile since 1909. There has been an increase of only 0.5 cent in passenger revenue per car-hour since 1913, while the average wage increase demanded is 8 cents per car-hour. Of the 145 various forms of tickets in use, 107 were introduced before 1908 and only twenty-two for the entire sixteen divisions have been introduced since 1912. The identification check and employee's coupon ticket were introduced at the request of the men. It is easier to accept a ticket than to make change incidental to a cash fare, while the ticket obviates the risk of counterfeit, mutilated and foreign coins. Since 1906 there have been no changes in transfer forms or additions to them, except in the Lynn division, when in 1910 fifteen revisions were made. Since 1909 there has been an increase in transfer passengers of only 0.4 per car-hour and 0.05 per car-mile.

There is no evidence that the hours are more irregular than they ever have been; in fact, the nine-hour-in-eleven law would seem to prove the opposite. There is no evidence that comparative operating conditions have changed; that freight, snow, service, or instruction work is any different; that curves have become more numerous, or that blind crossings, intersecting streets, railway crossings or bridges have grown in number; that rail conditions, single track operation, congestion of other city conditions have altered; that there is any new personal requirement; that mail, newspaper or company supplies have increased; that any greater knowledge is called for; that "near accidents" are now more frequent or impose a greater strain; that more announcements have to be made by conductors; that fare, ticket or transfer zones have increased; that the traveling public has become more difficult to handle; that more foreign, counterfeit or mutilated coins are received, or that more forms have been introduced or more reports required.

Such of these conditions and requirements as do exist have existed for many years and have been considered by the men and the company in fixing wages since 1900. The sole issue is whether they are more burdensome, and if so, to what extent. A higher standard of care and a stricter performance of duty are required, more stops are made (one for each 2 car-miles) and possibly more miles per day for some crews are covered, although the last is voluntary. Population, traffic and transfers have increased, the two latter very moderately. When these increases are compared with the easier working conditions, however, their importance becomes slight. Since the last wage award, work has become easier because of shorter hours, decrease in speed, lighter equipment, printed time-tables, reinstallation of the instruction car, white poles, the growing use of tickets and identification checks, electric switches, air brakes, simplified control, abolition of grade crossings, discontinuance of unnecessary stops, electric signals, improved track conditions, heated and inclosed vestibules, side bars in open cars, sand boxes and sand cars, double registers, the dispatching system, traffic officers, hand-thrown signals, the principle of seniority, operating signs, and rules with more detailed instructions and suggestions. The average wage itself has increased 13.2 per cent since 1909.

COST OF LIVING

Since 1909 the average wage has increased faster than the cost of living, the company thus exceeding its duty. Had it used the government figures for the North Atlantic states instead of making its own exhaustive local investigation on all the divisions of its system, the cost of living resulting would have been lower than actually was the case. The men's testimony as to the increased cost of foodstuffs was very indefinite, and no base price was taken in the letters exhibited from Taunton (Mass.) tradesmen. The personal testimony of the men as to increased rents had no value, in that it did not consider the average house or the average increase.

CHARACTERISTICS OF THE WORK

In regard to the so-called hazards of operation, the company maintains that to the careful conductor the danger of running-board injury is small; that observance of rules relative to side bars protects him from the danger of coming into contact with trees, poles, etc., and that there is not the least operating danger to him from high-tension lines. Only by carelessness can a shock be obtained from an insulated car wheel. Explicit rules cover the situation when cars fail to make their meeting points on time. In the five years ending December, 1914, there were only thirty-six head-on collisions on the entire system of nearly 1000 miles of track. Of twenty-six of the largest industries in the State, only one had a lower percentage of accidents than the company's record for its motormen and conductors in 1913.

The average yearly wage of 2132 regular men is $793.52; of 856 spare men, $630.76 and of 3008 blue-uniformed men, $788.84—higher than the average for the majority of Massachusetts workingmen and much higher when the money value of constant employment and of free transportation is added. The right to take off not exceeding thirty days without losing one's rating is peculiar to electric railway work. If this factor could be measured it would raise the average pay to a substantial amount. The company holds that the average wage of its men permits a very fair standard of living under Massachusetts conditions.

SUPPLY AND DEMAND

The company's evidence shows that this employment has many attractions sufficient to cause members of many other employments to abandon them and seek this. Under existing conditions the company is, and always has been, able to procure needed help without advertisement or solicitation. The wages of city employees do not constitute a determining factor in relation to street railway wages. The former wages are determined by the amount the people who are willing to tax themselves to pay for the public service. Neither is it sufficient for the men to assert that all electric railway employees are underpaid. Electric railways have been in operation for more than twenty-five years, and the necessary presumption is that within such a time the wage of any occupation will have reached a fair average level.

OTHER EMPLOYEES

The union calls for a certain rate per day in twelve specified trades for certain years of service, and also urges that all employees not so specified be paid the maximum wage in their respective classes and that an increase of 20 per cent be granted. Ranging from a minimum demand of 15 per cent increase for first-year painters to a maximum of 68 per cent increase for armature winders, these demands do not consider relative class or trade value, or efficiency measured in years of service. Their real basis is not one of economic, industrial or working needs, but rather one of force seeking to establish a uniform wage for practically all workmen. Roughly these wages demanded range from a minimum of $2.50 to a maximum of $3.50 per day, with double time for Sunday, holiday or overtime work. The company holds that the union has absolutely failed to demonstrate the need of these proposed rates. The union contends that the maximum rate should be accorded at the end of the first year. Apprenticeships in general trades require three years, and in the company's present service, five years. The work of machinists, pitmen, carpenters, blacksmiths, oilers, etc., in the Bay State company does not correspond with that in similarly named trades outside.

Through the introduction of labor-saving tools the work has become less laborious in shops and carhouses. Since 1910 track sanders have received an increase in pay 0.4 per cent greater than the increase in the cost of living, and the men in the equipment department, 5.67 per cent. The power-house and substation employees have had their hours cut from ten to eight, with no corresponding reduction in pay. In the line department, wages were increased 2.6 per cent more than the cost of living. The company contends that the union has introduced no evidence warranting an increase in its offer for extra time compensation to "cover the list," or for increasing the minimum daily guarantee of five hours' work. The hours of labor in different shops should remain as at present in view of the different local conditions.

CONCLUSION

In conclusion, the brief cites various court decisions emphasizing the right of the investor to a reasonable return upon his capital, and points out that in many other arbitration cases the union has recognized the ability or inability of the company to meet demands for increased wages as an important factor in determining an award. It reviews the financial condition of the company, which has not been questioned by the union, and holds that wages should be reduced to the 1912 basis. The management has been able and economical, honest and aboveboard. The company cannot maintain its 5 per cent dividend if wages are increased, or give the public the standard of service required. Counsel submit that if the board decides upon an increase of wages, the finding be made contingent upon the successful appeal of the company to the Public Service Commission for authority to increase fares. The assumption that such an increase would be granted by the commission and that if granted would add materially to the company's revenue, is in the opinion of the management "a nebulous foundation on which to base an increase of wages." The finding of the arbitration board is to be handed down by June 21.

Through an error in the report of the meeting of the Pennsylvania Street Railway Association, published in the last issue, H. R. Stadelman, one of the speakers of that meeting, was mentioned as having been connected with the Nachod Signal Company at Philadelphia. Actually, Mr. Stadelman is connected with the Electric Service Supplies Company, in its street railway signal department.

Jitney Figures from Two Southern Cities

Interesting Data Are Given on the Number of Passengers Carried and the Cost of Operation

Since the appearance of the jitney at Houston, Tex., early last December, the management of the Houston Electric Company has made periodical checks of the operation of every car of that character. In this city the effect of the jitney has been more than usually hurtful, because about 75 per cent of the travel is within a 2-mile zone. In fact, most of the lines are less than 3 miles long, and there are but four lines which are 5 miles to 6 miles long. The jitneys are operating throughout almost all the territory of the company. Their schedule speed averages 14 m.p.h. whereas the cars make but 8.5 m.p.h. on the city sections and 10.5 to 11.9 m.p.h. on the outlying sections.

This superiority in speed is due in part to the fact that the jitney has to stop only for the discharge of four to seven passengers, and in part to reckless driving, as evidenced by numerous arrests and accidents.

One notable feature of the Houston figures is that while the number of cars has decreased, the jitney-hours and jitney-miles have slightly increased. This is indicated by the hours and mileage of Table II rather than by the segregation of Table I. It is also shown by the increase in average revenue per car. As the latter figure is only $2.46, it is evident that a large proportion of the drivers are rush-hour snipers only. The all-day jitney operators naturally feel very bitterly about these interlopers. It will be seen from Table IV that under conditions of absolute freedom from regulation and ideal short-haul conditions, the gross daily revenue may reach $9.75. Most of the regular jitney operators, howevery, earn from $6 to $8.

To arrive at the earnings of cars regularly engaged in the jitney service, the cars shown as operating less than two round trips were eliminated from Table II. This excludes practically all the cars operated by individuals who, following their regular pursuits, haul passengers only during rush hours. After these cars are deducted, the data given in Table III are obtained.

TABLE I—CHECK OF HOUSTON JITNEY CARS

	Feb. 2	March 11	April 13
Total cars operated	714	656	527
Cars operated less than two round trips	442	373	229
Cars operated more than two round trips but less than four hours	94	84	112
Cars operated four hours or more but less than eight hours	105	115	102
Cars operated eight hours or more but less than ten hours	41	41	47
Cars operated ten hours or more	32	43	37

TABLE II—DATA FOR ALL HOUSTON JITNEY CARS

	Feb. 2	March 11	April 13
Trips operated	4,176	4,776	4,630
Hours operated	1,670	1,798	1,840
Miles operated	23,380	25,172	25,760
Speed in miles per hour	14	14	14
Passengers carried	18,028	19,725	21,650
Increased 20 per cent for short haul*	21,634	23,670	25,980
Revenue at 5 cents each	$1,081.70	$1,183.50	$1,299.00
Average daily revenue per car	$1.51	$1.804	$2.465
Average revenue per trip	$0.259	$0.249	$0.285
Average revenue per hour	$0.648	$0.658	$0.706
Average revenue per mile	$0.046	$0.047	$0.054

*This allowance is made to take care of intermediate passenger pick-ups not recorded by checkers.

TABLE III—JITNEYS OPERATING MORE THAN TWO ROUND TRIPS IN HOUSTON

	Feb. 2	March 11	April 13
Cars operated	272	283	298
Total number of trips	3,888	4,221	4,299
Total number of hours	1,551	1,595	1,764
Total number of miles	21,714	22,330	24,696
Speed in miles per hour	14	14	14
Passengers carried (including 20 per cent increase)	20,268	22,340	24,976
Revenue	$1,013.40	$1,117.00	$1,258.80
Average daily revenue per car	$3.72	$3.94	$4.22
Average revenue per trip	$0.26	$0.264	$0.292
Average revenue per hour	$0.653	$0.70	$0.71
Average revenue per mile	$0.0465	$0.05	$0.05
Average length of round trip, miles	5.59	5.45	5.74

TABLE IV—SEGREGATION ACCORDING TO GROSS EARNINGS

	March 11	April 13
Number of cars earning less than $1	373	281
Number of cars earning $1 or more but less than $2	76	41
Number of cars earning $2 or more but less than $3	54	49
Number of cars earning $3 or more but less than $4	68	40
Number of cars earning $4 or more but less than $5	47	36
Number of cars earning $5 or more but less than $6	22	24
Number of cars earning $6 or more but less than $7	8	21
Number of cars earning $7 or more but less than $8	4	11
Number of cars earning $8 or more but less than $9	1	6
Number of cars earning $9 or more	1	1
Total	656	527

TABLE V—RECORD OF CARS IN SERVICE IN HOUSTON

	Total in Service	In Service Previous Month	Entered Service this Month	Out Since Previous Check
February	714	...	...	...
March	656	235	421	479
April	527	279	248	377

Table IV shows the data obtained but with the cars segregated according to the amount of their gross earnings. Table V shows a record of the cars in service.

A series of detailed checks of the earnings of individual jitneys and buses in another large southern city undertaken by the local railway company, shows a situation there not greatly different from that in Houston. The period of the count covered thirty-one days between March 26 and April 25 inclusive, and showed that 401 jitneys carried an average of 18,229 passengers a day and earned an average of only $911.48, or but $2.27 gross each. As the jitneys in this city are not restricted to any fixed route they may earn a little more for carrying passengers an extra distance, and also for owl service at double rates. On the whole, however, the average earnings appear to be less than $2.50 a day. This very low average is due to the fact that many jitney operators are in other lines of business and use their cars for commercial purposes when making trips to and from their homes. Jitney operators who work twelve hours or more a day have gross earnings of $6 to $8.

Two routes were checked, those selected being two of the most popular in the city because of their short haul (twenty minutes for the round trip) and heavy travel. The result of the count is given in Table VI.

The earnings of the jitneys for a good Sunday on the two routes mentioned, as determined by the count, is given in Table VII.

The absurdity of a 5-cent, four-passenger or even seven-passenger service speaks for itself from these data. It has been found that even the three twenty-seat buses have not earned more than $10.80 a day.

Most of the cars in service are either of Ford or miscellaneous seven-passenger touring-car type. The estimated cost in dollars per bus-mile, as determined by the railway company, is presented in Table VIII.

TABLE VI—RESULT OF JITNEY COUNT IN SECOND SOUTHERN CITY

Number of Days	Route	Average Number of Jitneys	Total Jitney Days	Passengers	Revenue
31	A	238	7,380	366,803	$18,340.15
31	B	163	5,056	198,315	9,915.75
Total		401	12,436	565,118	$28,255.90
Average per day				18,229	911.48

TABLE VII—RECAPITULATION OF JITNEY COUNT FOR SUNDAY, MARCH 28

122 autos earned	from	$0.05	to $1.00	each
36 autos earned	from	1.00	to 2.00	each
40 autos earned	from	2.00	to 3.00	each
39 autos earned	from	3.00	to 4.00	each
27 autos earned	from	4.00	to 5.00	each
17 autos earned	from	5.00	to 6.00	each
8 autos earned	from	6.00	to 7.00	each
4 autos earned	from	7.00	to 8.00	each
9 autos earned	from	8.00	to 9.00	each
4 autos earned	from	9.00	to 10.00	each
5 autos earned		10.00	or more	

TABLE VIII—ESTIMATED COST OF JITNEY OPERATION

Ford		Old 7-passenger
0.016	Tires	0.03
0.006	Gasoline	0.014
0.002	Oil	0.002
...	Repairs	...
0.01	Supplies and garage	0.01
0.01	Driver	0.01
0.015	Depreciation	0.03
...	Accidents	...
0.004	Licenses	0.004
0.063	Total	0.100

Power Supply of the Public Service Railway

Factors Are Cited to Account for Increased Consumption of Electricity by Traction Lines

At the May meeting of the Public Service Company Section of the American Electric Railway Association, held recently in Newark, N. J., Dudley Farrand, vice-president and general manager of the Public Service Electric Company, described the development of the power generating system of the electric company since the formation of the corporation in 1903. The railway company operates no power plants but purchases all of the required energy from the electric company, using at present about one-half of the energy generated, i.e., 213,444,675 kw-hr. out of 430,818,532 kw-hr. generated last year. Mr. Farrand "qualified as an expert" to speak on this subject by stating that he began his electric railway work when Leo Daft was experimenting in Newark in 1889. He has been connected with it ever since. When the Public Service Corporation was formed there were fourteen power stations on the property, having a combined capacity of about 40,000 kw. This number had increased to twenty-six in 1914 with a combined capacity of about 171,000 kw. In the same period the number of substations increased from nine to fifty-eight, as the supply gradually changed from direct to alternating current. At first the railway load predominated, but the lighting load has grown faster until now the two are neck and neck.

In order to determine roughly the electrical energy consumption per passenger carried by the railway, Mr. Farrand divided the total kilowatt-hours supplied to the railway by the total number of passengers carried ten years ago and to-day. The result was to show an increase from about 0.48 kw-hr. to 0.529 kw-hr. per passenger during this period. The corresponding increase in kilowatt-hours per car-mile has been from 3.21 to 3.76, or 17 per cent. The schedule speed has increased more than 10 per cent at the same time. In the meantime the electric company has, by the introduction of modern generating and transforming apparatus, been able to make a very considerable reduction in the cost of generating energy partly, at least, offsetting the increased energy consumption per passenger carried.

In explaining the increased power consumption by the railway, Mr. Farrand found the following contributing causes: Increase in number of stops per mile; use of larger and heavier cars; adoption of four-motor equipment; more rapid acceleration of cars; increase in schedule speed; more brilliant lighting of cars; great increase in the number of electric heaters used; adoption of grooved rails in city streets with consequent friction losses; addition of electric signaling apparatus; substitution of electric for horse-and-cart hauling for construction and repair departments; demand for power for electrical welding of joints, and more liberal use of light in carhouses and offices. To offset the necessary increased demand motormen and others can do a great deal to save electrical energy. They can avoid "kangaroo" starts and "grandstand" stops; they can coast more; those responsible for car cleaning can turn out lights when not in use, etc.

In tracing the development of the company's power stations Mr. Farrand pointed out how the cost of electrical apparatus per kilowatt of capacity has been brought down in recent years. Averaging the cost over a period of years he found that the investment cost per kilowatt, exclusive of distribution, was $208.33, made up as follows: real estate, $25; buildings, $60; equipment in generating and substations (excepting items following), $40; engines and generators, $58.33; switchboards, wiring and transformers, $35; miscellaneous, $15. It should be possible to figure for the future a total of about $120 for bare cost of physical equipment, as follows: Generating stations, $50; transformers, aerial, $10, subway, $20; substations ($25 to $45), average, $30; miscellaneous, $10. Allowing for reserve, the total may be increased to $150. The latest power station of the company, known as the Essex station, when completed will have a capacity of about 150,000 kw and will have cost about $50 per kilowatt exclusive of real estate.

As an example of obsolescence Mr. Farrand stated that the contents of twelve power stations recently scrapped, which had originally cost $646,030, sold for $12,750. In order to give his audience an appreciation of the power consumption of an electric heater, Mr. Farrand showed that the heaters for one car use power requiring an investment of $1,250 in generating and distributing machinery.

Arkansas Managers Meet

Jitney Discussed in President's Address—Officers Elected for the Ensuing Year

At a meeting at Little Rock on May 11-13 of the Arkansas Association of Public Utility Operators the principal subjects of electric railway interest discussed were problems of financing small utility companies, franchise terms and the jitney.

The latter subject was considered particularly by President C. J. Griffin in his annual address. He pointed out that during the past year street railway companies have not only been subject to the falling off in revenue owing to the general business depression, but in addition to this they have the competition of the jitney bus. He stated that this was unfair competition, as the jitneys pay no tax whatever, and the street railway companies are compelled under their franchises to pave from one-third to two-thirds of the width of a street, which makes it possible for the jitney bus to thrive. He also stated that the jitney simply takes the short-haul passenger and leaves the long-haul passenger for the street railways.

The financing of small utility companies was considered in a paper presented by H. C. Couch, president of the Arkansas Power Company, Malvern, Ark. Mr. Couch cautioned promoters endeavoring to finance a property against painting it in tints too rosy, thereby making the financier expect too much from his investment. He also emphasized the value of long-term franchises, declaring that it is hard to finance a utility the franchise of which has less than twenty-five years to run. He insisted that it should not be difficult to convince a city council that a long-term franchise is not detrimental to the community's interest, while it is distinctly beneficial in financing the property, and that a city can properly grant a fifty-year franchise, while making contracts for street lighting and fire-hydrant service for shorter periods. Turning to the operation of the small central station, Mr. Couch urged that everyone connected with the company study most seriously the needs of the company's patrons. Each employee, he declared, should always be ready to listen to a complaint and, so far as he is able to do so, to remove the cause therefor.

Mr. Couch's paper was discussed by C. J. Griffith of Little Rock, Byron C. Fowles of Pine Bluff, Minor Q. Woodward of Pine Bluff, E. T. Reynolds of Camden, and C. M. Richards of Hope.

Other topics considered at the meeting were methods of reading electric light meters, collecting accounts and power transmission.

The following officers were elected for the ensuing year: president, H. C. Couch, Little Rock; vice-presidents, W. L. Woods, Texarkana, and W. J. O'Brien, Helena, and secretary-treasurer, Roy B. Fowles, Pine Bluff. The newly-elected president appointed the following members of the executive committee: Andrew Patterson, Texarkana; Mrs. Anna B. Stoops, Stuttgart; J. F. Christy, Jonesboro; Byron C. Fowles, Pine Bluff, and C. J. Griffith, Little Rock.

Railway Signal Association Meeting

Reports of Several Committees, Including Statement on Methods of Testing Signal Circuits and Signal Apparatus

At the stated meeting of the Railway Signal Association, held at the Hotel Astor in New York City on May 26 and 27, reports were presented by five standing committees and two special committees. Among the former was the report on power interlocking which included revised specifications for electropneumatic interlocking, with ten drawings, and revised specifications for fiber conduit and specifications for incandescent electric lamps. The committee on manual block presented a statement on the care of dry batteries, together with instructions for the maintenance of dry cells, gravity cells and caustic soda cells. The committee on standard designs presented eight new drawings, including a revision for the standard design of semaphore blade for upper-quadrant signals.

The committee on electric railway and alternating current signaling presented specifications for reactors for line and track circuits and reported that it was bringing up to date the sections of new and extended alternating current signal installations. Progress was reported in the committee's investigation of the inductive effects between signal circuits and adjacent electric circuits, as well as the hazard due to paralleling high-tension and low-tension lines. The committee on storage-battery and charging equipment presented specifications for nickel, iron alkaline storage batteries and included a statement on the cost of electric energy for charging batteries. The special committee on lightning protection made a report which included specifications for vacuum-gap lightning arresters, air-gap lightning arresters and choke coils for use with lightning arresters.

TESTING SIGNAL CIRCUITS

There was also a report from a special committee on electrical testing in which was presented a progress report on methods of testing electric signal apparatus and circuits. This stated that, with the exception of forms of recording the result, of track circuit and relay tests, very little had been done toward standardizing methods of conducting tests. Very few such forms are in use, and they are greatly different. In general the frequency and methods of testing are left to the discretion of the men having this class of work in charge. The number of inspectors, frequency of tests, and the nature and thoroughness of such tests varies with the size of the signal organization, density and importance of traffic and the extent of electrical signal apparatus.

On one of the largest railroads the practice is to test each circuit on the entire system for correct operation and insulation at least once each year. This is done by several men specially trained for the purpose. It does not include the testing of track and other simple circuits, which are a part of the every day routine of maintainers. However, the work of the latter is checked by the special men on their periodical visits.

In these annual tests controllers and relays are opened and closed, and the results of observation as to the action of the pending apparatus are recorded and checked with the circuit layouts as to correctness. This plan is simple, practical and takes a minimum of time and can readily be done without delay to traffic.

All underground and overhead wires are tested for insulation to ground, generally by the use of a megger or similar instrument which is more easily applied and gives a reading in less time than with other types of apparatus. The minimum resistance allowable depends upon the potential requirements surrounding conditions of the conductor, but in general any conductor with a resistance of less than one megohm is closely watched, those with one-half megohm resistance are usually renewed and those with one-quarter megohm are always renewed.

Generally, a fault is located and corrected before an interruption occurs. When testing cables, insulation readings are taken between the wires as well as to the ground, especially in the case of old cables or if the conditions are extremely unfavorable to the life or efficiency of the insulation. As testing between conductors at points where traffic is dense results in considerable delay, it is avoided if possible, a temporary cable being provided for use for making tests. Interior wiring is not usually tested except by observation and proper operation of apparatus. Emergency tests for location of faults affecting apparatus are usually made by foremen and maintainers, the special men being called upon only in case of any interruption.

TESTING SIGNAL APPARATUS

On small installations the apparatus is tested at the same time and by the same force that tests the circuits. On larger installations a different force is employed. Special attention is given to relays, which are exchanged and sent to central points for cleaning and repairs. Smaller divisions receive this attention in the field. They are cleaned, adjusted, and have pick-up and drop-away readings, these being noted on a paper form pasted on the bottom of the relay, together with the name of the tester and the date. Tower apparatus is tested and inspected by experts once each year in addition to very frequent inspections by maintenance forces. Signal motors and electric interlocking apparatus are frequently inspected but seldom tested (except for crossing protection) unless some form of trouble develops, when a thorough test is made and the fault corrected in the most practical manner.

Amusement Parks Open in Kansas City

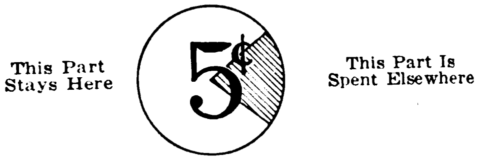
The amusement park season in Kansas City, Mo., opened on May 23 with the opening of Electric Park, the chief amusement center. This park is in the residence district, a block from the grounds of the Federal baseball league, and on the main route to Swope Park, the 1300-acre public playground. Electric Park and the ball grounds are on the south side of Kansas City; the American Association baseball grounds are also in the south part. This year Fairmount Park is under new management which will improve the attractions and probably will induce much larger traffic in that direction. Fairmount is convenient as an amusement park to Independence, Mo., and the growing suburban district between that city and Kansas City, all being served by the Metropolitan Street Railway.

Railway and Jitney Nickels

Their Distribution in Portland and Elsewhere as Illustrated in "Watts Watt"

Watts Watt, the publication of the Portland Railway, Light & Power Company, of Portland, Ore., in its issue of May 15, contained a diagram and table of the distribution of the nickel in electric railway and in jitney service. The material was published on opposite pages so as to be more effective. A reproduction follows:

THE STREET CAR NICKEL
(Chart below is based on 1914 operation)



The Part That Stays Here

I.—The street car company does not get a whole nickel. 28 per cent of it, or 1.4 cents, goes back to the public as a rebate in the form of commutation tickets, free tickets to city employees, such as policemen and firemen, and for transfers, so for each passenger carried the company only gets 3.6 cents. On the other hand, the jitney gets the whole nickel with no reductions of any kind.

II.—Wages alone are 41 per cent of this 3.6 cents, or more than the entire portion of the jitney nickel left in Portland.

III.—Taxes, bridge rentals and paving expenses consume a big part of the street car fare.

IV.—Then there is the outlay for damages, supervision and other local expenses, all of which stays here: also

V.—The portion of power cost representing wages, wood fuel and local supplies, and

VI.—Depreciation, that part of which includes local supplies and local labor.

The Part Spent Elsewhere

I.—Interest on street car investment. Nothing could please the Old Reliable Service Company more than to find Oregon money seeking investment in this company. Invitation to Oregon money has been and is constantly open to such purposes. Oregon money as a rule seeks more profitable investment than that permitted to the public utilities. And, so, the Eastern investor who is content with more modest interest return, comes to Portland's aid and that of the surrounding community by furnishing nearly all the funds required by the Old Reliable Service Company and other similar public utilities.

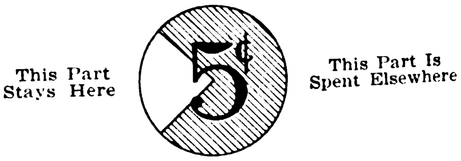
II.—Material manufactured elsewhere takes a small portion of the nickel.

III.—Remaining items entering into power cost.

IV.—Depreciation, that part which includes those things which cannot be purchased or made here.

¾ OF THIS NICKEL IS REINVESTED IN PORTLAND

THE JITNEY NICKEL
(Chart below is based on best available data from several sources here and elsewhere)



The Part That Stays Here

I. — Garage expenses and such repairs as can be made locally.

II.—Interest (if venture is not financed by automobile company or other outside interests).

III.—License fees.

IV.—Damages (in case victims succeed in recovering anything).

V.—Wages, when anything is left after other necessary expenses are paid. The fact that there are 35 per cent fewer jitneys in operation now than sixty days ago is evidence that the wages earned by the jitney operators are not sufficient to make the business attractive in by far the majority of cases. The City Hall Records prove this. Very few of the original jitney drivers are in business today. The fact that new ones have taken their place simply proves P. T. Barnum's famous statement.

The Part Spent Elsewhere

I. — Little Johnnie Rockefeller gets a big slice of the nickel for gasoline and oil.

II. — The Rubber Barons come in for another fat part of the coin (there are no tire factories in this locality).

III. — Repair parts bought from the Eastern auto manufacturers absorb a little more.

IV.—Depreciation. This is one of the rocks on which the big bulk of the jitney wildcatters have gone broke. Usually, old second-hand machines are purchased on the installment plan and are operated until they are in the last stages of "consumption," and then they are "scrapped" and sent to the "Old Ford's Home" and the jitney man must buy another or go out of business.

ONLY ¼ OF THIS NICKEL STAYS IN PORTLAND

The tables reproduced were also accompanied by other comments to emphasize the lesson conveyed.

Annual Convention of Southwestern Electrical & Gas Association

Economies in Track Construction, Repair-Shop Practice, Welfare and Safety Were the Principal Topics of Discussion at the Meeting Held in Galveston, Tex., on May 19 to 22

Operating problems, welfare and the jitney bus competition and proposed regulation were the principal topics of discussion at the annual meeting of the Southwestern Electrical & Gas Association held at Galveston, Tex., on May 19-22. More than 200 members registered on the opening day, and the total registration for the week was approximately 400. At the opening session on Wednesday morning President D. G. Fisher, assistant general manager Southern Traction Company, Dallas, Tex., presided, and Mart H. Royston city attorney of Galveston, welcomed the association to the city. John A. Bonner of Houston responded to the address of welcome on behalf of the association. Following the reading and acceptance of the minutes of the previous convention of this association, Secretary H. S. Cooper reported an increase in membership despite the unfavorable business conditions and the loss of some members of the association through the consolidation of some of the properties. Secretary Cooper stated that the present membership was 232, and in closing his report emphasized the importance of increasing the scope of the association's work, especially urging more attention to matters of public interest. President Fisher then addressed the convention, his remarks being summarized elsewhere in this issue.

At the railway session of the association, held on Wednesday afternoon, B. R. Brown, superintendent maintenance of way Dallas Consolidated Electric Street Railway Company, read a paper on "Track Construction in Paved Streets." V. W. Berry, master mechanic Northern Texas Traction, Fort Worth, Tex., opened the discussion by inquiring of the author his reasons for recommending girder rail as a substitute for high T-rail in paved streets. Mr. Brown responded that his experience with T-rail carrying interurban cars on paved streets had been that the heavy cars caused the rail to receive a wave motion which loosened the paving alongside. In addition Mr. Brown objected to T-rail because it was practically impossible to keep the wheel flanges from crowding dirt down in the flangeway, which ultimately resulted in the pavement buckling.

W. A. Sullivan of Shreveport spoke in favor of the Atlas joint as against the continuous joint. Richard Meriwether, general superintendent Dallas Street Railway, Dallas, Tex., stated that his company used the continuous joints exclusively and found them satisfactory. Others taking part in the discussion of this paper were R. T. Sullivan of Houston and Secretary Cooper.

"Economies in Repair-Shop Work and Maintenance" was the title of a paper presented by V. W. Berry, master mechanic Northern Texas Traction Company, Fort Worth, Tex. The discussion of this paper opened with a question as to how far inspection on a car-mileage basis could be applied to the various parts of car equipment. In response Mr. Berry stated that his company was inspecting everything on a car-mileage basis. While there might be some difficulty in arriving at the correct period, it was merely a question of working out a system. Secretary Cooper asked if it was not a fact that the predetermined time or mileage of the weakest part of a car, and not of the car as a unit, formed the basis of arriving at the correct inspection period. Mr. Cooper also brought out the point that where the predetermined period for inspection of the different parts came at approximately the same time, both or all of such parts should be inspected and repaired at one time.

Car painting as practised by the various member companies was also discussed informally, and it was brought out that the interval at which cars were given a thorough repainting varied from three to eight years on different properties. Secretary Cooper cited Galveston as an example of the advisability of thorough painting whenever painting was done. He stated that the Galveston climate deteriorated paint very rapidly, consequently the best quality of paint and varnish combined with first-class workmanship was none too good for cars on that railway. Richard Meriwether of Dallas and D. A. Hegarty of Houston also took part in this discussion.

G. W. Smith, electrical engineer San Antonio Traction Company, San Antonio, Tex., then read his paper on "Track Construction and Welding Rail Joints." The principal point brought out in the discussion which followed was that of the method of laying brick along the rails. Although this topic did not bear directly on the subject, it was of interest because the city engineer of Houston had attempted to force the Houston Electric Company to lay brick paving in stretcher courses along the rail. W. M. Archibald, engineer maintenance of way, objected to stretcher courses at this point because the longitudinal joints were in line with the direction of traffic. Mr. Smith responded that if it were possible to lay the bricks or blocks longitudinally with the rail a great deal of cutting would be saved. Continuing, however, he said that he objected to this practice because he feared that inasmuch as the longitudinal joint lies in the same direction as the traffic, the life of the pavement would be shortened materially.

D. A. Hegarty of Houston advised that where the ties were laid in concrete, corrugation followed and was due to extremely rigid construction. In another type of construction where the ties were laid in concrete pockets on a ballast cushion, corrugation had not appeared, due to the increased flexibility given to the rail. He said that this kind of construction also prolonged the life of the pavement in the track allowance. Others taking part in this discussion were W. A. Sullivan of Shreveport and Secretary Cooper.

In the absence of C. O. Birney, superintendent of car construction Stone & Webster Engineering Corporation, the time assigned for his paper on "A New Type of Street Car for City Operation" was devoted to a discussion of jitney competition and regulation. It was opened with a paper by R. T. Sullivan, general superintendent Houston Electric Company, entitled "A Study of the Jitney." This paper was written for the Stone & Webster *Public Service Journal* by Henry G. Bradlee and published in the April issue of this year. The general interest in this subject precipitated a lively discussion, which was opened by President Fisher with the remark that almost every city in the Southwest was afflicted with "jitneyitis." David Daly, manager Galveston & Houston Electric Railway, remarked that regulation had come first in the smaller cities probably because of the political influence of the people engaged in jitney business. While the railway companies were suffering considerable losses due to this class of competition he was of the opinion that it was a matter for the public to decide because in the end the public must pay the bill.

W. A. Sullivan of Shreveport stated that a local stock company had been organized in Shreveport in January, 1915, with about seventy jitney buses in operation, but that the number has been reduced to fifteen or eighteen. He stated that the City Council, at the instance of the public, had taken action which he thought would curb the development of the jitney bus in the city. C. A. Newning, editor of the *Southwestern Electrician*, voiced the opinion that the jitney business was on the wane. Charles W. Rogers of the Doherty Operating Company, New York, said that a light car weighing approximately 11,000 lb. would do more to kill the jitney bus competition than any other one thing. To this remark Secretary Cooper added that the jitney had led the public to expect a more frequent service and that in all probability it would be demanded of the street railways in the future. He also cited an illustration of how frequent service had paid the street railway companies before the advent of the jitney. A number of years before when Mr. Cooper was in charge of the Galveston property he doubled the service and tripled the receipts. The riding habit increased because patrons found that they would have to wait only a short time for a car and that it was quicker to ride than to walk.

Another point brought out was that the public would have to decide between an all-jitney service and an all-street railway service. The street railway companies operated some lines at a loss even before the jitney bus came, but this had been offset by profits on lines carrying heavier traffic and having shorter hauls. The financial responsibility of the street railway company as compared with the jitney bus operators was also an important argument against this form of competition. The railway companies were also maintaining pavement in the track allowance and thereby contributing a large portion of their net earnings. The jitney buses contributed nothing specifically for the maintenance of the street, and in most cities there was nothing to prevent a jitney operator from going out of business at any time his route proved unprofitable. Aside from these arguments against the jitney service, it had unquestionably congested street traffic.

Following the jitney bus discussion a short time was given over to considering the merits of a light car. C. W. Rogers of New York City, said that a one-man car weighing about 11,000 lb. had effected a saving of approximately 37 per cent in Atlanta, Ga. D. A. Hegarty brought out the point that even though a light car was adopted, the larger type of car would still be required where the traffic was heavy. The type of car was largely dependent upon the character of traffic, Mr. Hegarty said, and it was unprofitable to operate a large two-man car on the line one part of the day and some other type of car at another time of day.

V. W. Berry stated that the modern type of car proposed by manufacturers will be a great factor in solving the jitney bus question and, at the same time, make it possible to give better service. He said that it was out of the question to give quicker service with cars of the size and weight that are now being generally used. Recent refinements in the methods of construction, however, showed that these were much heavier than was necessary. Mr. Berry also said that another way to give better service was to charge a fare of 6 cents or more, as some of the Massachusetts companies were doing. In closing he stated that the present fare of 5 cents had been adopted only as an accident and as a matter of convenience and not because anyone had calculated that the 5-cent fare was reasonable.

Two contemporaneous sessions were held at the same time the railway session was in progress, at which subjects in accounting, and light and power were presented. The association president, D. G. Fisher, presided at the light and power session on Thursday morning. F. N. Lawton, manager Wichita Falls Electric Company, Wichita Falls, Tex., presented a paper entitled, "Boiler-Room Wastes and Economics." Other subjects presented at this session were of particular interest to central station operators. At the accountants' session a report of the committee on a system of simplified accounting for medium and small public utilities (railway, light, power, gas and water) was presented. This report was read and adopted in full. The session of both the light and power and the railway members, held on Thursday afternoon, was given over to an address by Charles B. Scott, secretary and treasurer Bureau of Safety, Chicago, Ill., on the subject "Important Factors in Accident Prevention."

At the Friday morning session of the association, a paper by F. R. Slater, general superintendent Texas Power & Light Company, Dallas, Tex., entitled, "The Advertising Influence of Employees" brought out a lively discussion. An abstract of this paper appears elsewhere in this issue, and the discussion was of particular interest to central station managers since it dealt largely with the sale of energy. In connection with the railway aspect of the subject, however, Mr. Meriwether of Dallas stated that the public naturally came in contact with the trainmen more than with any of the officials of the company. It was therefore important that the conduct of the men on the cars should be properly guided, because they were a great influence and potential force in shaping the feeling that the public had toward the company.

The final session of the association, held on Friday afternoon, was given over to a paper by Richard Meriwether, general superintendent Dallas Street Railway, entitled, "Welfare Work and the Education of the Employee." David Daly of Houston opened the discussion with the remark that one feature of the welfare work that had impressed him more than any other was the financial assistance rendered employees in periods of distress. Clubrooms completely equipped may fail to arouse the appreciation of the employee, but financial assistance in time of need makes him feel that the company is human and that it really has an interest in his welfare. Mr. Daly also mentioned a small pamphlet issued by the Galveston-Houston Electric Railway and known as "The Organization." This pamphlet contained heart-to-heart talks between the manager and the men on the job and was intended to encourage thrift and interest on the part of the employees in petty economies. Prizes were offered from time to time for thrift suggestions and a surprising number had been received. A. H. Warren of Galveston voiced the opinion that mutual benefit associations were very wonderful breeders of loyalty. It was important, however, that these associations so far as possible should be managed by the men.

At the short session on Saturday morning the committee which considered the president's address reported its approval and recommended that a permanent committee be appointed to act on matters involving the public relations of public utility companies. The report of the committee was adopted, following which the annual election of officers took place. David Daly, manager of the Galveston-Houston Electric Railway and the Houston Electric Company, was elected president; F. R. Slater, general superintendent Texas Power & Light Company, Dallas, Tex., was elected vice-president; H. C. Morris, Dallas, second vice-president; D. A. Hegarty, Houston, third vice-president; J. B. Walker, Dallas, treasurer, and H. S. Cooper, the present secretary, was re-elected to office.

ENTERTAINMENT

Association entertainment during the convention included surf bathing, dancing, smokers, card parties for the ladies and a Jovian banquet. On Friday evening, May 21, the Jovians held a rejuvenation and initiated fifteen candidates. Ell C. Bennett of Mercury presided at the banquet with 175 Jovians in attendance, including C. W. Hobson, Jupiter No. 1, and C. A. Newning, Jupiter No. 2. During the progress of the banquet there was a pause, and a tribute was paid to the late Elbert Hubbard, a Jovian who lost his life at the sinking of the *Lusitania*. Some abstracts of the papers follow:

PRESIDENTIAL ADDRESS

BY D. G. FISHER, ASSISTANT GENERAL MANAGER SOUTHERN TRACTION COMPANY, DALLAS, TEX.

Mr. Fisher's address treated principally of the effects of the current business depression upon electric railway problems and of the added complication introduced by the jitney-bus agitation. Before taking up these pressing matters he presented a brief outline of the history of the association since 1895 when it was the Texas Gas & Electric Light Association. It consolidated with the Texas Street Railway Association in 1898. He said, in substance, that during the past year the public utilities represented in the membership have been passing through a critical period because of the attitude of the general public toward all public utilities, as well as from the problems arising through the evolution of governmental regulations. There is a great need of effective publicity. Our systems of government are founded on the theory that the people rule, and that their final judgment is right. Surely, therefore, it is the part of wisdom to lay the railways' case fully and fairly before the tribunal to which they must appeal. There is a great need for closer co-operation between the public and the public utilities of the southwest. No better code of principles could be adopted, as a starter, than those laid down by President Wilson in his address before the mid-winter meeting of the American Electric Railway Association in Washington.

The European war has, to a large extent, brought on a lean year in this country, but with it one section of the association has been confronted with the motor-bus, or jitney. There may be commended to the consideration of all classes of public utilities the fact that there may be jitneys in other branches of public service also. As a matter of fact, every character of public service has its jitney. The lighting business has kerosene, gasoline and many other jitneys. The heating business has coal, wood and oil as jitneys, and the water business has cisterns and wells. The street railways have for a long time had their jitneys in small numbers, so small that their effect was hardly felt and but little attention paid to them; but suddenly, through unforeseen and unpreventable causes, the jitney grew from a dwarf to a giant in a few months. The lesson of the jitney should be taken to heart in every other kind of public service besides the street railways, and these industries should be in a better state of preparedness than was the street railway in this instance.

THE ECONOMIC LIMIT OF THE REPAIR SHOP

BY V. W. BERRY, GENERAL SUPERINTENDENT NORTHERN TEXAS TRACTION COMPANY

The question of the economic limit of the repair shop of a public utility resolves itself in many cases into a question of where repairs stop and manufacturing begins. Undoubtedly many medium and large-sized properties are leaning entirely too far toward the manufacturing end, with the result that true maintenance is being neglected on account of the attention given to manufacturing.

Frequently the remark is made: "It can be made in our own shop, and will not cost much." Or, in answer to the question, "What did it cost you?" one hears the reply: "We made it in our own shop, and it really cost nothing." Nevertheless it is probable that the speaker could have purchased as good an article or better for less than the cost of manufacturing it in the shop. In many cases, too, it will be found that the work of manufacturing has distracted the attention of perhaps the whole shop organization, or at least some one branch, from the work of inspecting, caring for, and maintaining the equipment.

It should be remembered that this is a day of specialization. The larger public utility companies may in some cases be able to compete with concerns making a specialty of a certain article, if the consumption of that particular article is great enough to warrant special machinery and an expert to conduct a special department. Otherwise it is pretty safe to purchase the article on the outside. The specialty of the average repair shop is, or should be, maintenance and not manufacturing.

Frequently one hears the remark, after a new piece of equipment or a new lot of rolling stock is put in service: "We will not have to spend anything for maintenance for a number of years." Such thoughts, if put into practice, will surely make trouble. Maintenance commences the moment the installation is completed, and unless extreme care has been taken in selecting the proper apparatus or equipment, maintenance has already accumulated to a greater or lesser extent. The sooner a remedy is applied, in the way of careful inspection and prevention, the less liability there is of excessive maintenance costs later on.

With regard to the selection of equipment, efficient operation is all right, and must be considered; but one must not forget that repair economy is also important. After one breakdown the resultant repair bill may wipe out the saving of a year, incurred on account of a slight increase in efficiency in other respects. The tendency is sometimes to forget the question of maintenance, while on the other hand the tendency of those dealing with maintenance only is to forget almost entirely the question of efficiency in other respects. Right here, between the two, there is a gap which must be filled before the greatest economy in operation can be obtained.

Obsolete equipment, that has to be retained for want of something better, is frequently neglected, resulting in a high maintenance cost and unreliable service, and the blame is all laid to the fact that the equipment is obsolete. A careful investigation may show that it would be economical in the long run to replace the old equipment with new, but the company may not be able to get the money to do so. What is there to do? Continue to operate the equipment in a broken-down condition, with a high maintenance cost, or put it in as good condition as possible, and keep it so by inspection, prevention and repairs? There is but one answer. Operate it in good condition, or do not operate it at all.

TRACK CONSTRUCTION IN PAVED STREETS

BY B. R. BROWN, SUPERINTENDENT MAINTENANCE OF WAY
DALLAS CONSOLIDATED ELECTRIC STREET RAILWAY

There are two distinct general types of construction for track in paved streets. These are the track laid on gravel or rock ballast and the track which is built on a solid concrete foundation. Where the sub-soil is sandy or of a clay formation, excellent results can be had with the former. It has several advantages well worth considering. Regular cars can be operated over the ballasted track while the surfacing and lining of the track is under way. A careful going over and tamping of ties, under traffic of cars, before placing the concrete paving foundation, will insure smooth riding and substantial track. Track so constructed and operated over by 1500 cars each day, in Dallas, since December, 1912, has shown absolutely no defects, either in track or paving. There is not a loose joint or a loose paving block—the paving being creosoted wood blocks—on this entire piece of work, and not 5 cents has ever been expended for maintenance. Since that time two other sections of track, including several special work layouts, have been built in a like manner, and the results obtained in each case have been most satisfactory. Within the last year or so this type of construction has gained much favor in the larger Northern cities. In the South we have stuck doggedly to the solid concrete base and are just realizing that much money could have been saved, not only in the initial cost of the track, but also in cost of maintenance and of rebuilding had the ballasted type of construction been used.

When track laid on rock or gravel ballast is rebuilt it is only necessary to remove the top paving and base, old ties and rail and then rebuild, using again the ballast already in place. In the case of rebuilding track laid with a solid concrete base it is necessary to pry out the old concrete base, which is a total loss, and then buy new ballast to take its place.

If the sub-soil is mucky, soft earth or quicksand formation, or if the district is poorly drained, then the solid concrete base should be used.

There is also a third type of construction in use, which is a combination of the two types mentioned; that is, a sub-base of 4 in. of solid concrete upon which 2 in. to 4 in. of gravel or rock is placed for ballasting the track. This type of construction can be used instead of the solid mass of concrete with all the advantages of the ballasted track and is highly recommended and used by the street railway companies in Toledo, Buffalo, Minneapolis, Detroit and several other cities.

Next comes the proper selection of the ties, rail and fastenings. With either type of construction can be used the steel or concrete, or the sawed pine, oak or cypress tie, and preference between them is mostly a matter of personal opinion and local conditions. The writer prefers the thoroughly seasoned, 90 per cent heart, 6-in. x 8-in. x 8-ft. long-leaf yellow pine tie in the ballasted track and the steel tie where the solid concrete base is to be used. If of wood, it is most important that the tie be thoroughly seasoned before it is put in the track.

As for open construction, the A. S. C. E. sections of rail cover our needs thoroughly, but no such results have been accomplished in the standardization of rail used in paved streets. High T-rail should only be used in paved streets where traffic is light, drainage good and no interurban cars are to be carried. In residence districts, under these conditions, the 7-in. 80-lb. T-rail is quite adaptable. Under heavy traffic and interurban cars, the girder rail should be used. At the 1913 convention a 7-in. 122-lb. and a 9-in. 134-lb. girder rail were adopted as standard. In Dallas the Lorain section 103-426 has been adopted and has satisfactorily fulfilled the requirements.

There are three principal types of joints in use—the plain angle bar; the reinforced joints, such as the Weber, Wolhaupter, Atlas and the Continuous joint, and the welded joint. The first type is obsolete, and the third type, the welded joint, is preferable, as it gives a continuous rail bearing and largely does away with future joint troubles. One objection to it is the high first cost, and also some trouble with breakages, usually due to indifferent workmanship. Of the second type of joints the Continuous is the most popular. It more nearly conforms itself to the web and base of the rail than either of the other joints of this class, and when properly applied with bolts drawn absolutely tight will give very little maintenance trouble.

A combination tie plate and rail brace on every tie will stiffen the rail and protect the tie from cutting and should be included in all types of construction. Either Harvey grip nuts or the steel bolt with high power nut-locks is recommended. The latter are gaining in favor, as the steel bolt does not stretch and the high-power nut-lock gives added strength and efficiency. Screw spikes are now universally used on all new construction work, the square spikes being as obsolete and inefficient as the plain angle bar.

The most vital factor for efficient maintenance of track is a well-organized repair force under the direction of experienced foremen. Where the system is large enough to warrant several gangs of men on track repairs, it has been found advantageous so to divide the work that each repair gang may be kept on specific classes of repairs. For instance, by having one force of men constantly on paving repairs, another for repairing joints and rebonding, etc., the efficiency of the men engaged in each class of repairs will be largely increased and the work more systematically carried on.

SPECIAL WORK

No company can afford anything less durable for the tracks in paved streets than "hard-center" work, and in most cases severity of traffic will warrant the greater initial cost of the manganese special work. Much stress has been laid on the so-called renewability feature of the hard-center work, but any mechanically jointed center that is easily detachable will be likely to detach itself when put under repeated strains. In the writer's opinion, this renewability feature is more theoretical than practical, for where centers are renewed on account of wear it is very difficult to make a good job by inserting new centers, for the reason that the surfaces seldom match up with the old work. The main drawback to solid manganese special work is the greater initial cost, but in most cases the additional life will warrant the greater outlay.

As special work does not wear out quickly and it is necessary to replace one or two pieces at a time, it should be set on rock or gravel ballast rather than on a concrete base. Particular pains should also be taken with its installation. More care in proper tightening of the bolts, in the aligning and surfacing of the layouts and other like precautions will greatly add to its life and save many a dollar in repairs.

PAVING AND ITS RELATION TO RAIL AND JOINTS

The most generally used classes of paving are: granite block, brick, bitulithic, asphalt and creosoted wood block. While the granite block is the most durable and most easily repaired, most cities will not permit its use because it is very noisy and slippery. Brick paving or vitrified paving brick was once very extensively used, but, being very brittle, it is short lived under heavy street traffic and, since the introduction of the creosoted wood block, has become almost obsolete. It is also noisy, and although the first cost is less than blocks or bitulithic, the many objections to its use, together with the very high maintenance costs, have tended to make it unpopular.

For paving in residence districts the bitulithic or asphalt pavement is more adaptable than either of the other pavings, being a cheaper pavement than blocks, and under light street traffic will stand up remarkably well. One advantage in the bitumen paving is that it allows the concrete to come up higher on the web, thereby stiffening the rail. The main objection is higher maintenance cost and the inability of the street railway company to make its own repairs on account of the very expensive equipment required.

The creosoted wood block is perhaps the most extensively used paving, and in business districts is unquestionably the best paving for the city and for the company. It is noiseless, sanitary, durable and easily repaired. In the tracks the creosoted wood blocks can be put down by the company's own construction force, and necessary repairs can also be made by the maintenance force, without need of expensive equipment. The blocks should be laid with small expansion joints between them, to be filled with tar, to eliminate the buckling of the blocks which was the main source of trouble with our first wood-block paving. There is on the market to-day a block with small ridges on one side and one end that permits the blocks to be driven and still leave an expansion joint for the filler. The first wood blocks laid in the track gave considerable trouble, but by specifying a better treated block, by mixing cement with the sand and making a damp mortar cushion, by using a tar filler instead of crude oil and by more care in laying the blocks, an excellent paving can be put down that will give very little maintenance trouble and that will outlast any other class of pavement.

ADVERTISING INFLUENCE OF THE EMPLOYEE

BY F. R. SLATER, GENERAL SUPERINTENDENT TEXAS POWER & LIGHT COMPANY

The three best assets of any public utility are satisfied customers, a pleased public, and contented employees. From the highest to the lowest, the employees have a direct influence in producing all three of these conditions, and their advertising value, or their value as a means of identifying the company, its aims and its aspirations is very great.

Very few of us regard any business as a personal entity. Yet nearly always there is a human personality in it which influences us. The visible parts of the business are the local employees with whom we come in frequent contact. If these are courteous, if they show consideration, if they are inclined to observe the customers' rights, the business will gain good-will and confidence and will thereby become "identified" as a desirable concern with which to do business. That employee or group of employees which can produce this condition of good-will and confidence is a valuable asset to the company and is the very best advertisement that it can have.

Much has been said about good-will and what it is. In substance it is a company's reputation with the public for square dealing, which reputation is largely governed by the manner in which the company treats not only its customers but its employees. More adverse public criticism can be created by disgruntled employees than in most any other way. This is especially true in cases of personal injury. A humanitarian treatment of these cases, whether of the employee or the public, will go farther toward "identifying" the company than any other one factor.

Every employee, no matter what his position, is a salesman: First, the employee must sell his services to the company and then, directly in proportion as he is contented or satisfied in his employment, he will sell his company's service to the community. On the manner in which those services are presented to the community by the employee will largely depend the favorable or unfavorable opinion and acts of that community with reference to the employer. "Advertising" of the wrong kind is a detriment, a loss, a liability that is cumulative in evil results. Advertising of the right kind, the favorable personal advertising of the employee, from president to office boy, is an asset that is cumulative of assets which can be obtained in no other way.

WELFARE AND EDUCATIONAL WORK AMONG EMPLOYEES

BY RICHARD MERIWETHER, GENERAL SUPERINTENDENT DALLAS STREET RAILWAYS

From answers to letters written to eighteen street railway companies it was found that fifteen of the companies had established mutual benefit associations among the men, and that eleven had adopted the club idea and had fitted up quarters with shower baths, pool tables, reading room, etc. The plans employed are very similar. The employee contributes 50 cents to 75 cents per month, and in case of sickness the association pays him from $6 to $8 per week after the first week of disability. The death benefit is from $100 to $500. The companies contribute in most cases enough money each year to keep the associations financially sound. In lieu of such an association, one company carries a blanket insurance policy for its employees, paying half the monthly premium of $1.40 on a $1,200 policy. Two companies take care of cases of distress directly through the management, and make loans to employees at low rates of interest. The majority of the companies have rooms equipped at the carhouses with shower baths, pool and billiard tables, reading facilities, etc., while a small number of companies have built separate and elaborate club houses.

Up to within a year ago the Dallas companies had done practically nothing in the direction of welfare or educational work among employees. The building of a new shop recently made space available for enlarging transportation quarters and providing a trainmen's lounging room, a room equipped with showers and toilet facilities, and an assembly room with a capacity of 300. These rooms were constructed with concrete floors, plastered walls with wainscoting, etc. A branch of the public library has been established in the trainmen's room, and 400 books are kept there. Twice a week a moving-picture show is provided by the company.

The members of the safety committees constitute also a welfare committee. The management advances money to those applying for assistance and deducts a small portion of each pay until the amount is paid up, making no interest charge. Cases of sickness or accidents are looked after by the company, and if the employee is unable to pay his expenses the company does so and allows the employee to repay them in installments.

In conclusion, it seems to me that welfare work and educational work are a means of breaking down the old barrier of distrust, suspicion and disloyalty which existed between the employee and employer, and substituting for them an understanding of their true relation and dependence of one upon the other for their mutual advancement and happiness. The extent of the work should be limited only by the financial ability of the company and the wisdom of its officials, guarding always against paternalism, but striving continually to advance the comfort, happiness and well-being of the employee, thereby winning his co-operation and loyalty.

TRACK RECONSTRUCTION IN SAN ANTONIO

BY G. W. SMITH, ENGINEER SAN ANTONIO (TEX.) TRACTION COMPANY

Since October, 1913, the San Antonio Traction Company has had to rebuild many of its tracks on account of the paving program adopted by the city. In all of the reconstruction, except special work, steel ties are used. These are 6 ft. long and 3 in. deep, with a 5-in. upper flange and a 3-in. lower flange. They are spaced between 4½-ft. and 5-ft. centers, except that at the joints they are spaced on 2-ft. centers.

For building temporary tracks in the downtown sections, or on paved streets where the tracks must be surfaced up for wagon traffic, some flat steel ties were used. These are 1½ in. thick, 6 in. wide and from 5 ft. to 6 ft. long and are punched for use with standard steel tie clips and bolts with 60-lb. T-rail. Excellent results have been obtained with this construction, which is filled in with old asphalt which has been removed from the surface of the streets.

For tearing out the old gravel-ballasted, 60-lb. rails and substructure, jack pits are dug opposite each other on each rail and spaced 15 ft. or 20 ft. apart. Two 15-ton track jacks are placed opposite each other, one under each rail, and the track is jacked up. As the track is raised, men with sledge hammers knock the ties clear of the rails. For tearing out concrete construction where wood ties have been used, jack pits are dug opposite each other under each third tie. Six 15-ton track jacks are placed in consecutive jack pits, and the whole mass of rail, ties and concrete is raised to a height of 6 in. or 8 in. and blocked up by large pieces of broken concrete, rock, or old ties. Drill-pointed chisels, made from 1½-in. octagon steel, and 12-lb. sledge hammers are used to break up the concrete, the large pieces of which are hauled to the storage yard for future use in concrete construction where steel ties are used.

For the new track construction the excavation is made 6 ft., 6 in. wide in order that there will be 3 in. of concrete covering the end of the ties. The depth of excavation is 15 in. for suburban tracks and 16 in. for tracks in the downtown district. This gives 5 in. and 6 in., respectively, of concrete under the tie. When the excavation is completed to line and grade, the steel is brought in over the operating track on the work car, which carries twelve 60-lb. rails and necessary ties. After gaging, the track is brought up to line and grade, and alternate ties are blocked up on wood blocks with shingles used as wedges.

Sand, rock and cement for the concreting of the track are brought from the material yards over the new track in two-car trains of 10-yard capacity and are distributed along the street at the side of the track before the track is lined or leveled. The concrete is poured directly into the track and is cut under ties and rails. It is pulled along the track for a distance of 30 ft. on each side of the mixer and leveled up by a crew of eight men.

For the special work, 6-in. x 8-in. x 7-ft. 16-lb. treatment creosoted pine ties are used and are spaced not less than 2-ft. centers; 9/16-in. x 5½-in. spikes are used with these ties. The excavation is made 19 in. deep and 7 ft. 6 in. wide, so that there will be 6 in. of concrete under and 3 in. of concrete outside of the end of the ties.

In all of the track reconstruction work the rail joints are welded by the Thermit welding process, with inserts. Three days after the track is concreted the joint straps are removed, a space of 9/16 in. having been left between the ends of the rails, and the rails for 6 in. on each side of the joint cleaned thoroughly with a wire brush. The insert is cut from the ball of a rail of the same composition as those which are to be welded together, and is fitted nicely into the space, opposite the ball, left between the ends of the rails for this purpose. A flat file is used in making a nice fit between rail and insert. The first inserts were cut on a lathe and cost 46 cents each for labor. The company is now making them for 5 cents, including cost of saw blades.

The molds are designed so that the superheated Thermit will be carried around the flange, web, lip and lower side of the ball of the rail, ½ in. thick and to a distance of 1½ in. each side of the joint. The molds, made in two halves, are rammed on a foundry squeezing machine and are constructed with a bead around the faces, which come together so that these beads are compressed, thus making a tight joint.

The molds are left in place for about twelve hours after the Thermit is poured to allow the joint to cool gradually to the temperature of the surrounding air; then they are removed, the risers are knocked off and the weld is cleaned of molding material and examined. The weld holes are then thoroughly cleaned and filled with concrete. Just before the track is turned over for traffic, which is two weeks after the concrete is poured, the joints are ground down to a smooth surface by means of a power rail grinder. When the joint is finished it is not possible to detect either hollow or hump on the surface or gage line of the rail by means of a 2-ft. steel straight edge.

When compromise joints are made, wax is used for a pattern, the mold being rammed around it and the wax melted out by the preheating. If a number of compromise welds are to be made between any two sections, it is well to buy or make patterns, because labor costs in making welds where wax patterns are used is three or four times as great as when a regular pattern is employed.

These welded joints gave 100 per cent capacity for power returns on the straight track, but the transfer of the return current around or through the special work had to be taken care of by bonding. After some experimenting a Thermit weld was successfully made between the copper bond and the rail. This gives a contact area equal to or greater than the cross-section area of the rail. The cable used, which is 800,000 circ. mil, is welded to the lower side of the flange of the rail, and a section cut through the weld shows a shading in color from steel at the top to copper color at the bottom of the weld. The cable enters the weld at the bottom and is therefore in contact directly with the copper film at the bottom of the weld, which insures minimum contact resistance. This method of bonding is being used on all reconstruction work.

The company has made 3000 welded joints on track laid with concreted roadbed, and since the tracks have been put into operation there have been but two breaks in the rails; one of these occurred at a crossover in the fall of 1914 and the other near a bridge in the winter of 1914. The first welds were made in winter of 1913.

A feature of the convention was the question box which was printed in pamphlet form and distributed to the members before the convention. An abstract of the questions and answers relating to electric railway practice will be published in an early issue of this paper.

Conference on Federal Valuation

About 250 men, including several from the Far West, attended the first session, May 27, of the conference called by the division of valuation of the Interstate Commerce Commission to afford the railroads and the state commissions an opportunity to discuss the various questions that have arisen in connection with the Federal work done thus far. The conference was held at the New Willard Hotel, Washington, with Charles A. Prouty, director of valuation, presiding. Thomas W. Hulme, general secretary of the Presidents' conference committee, was the general spokesman for the railroads, calling on various legal and engineering representatives of the carriers to answer the individual questions. Milo R. Maltbie represented the state commissions. Each side presented its case, but there was little rebuttal.

The first day was devoted almost entirely to the means of determining reproduction cost new. It was evident from the outset that the fundamental views of railroads and the state commissions differed widely. The former sought to have the railroad reproduced with present-day methods and prices, but from original conditions as far as they would involve expenses that present conditions would eliminate; they also argued that piecemeal construction and unforeseeable contingencies should be assumed. The state commissions, however, contended that reproduction demanded present conditions and an economical, continuous new construction program throughout, whether or not they would result in a fair value, and that contingencies that could now be foreseen be disregarded.

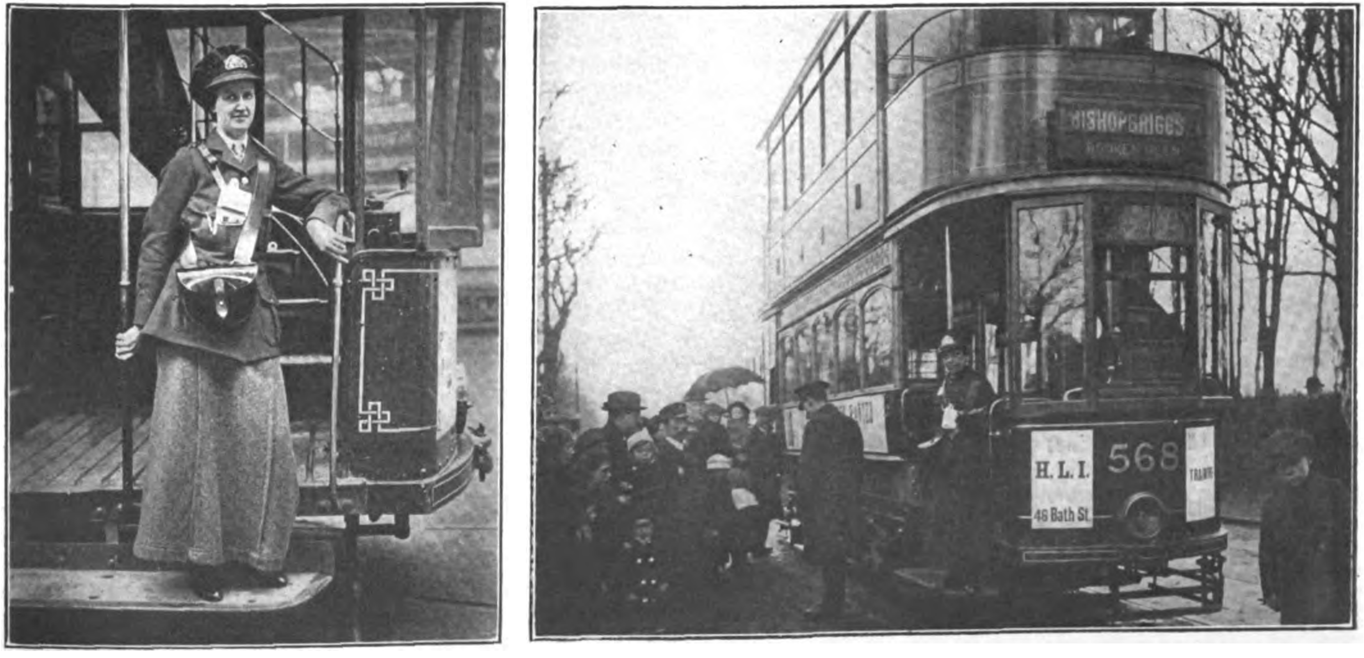
The railroads argued for an ample allowance for appreciation, emphasizing the increased actual value of a line adapted to requirements that had developed since the road was built, and of a solidified embankment and seasoned track. Mr. Maltbie contended that such adaptation as had required new culverts or other physical element would be accounted for automatically in the inventorying of such elements. He held, also, that solidification involved neither expense nor sacrifice, and should therefore not be recognized as of value for rate-making purposes.

The first day's session closed with an extended discussion of depreciation in its legal aspects by W. G. Brantley, speaking for the railways. He spoke of the chaotic state of this subject, and of the confusion between depreciation, meaning the amount of reduction in value due to deterioration, and the depreciation allowance, the theoretical or actual sum set aside annually to pay for final renewals. He did not think mortality tables could determine the former, nor could it be arrived at by a narrow consideration of age alone, or condition alone, or both. Good judgment must be used in every case. He did not believe there was any real depreciation in a road properly kept up. Mr. Prouty reminded him that the valuation act required that reproduction cost new less depreciation be determined, but Mr. Brantley argued that in the case of track the track as a whole should be considered the unit, and not the individual ties, rails and bolts. On that basis, as the seasoned track with adjusted cycles of renewal was actually more valuable than if every element in it were new, it would be grossly unfair to deduct depreciation because some of the parts were old.

Women as Conductors in Glasgow

Since the outbreak of the war the question of platform labor has been a serious one in a number of the British cities. In Glasgow alone 700 men employed by the tramway department as motormen and conductors joined the army at the outbreak of the war in August. Since then many others have volunteered for active service and on April 1 the tramways were short of their full complement to the extent of about 350 men.

During this time the thought of engaging women to act as conductors naturally occurred to the management, and arrangements were made first with but two women who were connected with the permanent staff of the company and consequently were familiar with the punch and ticket system employed, to take up the duty for a few days as conductors. They started work on March 28 and were placed on special cars and later on regular cars, to do regular duty. Reports were obtained from them as to their views of the work, and the performance of their duties was also carefully noted by members of the staff. Many passengers, also, expressed their opinions. From all the women received every encouragement and assistance, and the conclusion reached was that the experiment was completely successful and had shown that, in an emergency at least, women could act as conductors on cars. Some ten more women conductors were added to the force the second week in April and there are now more than 100 women on the cars. The accompanying views show two of the women conductors in service.



WOMEN CONDUCTORS ON DOUBLE-DECK CARS IN GLASGOW

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
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The Minutes of the Meetings Held by the Equipment Committee and the Committee on Power Generation Are Given—Activity in Various Company Sections

COMMITTEE ON POWER GENERATION

As mentioned in last week's issue a meeting of the above-named committee was held in Pittsburgh on May 18. A brief abstract of the minutes of the meeting follows:

In accordance with its assignment of work the sub-committee on power station costs submitted a comprehensive report embodying a complete method of analyzing such costs, together with a set of curves illustrating the application to a typical station. As revised by the committee this report will consist of two parts, a subdivision of accounts and an appendix consisting of engineering and operating data records and charts, with data reduced to certain standards for comparison of plant operation. The purpose of the subdivision of accounts is to provide a means whereby the operator may know in detail what the plant is doing and what the detailed costs are.

After a discussion of the A. S. M. E. boiler code the report of the sub-committee on the specification for the purchase of fuel was considered. It contained a complete form of specifications for such purchase on a B.t.u. and ash basis. The committee decided to recommend a specification showing the general form and the items to be considered but without the use of actual values. An appendix will contain the ranges of values for the items covered in the specifications.

The sub-committee on a specification for power station lubricants presented a report on the qualities of lubricants and gave the results of tests, and it was decided to present the following: A typical specification for lubricating oil; an appendix containing definitions of terms, and a comparison of values of qualities of oils used successfully by the companies.

The results of a study of the A. I. E. E. standardization rules by a sub-committee were next considered and it was the consensus of opinion that they represent a work of great value to the electrical engineering profession. The meeting then adjourned after instructing the sub-committees to have revised copies of their reports in the chairman's hands by May 30.

EQUIPMENT COMMITTEE

The Engineering Association committee on equipment met in New York on May 17 as was stated last week. The minutes put over last week on account of lack of space are given below.

W. W. Brown, Brooklyn, N. Y., reported for the sub-committee on wires and cables, stating that efficiency or reliability of the installation as well as the matter of fire protection had been considered. After going over the proposed rules it was decided that they should be printed in their entirety in the committee's report and submitted for criticism to the member companies prior to the convention, the rules being presented as a miscellaneous method and practice for the association. The rules in question, it may be said, have received extended attention by a large and representative committee of the fire underwriters' electrical bureau, and it was decided to present formal notification to the prior underwriters' electrical committee regarding the action of the equipment committee as a basis for further action by that body.

Proposed revisions in the specifications for heat-treated carbon steel axles, shaft and similar parts and for annealed carbon steel axles, shaft and similar parts, were then presented by Mr. Johnson. The suggested revisions were approved by the committee with minor modifications and it was decided to present them as standard practice for the association. A report on proof testing of forgings to determine their soundness after quenching and tempering was read and approved. This included a table for various heights of drop for a 2000-lb. tup and also a design for a gage for measuring the permanent set that might take place in proof-tested axles.

Mr. Dalgleish then read the report of the sub-committee on gears and pinions. With minor modifications these were approved for presentation as recommended practice, including a qualifying statement to the effect that the methods in gear and pinion manufacture are changing so rapidly at the present time that the specifications would probably be subject to considerable revision at a later date.

A new design for a journal brass for high-speed service in accordance with the suggestions made last year by the ELECTRIC RAILWAY JOURNAL was then presented by Mr. Clark. The proposed design can be used with the present box and with the present standard journal either with or without a collar. It may be used also with the present standard wedge and the proposed new design of wedge may be used with the present standard brass, thus making the proposed standard flexible in every respect, and exceedingly easy of gradual introduction on any road. F. Kingsley of the ELECTRIC RAILWAY JOURNAL was asked to take up informally the matter of co-operation between the Master Carbuilders' Association and the American Electric Railway Engineering Association with regard to the new design, as it was considered that the interests of the two associations were identical in the need for a brass to eliminate the difficulty experienced with the present construction.

Specifications for air-brake hose were then presented by Mr. Johnson, and it was decided to propose these as recommended practice for the association. It was decided further to request the ensuing committee to consider oil-resisting inner tubes for brake hose as a supplement to this report. Mr. Garrett then read a report of the sub-committee on the design for a limit-of-wear gage. He stated that no universal gage was possible for all services because the wear of flanges was liable to take place in different ways upon different properties. After discussion the matter was referred back to the sub-committee to consider the possibility of using two standard gages, one for city service and one for interurban service. Mr. Clark then presented a verbal report of the sub-committee on the A. I. E. E. standardization rules, stating that there were no definite recommendations that would be submitted at the present time.

With regard to the subject of steel-wheel design Mr. Phillips discussed the possible desirability of making changes in the present standard flange contour and wheel design and, in connection with this, the committee decided to refer the matter of the new standard contour adopted by the Central Electric Railway Association to the incoming committee for consideration. Mr. Phillips spoke also of the coning effect produced when standard axles are used with track gages greater than standard, especially when small wheels are used. He also spoke of the possible desirability of a change in the standard thickness of rim, but it was decided to let this matter go over until next year. He presented drawings of wheels ranging from 21 in. to 30 in. in diameter and it was decided to have a new general drawing made up to cover these and also the larger sizes, the old standard drawing not being complete.

Mr. Dalgleish of the sub-committee appointed to review existing standards then spoke of the desirability of changing the present standard brakeshoe design to meet present conditions. He suggested that the standard type of platforms for city cars should be eliminated and that a new design of axle for the smaller motor and wheel was needed. A redesign of the standard wheel tread and flange contour was also discussed.

Mr. Phillips then brought up the matter of stranding tables with regard to flexible stranding ranges, and Messrs. Dalgleish and Clark were asked to look into the question and report. Mr. Phillips also stated that he had been appointed to represent the interests of the car-equipment department on a special committee on lightning protection. He read a report of the last meeting of this committee as well as a paper which he had prepared to give an outline of the matter from the standpoint of the car-equipment engineer. The special difficulty existing at the present time was the wide difference of opinion as to the desirability of the earth grounding of the rails which was necessary for all lightning arresters that were mounted upon cars. The committee concurred in Mr. Phillips' views, and as no further business was to come before it, adjournment took place.

COMMITTEE ON POWER DISTRIBUTION

A meeting of the sub-committee on overhead materials on the committee on power distribution of the Engineering Association was held in New York on May 13 and 14. Those present were Charles R. Harte, New Haven, Conn.; C. L. Cadle, Rochester, N. Y.; G. W. Palmer, Jr., Boston, Mass., and C. F. Woods, Boston, Mass. The specifications for wooden cross-arms, iron and steel, including under this latter head specifications for wrought iron and mild steel, malleable castings, and commercial iron and steel, were put into final shape. In connection with this work a standard insulator thread was prescribed after consideration of advice from various manufacturers as to their practice.

MANILA COMPANY SECTION

At the meeting of the section, held on April 6, papers were delivered by J. M. Bury, assistant superintendent of transportation, on "Courtesy," and D. Solano, chief billing clerk, auditor's department, on "The Employee" (in Spanish). The local constitution was amended to give all departments of the company representation on the board of directors. The secretary stated that the section has now one associate and thirty-five active members.

In his paper on "Courtesy" Mr. Bury pointed out the peculiar temptations of the platform man to be discourteous. The public blames a great deal of its discomfort in transportation on the car conductors. The motormen, who are to blame for many of the conductors' troubles, should co-operate with the latter in this matter of courtesy. Mr. Bury was convinced that the local platform men have a good reputation for courtesy although they are not uniformly courteous. He pointed out the opportunities of the inspectors to study this matter and to promote pleasant relations between platform men and the public. Mr. Solano paid a tribute on behalf of the employees to the present management of the company which gives them much more opportunity for expressing individuality than did the Spanish régime. His plea was for reasonable freedom of action for the employee which would enable the latter to use his native ability in co-operating with the company. Where the management tries to do all of the thinking for the employee conditions are not favorable to this end. To quote Mr. Solano's own words, from a translation furnished by Secretary W. A. Smith, "Any employee who has initiative and will, can reduce the burden of things that are obstructive or useless, without reversing the general order established by the responsible head and directors of the organization."

WASHINGTON R. & E. SECTION

The May meeting of company section No. 4, held on the 24th, was purely a social affair held in conjunction with the employees of the Potomac Electric Power Company. The occasion was "amateur night" and the program consisted of "stunts" of one kind or another, with prizes for best three. The attendance was 450.

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FAKE ADVERTISEMENTS FROM PROGRAM WASHINGTON SECTION MEETING

The program was printed in a folder submerged in fake advertisements containing take-offs on prominent members of the companies' staffs.

DENVER TRAMWAY SECTION

The last meeting of the season of the Denver Tramway Company section was held on May 20. The meeting opened with a general discussion of the future conduct of sessions, especially regarding entertainment features. Many points were brought out for the benefit of the officers. The paper of the evening was by O. A. Waller, supervisor, on the topic "The Inspector and His Duties." The paper was discussed by E. T. Eckland, J. W. Dawson and many others. W. E. Casey, chief electrician of the company, was elected vice-president of the section to fill a vacancy created by the withdrawal of G. L. Rice from the service of the company. The attendance at the meeting was 110.

NEW ASSOCIATION OFFICES

As this issue of the ELECTRIC RAILWAY JOURNAL is being distributed Secretary Burritt and his associates are engaged in moving the association headquarters to 8 West Fortieth Street, near Fifth Avenue and but a few doors from the Engineers' Club. The necessity for this change is due to the impracticability of providing suitable office layout in the United Engineering Societies' Building and, after careful study of all possibilities, the executive committee selected quarters on the seventh floor of a new building in the immediate neighborhood of the present offices.

COMMUNICATIONS

Flange-Bearing Special Work

MINNEAPOLIS STREET RAILWAY COMPANY
MINNEAPOLIS, MINN., May 13, 1915.

To the Editors:

I read with interest the editorial on flange bearing special work in the issue of May 8, 1915. I have experimented with flange-bearing special work for crossings and so far the results obtained have been thoroughly satisfactory. The depth of flange used was ½ in., and having had good results in the past I am now ready to use a still shallower groove, say ⅜ in. The approach should be made as easy as possible and the length regulated by the length of the arms. The length of approach on our crossings is 18 in.

GEORGE L. WILSON,
Engineer Maintenance of Way.

MONTREAL TRAMWAYS COMPANY
MONTREAL, QUE., May 19, 1915.

To the Editors:

I have noticed the editorial in the ELECTRIC RAILWAY JOURNAL relating to flange-bearing special work.

Some years ago it was our practice to design the throatways of our frogs and crossings with a depth that was equivalent to normal depth of the flange, so that flange and tread wear were simultaneous. During the past two years we have experimented with the solid manganese work of a local manufacturer in decreasing the depth of throatway in the frogs and crossings by 1/16 in., on two different occasions making the total decrease on the last special work which we had ⅛ in. This permitted flange bearing across the intersecting gage lines, the ramp in the floor being 18 in. long. This intersection was installed about a year ago and was built of solid manganese, and at the present time the tread wear has not shown on the head of the rail. This company uses entirely chilled cast-iron wheels. There has been no undue chipping of wheel flanges that I can ascertain that is directly due to the shallow throatway. On a layout of hard center work, where the ramp of the floor was short, we have built up the throatway in the adjacent rolled rail by means of an electric weld. This has worked out very well, but unfortunately, owing to the manner in which it is built up, it does not last very long. We have also tried this on draw-bridge ends where grooved rail has been laid both on the bridge and on the abutment. This lasted about nine months before becoming tread ridden and tended to preserve the ends of the rails.

I question the policy of building up throatways in solid-manganese or hard-center special work for the purpose of raising the floor, except where the steel work at the intersection of the gage lines has signally failed, as the application of the intense heat necessary to make the addition to the throatway tends, without a doubt, to damage the manganese steel at a very vital point.

My judgment is that a flange-bearing throatway is desirable. To what extent the throatway should be built up, I am not prepared to say, as on one of the suburban lines on which we handle freight cars with M.C.B. wheels, we installed a frog with a throatway ½ in. in depth. We were handling gondola class of cars of 100,000-lb. capacity, which belonged to a very large industry on this line, and after several months of service over this frog, the industry complained about the chipping of its flanges, and an examination by the division roadmaster and the superintendent of track indicated that this frog was the cause, although the ramp was very easy. The wheels on the gondola were all chilled iron. This would seem to indicate that there is a limit to which the throatway can be raised. I think this subject is worth a great deal of attention from electric railway track men. W. F. GRAVES, Chief Engineer.

WILLIAM WHARTON, JR., & COMPANY, INC.
PHILADELPHIA, PA., May 21, 1915.

To the Editors:

I am surprised to see the flange bearings at intersections in special track work referred to as if they were something new and used by only few electric railways. Flange bearings, or risers in street railway track work at intersections and at the entrance of mates to tongue switches, have been a general practice as far back as the writer remembers. In fact, when wheels with a tread width of 2 in. or less were used in many cities, it was absolutely necessary to support the wheel on the flange to prevent it from dropping into the groove in front of the points of acute angle frogs and mates.

With the somewhat wider wheel treads now in general use, wheels do not actually drop into the deep grooves. The amount, however, that a 2½-in. tread, or even a 3-in. tread, bears on the wing of an acute angle frog before it gets additional tread support on the point is so small that the head of the wing rail and the frog point cut down very quickly, and heavy pounding soon results. The introduction of flange bearings at these points, therefore, undoubtedly helps to prolong the life of the track structures.

On right-angle crossings, or those very near a right angle, the deep grooves, of course, cause the wheels to drop into the flangeways, thus producing a serious blow on the tread and rail head at the receiving side of the groove. If the wheel tread is narrow, this blow is distributed over a smaller area than if the wheel tread is wide. The width of wheel treads in general use on electric railways in city streets is not sufficient to distribute this blow over a large enough area to enable even a hard and tough metal like manganese steel to withstand the punishment very long without pounding down or even breaking out. Flange bearings in such crossings again help matters and reduce, or at least limit, the pounding.

While some electric railways, a few years ago, specified that they did not want flange-bearing special track work, very few if any went further than to require that the grooves at intersections be made just a small fraction of an inch deeper than the depth of the wheel flange. This depth really meant that wheels with worn treads were flange bearing, or, if all wheels were new, they pounded down the rail treads until the flanges rode on the groove floor. Special-work manufacturers, as a rule, have never given up the flange bearing when the design was left to them.

Flange-bearing special work came into disfavor with some railways undoubtedly because chilled-iron wheel flanges chipped or spalled out, and this was attributed to the flange bearing or risers in the frogs or crossings. The chipped or broken wheel flanges on the flange-bearing special work, in the writer's opinion, are due more to the speed at which cars run over such places than to the existence of the flange bearings. If the rule to run at slow speed over crossings and special work was strictly adhered to, very few breakages of this kind would occur. The writer remembers a case where the breaking out of the wheel flanges appeared very aggravated and was attributed to the risers or flange bearings in some newly-installed special work. Later, it was found that the cars with the new wheels for which this special work was installed ran fast over a piece of old straight track which was flange bearing, and this was the cause of all wheel-flange breakages.

The incline from the deep groove to the flange bearing, for at least its effective portion, should be made as gradual as possible to prevent the deep flanges from receiving a blow when they entered the shallow groove. In a recent discussion among a number of special-work manufacturers a rise of 1/16 in. in 1 in. was considered a maximum.

Theoretically, the depth of the groove at the flange bearing should be exactly equal to the depth of the wheel flange. It is generally considered more practicable, however, to make the depth of the groove slightly less than the depth of a new wheel flange. This allows the wheel flanges to cut their own path until, theoretically, the wheel becomes equally flange and tread bearing. Practically, as the wheels are not all alike, some of the wheels will run only on their flanges through these grooves until they have cut the path in the flange bearing deeper, while wheels with shallower flanges tend to pound the rail head down until they are simultaneously flange and tread bearing. Thus, provided the wheels are kept in fair condition, there will always be a large number of wheels in flange-bearing work that will not strike a heavy blow because the treads are assisted across the crucial point by the flanges. In other words, unless wheels are allowed to wear so that deep flanges are produced on many wheels, the flange bearing should perpetuate itself. With proper inclines and close adherence to the rule of slow speed over special work, broken flanges due to the flange bearing should be a negligible factor and the flange bearing a distinct benefit to the life of the special track work.

V. ANGERER, Vice-President.

Way Records on a Cost-per-Section Basis

NEW YORK STATE RAILWAYS

ROCHESTER, N. Y., May 18, 1915.

To the Editors:

The matters touched upon in the article in the issue of the ELECTRIC RAILWAY JOURNAL for April 3, are of considerable importance to engineers in charge of maintenance of track, and may be divided into two classes: 1, The recording and distributing of the costs of labor and materials used in track maintenance; and, 2, the recording of types and details of track construction, intimately related with the first class through the maintenance-cost item.

The article by Mr. Hulett is interesting not only on account of the fact that it describes how the cost data were handled in one instance, but it suggests possibilities which, if worked out in detail, would lead to a marked increase in efficiency in track maintenance. A few of the lines of thought suggested by this article may be of interest at this time.

With reference to the distribution of accounts, the first requisite is accurate and comparative data. If a system of accounting is used similar to the one described in this article and two sections of track are found to have the same general characteristics it is an easy matter to compare the maintenance costs and conditions of the track and thus obtain the relative efficiency of the different foremen in charge of the maintenance. A study of this may also lead to a comparison of methods used by the foremen, or to new methods which may be suggested. With the records obtainable a comparison of new methods with old would lead directly to more efficient operation.

Another matter of interest in this connection is that, with definite detailed knowledge of the cost of different items which go to make up the total labor cost of track, information may be obtained from which the engineer can tell what equipment it would be advisable or economical to purchase. For instance, the New York Central Railroad Company has recently been experimenting with pneumatic tie-tamping equipment. In order to determine whether or not such equipment would lead to economy in track maintenance it would be necessary to know the actual cost of tamping a tie by hand and by machine, and it is detailed knowledge of this kind which is very essential to the engineer in his efforts to obtain efficiency. Another use to which this detailed knowledge can be put is in the making of estimates for future cost of maintenance, such as is described in Mr. Hulett's article.

Detailed data of the kind required are very difficult to obtain under the ruling of the various public service commissions or the Interstate Commerce Commission, on account of the fact that the different accounts permit of so many different items being charged to them. This is illustrated in the uniform system of accounts for street railway corporations, Second District of New York, in which all track labor covering distributing and placing ballast, renewing ties, repairing and relaying rails, joints, special work, etc., is charged to "roadway and track labor." While it is not necessary at all times to go into the minutest detail of keeping these accounts, yet there are occasions when these data are very valuable.

Mr. Hulett's method of sectionalizing track is very similar to the job-number system, and variations of the job-number system can be made which will enable the department distributing the costs of track maintenance to furnish the engineer with the required data. For instance, with the job-number system job No. 20 might cover a section of track, and job No. 20 sub-lettered "A" would cover the installation of ties on this particular piece of track, thus enabling the engineer to obtain the actual cost of installing ties, the remainder of the maintenance cost for the section being charged to job No. 20.

Another means of accomplishing a similar result would be to subdivide the account number. For instance, Account No. 8, "roadway and track labor," could be subdivided into account No. 8.1, which could be installing ties; account No. 8.2, surfacing track; account No. 8.3 hauling ballast, etc. Methods of this kind if properly used are of great value.

Another point is that different types of track construction in city streets can be given different job numbers even though both sections be on the same street, and maintenance costs kept separately on these separate types of construction. In this way data can be obtained showing the comparative costs of maintenance of different types of track construction, and data of this kind form the only basis on which an intelligent design of new types of track construction can be based.

This brings us to the second part of Mr. Hulett's article, with reference to keeping records of track construction. There are probably as many different methods of keeping these records as there are railroads, but the data should be kept, for it is only on these that an intelligent subdivision of a track for job numbers or sections can be based. Records of this kind are also necessary in reporting statistics to the state commissions or the Interstate Commerce Commission, and they are also very essential in making an inventory of the road or a revaluation of property which may some time be made of electric railways in much the same manner as is now being done by the United States government in the valuation of steam railroads.

In this connection a suggestion might be made that the different roads co-operate through the American Electric Railway Engineering Association with the idea of making track records more uniform in character. Studies as to the most efficient method of keeping these records would be of value not only to the roads themselves but also to the association on account of the fact that they would then be able to obtain more accurate and uniform answers to questions which are sent out from time to time by the different committees.

While the matter of keeping records may seem small and to be left for a "rainy day," from my own experience I can say that this is a subject which can and should be given considerable study. It is possible, by systematizing the method of keeping records, to eliminate from 50 to 100 per cent of the labor required to keep them, at the same time decreasing the possibility of error and increasing the usefulness of the record.

Mr. Hulett in his article has given us the method used in solving, or attempting to solve, the problems on his road, which is exactly what each engineer must accomplish in his own sphere, and we should be grateful to him for his efforts to assist us by bringing a matter of this kind to the attention of engineers generally through the pages of this magazine. D. P. FALCONER,

Engineer of Maintenance of Way.

National Electrical Safety Code

NEW YORK STATE RAILWAYS
ROCHESTER, N. Y., May 18, 1915.

To the Editors:

The subject of safety has become such a vital part of every American's life that he hardly appreciates the extraordinary precautions which are taken by the vast majority of public utility corporations for the safety and welfare of their patrons.

Following the general trend of thought of the public, and appreciating the necessity for some standardization and some guiding hand of the community at large, the bureau of standards has admirably promulgated such a set of rules which can be used by practically every industrial and public service company. These rules are the result of thought and study by representatives of the bureau for two or three years.

The ELECTRIC RAILWAY JOURNAL has published several letters on this subject in which the writers point out certain rules, compliance with which might be considered a hardship by some public utility corporations. There undoubtedly are, as in most original drafts of such rules, various measures called for which would appear drastic to some companies and which, of course, if put in force might place these companies in financial embarrassment. It should be the duty, therefore, of all public service corporations and others interested to answer the communication of the bureau of standards and outline any objections which they may have to the proposed rules. If this matter is not brought sufficiently to the attention of the personnel of the bureau of standards, the operating companies should not expect to criticise the rules after they are adopted and promulgated.

The degree of safety which is to be insured in any particular case does not necessarily dictate the degree which is necessary in every locality. There is, therefore, always a chance for argument as to whether or not a certain condition is properly safeguarded. This must of necessity be left to the judgment of the man responsible for the protection of life and property.

In developing a set of safety rules one point that should not be forgotten is the relative hazard between different localities. In the article appearing in the May 15 issue, Dr. Rosa defends his position with relation to prescribing a local foreman to each particular job. In practically all cases this is, no doubt, the safe method of procedure, but there are cases where one foreman can supervise small gangs of men to advantage when they are not located at such a distance that he cannot readily get into communication with them either by person or by telephone. It is better, however, not to have too many foremen as this is apt to disrupt the organization and to produce less safe conditions than when dependence is placed solely on one well-trained employee. The argument is always advanced by employees that a foreman should receive more wages than his subordinates. In the event that the safety rules apply this would materially increase the operating cost as the majority of the work is done by two men constituting a gang. This phase of the rules does not seem necessary.

The words "chief operator" have been used throughout the proposed code. The duties of the chief operator are prescribed in Article 430; namely, that he shall have the entire charge of the operation of the stations. Under the rules as prescribed, the chief operator would be a very busy man on a large system. A part of the duties prescribed to him would seem better left to the individual operator. For example, the chief operator is to instruct the station operator when to cut out lines for line work. After the lines are repaired and are ready to be cut in, the foreman in charge of the line work is to get in touch with the chief operator, who in turn will notify the operator in charge of the station to remove tags and allow the line to be cut in. There seems to be more danger when the operation passes through two hands than there would be in having the foreman report back to the operator.

The above paragraphs have been cited as showing the difference of opinion which will always exist on any set of rules, however excellent they may be. The bureau of standards cannot be held responsible for all of these differences of opinion, but should receive suggestions from all companies or individuals who are interested in the subject of safety or whom the safety rules will affect when placed in operation.

C. L. CADLE, Electrical Engineer.

THE CAPITAL TRACTION COMPANY
WASHINGTON, D. C., May 19, 1915.

To the Editors:

The various articles and communications which have appeared in different issues of the ELECTRIC RAILWAY JOURNAL regarding the proposed "National Electrical Safety Code" should receive the very careful attention of all electric railway men, for this matter is one of more far-reaching importance than may appear on the surface.

The scheme of promulgating a set of rules and specifications both for operating methods and construction details which, while not of any direct binding force in themselves, will prove a tremendous influence with state and municipal commissions, is a matter of such import as to merit the attention of the whole industry. The present-day tendency of regulating bodies to control in great detail all operations of the utilities under their supervision seems to the writer an unfortunate one which is not only unnecessary, but may result in crippling the initiative of our electric railway engineering force, which has been largely responsible for the wonderful development of the electric railway industry in its comparatively short life.

No criticism is intended of the spirit in which Dr. Rosa and his associates have undertaken and carried out their work, nor of the excellent results which they have in general obtained, but the effects of this work may be so far-reaching and important that it behooves every engineer and operating official of our utility companies to give the matter careful study in all its details and to make their criticisms and suggestions known either directly to the bureau of standards or through the association's representative, W. J. Harvie.

J. H. HANNA, Chief Engineer.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

The Cause of Thick and Thin Wheel Flanges

BY M. M. LLOYD, MASTER MECHANIC, DES MOINES (IA.) CITY RAILWAY

A careful study, extending over a period of seven years, has convinced me that the principal cause of thick and thin flange wear on rolled-steel wheels is the difference in the wearing quality of the metal in the two wheels. Tests have demonstrated that this character of wear was not due to the fact that the trucks were out of square. Neither was it due to the difference in the diameters of the wheels, nor to the predominating curves and grades of the track, nor could it be attributed to the position of the gear and pinion. Thick and thin flanges develop regardless of any of these conditions and on both single and double-end equipment. Tests also showed that thick and thin flanges were not due to the position of the wheels on the axle, hence the only conclusion that could be drawn was that they were due to a difference in wearing qualities of the steel in the wheels.

It is only reasonable to expect that a slight variation in the chemical composition or the density of the metal will affect the wearing qualities. It is practically impossible to refine the manufacturing process to a point where all the qualities which may affect the wear are absolutely identical in the two wheels. It is possible, however, to delay this kind of wear by checking the trucks for square whenever wheels are turned and by taping the wheels to be sure that the diameters are exactly the same. Accurate centering of the wheels on the axle is also important and care should be exercised in this respect.

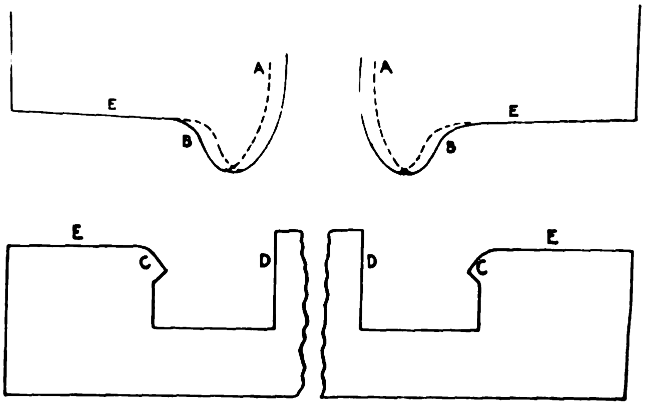
Derailments from Worn Flanges

BY R. P. WILLIAMS, INSPECTOR OF SPECIAL WORK, BROOKLYN RAPID TRANSIT SYSTEM

A common cause of derailment is the worn wheel flange. Fig. 1, in full lines, shows the perfect wheel flange; the dotted lines at *A* and *B* showing the wheel worn to the condemning point.

It sometimes happens that all of the wear occurs at *B*. This wear may be caused by shoe wear, or when a car is operated on a line where there are many curves of long radius, where the guard rail is not considered necessary. With the wear showing all at *B*, derailment is almost certain to occur opposite the mate point, this form of wear having the same effect as narrow-gage wheels. The derailment is caused by the lateral motion developed in the tangent track ahead of the switch. Following the inner dotted line at *B* into the full line *A*, it will be seen that a flange of fairly good shape still remains, the danger point not being readily detected by the single-flange gage.

Fig. 2 shows a standard wheel gage made from 1½-in. x 3/16-in. or ¼-in. steel bar which, properly made and used, will show this dangerous wear immediately. Points *C* and *C* of the gage are made to fit the perfectly gaged wheels, point *D* of the gage corresponding to the fullest thickness allowed at *A* in Fig. 1. The distance, then, between *D* and *D* of the gage must be the proper distance between *A A* of Fig. 1, on the wheels. To test for wear at *B*, place the surface *E* of the gage against the surface *E* of the wheel, bringing *C* of the gage snug to *B* of the wheel. If point *D* of the opposite opening laps over *A* of the other wheel, the tendency to climb the tongue opposite the mate point is shown in proportion to the lap. After a little practice the operator will be able to detect this form of wear very readily. Should the flange wear have developed altogether at *A*, the mate side wheel may enter outside the mate point, or as it is termed, "straddle the mate," and cause derailment in that way.



WORN FLANGES—FIG. 1—LIMITS OF WEAR; FIG. 2—WEAR GAGE

Testing Motors for Electrical and Mechanical Conditions

BY A. P. LEWIS, SUPERINTENDENT OF POWER AND SHOPS, CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, COLUMBUS, OHIO

Experience with different motors in high-speed service has led the mechanical department of the Cleveland, Southwestern & Columbus Railway to conclude that a potential test in excess of the line voltage is unnecessary. It also believes that a high-tension a.c. test of armatures is too severe, necessitating mechanical and electrical conditions which never are required in service, unless the equipment is struck by lightning, under which condition the high-voltage a.c. test is insufficient. Moreover, the mechanical department has found that nine out of ten cases of motor trouble are mechanical and that the remainder are due either to short-circuits, because water has collected in the motor, or because bearing wear has allowed the armature to come in contact with the pole pieces.

After an armature has been repaired it is tested carefully for "shorts" by the ordinary telephone-receiver method, following which it receives a potential test at

700 volts d.c. or the line voltage. As a final check on its mechanical and electrical condition, the repaired motor is mounted in the truck and made ready for service. In this position three of the motors in a four-motor equipment are disconnected and the repaired motor is made to move the car. This test is believed to be sufficiently severe to meet any service condition and at the same time assures an ample factor of safety to provide for emergencies.

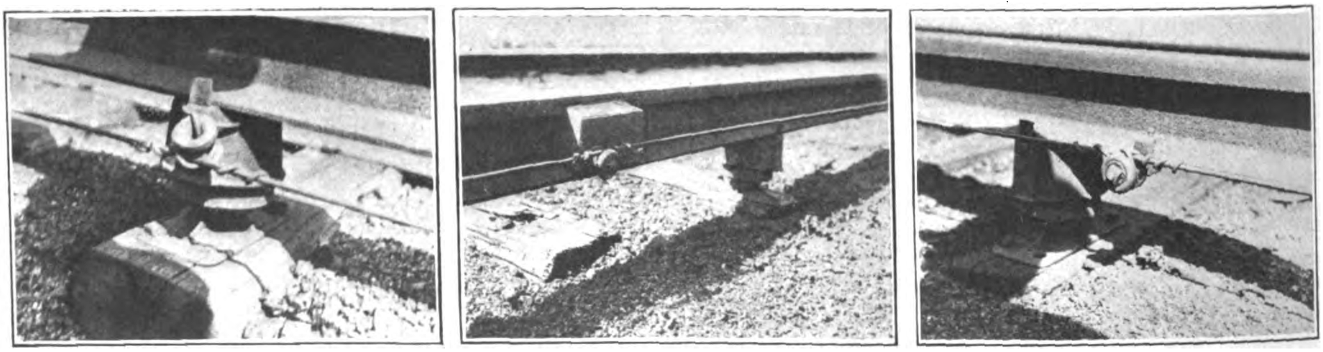
Attaching Signal Wires to Third-Rail

BY G. H. MC KELWAY, DISTRIBUTION ENGINEER BROOKLYN RAPID TRANSIT COMPANY

On one of the large third-rail lines a problem presented itself a few years ago which would not be met with on railroads of any other type.

The problem was how to carry signal wires almost the entire length of the line without installing either a pole line or underground conduits. On most third-rail lines the tracks are parallelled with a high-tension line connecting the substations so that signal wires can be run either on the poles of that line or in spare ducts, if the wires are underground. In the case in question, however, neither of these facilities was at hand so that it appeared as if an entirely new and costly installation for the signal wires would have to be made. This, however, was avoided by attaching the rubber insulated signal wires either to the third-rail itself or to the insulators supporting it.

As shown in the accompanying illustration, three different methods of attaching the wires were tried out. Fig. 1 shows the method first used which, although the cheapest in first cost, was also the most expensive to maintain. Here the signal wire was tied to a porcelain spool insulator, which in turn was tied with a piece of wire around the cap of the third-rail insulator. A second plan, shown in Fig. 2, consisted of tying the signal wire to a spool screwed to a small block of wood, which was, in turn, bolted to the third-rail. Although the materials used with this method are in themselves very cheap, the labor of drilling the rail and fitting the wood blocks to it make the plan considerably more expensive than the preceding one. It, however, makes a much neater and more workmanlike job. Fig. 3 shows the last plan tried. In it the signal wire was tied to the porcelain insulator as before, but the insulator was made a part of a clamp fitting around one flange of the third-rail and fastened to it by means of a set screw. Such clamps can be purchased from stock and, while they are more expensive than the other fittings described, yet they can be put on the rail very easily and cheaply, making a job that is not only strong and permanent, but good-looking as well.

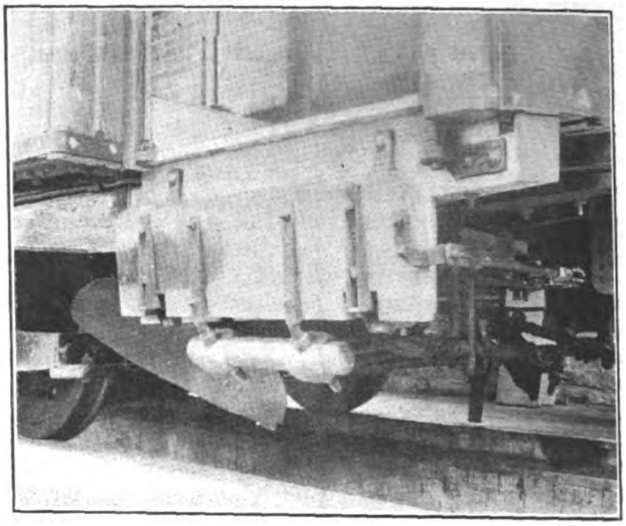


ATTACHING SIGNAL WIRES TO THIRD RAIL—FIGS. 1, 2 AND 3, SHOWING DIFFERENT ATTACHMENTS

A Balanced Door-Operating Mechanism

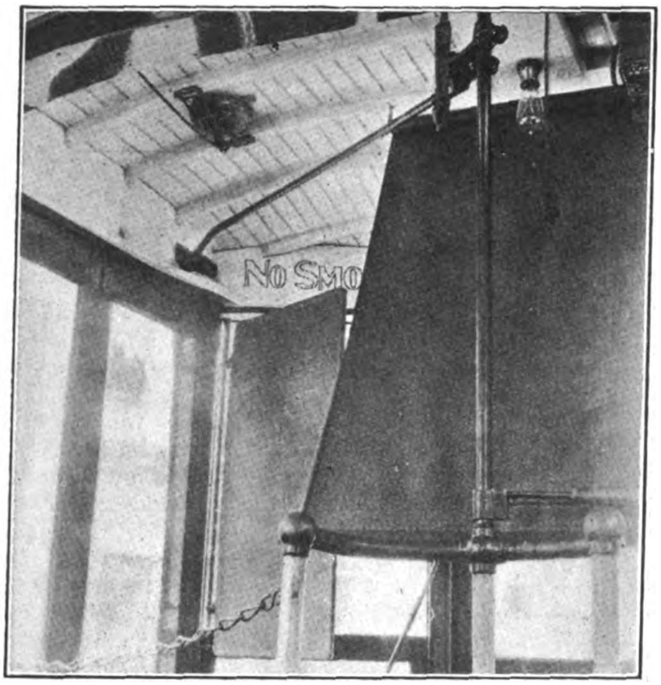
BY JOHN SUTHERLAND, MASTER MECHANIC TRI-CITY RAILWAY & LIGHT COMPANY, DAVENPORT, IA.

Ease of operation and insurance against failure governed the design and arrangement of the door-operating mechanism recently installed on the cars of the Tri-City Railway & Light Company, Davenport, Ia. The first requisite was obtained by providing a counterweight on the step sufficient to make the mechanism pass through the full cycle of movements after the operating lever had been released from the locked position. The use of the counterweighted mechanism also made it possible to employ lighter rods and to simplify the arrangement. The operating lever at the conductor's end of the car is at his stand in the center of the bulkhead. This lever is not permanently fastened to the operating mechanism, but like the motorman's controller and reverse handles, may be shifted from one end of the car to the other. The counterweight is 17 ounces lighter than the weight of the step, and is so mounted as to permit accurate adjustment. A view of the step and counterweight is shown herewith. The step-operating lever is attached to the base of the rod which passes up through the floor to the conductor's stand, and the door-operating lever is attached to a crank at the top of this rod. Both the steps and door are locked in position by forcing the cranks and levers beyond dead center.



BALANCED DOOR-OPERATING MECHANISM — STEPS, COUNTERWEIGHT AND LEVER CONNECTIONS

The door-operating mechanism beside the motorman's position is also of the counterweighted type. The step shown is operated by the lever at the motorman's posi-



BALANCED DOOR-OPERATING MECHANISM—CONDUCTOR'S STAND AND DOOR LEVERS

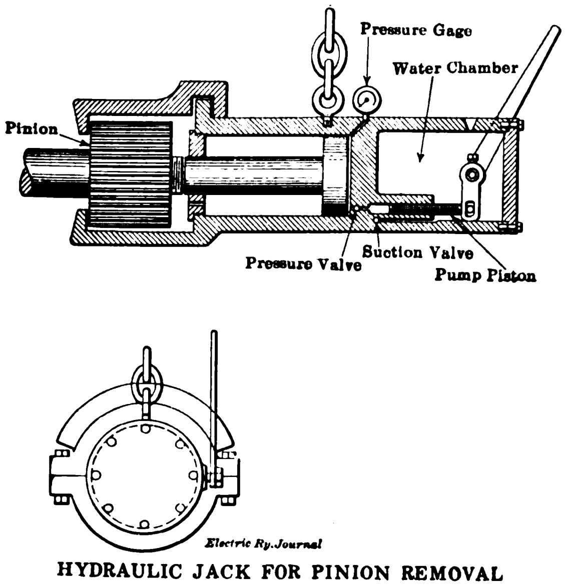
tion, the mechanism beneath the platform being visible in the illustration. In a second view the conductor's stand and the lever and crank connections to the doors are shown. It is also interesting to note in this view the arrangement of the curtains to prevent interior lighting reflections from interfering with the motorman's vision through the vestibule windows. An ordinary curtain on a roller fixture, attached to the vestibule roof back of the motorman's position, is pulled down and hooked to the conductor's stand. Reflections on the two side vestibule windows are eliminated by two curtains on frames. These are mounted on rods with springs so that they will assume the correct position when the doors are closed, and when the doors are open the curtains are swung back against the windows.

Hydraulic Jack for Pinion Removal

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES
SAULT STE. MARIE, MICH.

The article by R. H. Parsons on the removal of motor pinions printed in the ELECTRIC RAILWAY JOURNAL of April 3, recalled to my mind similar difficulties once experienced in the removal of motor pinions in a large repair shop. The problem was solved by a special design of hand-operated hydraulic jack. The accompanying illustration shows the hydraulic jack in section. The jack was suspended in a small jib crane, mounted on a post between the car pits.

A car whose pinions were to be changed was brought to this pit, and each motor was transported via a pit carriage to a point where it would be clear from the wheels. Then the pinion was heated with a gasoline torch to about 100 deg. Cent., the jack was applied and the pinion removed by applying several strokes with the hand pump. If the pressure gage indicated that the pinion was abnormally tight, the pinion was heated again and the jack reapplied.



HYDRAULIC JACK FOR PINION REMOVAL

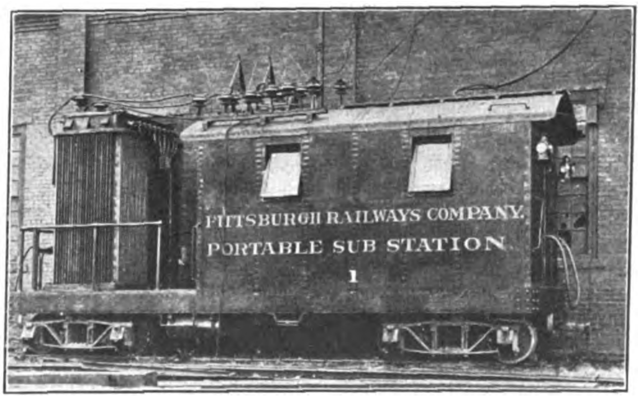
Portable Substation at Pittsburgh

The Pittsburgh Railways Company, one of the first traction systems to install an especially designed portable substation car, has recently made public the operating costs for its first year of service. During this time the station was in use intermittently for periods equivalent to about six months of continuous operation. The operating data follow:

OPERATING DATA FOR ONE YEAR

Output	255,190 kw-hr.
Cost of operation:	
Wages	$1,054.09
Supplies	57.76
Transportation and maintenance	189.20
Total	$1,301.05
Operating cost per kilowatt-hour output for period of one year	$0.0050

The substation, consisting of a 500-kw rotary converter, transformer and the necessary switching apparatus mounted on a double-truck steel car, was furnished by the Westinghouse Electric & Manufacturing Company. The cost of this outfit, complete and ready for operation, was between $20 and $22 a kilowatt. This is considerably lower than the cost per kilowatt of the average small substation.



PITTSBURGH RAILWAYS—PORTABLE SUBSTATION IN OPERATION AT CHARLEROI, PA.

The substation which was placed in operation in October, 1913, was first used to help out an overloaded industrial substation until a new one, with adequate capacity, had been constructed; next at a point where a country fair was overloading the local substation, and finally to delay for several months the starting of a small and inefficient steam plant which was used during the winter months to carry the peak.

The car, upon which the converting apparatus is mounted, was supplied by the Railway & Industrial Engineering Company of Pittsburgh. It weighs approximately 24,000 lb., and is constructed entirely of steel, with the exception of the window sash and doors. The side sills, center sills and body bolster are constructed of 12-in., 20½-lb. channels. The floor supports are of 6-in. 8-lb. channels, and the floor is of ¼-in. steel plates, fastened with counter-sunk rivets.

The cab, which is of No. 14 gage sheet steel, is 15 ft. long. The bulkhead at the end of the car is removable to permit the installation of the apparatus. In each bulkhead is a sliding door with glass windows. Above each door is a drop transom for ventilation. In each side of the cab are two windows, pivoted at the middle. Handholes with covers are provided in the floor to insure a good circulation of air in warm weather.

The trucks are the diamond arch-bar type, of 80,000 lb. capacity, mounted on 24-in. wheels. The principal over-all dimensions of the car are: length, 27 ft.; width, 8 ft.; weight, complete with equipment, 66,000 lb.

The high-tension, air-break switches, horn-gap fuses and lightning arresters are mounted on the roof of the cab. On the open end of the car is installed a 550-kva, 22,000—424-volt, three-phase, sixty-cycle, oil-insulated, self-cooled transformer of the outdoor type. Taps are brought out on the high-tension windings for voltages ranging from 10,000 to 22,000. The low-tension windings are provided with 3, 6 and 9 per cent taps, in addition to the 37 per cent taps for starting the converter.

In the cab are installed a 500-kw, 600-volt d.c. six-phase, sixty-cycle, 900-r.p.m., rotary converter, switchboards and necessary rheostats. The converter is mounted on special supports, designed to permit leveling for any grade on which the car may be installed. The switchboard panels are installed at either side of the door nearest the transformer. Connections are provided for starting the converter from the d.c. side, in case the station is operated from a line upon which starting from the a.c. side would be objectionable.

The double-throw a.c. starting switch is mounted underneath the car floor and is completely inclosed within a removable sheet-iron case. This switch, as well as the high-tension, air-break switch on the roof; is operated from the a.c. switchboard panel in the cab.

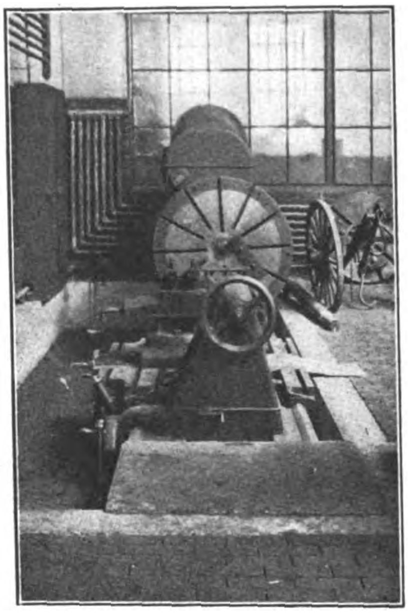
A light framework, covered with canvas, in which are provided mica windows and flap doors, incloses the space between the cab and the transformer. In this inclosure are provided a table and chair for the convenience of the operator in making out reports. A portable electric heater is carried on the car during the winter months. When the station is operating the heater is placed in this inclosure. When the station is not in service the heater is placed in the cab and serves to prevent sweating of the walls and equipment.

A desk telephone set is installed and connection is made to the nearest company line, so that the operation of the station may be supervised by the load dispatcher. The station is operated by any of the emergency operators of the electrical department. When not in use, the car is kept in the most convenient storage yard.

The station has been in operation, intermittently, for about twenty months, and very little trouble has been experienced. The parallel operation of the station with near-by stations has given no trouble whatever. The use of an equalizer cable has been found unnecessary when operating at a distance of more than three-quarters of a mile from every rotary-converter station.

Through a typographical error the word "to" was inserted before "$2,000" in the article on the subject "The Special Work Shop," printed on page 992 of last week's issue. The sentence should read "if the railway has an unoccupied building, the cost could be reduced $2,000."

Locating a Lathe in a Floor Recess to Facilitate Wheel Handling



ENGINE LATHE LOCATED IN PIT

In the repair shop of the Holyoke (Mass.) Street Railway the handling of car wheels at a 42-in. engine lathe is made convenient by the mounting of the lathe in a pit in the floor 20 in. deep, 20 ft. long and 7 ft. wide. The wheels are practically rolled into place in the machine, a few inches lift being given by the shop crane for the final placing. A jib crane will shortly be placed over the tool for this service, releasing the main crane for other work. The lathe is driven by a variable-speed motor and the location in a pit does not inconvenience the operator, as he stands upon the wooden block pit floor, the controller handle being about 22 in. above this. A short flight of steps leads into the pit, which has concrete foundations for the lathe itself. An end view is shown.

Why Midi Railway Chose Flexible Instead of Rigid Overhead

After trying one type of rigid overhead construction, one type of catenary without tension take-up devices and five types of catenary with tension take-up devices, the Midi (Southern) Railway of France decided recently in favor of the second form, namely, a simple non-compensated catenary. This means that the company will follow American rather than European catenary practice. The favored construction consists of a steel cable of 40 sq. mm (about No. 1) cross-section and a conductor of 100 sq. mm (about No. 0000) cross-section. The rigid system comprised a triangular truss which was vertically suspended through hangers from a heavy cable. (See ELECTRIC RAILWAY JOURNAL, page 26, July 6, 1912.) Some of the systems with tension take-up features had compensating devices for the contact wire only, while others had such devices for both contact and catenary wires. The non-compensated catenary was chosen because it would cost $480 to $640 a mile less than the compensated systems, and unlike the rigid system it could be operated with standard current collectors.

It was found that when the contact wire was horizontally adjusted at the average temperature, the difference between its highest and lowest positions was only 27 mm, compared with 235 mm for ordinary single-wire suspension.

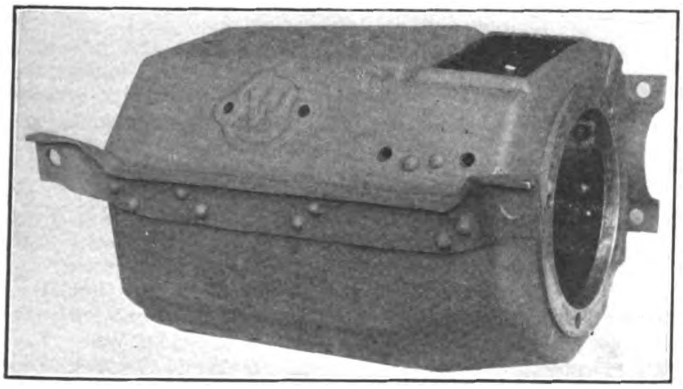
The Midi Railway is using single-phase current at sixteen cycles, 12,000 volts on the trolley. The energy is transmitted at 60,000 volts. The sections now equipped follow: Lourdes-Pierrefitte, 13 miles of single track; Ille-Perpignan, 13.6 miles single track, and Tarbes-Lourdes, 13 miles of double track. Old rails were used as poles until the supply was exhausted, whereupon lattice poles were purchased.

Pressed-Steel Motors on a Cleveland Car

The first of the pressed-steel railway motors which were exhibited by the Westinghouse Electric & Manufacturing Company at Atlantic City last October are now being tried out on the Cleveland Railways, and their performance under regular operating conditions will be watched with interest by railway managers, to whom the problem of cutting down the dead weight of car equipment is always of interest.

The use of pressed steel for frame and details, while a decided novelty for railway service, has already met with marked success in the industrial field for which the Westinghouse Electric & Manufacturing Company developed a line of pressed-steel d.c. motors six years ago. The inherent advantages of this construction led to the design of a standard line of a.c. motors, embodying the same features, which proved equally successful in industrial service, and this led to the present design for railway work.

The type of motor used on the Cleveland car, No. 330, is rated at 40 hp at 500 volts, and weighs 2100 lb. The corresponding motor with the cast-steel frame, No. 340, which is the lightest of its type ever built, weighs 2325 lb. Comparing the new motor with the lightest 40-hp low-speed motor of about two years ago, there is a saving of approximately 530 lb. per motor, or a total saving of more than 1 ton in the case of a four-motor equipment. In addition the pressed-steel construction permits a decrease in the size and weight of the wheels, with a consequent lessening of the height of the car floor. The new Cleveland car that is equipped with the pressed-steel motors has wheels 26 in. in diameter.



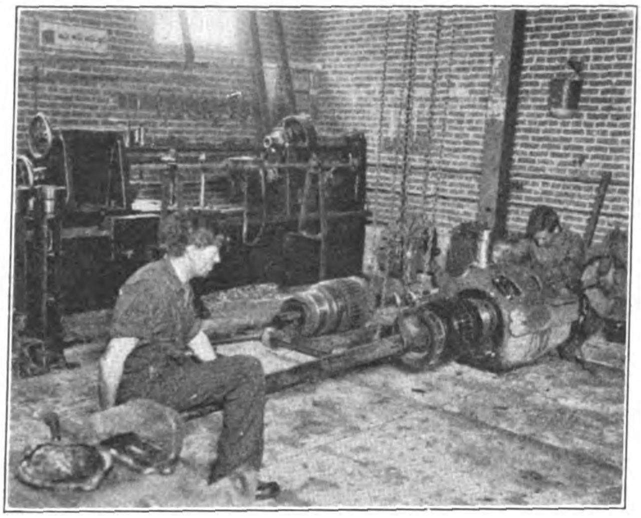
PRESSED-STEEL MOTOR FRAME WITH RIVETED CONNECTIONS

With cast-steel motors, it is practically impossible to avoid variations in the thickness as well as a certain amount of blow holes, sand, etc., in the castings. Consequently the torques exerted by various motors of the same design for a given current always vary to a certain degree, and this results in an unequal distribution of load among the several motors on a car. With a pressed-steel motor, however, the material is not only absolutely uniform but may also be worked to exact dimensions, resulting in uniform torques and equal distribution of load for all motors. It is possible, therefore, to design motors with pressed-steel shells with a much smaller allowance for manufacturing irregularities, a fact which will permit still further reduction in weight.

The manufacture of these motors involves the use of special hydraulic presses, the various parts of the motor such as the yoke, the two halves of the frame, the axle bracket, etc., being hot-pressed from sheets of open-hearth steel, and then riveted together. The electrical construction follows standard Westinghouse practice. The motor is of the ventilated type, air being drawn through ducts in the armature and passed also between the pole pieces.

Using a Crane and Pipe to Handle Armatures

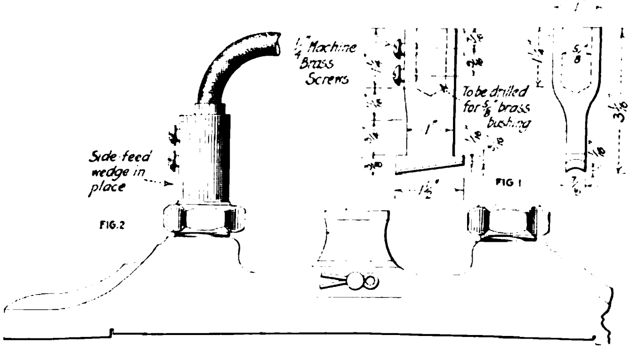
The accompanying illustration shows how a 3-ton Chisholm & Moore crane is used in a small shop to facilitate the removal and replacement of armatures without placing the motor on end. As illustrated, the crane hook is inserted in a sling which is carried around a long piece of cast-iron pipe. One man places this pipe over the armature shaft for use as a lever, so that with the aid of the crane two men can readily guide the armature to its place in the shell and to the low armature truck shown at the left.



CRANE AND PIPE USED TO HANDLE ARMATURES

Combination Side-Feed Wedge for Splice Ears

Often in overhead electric line construction and maintenance, it is necessary to install a splicing ear at a point where a feeder ear is required. To obviate the necessity for both types of ears at these locations, combination side-feed wedges, similar to that shown in the illustration. are used on the lines of the Brooklyn Rapid Transit System. These wedges have given thorough satisfaction. The assembling of the wedge in the company's standard Type "N" splicing ear is also shown. The composition of these wedges is the same as that used in the company's standard trolley ears.


1/4" Machine Brass Screws
To be drilled for 5/8" brass bushing
Side feed wedge in place
FIG. 2
FIG 1
1"
1 1/2"
5/8

B. R. T. SPLICING EAR—FIG. 1—SIDE-FEED WEDGE; FIG. 2—TYPE "N" EAR WITH SIDE-FEED WEDGE

News of Electric Railways

NEW YORK COMMISSIONERS EXONERATED

Members of the Public Service Commission for the First District of New York were exonerated on May 26 by Governor Whitman of charges of misconduct in office and neglect of duty. The Governor made no report on his findings in the cases of the upstate commissioners. In arriving at his decision not to dismiss any of the first district commissioners Governor Whitman pointed out that there was no appeal from the decision of a governor to dispose of charges filed against State officials. He said that the personal integrity of the commissioners against whom charges were filed had not been impugned. Regarding the testimony taken by the legislative investigating committee, the Governor said that it showed that regarding the work of subordinates of the commission, who sought to secure action upon complaints against the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company, satisfactory results were not effected in many instances and that the commissioners themselves did not give their subordinates the necessary support. There was also evidence that all of the five commissioners failed to proceed as promptly and diligently in disposing of matters taken up by them in formal hearings as their obligation to the public required. He expressed the belief that the proper orders of the commission will be enforced in the future, and said that he will hold the commission strictly responsible for any failure of effort to secure such enforcement. The fact that he had received absolute discretion did not justify him in disregarding simple and elementary rules of evidence. He had no doubt whatever that were his actions reviewable an appellate court would reinstate the commissioners were he to remove them on the evidence before him.

TOLEDO ORDINANCE PROVISIONS DISCUSSED

A communication from City Solicitor Thurstin was read at the meeting of the Council committee on railways and telegraphs at Toledo, Ohio, on May 19. It related to the municipal ownership ordinance and the $8,000,000 bond issue authorized to pay for the local street railway and light property. In reply to the committee's inquiry for more details as to the plan authorized by the ordinance, Mr. Thurstin said that the form of the bond would be similar to any other municipal bond, and the trust deed would be similar to the deed used by railroad corporations or such as would be approved by the United States Mortgage & Trust Company, New York.

F. R. Coates, president of the Toledo Railways & Light Company, and Thomas H. Tracy, attorney for the company, met with the franchise committee of the City Council on May 14 to discuss the tentative draft of the conditional franchise that had been prepared by the committee. Mr. Tracy first objected to some of the provisions in section No. 6, especially that which provides for a two-thirds vote of Council in establishing the rate of fare for any five-year period. He also objected to the provision that under certain conditions the return on the investment shall be only 4 per cent. Mr. Tracy said that it is impossible to tell what the developments of the future will bring. As an instance, Council had within the last two years enacted a 3-cent fare ordinance, when the members knew that this rate would barely pay operating expenses. He insisted that provision should be made for compensation to the company for losses each time where they could be shown to have been the result of the rate of fare established by Council for any five-year period. Mr. Tracy also objected to the section which extends the workmen's 3-cent fare to 8:30 o'clock in the forenoon and to the phraseology of the portion regarding universal transfers. No agreement was reached in regard to any of the sections of the ordinance which were discussed.

The Toledo, Bowling Green & Southern Traction Company has sent a communication to the Council in which it refused to comply with the order of that body to carry passengers to and from parks and cemeteries within a mile of the corporate lines of the city for the same fare as charged within the city. The company said that the State law on fares did not apply to it.

PENNSYLVANIA RAILROAD PUBLICITY

How the Company in Various Ways Takes the Public Into Its Confidence

At the recent hearings before the United States Commission on Industrial Relations in Washington, D. C., the publicity policy of the Pennsylvania Railroad was described in part as follows:

The company started its publicity work some nine years ago by first inaugurating a plan of full publicity regarding all accidents on its lines. Since that time the work has been extended to cover the activities of all departments. The railroad makes an effort to see to it that what the press publishes about the railroad shall not consist of complimentary notices about the railroad or its officers, but facts of consequence. It endeavors to see to it that in all matters the public learns what the railroad believes to be the truth. The railroad tells its story, tells it frankly, tells it fully, tells it often, and tells it with a view to its being understood and carrying conviction.

An essential principle back of the publicity policy of the Pennsylvania Railroad is this: If it is going to be able to work out its problems properly, it has got to be believed in. It must get imbedded in the public mind what is in all truth the supreme fact of the situation, namely, that it is doing its work as best it can and doing it, in the main, exceedingly well, doing it as well as, if not better than, the railroad business is being done anywhere else in the world. In short, the company endeavors to secure the help of the public in working out its problems. To do that it must acquaint the people with its problems.

The first plan of distribution worked out was to give information verbally and in printed form to the press in Philadelphia, and then to send, when there was time, copies of that information to the papers throughout the system direct. A plan was then developed whereby representatives of the company at various points were appointed to deal with the press in each place. In some cases it was the general superintendent, in other cases the superintendent, or the agent or some other employee, as the case might be.

The Pennsylvania Railroad never pays any newspaper anything to print anything as news, or as an editorial regarding its service. It wants the papers to feel that if it gives them any information, they can do as they wish with it—publish it or throw it into the waste basket. What they do does not affect in the slightest the attitude of the company toward them.

Mr. Rea said, shortly after he became president of the Pennsylvania Railroad: "Do not ever ask any newspaper not to print anything that is so; if it is bad let them print it, because in that way the matter will probably be brought to my attention so that we can have it corrected. The only thing we want to ask of newspapers is that when they do mention the Pennsylvania Railroad or they mention railroad matters generally, they publish the truth in small matters as well as in great."

These instructions given by Mr. Rea are typical of the principles the company follows in its publicity work, as well as in all of its other activities.

It has been found that it is not wise to depend entirely upon the newspapers; that there is a very much broader field to cover and that the company must study methods of getting the attention of people, to get into their minds ideas which it could not get to them through the newspapers. A study was made of the railroad's own constituencies. It was found that the Pennsylvania Railroad System has at least 112,000 shareholders. Bondholders are estimated at something more than 200,000, though a great many of them are not registered. The company also has its employees, of whom there are between 200,000 and 250,000 on the lines east and west of Pittsburgh. Of course, it is a very difficult thing to get at so many men. The idea of publishing a magazine has been considered, but that would be a very large undertaking. The company, therefore, started out by publishing leaflets giving certain details of operation. These are not sent to everybody; one, for example, is sent almost entirely to the men on a certain division; in another case it may be sent very largely to the men on a grand division; in another case to the locomotive engineers. The idea is to get before the employees facts of interest which the management feels will be instructive and of benefit to these particular men.

In addition to the employees, there are the railroad's passengers—about 150,000,000 a year. This means that every day of the year some 500,000 people take Pennsylvania Railroad trains. To get them interested is a large undertaking. A plan of publishing bulletins to be posted on station bulletin boards was adopted. The theory is that in publishing these with more or less frequency and getting even a small percentage of these 500,000 people a day that take the trains to read them, the company will be able to implant in their minds thoughts and facts—not too heavy—which will cause them to think and to discuss the affairs of the railroad and railroads generally with their neighbors.

RAILROAD ADVERTISING

Edward Hungerford, advertising manager of Wells-Fargo & Company, formerly with the Brooklyn (N. Y.) Rapid Transit Company and before that with the Erie Railroad, presented a very interesting paper before the Canadian Railway Club at Montreal recently on the subject of railroad advertising. Mr. Hungerford said that no matter how advertising on the railroads had progressed, he thought he was fair in saying that the advertising manager on the railroad had not been permitted to make similar progress. No one dared to doubt the final decision of the members of the legal staff in matters affecting their branch of the conduct of the railroad business and executives did not change the structural plan for bridges or the detailed profile for a projected line across new country. Just as the legal department of the railroad was its defensive wing, so should the advertising department be its offensive. The advertising manager should sit alongside the general manager and the traffic manager, the counsel and the comptroller. He should be freed from the detail and left to plan the publicity of the railroad in its every phase. He did not believe that railroads had yet used paper and ink to the greatest advantage to fight most of their battles for public sentiment, in repelling the attack of unjust legislators and commissions. As a rule if the railroads have advertised for public sentiment through the newspapers it has been an eleventh hour measure adopted in a great crisis. With respect to the advertising of the railroads in regard to full-crew legislation and similar matters Mr. Hungerford suggested that the railroads had doubtless studied the excellent results obtained by the policy of advertising of the telephone companies. This was a splendid example of the use of advertising of the highest type by a public utility. He also thought that they had read the printed record of the individual campaign waged by the Toledo Railways & Light Company, or the campaigns of various traction and lighting utilities which have handled such problems and handled them intelligently. On the whole, however, the railroads had not taken hold of the great questions of public policy and grasped them with the strength that some other businesses have shown. He thought this was due to one thing, namely, that the advertising manager of the railroad had not compelled himself to be recognized as an executive of the railroad organization.

CINCINNATI LOOP MEASURE PASSED

The Bauer bill, providing for the construction of a rapid transit loop in Cincinnati, has been passed by the Ohio House, after being amended in such a manner as to prevent the issue of bonds above the amount defined by the Longworth law after the construction of the loop is completed. Because of the legislation that must be enacted by the Cincinnati City Council, there will be just sufficient time to submit the bond measure to the voters at the fall election. The Pink bill, relating to the construction of the subways for the rapid transit loop, has also been passed. This gives the city all the State legislation necessary for allowing the construction of the much-desired loop, which will provide an entrance to the business section of the city for all interurban lines and give a rapid transit service to many of the outlying portions of the city. Under this law the Mayor of Cincinnati will appoint a rapid transit commission of three members and the loop will be constructed under its supervision. When completed, it is probable that the loop will be operated by the Cincinnati Traction Company or some other company interested in the suburban or local business.

NEW WORKING AGREEMENT UP IN CHICAGO

The present agreement between the Chicago surface and elevated railways and their employees expires on May 31. Negotiations for a renewal have been under way for the last two weeks and the essential points regarding working conditions were apparently disposed of without serious difficulty. When President Leonard A. Busby informed the union's representatives that there could be no increase in the wage schedule at this time the negotiations came to an end. In summarizing the situation Mr. Busby gave out the following interview:

"The proposition submitted by the men called for certain changes in working conditions and an increase in wages. We have been able to work out a material improvement in working conditions. With reference to the request for a wage increase, I produced for the inspection of the committee our records showing our loss in gross receipts during the last eight months. This loss has now reached the sum of more than $4,000 a day. I told the men that under these conditions an increase in wages was not warranted at the present time. I, therefore, offered the men a renewal of our present contract with improved working conditions and the present wage scale. The entire matter is now in the hands of the employees' committee for consideration."

The result of these negotiations has been laid before the employees, who, according to the laws of the union, cannot strike without first offering arbitration to the company. Arbitration would be acceptable to the company and it is generally believed that this method of settlement will be accepted by the employees.

DECISION IN OHIO TAX CASE

In the case of the Ohio Traction Company against the Ohio State Tax Commission, the State Supreme Court has rendered decisions under both the Langdon act and the Hollinger law of 1911, pertaining to excise taxes. The court held that under the Langdon law electric railways must pay an excise tax of 1.2 per cent only on the revenues derived from actual operation of roads under their control, but cannot be held for the earnings derived from securities of subsidiary companies. The court decided that under the amended Hollinger act railways must pay the excise tax on buildings owned, but that they cannot be held for tax on the income derived from subsidiary companies. Under the decision, the collection of interest or dividends on the securities of underlying companies is not considered as the transaction of railway business under either of the laws, but in the second instance the use of buildings and receipts from them, as in the case of the Cincinnati Traction Building, is considered a feature of railway business.

DETROIT ARBITRATION DECISION

Motorman Peter Whaling, because of whose dismissal by the Detroit (Mich.) United Railway the union motormen and conductors went on a one-day strike, was ordered reinstated by a majority of the board of arbitrators which closed its session on May 27. James Couzens, of the Municipal Street Railway Commission, and J. V. Cunningham, State Labor Commissioner, agreed upon the reinstatement with back pay, while S. T. Crapo, the third arbitrator, dissented. The majority of the board admitted that Whaling was not a first-class motorman, but said that he was no worse than some others. They recommended that stricter discipline and higher requirements for motormen be maintained by the company, although they did not point out how this was to be done when the company in this instance, by their decision, was debarred from discharging a motorman whose record showed sixty-odd offenses against rules, including many instances of unsafe operation. Mr. Crapo, who voted against the reinstatement, declared the testimony showed that Whaling lacked judgment and was wanting in ability to state facts correctly. He held that as a matter of public safety the standard of motormen should not be lowered, and declared that such would be the case if Whaling were reinstated.

Immediately after the decision had been announced, F. W. Brooks, general manager of the company, issued a statement in which he characterized the action of Arbitrators Couzens and Cunningham as an outrage, and said that "the finding shows this arbitration a ridiculous farce and offends every sense of fairness." Mr. Brooks declared the decision "surprisingly in conflict with the testimony," but said that the company would reinstate the man, "knowing him to be an incompetent motorman and an improper person to compel the public to come in contact with or trust their safety to." He added that the decision "seems to establish as a standard for motormen the characteristics of recklessness, untruthfulness, perjury, dishonesty and the practices of a thug."

Mr. Couzens, as a third member of the board, blocked every effort of the company to get Whaling's entire record before the board, and practically every decision which he made on the admission of testimony aided in screening the discharged motorman.

New Michigan Road Opened.—The new line of the Michigan Railway between Kalamazoo and Grand Rapids has been placed in operation.

City of Des Moines Restrained.—United States District Judge Martin J. Wade at Des Moines, Ia., has overruled the motion of the city to dismiss the petition of the bondholders of the Des Moines City Railway for a restraining order preventing the city from tearing up the company's tracks on or after June 22, when it is held the franchise expires.

Drastic Action in London Strike.—The County Council of London, England, took a drastic step on May 22 to deal with the strike on the municipal tramway system. It ordered all employees of military age who are eligible for service in the army or navy to surrender their uniforms and badges. Only men above military age will be employed during the remainder of the war.

Illinois Proposes Home Rule.—The Illinois Senate committee on public utilities has reported out two alternative Chicago home-rule bills. One of the bills provides for control of public utilities by the city council and the other provides for the appointment of a commission by the mayor. Both bills will give home rule to all cities having a population of 5000 or more if they adopt a Chicago act.

New Secretary of National Railway Appliances Association.—Bruce V. Crandall, secretary of the National Railway Appliances Association since July 1, 1911, has resigned on account of the increased demand upon his time made by his own business. C. W. Kelly, treasurer and director of exhibits, has been elected secretary for Mr. Crandall's unexpired term, and all correspondence should be addressed to Mr. Kelly at 349 Peoples Gas Building, Chicago.

Action on New York Bills.—As noted elsewhere in this issue Governor Whitman has signed the Thompson jitney bill. He has disapproved the act to amend the public service commissions law, in relation to the approval of transfer of capital stock; the act to amend the stock corporation law in relation to the organization tax payable under sec. 108 of the tax law by any corporation issuing shares of stock without designated monetary value; to amend the workmen's compensation law, in relation to the distribution of copies of such law in three languages; to amend the highway law so as to permit the laying of railroad tracks on the Albany Post Road within Westchester County.

Labor's Demands. — Representatives of organized labor have formulated a long list of demands for constitutional amendments in the interest of labor to be submitted to the committee on industrial relations of the Constitutional Convention of New York. Among the things desired are an absolute prohibition against establishing military rule until conditions shall have rendered the sitting of courts of justice impracticable, provision against the creation of a State constabulary, a section defining the rights of labor substantially in accord with the spirit of the Clayton law and that it be made incumbent upon the Legislature to provide for the inauguration of an old-age insurance system and insurance against unemployment.

Massachusetts Legislature.—Governor Walsh has signed a bill which enables the Boston Elevated Railway's bonds to become legal investment for savings banks. The act is general, applying to any street railway company, which, because of emergency, has been compelled to reduce its dividend, but which, in the succeeding two years, has restored the dividend to the previous 5 per cent rate. The prospects for jitney legislation are dead for the present session. Senator Gordon of Springfield attempted to introduce a new bill Monday providing an amendment to the present hackney law allowing cities to regulate the use of vehicles in the streets and licensing such of them as is deemed necessary. On account of the lateness of the session the committee on rules refused to admit the measure.

New York Industrial Commission Created.—The Whitman administration plan for the reorganization of the labor department and the workmen's compensation commission was consummated on May 24, when the Governor appointed the members of the industrial commission, which supersedes the two other departments. The Governor signed the industrial commission bill on Saturday. John Mitchell, former president of the United Mine Workers and now a member of the workmen's compensation commission, was made chairman of the industrial commission. James M. Lynch, at present labor commissioner and prominent in labor circles, was appointed to the second place on the commission. The remaining three places went to William H. H. Rogers, Rochester; Louis Wiard, Batavia, and Edward P. Lyon, Brooklyn.

The Pan-American Financial Conference.—The Pan-American Financial Conference, inspired by Secretary McAdoo of the Treasury Department, and for the expense of which Congress appropriated $50,000, was begun at Washington on May 24. President Wilson personally opened the sessions in the Pan-American Union Building at the Capitol. Delegates from eighteen other American republics were in attendance. Attempting to solve some of the financial and commercial problems which have been brought to the American republics as a consequence of the European war, the distinguished foreign visitors have been in session in Washington for a week, and have now started upon a tour of some of the Eastern cities of the United States, as the guests of the government. About 100 American business men identified with the most important industries of the country attended at the invitation of Secretary McAdoo.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The complete program has been announced for the summer meeting of the Central Electric Railway Association, which is to be held on the *S. S. City of Erie* on June 17 and 18. The meeting of the executive committee will be held on June 17. June 18 will be given over to the outing and other pleasures. The program of papers announced for June 17 follows:

"Railway Motor Gearing," by W. L. Allen, commercial engineer of the R. D. Nuttall Company, Pittsburgh, Pa.

"Track Joining and Bonding," by E. C. Price, vice-president and secretary of the Indianapolis Switch & Frog Company, Springfield, Ohio.

"The Human Element in Electric Railway Operation," by H. C. De Camp, Westinghouse Electric & Manufacturing Company at Cincinnati.

"The Engineer in the Service of the Public, or Engineering in a Broader Aspect," by Prof. M. E. Cooley, dean of the engineering department, University of Michigan.

The *City of Erie* will leave the steamship company's new pier, at the foot of Ninth Street, Cleveland, at 9 a. m., Central Standard time, June 17, 1915. It will cruise among the islands and along the northern part of the lake during the day and night, reaching Buffalo Friday morning, June 18. The International Railway and the Niagara Gorge Route have asked the members of the association to be their guests on a trip from Buffalo to Niagara Falls, where a visit to the Falls will be made, including a trip around the widely celebrated Gorge Route. Luncheon will be served en route and the party will return to the ship at Buffalo during the afternoon. The ship will then cruise back through the evening and night, reaching the pier at Cleveland Saturday morning about 9 o'clock. Tickets for the round trip on the ship, including meals and berth for two days, will cost $15. They may be secured of L. G. Parker, 6917 Bessemer Avenue, Cleveland, Ohio.

Financial and Corporate

ANNUAL REPORTS

Omaha & Council Bluffs Street Railway

The statement of income, profit and loss of the Omaha & Council Bluffs Street Railway, Omaha, Neb., for the year ended Dec. 31, 1914, follows:

Revenue from transportation:	
Passenger revenue	$2,787,425
Special car revenue	2,402
Mail revenue	24,406
Transportation of mail carriers	8,396
Miscellaneous revenue	324
Total revenue from transportation	$2,822,953
Revenue from operations other than transportation	143,260
Gross earnings from operation	$2,966,213
Operating expenses	1,608,231
Net earnings from operation	$1,357,982
Miscellaneous income	7,214
Gross income less operating expenses	$1,365,196
Deductions from income:	
Taxes	$233,126
Interest on funded debt	473,049
Interest on funded debt of leased lines	90,400
Rent of leased lines	60,000
Miscellaneous interest	300
Total	$856,875
Net income	$508,321
Dividends	450,000
Surplus for the year	$58,321
Surplus Jan. 1, 1914	139,303
Credited to surplus during the year	12,688
	$210,312
Charged to surplus during the year	37,981
Surplus Dec. 31, 1914	$172,331

The gross earnings in 1914 compared with those of the preceding year showed a decrease of $30,417 or 1.02 per cent. The operating expenses increased $35,809 or 2.28 per cent. The balance in the reserve for depreciation as of Jan. 1, 1915, was $1,097,849. An amount of $72,627 was charged to this account during 1914 for rebuilding track and making other replacements. During the year $182,858 was expended for betterments, additions and extensions. A sum of $15,035 was expended for betterments on leased lines. On May 1, 1914, the underlying bonds of the Omaha Street Railway amounting to $2,500,000 were paid.

Cleveland, Southwestern & Columbus Railway

The statement of income, profit and loss of the Cleveland Southwestern & Columbus Railway, Cleveland, Ohio, for the twelve months ended Dec. 31, 1914, follows:

Gross earnings:	
Revenue from transportation	$1,175,170
Revenue from operation other than transportation	80,113
Total	$1,255,283
Operating expenses and taxes:	
Operating expenses	$757,021
Taxes	58,778
Total operating expenses and taxes	$815,799
Net earnings from operation	$439,484
Other income	168
Gross income	$439,652
Deductions from income	328,114
Net income	$111,538
Profit and loss surplus at beginning of year	366,040
Profit and loss surplus—Dec. 31, 1914	$477,578

On account of the general business depression the gross revenue of the company did not equal the amount anticipated, but owing to the fact that a new passenger tariff was established effective Jan. 1, 1914, raising the rate of fare in many instances, the company was able to exceed by $48 the gross revenue of 1913, although 200,000 less paid passengers were carried. The passenger revenue during the year increased $5,043; milk revenue, $1,739; freight revenue, $1,239, and rental of track and facilities, $2,449. Decreases in earnings were experienced in the case of parlor and special car revenue, $2,779; express revenue, $2,156; power revenue, $4,663, and other smaller items.

The total operating expenses during 1914 showed a decrease of $2,366. This was caused almost entirely by a decrease in power plant operation of $27,519, other expense items showing the following increases: maintenance of way and structures, $10,030; maintenance of car and shop equipment, $2,911; maintenance of power plant equipment, $1,131; conducting transportation, $2,830; general and miscellaneous, $5,889, and electric package operation, $2,433. The maintenance expenditures covered the rebuilding of approximately 14 miles of high-tension pole line, the replacing of 300 defective poles and the installation of approximately 40,000 ties. The maintenance charges also included an item of $7,920 for depreciation on equipment. Taxes increased $2,257 during the year. The operating ratio was 60.31 per cent in 1914 as compared to 60.5 per cent in 1913, while the ratio of operating expenses and taxes to gross revenues was 64.99 per cent in 1914 as compared to 65 per cent in 1913.

The total expenditures for additions and improvements for the year were $109,634, including $41,065 for lighting lines, $30,690 for rolling stock, $19,983 for power plant and $17,967 for track and roadway. The following table presents the most important operating statistics for 1914 and 1913:

	1914	1913
Passenger car-miles	3,418,707	3,418,197
Express and freight car-miles	400,614	386,452
Service car-miles	122,825	96,272
Paid passengers	6,942,908	7,152,821
Pass passengers	39,213	38,506
Employees	292,544	297,217
Transfers	394,185	376,762
Gross earnings per car-mile, in cents	31.84	32.17
Operating expenses and taxes, per car mile, in cents	20.69	20.91
Earnings per mile of track	$6,006	$6,005
Operating expenses per mile of track	$3,622	$3,633

Washington, Baltimore & Annapolis Electric Railroad

The latest annual report of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., shows that the railway operating revenues for 1914 were $816,938, as compared to $831,940 in 1913, a decrease of $15,001 or 1.8 per cent. In 1914 the operating expenses totaled $449,626 as compared to $423,626 in 1913, an increase of $26,000 or 6.1 per cent. The net revenue from railway operations in the two years was $367,313 and $408,314 respectively, a decrease for 1914 of $41,001 or 10 per cent.

The report states that although the railway operating revenues decreased $15,001 during 1914, the general business really increased about that amount. In March, 1913, the earnings from passenger traffic resulting from the Presidential inauguration exceeded $30,000, for which there was no corresponding item in 1914. The increased expenses for 1914 were caused by an advance in wages of trainmen and other employees, by charges to depreciation on equipment, and by additional expenditures necessary to preserve the company's standard of maintenance.

The net revenue from auxiliary operation increased from $3,835 in 1913 to $14,925 in 1914, this increase being caused by the sale of power to the Annapolis Public Utilities Company. Taxes assignable to railway operation showed a slight increase for 1914, but the non-operating income increased from $7,061 in 1913 to $13.071 in 1914 on account of dividends on stock of the Annapolis Public Utilities Company. The gross income in 1914 amounted to $357,495 as compared to $381,823 in 1913, a decrease of $24,328 or 6.3 per cent. On account of a small increase in deductions caused by increased bond interest, the net income decreased from $129,620 in 1913 to $101,728 in 1914, an amount of $27,892 or 21 per cent.

American Power & Light Company, New York, N. Y.—The latest report of the American Power & Light Company states that all its operating subsidiaries made substantial progress during the calendar year 1914. The increase in the combined gross earnings was 13 per cent and in the net earnings 16 per cent. The total gross earnings were $6,615,994, of which 58 per cent was from electric light and power, 28 per cent from artificial gas, 8 per cent for natural gas, 3 per cent from electric railways and 3 per cent from water business. In the case of the Pacific Power & Light Company, which operates the street railways in Astoria, and through the Walla Walla Valley Railway operates the street railways in Walla Walla and the interurban line between Walla Walla and Milton, 12 per cent of the total gross earnings was derived from electric railway operation. The Southwestern Power & Light Company, which controls the Paris (Tex.) Transit Company, secured 2 per cent of its gross earnings from its electric railway. The combined surplus balance accruing to the American Power & Light Company as of Dec. 31, 1914, was $1,325,162.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—The directors of the Augusta-Aiken Railway & Electric Corporation have decided to increase the authorized 6 per cent cumulative preferred stock from $1,500,000 to $2,250,000, the $750,000 of new stock to be on a parity with the present issue. The accrual of dividends on the new preferred stock will be only from Oct. 1, 1915. A special meeting of stockholders has been called for June 23 to authorize the foregoing. Stockholders of record June 1 will be offered the right to subscribe on or before June 15 for the new preferred stock at par, in an amount not exceeding one-fifth of the shares held.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The London holders of the first mortgage 5 per cent bonds of the Barcelona Traction, Light & Power Company on May 11 approved the proposed readjustment plan described in the ELECTRIC RAILWAY JOURNAL of Feb. 27 and May 1. An additional meeting will be necessary in June, however, for insufficient notice was given to French and Belgian bondholders.

Berlin (Germany) Elevated-Subway System.—The Berlin Elevated-Subway System (Berlin Hoch- und Untergrundbahn) in its annual report for 1914 presents an interesting table which shows the marked falling off each month in operating revenue and number of passengers carried after the mobilization in August, 1914. Owing to the great amount of traffic prior to the outbreak of the war, however, the total operating revenue for 1914 was 10,104,404 marks ($2,425,057) as compared to 9,383,248 marks ($2,241,989) in 1913. The total number of passengers carried in 1914 was 77,027,513 as compared to 71,525,370 in 1913. At the time of the mobilization the greater part of the employees were summoned to enlist, but it was possible to find enough substitutes to maintain operation for the decreased traffic. The average revenue per passenger in 1914 amounted to 13.12 pfennige, or 3.28 cents, as in the preceding year. The company operated in 1914 4,352,265 train-km. (2,704,497 train-miles) with six-car trains. It owned at the end of the year 400 cars, including 226 motor cars and 174 trailers. During the year the construction of a short connecting line from Gleisdreieck to the Wittenbergplatz was begun. When this connection is finished it will enable a through routing of the Schöneberger trains over the eastern lines. The company opened up three profitable auto-bus lines. These, however, were discontinued at the outbreak of the war when the buses were commandeered for the army.

Chambersburg & Gettysburg Electric Railway, Chambersburg, Pa.—H. B. McNulty, Chambersburg, Pa., is reported to have secured options on a number of public service properties in Waynesboro, Chambersburg, Shippensburg and Greencastle in the interest of a syndicate which it is said contemplates merging the properties. Among the companies mentioned as being included in the proposal are the Shippensburg Gas & Electric Company, Chambersburg Gas Company, Chambersburg & Gettysburg Electric Railway, Chambersburg & Shippensburg Railway, Chambersburg, Greencastle & Waynesboro Street Railway, Greencastle Electric Company, Waynesboro Electric Company, Waynesboro Gas Company, and Mercersburg Turnpike Company.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Ohio Public Utilities Commission recently authorized the Columbus Railway, Power & Light Company to issue $1,739,000 of first refunding and extension sinking fund mortgage 5 per cent bonds at not less than 80, but refused to permit their hypothecation for less than 80 pending their sale. The company asked to issue $1,800,000 of bonds and to use them as collateral at 66 2/3. The proceeds of $1,189,000 of bonds are to be used in payment for additions, extensions and improvements made between Nov. 1, 1913, and March 31, 1915, which cost $951,244. The proceeds of $300,000 are to be used to enlarge the working capital, and of the remaining $250,000, to pay part of the cost of the company's improvement programme for 1915. The statement of the company filed with the commission showed that $431,220 had been authorized for this purpose.

Denver (Col.) City Tramways.—Commissioner of Finance Clair J. Pitcher filed suit in the District Court on May 24, asking that a receiver be appointed for the Denver City Tramways. The action does not arise from any financial trouble, but from the dispute incidentally over the payment of taxes and fundamentally over the question of jurisdiction between the city and the State. The utility valuation and tax levies were made by the city authorities and they refused to recognize the authority of the State taxing board in revising them. The utilities went into court on the question of jurisdiction and the Denver Gas & Electric Light Company made tender, under protest, of its taxes. This the city refused to accept and the entire matter is now being threshed out in the courts.

Dominion Traction & Lighting Company, Ltd., Windsor, Ont.—The Canadian Dominion Traction & Lighting Company recently filed a certificate showing a decrease in common stock from $10,000,000 to $8,000,000. The authorized issue remains $2,500,000. This company controls the Windsor, Essex & Lake Shore Rapid Railway.

East St. Louis & Suburban Company, East St. Louis, Ill.—Whitaker & Company, St. Louis, Mo., are offering $20,000 of 5 per cent first mortgage bonds of the East St. Louis & Suburban Company, due on April 1, 1932, at a price to yield 6 per cent.

Idaho Railway, Light & Power Company, Boise, Idaho.—Special Master Markus will sell at public auction to the highest bidder on June 14, in conformity with the decree of the United States District Court, the property of the Idaho Railway, Light & Power Company. The court has fixed the minimum upset price at $4,542,750, and the master will receive no bid unless accompanied by a certified check for $50,000.

Massachusetts Electric Companies, Boston, Mass.—The Massachusetts Electric Companies has passed the semi-annual dividend of 2 per cent on its preferred stock, due under normal conditions in July.

National Properties Company, New York, N. Y.—The National Properties Company has taken over the management of the Jersey Central Traction Company, which was recently purchased by Laird Brothers, Wilmington, Del., as noted in the ELECTRIC RAILWAY JOURNAL of April 30. The property was formerly owned by Morris Brothers & Company, Philadelphia.

New York (N. Y.) Railways.—The United States Supreme Court recently denied the petition of the city for a writ of certiorari to review lower decisions which had confirmed a report by the special master denying preference to claims against the Metropolitan Street Railway and the New York City Railway for money spent in paving between car tracks and 2 ft. outside. The court also refused to review decisions granting the tort creditors' committee equal treatment with the railways' supply houses.

New York Central & Hudson River Railroad, New York, N. Y.—During the calendar year 1914 the New York Central & Hudson River Railroad expended $116,128 for the electrification of its lines from Mott Haven to Croton. It also expended $1,444,832 for the four-tracking and the electrification of the New York & Harlem Railroad from New York to North White Plains, and for other general improvements. Six electric locomotives were put in service, costing $454,675. The company now has sixty-three electric locomotives, 174 electric motor passenger coaches, twelve electric motor combination passenger cars and six electric motor mail, express and baggage cars. Under a consolidation agreement ratified on Dec. 22, 1914, this company with others is now included in a new corporation, the New York Central Railroad.

Ohio Traction Company, Cincinnati, Ohio.—The Ohio Supreme Court in a recent decision reversing a lower court held that the Ohio Traction Company is not liable for an excise tax of 1.2 per cent on earnings from securities of subsidiary companies, this tax under the original act applying only to earnings from operation. Under the amended act of 1911, however, the company is liable for a tax upon earnings from other sources than investments, such as building rentals.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company on May 22 paid off in cash $1,500,000 of its 5 per cent. one-year notes not due until Dec. 15. This clears up the entire floating debt. The original issue of the notes amounted to $4,000,000, two previous payments having been made in March and April. An official states that the early payment of notes has been due to the steadily strengthening financial position of the company. Its gross income has grown from $11,342,140 in 1907 to $17,220,504 in 1914, an increase of $5,878,364 or about 52 per cent, and the net income has gained correspondingly. One unique feature is that the company, notwithstanding its size, is the owner in absolute fee of all the properties it operates.

Portland Railway, Light & Power Company, Portland, Ore.—The stockholders of the Portland Railway, Light & Power Company on May 14 voted to put into operation the capital readjustment described in the ELECTRIC RAILWAY JOURNAL of May 1. The $1,250,000 of cash to be raised thereby will be used for current needs.

San Diego (Cal.) Electric Railway.—The California Railroad Commission finds that the reproduction cost of the operative property of the San Diego Electric Railway, as of June 30, 1914, is $4,736,149, and that the reproduction cost less depreciation, as of the same date, amounts to $4,481,160.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Interest due on May 19 on $1,587,000 of general consolidated mortgage 5 per cent bonds of the San Francisco, Oakland & San José Consolidated Railway was paid at maturity. John S. Drum, secretary of the F. M. Smith advisory committee, states that the complete financial reorganization of the railways is believed to be necessary. All the engineering and accounting data and other information necessary have been collected, but no plan will be determined upon until the California Railroad Commission acts on the company's application for an authorized valuation. When this valuation is received, a reorganization committee will begin work at once. Inasmuch as all the preliminary valuations give a sum in excess of the note and bond issues at par, bondholders are advised not to dispose of their securities at the present market prices. Under a recent decision the California Railroad Commission has authorized the San Francisco-Oakland Terminal Railways to execute a 6 per cent promissory note of $27.000, payable to the Central National Bank, Oakland. This note represents the balance due on a note of $65 000 made by the Oakland Traction Company on March 21, 1912.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—Ernest Gonzenbach has been appointed receiver for both the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad. These two companies are financially distinct organizations but are operated under one management. The former operates from Syracuse to South Bay and Oneida Lake, with a double-track line and very heavy construction. It has $300,000 of preferred stock and $700,000 of common stock and a total bonded indebtedness of $550,000. The latter is a separate five-mile branch running as far as Brewerton, although it was originally intended to operate as far as Watertown and the Thousand Island resorts. This company has $40,000 of capital stock and a first mortgage bond issue of $200,000. The plan of reorganization contemplates a consolidation of these properties and the issuance of new preferred and common stock and a first mortgage of $375,000 covering the two properties. The majority of present security holders have agreed to the plan and deposited their securities. A reorganization committee has been appointed, consisting of W. L. Smith and William Nottingham, Syracuse, and F. W. Roebling, Jr., Trenton. E. I. Edgcomb, Syracuse, and W. O. Morgan, New York, have been designated as the attorneys for the committee.

DIVIDENDS DECLARED

Baton Rouge (La.) Electric Company, 3 per cent, preferred.

El Paso (Tex.) Electric Company, quarterly, 2¼ per cent, common.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

Northern Ohio Traction & Light Company, quarterly, 1¼ per cent, common.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
ATLANTIC SHORE RAILWAY, KENNEBUNK, MAINE					
1m., Apr., '15	$23,855	*$23,303	$552	......	......
1 " " '14	25,154	*22,469	2,685	......	......
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., Mar., '15	$7,006	*$6,854	$153	$1,136	†$984
1 " " '14	6,880	*7,549	†669	1,074	†1,743
12 " " '15	122,453	*101,311	21,141	13,345	7,796
12 " " '14	121,671	*99,787	21,884	12,972	8,912
CAPE BRETON (N. S.) ELECTRIC COMPANY, LTD.					
1m., Mar., '15	$23,496	*$15,666	$7,830	$6,543	$1,287
1 " " '14	26,551	*16,358	10,193	6,439	2,753
12 " " '15	344,249	*209,008	135,240	78,123	57,117
12 " " '14	376,509	*209,840	166,669	74,215	92,454
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Mar., '15	$55,583	*$26,186	$29,397	$28,791	$606
1 " " '14	53,465	*24,702	28,763	24,814	3,949
12 " " '15	690,773	*307,168	383,605	336,079	47,527
12 " " '14	628,005	*285,033	342,973	287,775	‡69,680
DALLAS (TEX.) ELECTRIC COMPANY					
1m., Mar., '15	$144,816	*$89,420	$55,396	$33,429	$21,967
1 " " '14	188,287	*117,778	70,510	26,867	43,643
12 " " '15	2,110,020	*1,204,412	905,608	390,934	514,674
12 " " '14	2,257,058	*1,332,209	924,849	309,363	615,486
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Mar., '15	$52,189	*$31,983	$20,206	$8,772	$11,434
1 " " '14	51,191	*32,527	18,684	8,250	10,414
12 " " '15	670,976	*391,986	278,990	103,352	175,638
12 " " '14	516,014	*327,655	188,359	84,763	‡135,132
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.					
1m., Mar., '15	$198,612	*$120,944	$77,668	$64,663	$13,005
1 " " '14	227,929	*142,438	85,491	56,255	29,236
12 " " '15	2,522,109	*1,543,449	1,008,660	732,515	276,145
12 " " '14	2,736,341	*1,675,519	1,060,822	600,227	460,595
FT. WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.					
1m., Mar., '15	$138,953	$80,696	$58,257	$54,527	‡$4,139
1 " ' '14	149,452	88,655	60,797	52,369	‡8,557
3 " " '15	430,341	243,765	186,576	160,613	‡26,999
3 " " '14	460,431	260,539	199,892	152,862	‡47,825
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., Mar., '15	$58,708	$33,184	$25,524	$19,725	‡$9,566
1 " " '14	58,527	33,193	25,334	20,731	‡8,890
9 " " '15	608,579	325,154	283,425	177,995	‡129,498
9 " " '14	576,632	303,249	273,383	184,143	‡112,329
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.					
1m., Mar., '15	$128,701	*$85,327	$43,374	$27,254	$16,120
1 " " '14	177,956	*101,663	76,293	25,883	50,410
12 " " '15	1,958,748	*1,096,333	862,415	323,776	538,639
12 " " '14	2,152,499	*1,200,752	951,747	287,928	663,819
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., Mar., '15	$615,210	*$401,582	$213,628	$181,241	$32,387
1 " " '14	713,650	*436,860	276,790	175,251	101,539
12 " " '15	8,169,612	*4,938,420	3,231,192	2,135,049	1,096,143
12 " ' '14	8,713,435	*5,015,023	3,698,411	2,084,765	1,613,646
TAMPA (FLA.) ELECTRIC COMPANY					
1m., Mar., '15	$82,268	*$42,007	$40,261	$4,376	$35,885
1 " " '14	79,143	*43,960	35,183	4,514	30,669
12 " " '15	991,860	*512,744	479,116	53,066	426,050
12 " " '14	888,407	*494,377	394,039	55,948	338,081
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Apr., '15	$762,240	$490,149	$272,090	$132,666	‡$141,613
1 " " '14	743,327	464,391	278,936	129,397	‡149,790
4 " " '15	3,031,992	2,045,274	986,717	531,065	‡466,007
4 " " '14	2,916,747	1,916,468	1,000,278	517,204	‡486,932
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., Mar., '15	$399,491	$202,889	$196,602	$138,038	‡$65,021
1 " " '14	415,399	196,787	218,612	134,542	‡89,666
9 " " '15	3,860,783	1,858,866	2,001,917	1,225,584	‡836,154
9 " " '14	3,863,509	1,855,977	2,007,533	1,208,990	‡863,061

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

New York State Bill Signed—Jitney Made a Commission Issue in Illinois

In the jitney news this week the action of Governor Whitman of New York in signing the jitney bill stands out among the other events like Mars at perihelium. This measure, the provisions of which had been referred to previously in the ELECTRIC RAILWAY JOURNAL, provides in brief that no vehicles charging a fare of less than 15 cents shall be operated in any city until the owner has procured, after public notice and a hearing, the consent of the local authorities as defined by the railroad law and has executed and delivered a bond in an amount fixed by the local authorities. In short, the new law merely carries out the basic idea of the public service commissions law that while public utilities are regulated they will also be protected from improper competition.

In Pennsylvania the bill vesting the local authorities with the right to regulate jitneys in their particular districts has passed both Houses of the Legislature. It is regarded as likely that the Governor will sign the measure. The jitney bus regulation bill which was killed in Massachusetts, as noted last week, was originally introduced by the Massachusetts Street Railway Association and provided for heavy bonding and responsibility for accidents, besides placing the jitneys under the regulation of the Public Service Commission. It was later amended to permit local municipal authorities to license the jitneys and regulate the traffic. The opinion of the Attorney-General relative to the constitutionality of the bill being adverse, the House refused to put the measure through.

In Illinois the jitney has also, in a measure, been made a State issue. There the Jacksonville Railway & Light Company has carried its case against the jitney to the State Public Service Commission, which body has been asked to decide whether the jitney is a public utility. The hearing in this case will be held before the commission at Springfield on June 2. In Pennsylvania the members of the commission have refused to discuss the matter on account of the pending case from Tarentum. While the original Pennsylvania act did not contemplate the regulation of the jitneys, it is held by lawyers that if the commission so desired, it could regulate the business either under "common carrier" or "personal" clauses of the law. So far the only official notice that the Pennsylvania commission has taken of the jitneys is in granting certificates of public convenience to companies which applied for charters.

In Vancouver, B. C., a jitney bus ordinance has been passed to go into effect on June 1. Change making or fare collecting while the jitney is in motion is prohibited. Jitneys may not stop for taking on or letting off passengers except within 2 ft. of the curb and not nearer than 30 ft. from a street corner. A bond approved by the city must be filed with the City Council.

In the City of Portland, Ore., Commissioner Daly has requested City Attorney Lathrop to prepare a new ordinance to regulate the jitneys. The measure, which will embody all of the essentials of the ordinance passed on April 2, and held up by the referendum invoked by the jitney drivers, will be submitted to the voters at the June election. The course proposed is the only way to get the jitney question before the voters at the election next month, as the referendum invoked on the other measures holds the question up for two years.

Among additional cities in which the jitneys has gone out of business recently are Pueblo, Col., and Little Rock, Ark. The Pueblo *Chieftain* says that "the cars quit because there was not any money in the business." In an editorial that paper said in part: "Novelty had a good deal to do with the early success of the jitneys, and if they did not continue to get the patronage necessary to make them a success it was because they failed, in important ways, to meet the requirements for a successful city system of transportation." The drivers of more than forty jitneys, constituting virtually the sole motor transportation in Little Rock, suspended on May 13 following an order of the chief of police requiring that the operators of all cars not operating under a bond of $2,000 as fixed in the recent city ordinance be arrested.

In New Orleans the jitney owners have been notified that they will have until June 1 to file the bonds of $5,000 for each car operated as provided in the ordinance enacted recently. This measure, so drawn as not to be discriminatory, will be complied with by the New Orleans Railway & Light Company filing with the city a bond of $2,500,000 to cover 500 of its cars.

The revelations in St. Louis referred to in the ELECTRIC RAILWAY JOURNAL of May 22 are regarded as being largely responsible for the introduction of a regulatory measure in the Board of Aldermen of that city. This measure was presented by Alderman Koenig and should not be confused with the one upon which Director of Public Safety Talbert is understood to be at work. The Koenig measure fixes the bond at $10,000. The license fee is placed at $25 a year for a car carrying five passengers or less, $35 a year for a car carrying six or seven passengers, and at $5 a seat a year for cars carrying more than seven passengers. Cars must operate over a fixed route on a definite schedule. Penalties are fixed for violations of the provisions of the measure. The Team Owners Association of St. Louis is distributing a double page folder 8 in. wide by 12 in. high containing head lines from the local papers dealing principally with jitney accidents. The circular is headed: "The Irresponsible Jitney. The Irresponsible Driver." The sub-heads follow: "Auto Accidents Have Increased 72 per Cent Since the Auto-Bus Started," "Extortion, 'Mashing' and Assault Show the Need of Its Regulation."

The first trial on a charge of violating the provisions of the new Fort Worth jitney regulation ordinance resulted in a conviction in the Corporation Court of Fort Worth. The case was against R. L. Moore, who was charged with operating a jitney without a license. Mr. Moore's defence was that he did not operate a jitney bus. He had a contribution box in his automobile into which passengers could deposit any amount they desired, and he introduced witnesses who testified that they rode in his automobile several times but did not contribute anything. Mr. Moore immediately appealed the case to the County Court. He has since been arrested again on the same charge. Twenty-two other cases have not yet come to trial.

Application was recently filed with the City Commission of Fort Worth by the jitney union asking for a referendum election on the jitney ordinance. No action was taken and application was then made for a mandamus to compel the commission to order the referendum election. The city officials were cited to appear in court to show cause why the mandamus should not be issued. They advanced the argument that the ordinance in question was passed under the police power of the commission and was an emergency measure designed for the immediate preservation of the public peace, health and safety and was not subject to the referendum provision of the charter. The court took the matter under advisement.

ALBANY SERVICE HEARING

Before the Public Service Commission for the Second District of New York on May 25 the officers of the United Traction Company and the Delaware & Hudson Company began their argument to prove that the company is financially unable to carry out the provisions of the commission's recent order with regard to the purchase of new cars now and in the future. Due to the illness of W. H. Williams, vice-president of both companies and the man most familiar with their financial situation, it was necessary to adjourn the hearing after he had been on the stand but a short time. The matter will be further taken up on June 7 at noon.

Before the hearing was adjourned, however, Chairman Van Santvoord of the commission announced that the commission would order the immediate preparation of transfers to be used by passengers boarding the Schenectady cars eastbound within the city line of Albany. The company agreed to accept this order. C. F. Hewitt, general manager, announced that the transfers would be ordered immediately and that he would put them in service on or before June 25. Attorney Lewis E. Carr made it plain that the company in doing this did not agree to the principle of giving transfers to all passengers coming into Albany on the Schenectady cars. This is the subject of a separate proceeding now before the commission.

The company opened its case with a general discussion of the financial situation by L. F. Loree. Mr. Loree described the difficulty of obtaining funds at this time for even prosperous enterprises due to the European conflict and told of the increased rates which all borrowers were compelled to pay. Taking up the effect of the war upon the purchase of new cars Mr. Williams told the commission that it made the borrowing of money more difficult and that it reduced earnings. The reduction of revenues so far this year was such as to enforce the belief that the company would not be able to meet fixed charges at present carried. While taxes had increased 134 per cent on the United Traction properties since 1906, the increase in revenues had been only 25 per cent. Mr. Williams said that he could not at present make such a loan as the purchase of the new cars would require with any reasonable expectation of meeting the additional fixed charges which it would entail. Up to last year such charges might have been taken care of out of money paid in dividends. That was no longer possible. Mr. Williams submitted figures to show the falling off in revenue for the first four months of this year as compared with the same months of 1914. For the first twenty-one days in May, Mr. Williams testified that the receipts on the Albany division had been $5,138 less than last year and $5,707 less on the Troy division. This is a total falling off for the system of $10,844 for these twenty-one days.

PUBLICITY IN FORT WORTH

Jitney Seized as an Opportunity to Establish Better Public Relations

The Northern Texas Traction Company, Fort Worth, Texas, has completed the publication over the signature of George H. Clifford, manager, of a set of fourteen advertisements dealing with the company, its progress and its future, which attracted unusual attention. The ads were all published under the main caption, "To the People of Ft. Worth." Sub-captions were not used in all cases. Those that were used follow: "Urban Transportation and City Building," "Electrifying Street Railways," "The Making of a Modern City," "Jitneys and Interurbans," "What the Jitneys Are Doing," "Pulling Down the Temple," "Who Gets the Profits?" "Is Sympathy Being Misplaced?" "Are We Playing the Iconoclast?" "Street Congestion and Accidents," "A Sense of Responsibility," "Traction Company as a Monopoly," "A Word in Summing Up."

The Northern Texas Traction Company was one of the few companies that seized upon the jitney as a means to establish better public relations. In the advertisements referred to it told its story and told it frankly. The case of the company, well put, was received by the public cordially. There was no adverse comment whatever. In fact, many citizens wrote, telephoned or called upon the company to ask how they could help. It is proposed now to bind the ads for general distribution.

In its initial advertisement the company stated its purpose as follows: "The Northern Texas Traction Company is, from day to day, going to lay the facts of the case before those people whose destiny is linked with its destiny, and leave it to them to determine if they want to destroy or seriously impair this agency which is essential to the physical development, prosperity, and growth of the city." In concluding the series the company said in part:

"The cry of the jitney that if it is compelled to perform the proper functions of a common carrier it will be forced out of business, is an admission of the charge we have proved that it is absolutely incapable of performing those functions. If it could take the place of the traction company, and survive, it would do so. If it cannot carry its share of burdens and responsibility to the citizenship, why should it be tolerated, and permitted to destroy an agency which meets all its obligations, and is an aid in city building?

"If the jitney could care for all the people all the time, meet all the requirements of a transportation company, and aid in the upbuilding of the city, the traction company would not lift a hand to hinder.

"But the Northern Texas Traction Company does not believe it would be a good citizen of this town if it did not place its knowledge of this situation before the people, or ask them to decide if they want to destroy it, and depend upon a nondescript lot of irresponsible automobiles which have neither the capacity nor the stability to perform the functions which are necessary to the future development of the city.

"Confession that the jitneys cannot discharge these obligations is also confession that they are incapable of rendering the service necessary. Yet serious injury is being done to the traction company by numerous operators entering the service only to find they cannot make a profit. Others are permitted to engage in the business only to meet the same fate. Will this condition be permitted to exist and thereby destroy one of Fort Worth's best citizens?

"In our series of articles we have met this issue fairly, frankly, fearlessly and truthfully in an appeal for fair play and in defense of any reduction or crippling of our service, which will of necessity result if present conditions continue.

"We therefore rest our case and await your decision."

One-Man Cars in Tucson.—The Corporation Commission of Arizona has sanctioned the use of one-man cars on the lines of the Tucson Rapid Transit Company.

Memphis Transfer Case.—The Court of Civil Appeals of Tennessee held recently that the Memphis Street Railway was not obliged to issue transfers upon its tickets sold at the rate of eleven for 50 cents. The city has taken an appeal to the State Supreme Court.

Wilkes-Barre Wage Testimony All In.—Testimony in the wage dispute between the officials and employees of the Wilkes-Barre (Pa.) Railway, being heard before a board of three arbitrators, has been brought to a close and the arbitrators fixed June 19 as a date for final argument. The board ruled, however, that written testimony may be submitted to the arbitrators at any time up to June 19.

Experiment in Albany with Stepless Car.—The United Traction Company, Albany, N. Y., will place in service on its Albany lines a low-level, stepless car for the purpose of ascertaining its general fitness for operation under the severe service conditions existing in that city. The car is one borrowed by the company from the Third Avenue Railway, New York. The well-known "pay-within" features, and the latest type of motors, trucks and other details of equipment are embodied in its construction.

Cedar Valley Road Time-Table.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., known as the Cedar Valley Road, has issued a very attractive time-table in booklet form 3¼ in. wide by 5½ in. high. In addition to the time-tables, there is at the top of practically every page a halftone reproduction of the equipment of the company or some point of interest along the line concerned with the company's business. A double page map, 6 in. wide by 5 in. high, shows the route of the road and all the connecting lines.

For Editors of Company Publications.—Under "Carried Out Orders," Edward K. Lynch has the following in his column in the May issue of the *New York Railways Employees' Magazine*, edited by H. P. Waugh: "Mr. Waugh, the editor of the *Magazine*, wheeled his chair around and pushed a button on his desk. The person wanted entered. 'Here,' said Editor Waugh, 'are a number of directions from outsiders as to the best way to run the *Magazine*. See that they are all carried out.' And the office boy, gathering them all into a large waste basket, did so."

New Brooklyn Advertising Company.—The Brooklyn (N. Y.) Rapid Transit Company has organized and started in operation the company through which it will handle all its car advertising, news-stands and other privileges under the name of the Broadway Subway & Home Borough Car Advertising Company, Inc. The new company's office will be at No. 31 Nassau Street, New York. The chairman of the board is Nicholas F. Brady, the president Joseph P. Day and the secretary Lewis C. Sanford. The company, instead of leasing all its news-stands to one large corporation, intends to conduct the stands itself.

New York Health Board Rebuffed.—Theodore P. Shonts, president of the New York (N. Y.) Railway, has declined to accept the request of Dr. S. S. Goldwater, health commissioner of New York, asking the company to consent to the department taking charge of the dispatching of the cars on the Sixth Avenue line. Mr. Shonts says that it is difficult for him to imagine that any railroad would turn over the management of its property, even temporarily, to any person who could not assume the responsibility that goes with railroad operation. Dr. Goldwater thinks that Mr. Shonts missed an opportunity which he may never have again.

The Augusta-Aiken Fare Increase.—The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has filed notice with the Railroad Commission of South Carolina that it will put into effect on June 1 the advance in fares authorized by the commission last December. Commutation rates remain unchanged, but the single fare from Augusta to Aiken will be 40 cents instead of 25 cents; to Belvedere, 10 cents instead of 5 cents, as at present; to North Augusta, though, the fare will remain the same, 5 cents. The company is preparing to meet the suggestions of the commission with respect to separate compartments for whites and for blacks and relating to the providing of toilet facilities on the interurban cars.

The Queens County Service Case.—The New York & Queens County Railway, Long Island City, N. Y., has notified the Public Service Commission for the First District that it cannot accept the order of the commission, adopted after rehearing, requiring certain additions to the service of the company. The company's letter states that it would have to purchase forty-three or fifty-five additional cars and increase its power plant at a large expenditure in order to carry out the terms of the order. The company says that it is not in financial condition to bear this expense, and therefore asks for a rehearing. The commission decided to give the company an opportunity to present evidence as to its financial condition at a hearing which was set to be held on May 27.

The Cheapest Car Ride in the World.—Electric railways concerned about low fares may find comfort in the plight of the El Paso (Tex.) Electric Railway, which operates one of its lines into Juarez, now dominated by the Villaistas. Real money in this part of Mexico has been replaced by a variety of "shinplasters" liberal in color and engraving, but worth just now about 4 cents on the dollar in Uncle Sam's specie. Unfortunately, the franchise of the El Paso Electric Railway calls for a fare of 10 cents Mexican. At the current rate of exchange, therefore, the Mexican passenger is enjoying his ride at 0.4 cent per trip. Tickets and Mexican fares are collected by means of registers, while a cash box handles all real money. Like the character in Ibsen's "Peer Gynt," there's nothing to do but wait hopefully for better days to come.

Houston Electric Advertising.—The Houston (Tex.) Electric Company is carrying in the daily papers of Houston a series of very effective advertisements designed to acquaint the public better with the work which the company has done in the interest of the city. In a recent advertisement headed "Pulling Down the Temple" the company stated frankly that the jitneys were handling one-third of the traffic in Houston, which meant a loss in revenue to the company of $30,000 a month. The company concluded the advertisement as follows: "The study of the jitney service has developed the opinion that it is the result of the lack of work. Perhaps it is true that men are willing to drive jitneys for what they can make to tide them over. If you look the facts squarely in the face, you need not be a prophet to read the future."

Detroit Freight Contract.—The Detroit (Mich.) United Railway freight department reports closing a contract to handle 18,000 tons of sand, gravel and cement from the Grand Trunk Railway System connection between Birmingham and Royal Oak, Mich., a distance of approximately 5 miles. This material will be set on team trucks and will be used in constructing good roads. The freight department of this road has also just closed a contract to transport 25,000 automobile touring bodies between Detroit and Flint, Mich. These shipments will include sedan and couplet bodies manufactured by the Fisher Body Company, Detroit, and will be delivered to the Buick Motor Car Company, at Flint, Mich. The total haul will be approximately 68 miles, and it will take four months to handle the 1050 cars required for this contract.

Retaliation at Increase in Fare.—The board of commissioners of Wayne County (Ind.) filed suit May 15 to enjoin the Terre Haute, Indianapolis & Eastern Traction Company from further use through Wayne County of the National Road as a right-of-way. The action is the outgrowth of the new passenger tariff schedule which went into effect on May 1, and which makes the uniform rate of 2 cents a mile in accordance with the State law, while the franchise under which the company operates in Wayne County sets the maximum at 1 2/3 cents. The company contends that a franchise provision as to the rate of fare is not binding in the face of the order of the Public Service Commission granting the increase. The county, it is stated, will admit this, but will contend that the section giving the company the free use of the National Road can be revoked under the terms of the franchise agreement as a result of the increased fare. In other words, the county takes the position that the company has the power to charge the increased rate, but that it cannot charge the increased rate and operate over the National Road. The county will insist that the company purchase its own right-of-way and remove its tracks from the highway.

Serious Steam-Electric Collision.—A Santa Fé Railroad locomotive crashed into a Pacific Electric Railway passenger coach on May 7 at the Aliso Street crossing in Los Angeles, Cal., completely wrecking the car, killing five passengers outright and injuring thirty others. At a meeting of the Los Angeles Board of Public Utilities, held to fix upon a means of preventing a recurrence of the tragedy, new regulations governing steam-electric crossings were adopted to go into effect at once. These provide that all street and interurban cars must come to a full stop at least 10 ft. from a railroad crossing and proceed only after receiving a clear signal from a human flagman at the crossing. If no flagman is stationed at the crossing, one of the train crew must go to the far side of crossing before signaling to go ahead. Railroad trains must not exceed 8 m.p.h. within the city over any interstate or interurban railroad crossing. All Pacific Electric cars are to have right-of-way over steam railroad trains at the San Pedro, Los Angeles & Salt Lake crossing on the east side of the river and at the Santa Fé Railroad crossing on the west side of the river, where the recent accident occurred. The City Council also adopted a measure providing for the construction of a viaduct in East Seventh Street over the railroad tracks, and the expense of which is to be borne jointly by the Santa Fé and the Salt Lake railroads and the Los Angeles Railway, with the property owners assessed their proportionate share of the expense, and the city and county aiding.

Peninsula Rate Decision.—The Railroad Commission of California has dismissed the complaint of the San Mateo County Development Association, the city of Palo Alto and the Palo Alto Chamber of Commerce against the Southern Pacific Company, in which request had been made that the commission reduce the peninsula rates. The San Mateo County Development Association asked for a reduction of the inter-station fares in San Mateo and Santa Clara Counties. The city of Palo Alto and the Palo Alto Chamber of Commerce asked for a reduction of the rates between San Francisco and Palo Alto. In its decision the commission held that the complaint that the existing rates were unreasonable, unjust and discriminatory had not been sustained. The decision states that recently a compromise was reached on these rates between the peninsula bodies and the Southern Pacific Company by which substantial reductions were made. The commission states that while the complaints under consideration are not directed primarily at these compromise rates, they are directed against inter-station rates, and if these inter-station rates are reduced, the effect will necessarily be another general reduction in the peninsula rates. The commission points out that the reductions heretofore made in the peninsula rates for individual monthly commutation service have been of substantial benefit to the peninsula communities. The opinion discussed at length the various rate schedules about the bay. The commission held that the rates charged for the electric suburban service in Alameda County do not form a proper basis of comparison for the steam service under the conditions pertaining on the San Francisco peninsula.

Personal Mention

Mr. H. C. Couch, president of the Arkansas Light & Power Company, Arkadelphia, Ark., has been elected president of the Arkansas Association of Public Utility Operators.

Mr. Wallace E. Higgins has resigned as vice-president and general manager of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to take up other business. Mr. Higgins has been connected with the company since its organization in 1903.

Mr. A. J. Purinton has resigned as general superintendent of the East St. Louis & Suburban Railway, East St. Louis, Ill. Mr. Purinton was appointed to this position in July, 1912. He was formerly superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

Mr. John P. Garner, formerly connected with the United States Life Insurance Company, and at one time a manager for the Chicago Telephone Company, has been appointed commissioner of public service of Chicago by Mayor Thompson. Mr. Garner succeeds Mr. Montague Ferry, who was appointed by former Mayor Harrison as Chicago's first commissioner of public service.

Mr. Thomas Hilliard, St. Catharines, Ont., has been appointed secretary of the Canadian government purchasing commission. He is of English birth, is an electrical engineer, and was technical sales manager for a number of years for the Canadian General Electric Company and later for the Canadian Crocker-Wheeler Company. The Canadian government purchasing commission will have charge of all the purchases of material for use in the war. It has established quarters in the Booth Building, Ottawa.

Mr. P. J. Murphy has been elected vice-president and general manager of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to succeed Mr. W. E. Higgins, resigned. Mr. Murphy was born in White Haven, Pa., and prepared for college at Harry Hillman Academy . In 1898 he was graduated from Lafayette College with the degree of electrical engineer. Since that time he has been employed by the General Electric Company, the International Traction Company, Buffalo, N. Y., and for the past ten years he has been engaged in important engineering and operating work for Ford, Bacon & Davis, New York, N. Y.

Mr. Darwin P. Kingsley, president of the New York Life Insurance Company, has accepted the presidency of the Safety First Federation of America, and under the by-laws of the organization automatically becomes a member of the executive committee as well as the board of directors for the full term of three years. The federation, with headquarters in New York, was organized at a convention held two months ago, attended by delegates from fourteen States representing some of the most important cities in this country. All of the officers, with the exception of the president, were chosen at that time, the office of president being left open to be filled at a later date.

Mr. Ernest Gonzenbach, general manager of the Empire United Railways, Syracuse, N. Y., and associated lines, has been named as the receiver of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad. Included in this receivership are two subsidiary companies, the Oneida Lake Terminal Company, owning several hundred acres on the shores and two large islands on Oneida Lake, and the Sagamore Navigation Company, owning and operating a 600-passenger steamboat and a fleet of smaller launches. Mr. Gonzenbach has designated Mr. C. I. Craigmile to act as manager for the receiver, and Mr. E. I. Edgcomb to be attorney for the receiver.

Mr. S. C. Rogers, since 1911 secretary and treasurer of the Youngstown Dry Goods Company and before that treasurer of the Mahoning & Shenango Railway & Light Company, Youngstown, has been appointed assistant treasurer and auditor of the Empire United Railways, the Auburn & Syracuse Electric Railroad and associated lines at Syracuse, N. Y. Mr. Rogers entered upon his new duties on May 15, succeeding Mr. W. W. Foster, who resigned to become treasurer of the Buffalo, Lockport & Rochester Railway. Mr. Rogers was connected with the Mahoning & Shenango Railway & Light Company and its constituents for ten years. Before entering the field of public service accounting and finances he served nineteen years in New York and Chicago with J. M. Young & Company, importers of china, glass and fancy goods. During his connection with the Mahoning & Shenango Railway & Light Company, Mr. Rogers was active in the affairs of the American Electric Railway Accountant's Association and the Central Electric Accounting Conference, and in December, 1910, was elected president of the conference.

DAVID DALY

Mr. David Daly, the president-elect of the Southwestern Electrical & Gas Association, was born in Boston, Mass., on Oct. 16, 1878. He was educated in the public schools of that city and afterward entered Harvard. When he was twenty-two years old he entered the employ of the Stone & Webster Engineering Corporation, and after serving with that company in Boston in various capacities he was sent by Stone & Webster to Ponce, P. R., as local manager of the Ponce Railway & Light Company. Mr. Daly returned to the United States in May, 1905, and in August of that year he was appointed by Stone & Webster to manage the Houston (Tex.) Electric Company. Later, while retaining managership of the Houston Electric Company, Mr. Daly was also made manager of the Galveston-Houston Electric Railway.

OBITUARY

Rodney Curtis, the first president of the Denver (Col.) Tramway, is dead. In 1885 he with Messrs. Evans, Brown, Keener and others built the line on Fifteenth Street, Denver, which proved the nucleus of the present system. Mr. Curtis was regarded as one of Denver's first citizens.

J. Drew Allen, formerly associated with the Chicago sales office of the Pennsylvania Steel Company and later representing the Taylor-Wharton Steel Company in the Pacific Northwest, died from a compound fracture of the skull sustained while making an examination of rails for a local traction company in Salt Lake City, and died on May 16. He was about thirty-three years old and in his selling experience had made a specialty of street railway track work.

PRIZES FOR TRAFFIC RELIEF SUGGESTIONS AWARDED

About 200 designs were submitted at the recent competition conducted by the Municipal Art Society of New York for the best architectural solution of traffic congestion at the hypothetical intersection of an avenue and a street down which a street car line should run. The designs were judged by prominent officials of several different civic departments and societies of New York. The first prize, $300, was awarded to John S. Yewell, Peekskill, N. Y. Although the terms of the competition did not specify any particular location, many of the designs, including that of the winner, presupposed the intersection of Fifth Avenue and Forty-second Street. The winning design specified a double-ramp system for the street, one for automobiles and one for street cars, leading underneath the avenue. Most of the plans called for a bridging of the avenue over the car street rather than having the car line bridge the avenue. Several of the designs included an elaborate car waiting station beneath the avenue bridge. In some drawings the car tracks were rerouted around by a less congested street. The plans differed widely in the amount of adjoining property to be condemned in order to provide for the proper traffic relief system desired. No definite plans have yet been made as to whether any of these designs will be considered for actual installation anywhere.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Middletown & Chester Railway, Middletown, Conn.—Incorporated in Connecticut to build an electric railway between Middletown and Chester. Incorporators: Richard H. Bunce, Gustaf B. Carlson, Isaac Spear, Randolph S. Lyon, George Burnham, Eben Jackson, Dale D. Butler, Middletown, and Robert W. Perkins, Norwich. [Dec. 19, '14.]

FRANCHISES

New Britain, Conn.—The Connecticut Company will ask the Council for a franchise to extend its lines through Myrtle Street, Grove Street, Broad Street, Washington Street and Farmington Avenue as far as Commonwealth Avenue, New Britain.

Cedar Rapids, Iowa.—The Iowa Railway & Light Company has received a franchise from the Council to build two additional tracks on Fourth Avenue between Second Street and Third Street, Cedar Rapids.

Long Island City, N. Y.—The Manhattan & Queens Traction Corporation will ask the Council for a franchise to build a loop from Queens Boulevard along Van Dam Street to Review Avenue, along Review Avenue to Laurel Hill Boulevard, to Packard Street and back to Queens Boulevard, Long Island City.

Cleveland, Ohio.—The Cleveland Railway has asked the Council for a franchise to extend its West Twenty-fifth Street line southward on State Road through Brooklyn. The cost of constructing the extension is to be borne almost entirely by property owners along the route.

Lynchburg, Va.—The Lynchburg Traction & Light Company has asked the Council for a franchise to extend its line from the Fair Grounds to Fort Hill.

TRACK AND ROADWAY

***Ingleside & East Arkansas Railway, Ingleside, Ark.**—This company plans to build a line from Ingleside 25 miles east, via Fisher, to a point in Pointsett County. C. B. Richmond, St. Louis, Mo., is interested.

Northern Electric Railway, Chico, Cal.—Negotiations are pending between this company and the Oakland, Antioch & Eastern Railway for the construction of a branch line from Suisun to the main line of the Oakland, Antioch & Eastern Railway at a point directly opposite Suisun. This branch would give the Northern Electric Railway's Vacaville-Suisun branch direct connection with the Santa Fé Railroad via the Oakland, Antioch & Eastern Railway at Bay Point and with the Western Pacific Railway in Sacramento. The new line will be 7 miles long.

Sausalito (Cal.) Incline Street Railway.—Surveys have been made of this proposed electric-cable railway, right-of-way has been secured and engineering reports and estimates compiled. The right-of-way extends from Water Street, over Oak Lane and continues to the summit of the hill, a distance of 2900 ft. Allen H. Vance, president. [Feb. 25, '15.]

Meriden, New Britain & Hartford Railway, Hartford, Conn.—Work will be begun at once by this company on its line between Meriden and Hartford. Construction will be begun at the Meriden end of the line. From Meriden to New Britain the greater part of the route will be over private right-of-way. A large part of the material has already been ordered and will be delivered as soon as possible. The tracks will be rock-ballasted and will be of the most substantial character. It is expected that the line will be ready for operation throughout within two years. Mayor Daniel J. Donovan, Meriden, is interested. [March 27, '15.]

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company is building an extension of its Lansdowne Avenue line from Linden Avenue south to Lynch Avenue and thence on Twenty-fifth Street to Jones Park, St. Louis. Considerable track has been laid.

Iowa City-Muscatin Interurban Railway, Iowa City, Ia.—Surveys have been completed and the right-of-way almost entirely secured for this company's line between Iowa City, Muscatine and West Liberty. Subscriptions will be solicited to raise the $250,000 which must be subscribed before the building of the road is begun. A. D. Bowen, Muscatine, is interested. [April 24, '15.]

***Gretna, La.**—Edward L. Slattery and associates are planning to build a 2-mile electric railway from the ferry landing at Gretna to a point on the New Orleans Southern & Grand Isle Railway.

Bangor Railway & Electric Company, Bangor, Maine.—This company has notified the Mayor of its willingness to co-operate with the city of Bangor in improving the condition of the city streets by filling in the depressions between its tracks and repairing its tracks where necessary.

Springfield (Mass.) Street Railway.—This company is considering the petition of the Van Horn Citizens Club for an extension of its line from the corner of Chestnut Street and Carew Street, through Carew Street to connect with the present tracks on Page Boulevard.

Michigan United Traction Company, Jackson, Mich.—This company has placed in operation its extension from Kalamazoo to Grand Rapids.

Michigan Railway Company, Kalamazoo, Mich.—This company has contracted with the Michigan Railway & Engineering Company to build a 2½-mile cut-off from Yorkville on its Battle Creek-Allegan division to Gull Lake. This cut-off will take the place of a line running from Gull Lake Junction on the Michigan United Traction Company's line near Battle Creek to Gull Lake. The new line will be the same standard of construction as that adopted for the Kalamazoo-Grand Rapids line, namely, 2400-volt, third-rail.

Muskegon, Casnovia & Saginaw Interurban Railway, Muskegon, Mich.—Surveys have been made of this proposed line from Crystal Lake to Muskegon, 80 miles. C. S. Gamble, former city engineer, was in charge of the survey. [May 1, '15.]

Jackson Light & Traction Company, Jackson, Miss.—This company will begin at once rebuilding its tracks on Capitol Street, Jackson. The work will consist of the complete tearing up of both tracks, the laying of 6 in. of concrete under the ties and paving with wood blocks.

Metropolitan Street Railway, Kansas City, Mo.—This company will begin at once the reconstruction of its track on Holmes Street between Twenty-third Street and Thirty-first Street and on Brooklyn Avenue between the Belt Line and Thirty-first Street, Kansas City.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—This company, which is planning to build a line from Lakewood to Point Pleasant, has asked the Board of Public Utility Commissioners of New Jersey for permission to issue $520,000 of securities, comprising $200,000 in stock and $320,000 in bonds. It is stated that residents along the right-of-way of the proposed road have engaged to take all of the securities. George O. Vanderbilt, Trenton, is interested. [Jan. 2, '15.]

Binghamton (N. Y.) Railway Company.—This company is extending its line to Johnson Field, Binghamton.

Brooklyn, N. Y.—Bids are desired until June 15 by the Public Service Commission for the First District of New York, for constructing Section No. 1 of Route No. 29, being part of the Eastern Parkway subway (Nostrand Avenue branch), Brooklyn, beginning at a point under Eastern Parkway about 192 ft. west of Nostrand Avenue, extending under Eastern Parkway and Nostrand Avenue to a point about 220 ft. south of Church Avenue. Plans and specifications can be obtained at the office of the Public Service Commission.

Brooklyn, N. Y.—The Public Service Commission for the First District of New York has directed its chief engineer to prepare plans for the construction of the Utica Avenue subway in Brooklyn. This subway will be a branch of the Eastern Parkway subway, which will be operated by the Interborough Rapid Transit Company. It will be a two-track underground railroad, extending from Eastern Parkway down Utica Avenue to Flatbush Avenue. The Utica Avenue route was not included in the dual system contracts and the city has not appropriated money for its construction. Property owners in the vicinity have petitioned the commission to have it built upon the assessment plan, the cost to be assessed against the property benefited. This method of construction is permitted by the rapid transit act but has never before been used.

Brooklyn, N. Y.—Bids will be received until June 11 by the Public Service Commission for the First District of New York for the supply of 5,000,000 lb. of steel rails and corresponding quantities of ties, spikes and other material needed for track construction on the New Utrecht Avenue elevated railway in Brooklyn, a branch of the Fourth Avenue subway.

New York, N. Y.—A new route for a connection between the Bronx Park branch of the existing subway at Simpson Street and the proposed Pelham Bay Park branch of the Lexington Avenue subway in the Bronx has been adopted by the Public Service Commission for the First District of New York, and sent to the Board of Estimate. The commission advised the board that the necessary money for the construction of the said connection should not be deducted from the existing funds appropriated to carry out the construction provisions of the dual system contract, and that if the connection is built it will be necessary for the Board of Estimate and Apportionment to appropriate additional money. Residents of the eastern part of the Bronx have been urging the construction of this connection for some time. The new route provides for an elevated railroad running through Westchester Avenue so as to join the two lines.

Port Jervis (N. Y.) Traction Company.—Plans are being made by this company to extend its line to Milford, Pa.

New York State Railways, Syracuse, N. Y.—In connection with repaving work being done this company is relaying its track for 2¼ miles on East Genesee Street, Syracuse. It is estimated that the work will cost about $75,000.

Durham (N. C.) Traction Company.—Grading has been begun and track will be laid at once by this company on its 2-mile extension in Durham.

North Carolina Traction Company, Winston-Salem, N. C.—Specifications will be ready about June 15 and contracts will be let during the summer or autumn for this company's proposed line from Winston-Salem, N. C., north, through Forsyth and Stokes Counties, Va., to Christiansburg. The northern terminus will connect with the main lines of the Virginian Railway and Norfolk & Western Railway, and the southern terminus will connect with the Norfolk & Western Railway, Atlantic Coast Line and Southern Railway. Two bridges will be built, one 300 ft. long and the other 150 ft. long. Benjamin D. Hammond, P. O. Box 21, Station A, Boston, Mass., general manager.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—This company has placed in operation its extension from Chauncey to Athens.

Brantford (Ont.) Municipal Railway.—Work has been begun by this company rebuilding and extending its track in Brantford.

Toronto (Ont.) Railway.—This company has begun the work of laying tracks on Ossington Avenue, north of Bloor Street, Toronto, for the extension which has been ordered by the Ontario Railway Board.

Willamette Valley Southern Electric Railway, Portland, Ore.—Plans are being made by this company to build an extension of its line from Mount Angel to Salem.

Phoenixville, Valley Forge & Strafford Electric Railway, Phoenixville, Pa.—This company's line through Phoenixville has been completed.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—Surveys have been made of this company's proposed extension from Koppel to New Galilee. With the exception of one, all rights for the new line have been secured. The line will connect with the Pittsburgh, Lisbon & Western Railroad, a steam road extending from New Galilee through Darlington to Lisbon, Ohio, which will be purchased by the Pittsburgh, Harmony, Butler & New Castle Railway and converted into an electric line.

Scranton & Binghamton Traction Company, Scranton, Pa.—About 80 per cent of the grading has been completed on this company's line between Nicholson and Montrose. Poles are being erected and wires strung along the route and the work of laying track is being pushed with the expectation that the line will be completed to Montrose early in the fall. It is the plan of the company to finish the connection from Montrose to Binghamton next year, when there will be through trolley service between Scranton and Binghamton.

***Bristol, Tenn.**—Surveys have been completed through East Tennessee and contracts are being awarded for the construction of an electric railway from Kingsport to Newport. Surveys are also being made for an extension of the line to Bristol to connect with the Norfolk & Bristol Railway. LeRoy Park, Bristol, is among those interested.

Beaumont, Liberty & Houston Traction Company, Houston, Tex.—The holdings of this company have been taken over by Franklin Watson and W. N. Vinton, Columbus, Ohio, who will form a construction company for the purpose of starting work on the project. Application for a charter will be made at once and the company organized with a capital stock of $300,000. Edward Kennedy, who has promoted the enterprise, will not be identified with the new company. J. H. McCracken, Houston, general manager. [April 17, '15.]

Houston, Richmond & Western Traction Company, Houston, Tex.—Two routes are being discussed for this proposed railway, one being via Eagle Lake, Columbus, Flatonia and Seguin, and the other via Wharton and Yoakum. Houston will be the eastern terminus and San Antonio will be the western terminus. Construction will be begun as soon as the route is finally determined upon and right-of-way secured. E. Kennedy, Houston, is interested. [May 15, '15.]

Abilene Gas & Electric Company, Abilene, Tex.—Plans are being made by this company to extend its lines to Clyde, Putnam, Baird, Cisco and possibly other towns east of Abilene. The new section will be a high-tension line 48 miles long, extending eastward from Abilene in the general direction of the Texas & Pacific Railway, paralleling that road wherever possible.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—This company has been organized and the following officers elected: Edward Brast, president; W. W. Jackson, vice-president; M. G. Ambler, secretary, and Ben T. Neal, Jr., treasurer. [May 8, '15.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—Surveys have been made of this company's proposed extension in Merton and it is expected that construction will be begun by July 1.

SHOPS AND BUILDINGS

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Bids are being asked by this company for the erection of a 60-ft. addition to its office building at Delaware Avenue and du Pont Street, Wilmington. The north wall of the building is to be removed.

Boston & Worcester Street Railway, Boston, Mass.—Plans are being made by this company to begin work at once on a new freight house to be built on South Street, Hudson. The building will be 25 ft. x 65 ft.

Piedmont & Northern Railway, Charlotte, N. C.—A contract has been placed by this company with Fiske-Carter Construction Company, Greenville, S. C., for the reconstruction of its freight depot at Anderson, S. C., recently damaged by fire. The cost is estimated to be $20,000.

POWER HOUSES AND SUBSTATIONS

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Sanderson & Porter, engineers, are supervising the construction of a new 5000-kw steam power station in Parkersburg. For economical reasons the new structure is being built on a different site from that of the old power station which it will replace. The new power house will be about 100 ft. x 150 ft. and of concrete, brick and steel construction. Contracts have been let for the main equipment, including generators, boilers, switchboard apparatus and transformers. It is expected that the building will be completed by Jan. 1, 1916.

Manufactures and Supplies

ROLLING STOCK

Butler & Grove City Railway, Grove City, Pa., expects to order two passenger cars in the near future. This is in addition to the two internal-combustion locomotives recently ordered, as noted in last week's issue.

McConnellsburg & Fort London Railway, McConnellsburg, Pa., is having two 44-ft. steel, cork-lined, combination passenger and baggage cars, with Baldwin K type trucks, built by the Niles Car & Manufacturing Company.

Cleveland & Erie Railway, Girard, Pa., is having two light-weight 51-ft. steel, cork-lined, center-vestibule interurban cars with Baldwin A type trucks, built by the Niles Car & Manufacturing Company. The cars are of Niles standard structural steel construction, no pressings from special dies being permitted.

Tucson (Ariz.) Rapid Transit Company has ordered through the Federal Light & Traction Company, New York, its controlling company, four one-man arch-roof cars from the Wason Manufacturing Company. The cars will be of wood construction and of the front-entrance type with closed vestibules. The Federal Light & Traction Company reports that operating expenses per car-mile on the lines of its subsidiary, the Las Vegas Light & Power Company, Las Vegas, N. M., have been cut in two by the adoption of small one-man cars. The former two-man cars of this line cost during 1912 18 cents per car-mile to operate. This figure includes all operating charges and also taxes, but not interest charges. The larger cars were replaced in 1913 by one-man cars, the operating cost of which during 1913 was only 9.05 cents per car-mile, or half the amount of the previous year.

TRADE NOTES

Union Spring & Manufacturing Company, Pittsburgh, Pa., has moved its New York office from the Singer Building to 50 Church Street.

Corliss Carbon Company, Bradford, Pa., manufacturer of motor and generator brushes exclusively, has removed its office and stock room to the Engineering Building, 114 Liberty Street, New York City.

Imperial Brass Manufacturing Company, Chicago, Ill., recently adopted a rather unusual departure from the ordinary selling plan. Two of its expert oxy-acetylene welding and cutting engineers started in an automobile on a "coast to coast" trip. The automobile carries a complete Imperial welding and cutting equipment as well as supplies, and practical demonstrations of its safety and efficiency are being made in various garages and manufacturing plants in all cities along the route.

British Westinghouse Company, Manchester, England, has long had a small rifle range at its works for the use of an organization among its employees. When war broke out the company increased the size of this range so that no less than thirty-six men can now use it, ten using the 25-yard range and twenty-six at the 50-yard range. The cost of the improvement, together with that of the rifles, telescopes, etc., was largely covered by voluntary subscription of the employees. The company gave considerable financial assistance and lent the grounds. Instruction classes in rifle shooting are now being held among the boys under seventeen years of age employed in the shops and offices of the company. Up to date 1506 men have left this company to join either the army or the navy, news having been received that twelve out of this number have been killed in action. The company has set aside a large sum of money for the purpose of helping the dependents of those who have left. Up to the present time the number of families receiving weekly relief is 674.

ADVERTISING LITERATURE

Bonham Recorder Company, Hamilton, Ohio, has issued a catalog entitled "Earnings Per Passenger-Mile."

Dearborn Chemical Company, Chicago, Ill., has issued a folder in regard to its service in analyzing feed water for boilers.

Draeger Oxygen Apparatus Company, Pittsburgh, Pa., has issued a folder in regard to its pulmotor for resuscitation from electric shock.

Ohio Brass Company, Mansfield, Ohio, has issued a folder on its rail bonds. The folder announces an order received from this company for 30,000 rail bonds for the first 225-mile section of the electrification of the Chicago, Milwaukee & St. Paul Railway, now under construction.

Delta-Star Electric Company, Chicago, Ill., has issued folder No. 49 which describes the automatic high-speed sphere gap S. & C. arrester. The valve action of this arrester is well demonstrated and will be of interest to those concerned with high-tension transmission.

Edward B. Smith & Company, Philadelphia, Pa., bankers, are distributing a form sheet for the convenience of their customers in listing investment securities. The sheet contains columns for properly listing the name of the company in which the security is held, the amount, par value, kind of mortgage or lien, interest rate, rate of security, income due each month, total income, purchase and appraisal price, State and federal tax and actual cash value of the security.

Hanna Engineering Works, Chicago, Ill., have issued a catalog describing the various types and details of their compression yoke riveters for car and bridge building, for which the Vulcan Engineering Sales Company, Chicago, Ill., is sole agent. In this type of riveter there is combined in a simple form toggles, levers and guide links to give the large opening of the toggle joint movement with its gradually increasing pressure so that the desired pressure is reached, then a simple lever movement throughout a considerable space under approximately maximum pressure. This space is sufficient so that there need be no uncertainty about pressure applied on the rivets; and, once adjusted for a certain length of rivet and thickness of plate, the machine will require no further adjustment for ordinary variation in length of rivets, size of holes, or thicknesses of plates.

NEW PUBLICATIONS

Statistics of Railways of the United States, 1903-1913. Bulletin 1975: Bureau of Railway Economics, Washington, D. C. 81 pages. Paper.

This pamphlet is the first of an annual series containing statistics for the latest ten-year period for which official figures are available on the subject of railway statistics. The tabulations are based upon official data published by the Interstate Commerce Commission and the census bureau. The pamphlet is a convenient reference book for steam railroad statistics, inasmuch as it does away with the necessity for consulting separate volumes of official statistics.

Validity of Rate Regulations. By Robert P. Reeder. T. & J. W. Johnson Company, Philadelphia, Pa. 1914. 440 pages. Buckram, $5.

The one subject in connection with commission activity that is of most interest to electric railways and yet is least fully understood on account of the highly technical legal features connected therewith, is that of the validity of rate regulations. With both the Interstate Commerce Commission and the various state commissions promulgating rulings in regard to rate regulations, it is almost impossible for the electric railway official to classify the decisions on established points or to follow the trend of rulings on the many unsettled problems.

For these reasons, this book by Mr. Reeder should be of great interest, both as a treatise dealing with the principles of constitutional law involved in rate regulation, and as a compilation of 4000 citations on the various points involved. It presents a broad discussion of the purposes of those who placed in the federal constitution the provisions bearing upon rate regulations, and explains the contrast between state and federal power in this matter, the methods of making and of enforcing regulations, the principles governing the valuation of property, the constitutional rate of return, discrimination in regulation differentials and the impairment of contract. While many electric railway operators may not agree with the author on the mooted questions of valuation, depreciation, rate of return and the like, the book should serve as an invaluable basis for counsel in the preparation of rate briefs. By omitting the footnotes and case citations the layman can also obtain a clear analysis of this intricate subject.

Electric Railway Journal

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FOOL-PROOF LOCOMOTIVES

Judging by the most recent electric locomotive designs, the aim of the builders is to produce a machine that will stand any amount of rough handling. Both the Chicago, Milwaukee & St. Paul and the Norfolk & Western railroads will have locomotives that can exert full accelerating effort for a period of five minutes without injurious heating even though they may be unable to move. This is, indeed, a most important qualification. Ruggedness in design has received attention over everything else for years in railroad service, as is only to be expected. The primary object is the movement of freight. Considerations of economy are largely subordinate, and even satisfactory explanations of train delays constitute a poor return for the loss of earning power that has been involved. Heretofore the electric locomotive has frequently, and justly, been accused of being like an over-willing horse that would work itself to death if given the chance. As the chance is always given on a railroad, this feature has been a decidedly weak one, and now that the new form of motive power has embraced the principle of having a continuous capacity that is almost equal to its hourly rating, together with an ability to stand still almost indefinitely while exerting full tractive effort, its possibilities have broadened enormously.

ELECTRICAL VERSUS MECHANICAL FAILURES

With the rapidly increasing interest in the electrification of steam railroads a question as to the relative reliability of electrical apparatus seems to have arisen quite frequently. The matter is, of course, impossible of direct settlement, but general indications point to the fact that the electrical machinery now being used for locomotives operates largely without repairs and with but comparatively little attention. As an example, on the New York, New Haven & Hartford Railroad's electric freight locomotives, there were eight engine failures during March. Two were due to hot bearings and two to broken parts. Four were due to electrical grounds and presumably were remedied without a vast amount of trouble. During the previous month exactly the same relation of mechanical to electrical failures was recorded, and incidentally it may be said that, during both months, the switch engines on the same road operated without failures of any kind. In the end the rugged equipment of electric locomotives hardly comprises enough inherent "grief" for the master mechanic to consider seriously. His work under electrification will be, as it always has been, the mechanical repairs involved by the heavy wear and even physical abuse to which every locomotive is subject.

CLEARANCE LIMITATIONS WITH ELECTRICITY

The two widely different types of electric locomotives which are described elsewhere in this issue possess the common characteristic of literally enormous power, and this has very material significance in view of the trend of modern railroading. Heavy trains are, of course, essential under the long-haul conditions that prevail in this country, and the constant endeavor to increase tonnage has resulted in a veritable struggle on the part of the locomotive designer to produce machines capable of meeting the demands of the transportation department. The difficulty with the large steam locomotive has been to confine its dimensions to the limits established by the standard gage and the tunnel and bridge clearances, and it has taken years of gradual development to bring the steam-driven unit to the point it has reached today. The electric locomotive, on the other hand, is inherently compact in design, and it has in one step acquired superiority in power over the steam locomotive, both of the electric units under discussion, with tractive efforts of the order of 100,000 lb. exceeding even the largest steam locomotives of the Mallet type. For the immediate future, perhaps, no demand will exist for much more powerful machines than these. But with the general introduction of the new couplers, with draft rigging to suit, the present limits on train length will again be advanced, and as the electric locomotive escapes absolutely any handicap involved by over-all dimensions it will be easily possible to provide designs suitable to the new conditions.

TESTING MOTOR INSULATION

As a result of the long experience of designers and users of electric railway motors and of electrical machinery in general, standard recommendations as to insulation tests have been evolved. Such recommendations are incorporated in the A. I. E. E. standardization rules, which specify a test voltage of twice the normal plus 1000, and in the recommended practice of the A. E. R. E. A. For trolley roads the latter specifies 2500 volts alternating current for five seconds on new armatures and fields, and 1000 volts alternating current for five seconds on old armatures and fields. This practice appears to be rational, as it provides a test which, while searching, is in no wise destructive. The factor of safety is no more than is reasonable to provide for deterioration in service and to enable the insulation to stand the extra voltages sure to be imposed upon it. Such extra voltages are produced by the opening of circuit-breakers, resulting in sudden collapse of the magnetic field of the motors, with consequent self-induced voltages. High voltage discharges are apt to occur also during atmospheric disturbance, as is clearly evident in strings of incandescent lamps connected between trolley wire and ground when a thunderstorm is in progress. While we understand that some, and possibly many, railways do not employ the high-voltage tests on account of their supposed severity and at the same time have very satisfactory success in maintaining motor equipment, it is probably true that the motor insulation in these cases is so carefully looked after anyway that it would withstand the recommended test voltages without injury. It is obvious that recommended standards can only be successful when they epitomize good practice in their respective lines, but when they have been evolved as in the present case by competent representatives of both manufacturer and user there is every reason for adopting them and profiting by them.

SUPPLEMENTARY FINANCING

The sale of about $9,890,000 of cumulative first preferred stock by the Pacific Gas & Electric Company during the eleven months ended April 30 has caused considerable comment in regard to the rise of such a class of securities as a financing medium. Probably the ablest exposition of this subject is that presented by G. K. Weeks, president San Francisco-Oakland Terminal Railways, before a recent meeting of the San Francisco section of the American Institute of Electrical Engineers.

It goes without amplification that the primary financing of public utilities is accomplished through the sale of mortgage bonds. Owing to the existence of certain conditions, however, additional financing is generally necessary. In the first place, bondholders and bond houses are chary of investing in any property that does not provide a one-quarter or one-third equity above the mortgaged indebtedness. Some public service commissioners have had this fact in mind in expressing the opinion that not more than 75 per cent of the investment in any public utility should be secured through the sale of bonds. In the second place, every well-drawn indenture of an open-end or limited-open-end character contains a provision that all bonds subsequent to the original issue may be sold to cover only a specified percentage of new capital costs—such percentages usually ranging from 66 2/3 to 90 per cent. It is evident from these facts that from 10 to 33 1/3 per cent of public utility investment must be secured from stockholders' assessments, surplus earnings or the issuance of junior securities.

Assessments of stockholders are, of course, unpopular and can be considered as only emergency measures of the most extreme type. Moreover, the surplus earnings that are available for reinvestment in the case of most properties are not large enough to take care of the additional financing even if such were desired. Paradoxical as it may seem, the larger and more prosperous the utility, the less likely it is to possess sufficient surplus to provide all needed capital above that obtainable from mortgage bonds, for with its progressiveness and potential prosperity comes a correspondingly increased need for new construction and extensions. The third expedient, junior securities, is also not without its difficulties, for the inclination may be to secure the needed funds through the issuance of short-term obligations, funded or unfunded, which on account of their comparatively imminent payment or refunding only serve to complicate the supplementary financing as the necessity for this continues year by year.

By virtue of necessity, therefore, it seems that some authorized stock issue should be used for supplementary financing. This step is not at all devoid of propriety, however, for it is quite fitting that the equity above mortgage indebtedness should be created by those who through their voting power control the management and who share in the disposition of the net income. But what sort of stock should be sold—common or preferred? The answer to the question, we believe, depends on the interrelated factors of marketability and valuation. In the case of companies with a larger surplus, a good dividend record and all outstanding stock fully covered by property investment, it may be possible to dispose of common stock at the price fixed by the authorizing commission. Such a method is conservative and satisfactory. Yet if the outstanding stock issue is already in excess of a recognized valuation, or if a general financial stringency makes unattractive the issuance of common stock, the logical medium to be used is preferred stock. A cumulative and non-assessable issue of this kind, perhaps participating both as to dividends and as to assets, is desirable as a standard in all cases when common stock cannot well be sold. It is wise to have a check against over-extension, such as the California Railroad Commission provision that if the property value amounts to only 50 per cent of the par value of the preferred shares outstanding after deducting senior obligations, no more of such stock may be sold even if a market exists at a satisfactory price. With such a safeguard to investors, preferred stock should become quite popular as a supplementary financing medium.

SIMPLICITY—AN ESSENTIAL OF DESIGN

It is frequently the case that American machines are classed as crude, an imputation that is generally extended to our mechanics as well. No doubt there is much upon which to base such a belief, but even so, the rough-and-ready practices that have been at the root of our machine design, especially in the field of transportation, have not been adopted without material reasons to commend them. Indeed, it is with more than a trace of doubt that many engineers of to-day look upon the ready acceptance of complication for the sake of somewhat improved economy, and it may well be asked whether the growing spirit of willingness to abandon the rugged, albeit somewhat uneconomical, designs of the past fifteen or twenty years is going to be altogether beneficial.

Probably the best example of the change that seems to be taking place is found in the steam locomotive, which for some four score years remained almost exactly in the form devised by one of the earliest of its designers. Such changes as took place were largely those of increased size. The details remained the same, and even they were limited to the minimum established by a rigid policy of simplicity. But within the past ten years these conditions have been absolutely reversed, and to-day the steam locomotive in many cases is a bewildering complexity of compound cylinders, articulated frames, superheaters, feed-water heaters and other things that are characterized, even by the younger generation of officials, as "frills" whose liability to break-down increases engine failures. Already there is arising a question as to whether or not they really pay.

In the field of power generation the rise of the Diesel engine is equally conspicuous. Compared with the turbine its multiplicity of parts seems to be infinite. Its economy, of course, is excellent and its ability to avoid stand-by losses during the hours of no load constitutes a splendid argument in its favor. Yet do these advantages compensate at all for the fact that the failure of one of its many essential details means a shut-down? Apparently an affirmative answer has been frequently given, at least in England, where insurance of Diesel engines against break-down seems to be the rule, the annual premiums ranging from 3 per cent to 7½ per cent on the amount of the insurance. These rates, it is true, are considered by the Diesel Engine Users' Association to be unduly high, but at that is it possible to calculate the indirect losses due to a shut-down? Certainly the normal savings of a slightly improved operating efficiency are a small return for the enforced use of a prime mover whose reliability, unlike that of Caesar's wife, is always subject to suspicion.

The tendency toward the acceptance of complexity in design in the electric railway industry is perhaps not distinguished by any particularly shining example. Yet automatic details that stand very close to the border line of "frills" in their limited ability to improve operating efficiency as opposed to their complexity have been introduced by the score during the past five years. Many of them, of course, have fallen by the wayside. But on the other hand, many more have sprung up to take their places so that in the end every railway is constantly under a temptation to adopt devices which will admittedly effect a saving, but which cost enough more in labor and in lost time to reduce the saving to zero. This it would seem is something that could well be borne in mind at all times by railway managers. To make an increase in operating efficiency may not be excessively difficult, but to make it simply is a problem of Gargantuan proportions.

THE PHASE CONVERTER

By the use of a simple but commercially novel phase converter it has been possible to combine the advantages of single-phase power distribution and three-phase torque production in the Norfolk & Western locomotives which are exhaustively described in this issue. The principles of operation of this particular type of converter are fully described in the article. The peculiar virtues of the polyphase motor for certain kinds of heavy railroad work were clearly laid down by Cary T. Hutchinson in his A. I. E. E. paper of Nov. 12, 1909. In spite of these facts but one traction application of this motor has heretofore been made in the United States, the chief obstacle to its progress in this field having been the second overhead wire. The phase converter renders this wire unnecessary, and is considered by the designers in the present case the lesser of two evils.

The induction motor is ideal as a phase converter in most particulars. It is simplicity itself structurally, and its ruggedness leaves little to be desired as to durability. There is no limit to the speed of the rotor excepting that set by the strength of the constituent parts so that the machine may be made quite light per unit of output. Like the traction motors it imposes no frequency limitations on the power supply, and it requires even less attention than the motors as there are no sliding contacts.

The addition of induction apparatus to the equipment necessarily involves some exciting current with corresponding loss of efficiency and lowering of power factor, and there are bearing, windage and electrical resistance losses also. Only a part of the power, however, passes through the phase converter, and this fact must be borne in mind in estimating the relation of the phase converter losses to the total input. The main problems in connection with the converter design have not been in reducing power and other losses, in the control of which there is much experience to guide, but rather in counteracting the effects of magnetic reactions. When a simple phase converter, like that described in the article, furnishes current to a load circuit that current reacts upon the revolving field and shifts its phase position. This effect appears in the load circuit as a phase displacement of emfs; in other words, the voltages become unbalanced. The efficiency of the circuit as a power producer is correspondingly impaired. The T-connection of the stationary transformer and the phase converter windings in the Norfolk & Western locomotive give a simple means of correcting phase distortion by shifting the point of T-connection. A second plan not substantially different in principle for neutralizing the reactive mmf, as experimentally developed by the General Electric Company, was described in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 11, 1913, page 678. In this a variable amount of line emf is introduced into the quadrature circuit (in a two-phase motor) to bring the emf of the latter to its normal value and phase position. In the General Electric plan also the converter was excited from an auxiliary winding carried on the cage-wound rotor and supplied with current from a synchronous exciter for the purpose of improving the power factor.

In view of all of the above facts regarding the phase converter it will be interesting from the electrical engineering standpoint to have, for purpose of comparison with other systems, the following among other data: The power factor in the line circuit at various loads; the voltages and phase relations in the three-phase and two-phase circuits under starting and running conditions, and the efficiencies of the locomotive as a whole and of the phase converter under the same conditions.

The Norfolk & Western Electrification

The First Month's Service of This Important Installation Has Demonstrated the Complete Success of the Single-Phase Contact System in Combination with Three-Phase Locomotives Having Rotary Phase-Converters —Train Loads of 3250 Tons Are Handled Up 2 Per Cent Grades at 14 M.P.H.

During the past month regular operation on the electrified division of the Norfolk & Western Railway has been inaugurated under thoroughly successful circumstances, an outcome that establishes one of the most important forward steps in the progress of electrification of steam railroads. The installation, which has been mentioned from time to time in these columns, is unique in its combination of the inexpensive and efficient single-phase overhead contact system with the rugged three-phase motor for the locomotives.

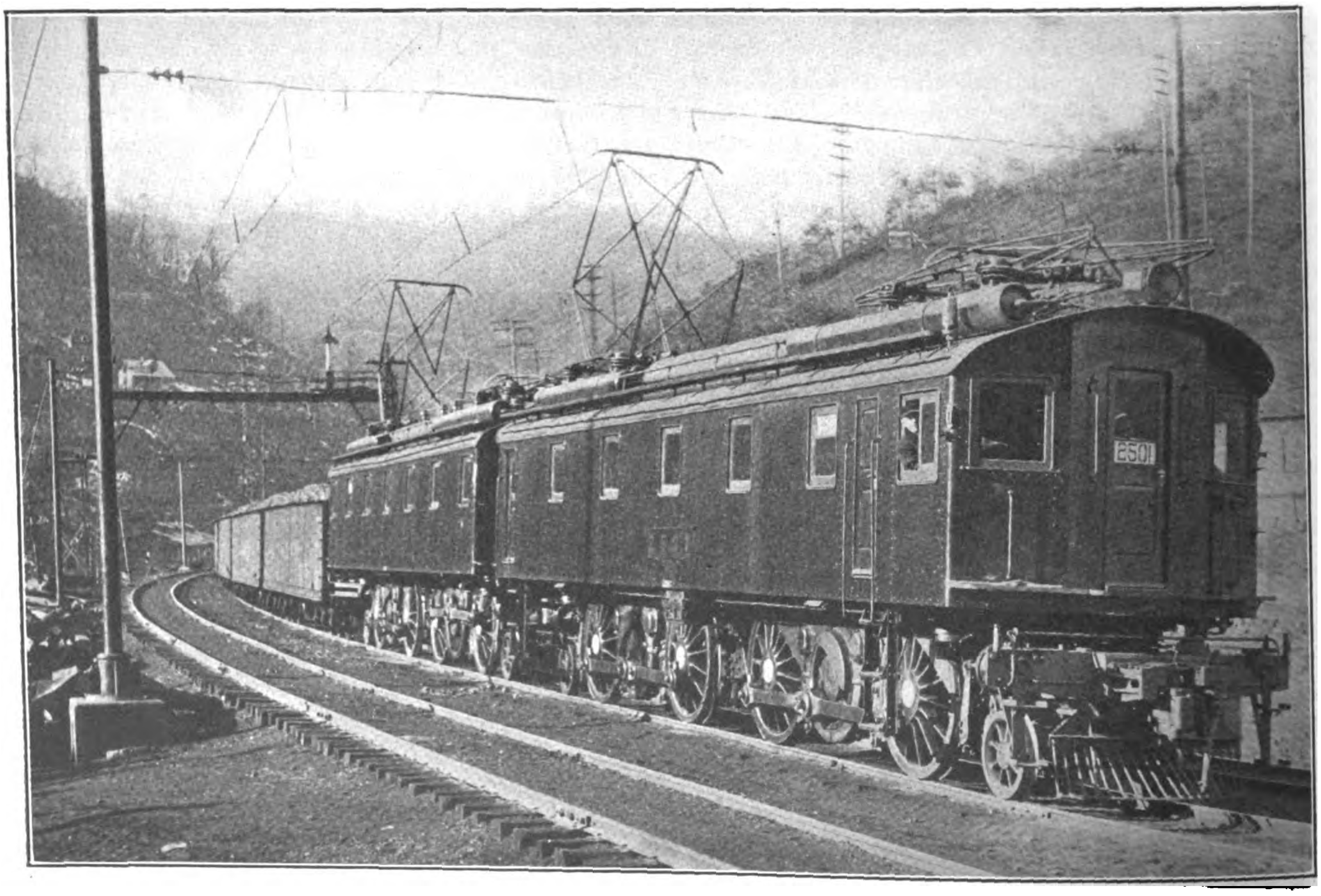
The electric zone is located on the main line where it passes through the coal fields in the southern part of West Virginia, extending from Bluefield to Vivian, a distance of about 30 miles. The line is double track throughout except in the Elkhorn tunnel, and there is a large mileage of third-track, passing sidings, branches into the coal workings along the line, and yard trackage. The grades are heavy, and fully 60 per cent of the line is on curves, the maximum being 12 deg. Primarily, the traffic consists in collecting loaded coal cars from the mine sidings and yards, and transporting them up the grades and over the summit of the mountain range to the general classification yard at Bluefield, a division point for the railway. From Bluefield, after classification, the cars are shipped east to the various destination points, chiefly to the railway company's marine shipping pier at Norfolk, Va. All coal traffic originates west of Flat Top, a station about 6 miles east of the mountain summit. Coal shipments to the east constitute the chief load to be handled electrically, but some coal originating east of the summit is shipped to the west, and this also is hauled by the electric engines to the yards near the west end of the electric zone.

There are numerous colliery sidings throughout the coal fields and the service includes the delivery of empties on the return trip as well as the collection of loaded east-bound cars. The electric zone is, therefore, practically a local switching and short-haul division between the coal fields and Bluefield, and it is operated to a large extent independently of the other traffic on the main division. In addition to the heavy tonnage of coal trains, however, through merchandise freight and passenger traffic over the electric zone is helped up the grade by the electric locomotives which are used as pushers, the steam locomotives remaining at the head end.

These conditions are especially favorable to electric traction because trains may be dispatched at fairly uniform intervals throughout the day, thus imposing a fairly uniform load on the power system. At the same time the full service is handled with a moderate number of locomotives, each one of which is able to make several round trips in each day.

Traffic Conditions Improved by Electrification

The purpose of the substitution of electricity for steam was to increase the capacity of the line by materially reducing the time required to handle trains, and



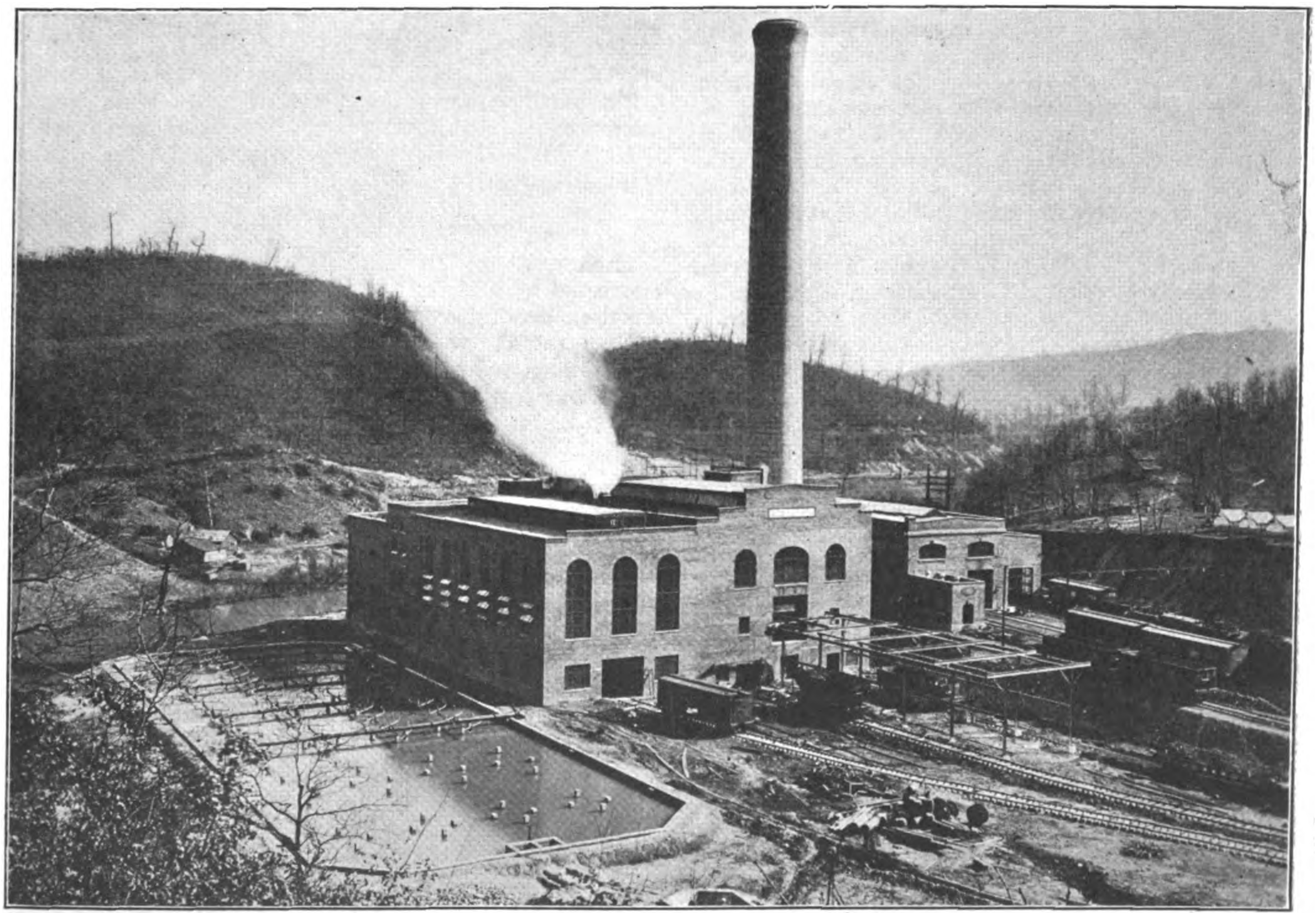
NORFOLK & WESTERN ELECTRIFICATION—SINGLE LOCOMOTIVE COUPLED TO TONNAGE TRAIN also to provide a more economical and efficient service over the heavy grades. To this end the electric locomotives were designed to handle the heavy freight trains up the grades at the high running speed of 14 m.p.h. as compared with about 7.5 m.p.h. under steam operation. A further saving in time is effected by the elimination of the delays that were experienced by steam trains because of their occupation of the tracks while the two or three locomotives coupled to each train took on coal and water, one at a time, at the several coal and water stations on the grade. The effect of increased speed is especially marked at the single-track Elkhorn tunnel. This is 3000 ft. long and is on a 1.5 per cent grade. Under steam operation it had been necessary on account of the requirements of ventilation to reduce the up-grade speed in the tunnel to about 6 m.p.h. This involved a time interval of seven minutes for clearing the block that included the tunnel. Under electric operation, however, the movement is made in about three minutes.

The coal trains handled in this service weigh 3250 tons and were formerly hauled up the grade by three steam locomotives. Two of these, a road engine and a helper, were used over the entire division. The third engine, located at the rear, served as a pusher up the 1.5 per cent and 2 per cent grades, and was cut off at the summit, all of the steam locomotives being of the highly developed, heavy, Mallet type fitted with mechanical stokers and superheaters. Under electric operation a single road engine is used over the electric division and a second electric engine is used as a pusher up the heavy grades. One electric engine, therefore, takes the place of two Mallets over the division, and two electric engines take the place of three Mallets up the grade. In a recent test a 4800-ton train was hauled over the division by three electric engines, two of which acted as pushers. In all cases the electric locomotives handle the trains at approximately double the speed obtained with steam. On the 9-mile grade between Cooper and Graham, where the maximum rise is 0.4 per cent and some stretches are level, the speed of the electric locomotives is 28 m.p.h.

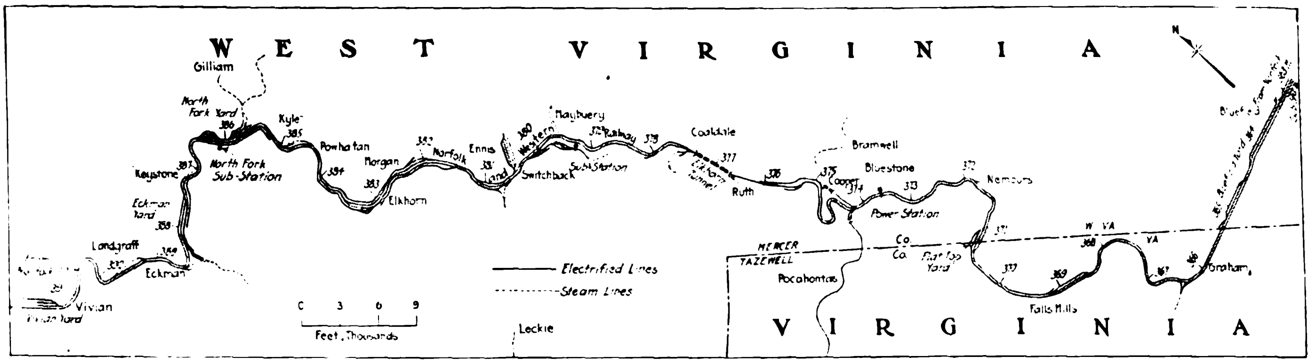
The electric installation has been designed for handling a daily total of twenty eastbound trains, or 65,000 tons, over the division, but ample provision has been made for additional traffic and extensions of electrified tracks when required. At the present time the number of tonnage trains handled daily is about twelve, and pusher or helper service is also provided for all of the through-freight and passenger trains.

In addition to the direct advantages and the economies resulting from the electric train service, the presence of an adequate and efficient power supply has permitted the electrical operation of various auxiliary plants in the vicinity. Thus, a large steam pumping station at Bluestone for the water supply for steam locomotives has been shut down and the pumping is done at the electric power station located nearby. Also the fans for ventilating the Elkhorn tunnel will now be driven by electric motors, and ultimately electric power will be used for operating shops and pumps at Bluefield as well as at several other points on the division.

Although the electrification of this division had long been under consideration, the actual decision to electrify was not reached until about three years ago, when the lay-out and design of the entire installation was worked out in all details by Gibbs & Hill, engineers for



NORFOLK & WESTERN ELECTRIFICATION—VIEW OF POWER HOUSE AND COOLING POND, WITH REPAIR SHOP AT EXTREME RIGHT


WEST VIRGINIA
Gilliam
North Fork Yard
386
Kyle
385
Powhatan
384
Morgan
383
Elkhorn
382
Norfolk
Ennis
381
Land
380
Western
Maybuery
Switchback
Sub-Station
Railway
379
Coaldale
377
Elkhorn Tunnel
Ruth
376
Bramwell
375
Cooper
374
Bluestone
373
372
Nemours
Power Station
Keystone
387
North Fork Sub-Station
Eckman Yard
388
Landgraff
389
Eckman
Vivian
Vivian Yard
Electrified Lines
Steam Lines
0 3 6 9
Feet, Thousands
Leckie
MERCER
TAZEWELL
Co.
Co.
Pocahontas
Flat Top Yard
371
370
369
W. VA
368
VA
367
366
Graham
Bluefield
N
VIRGINIA

NORFOLK & WESTERN ELECTRIFICATION—MAP OF ELECTRIC ZONE

the railway company. All construction, excepting the power house and repair shop, and some of the power-station equipment, was carried out by a specially organized railroad force under the supervision of the engineers.

Single-Phase-Three-Phase Locomotives

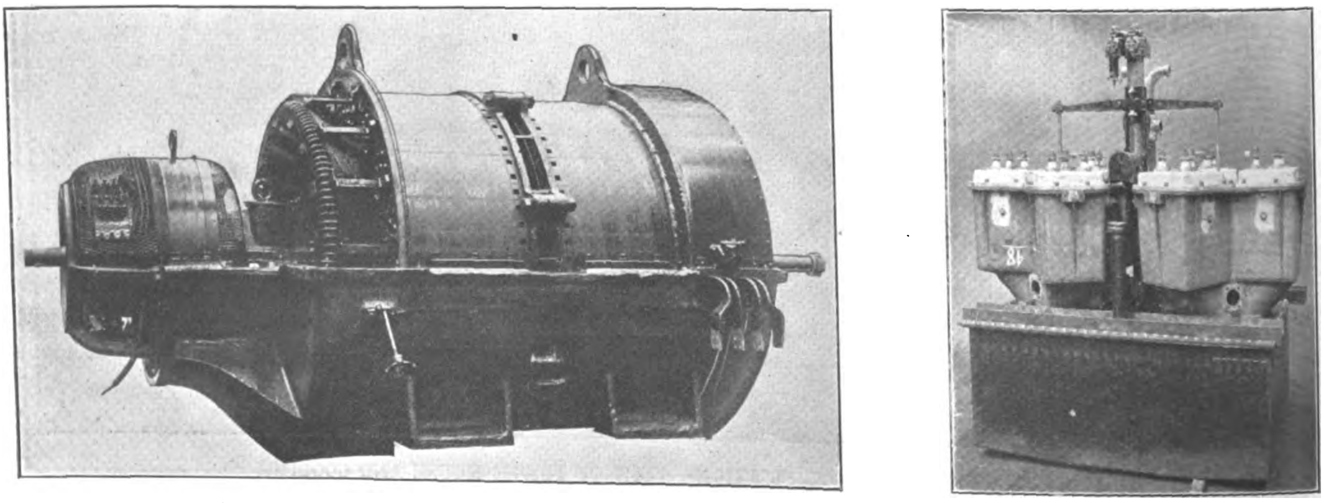
Probably the most interesting of the many striking features of the installation is the Baldwin-Westinghouse, single-phase-three-phase locomotive. The traffic on the electric zone is handled by twelve of these machines each consisting of two 135-ton units or halves so that the total locomotive weight is 270 tons.

In the case of the Norfolk & Western electrification the train weights are so great that it is obviously necessary to have part of the motive power at the rear in order to avoid excessive strain on the draft rigging of the cars. However, the trains are of such great length that there is difficulty in signaling from the locomotive at the head end of the train to the one at the rear, and thus the locomotives are subject to treatment which would be considered impossible in ordinary service. For example, it is not unusual for the rear locomotive to receive a signal to go ahead one full minute or even more before the head locomotive has come into action. In consequence, the rear locomotive will stand still during this period, although it is exerting full tractive effort in an endeavor to start the train. This condition arises most frequently when the rail is wet and permits slipping the drivers, or when the air brakes do not release promptly. Under such circumstances, the train must frequently be allowed to drop back a little and the attempt to start must be repeated. Also, when a train on an up grade comes to a stop the head engine will shut off power and will apply the brakes while the rear engine keeps pushing the train until its tractive effort is exceeded by the bunching of the front cars.

Ordinarily, these requirements would involve exceedingly careful handling, but the locomotives have been designed especially to meet these severe conditions so that their manipulation does not even involve especial attention. The rugged construction of the three-phase induction motor, with its freedom from commutator troubles, together with the liquid rheostat that is installed on the locomotive, is of the greatest importance in meeting these conditions. The rheostat not only gives the smoothest possible gradation of tractive effort, but the latent heat of the steam that is generated within it makes possible the dissipation of an extraordinarily large amount of heat without difficulty. It may be said also that the inherent characteristics of the induction motor enable the locomotives automatically to hold the train at a constant speed without the use of brakes on descending grades by regenerating and returning power to the line. This is accomplished without additional or complicated apparatus. Conditions are such that full advantage of this form of braking can be secured, in that the trains are very heavy, the grades are severe, and the speed relatively high. In actual service the performance of this feature of the installation has proved to be highly satisfactory, the heaviest train being handled down the mountain grade by a single locomotive at a uniform speed of about 15 m.p.h. with the air brakes held in reserve to bring the train to a standstill when desired.

Features of Design

Each unit or half locomotive has two main trucks connected by a Mallet-type hinge, and each main truck has two driving axles included in a rigid wheel base with a radial, two-wheel, leading truck. The buffing and pulling strains are transmitted through the main truck frame and through a twin draft rigging mounted on the main truck at each end of the unit. The cab is of the box type and is supported on the main truck

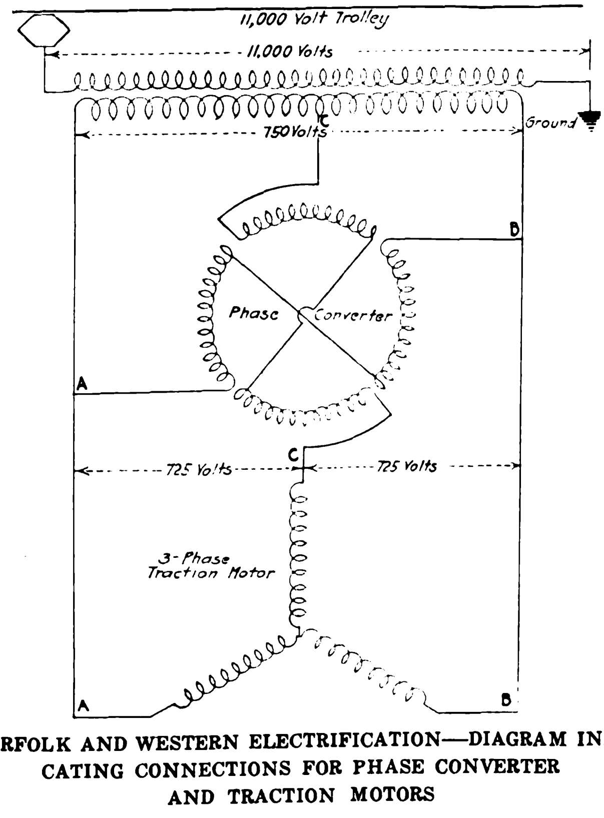


NORFOLK & WESTERN ELECTRIFICATION—PHASE CONVERTER AND LIQUID RHEOSTAT entirely by spring cushion friction plates and there is no weight on the center pins, which serve only to maintain the cab in its proper position on the truck. An engineer's compartment is provided at one end of each unit, the two units being so coupled as to provide for operation from either end of the locomotive.

Each locomotive has eight pairs of drivers connected in pairs by side rods to a jack shaft between the two wheels. Each jack shaft is driven by two motors geared to it so that the locomotive has eight traction motors. These are of the three-phase induction type with wound secondaries and with field-windings arranged for four-pole and for eight-pole operation. They are ventilated by forced draught, the air being supplied from the main ventilating duct which also delivers cooling air to the phase converter and to the cooling towers for the liquid rheostat.

Provision is made for two running speeds, respectively 14 and 28 m.p.h. When the locomotive is starting, resistance is inserted in the secondary circuit of the motors by means of the liquid rheostat, the amount of resistance being varied by hand at the controller. For the 14-m.p.h. speed all motors are connected in parallel, and the eight-pole combination is set up for each one. For the 28-m.p.h. speed the motors are also connected in parallel, but four of the poles of each motor are cut out, thus doubling the synchronous speed. The locomotives are equipped with the unit-switch type of control and are arranged for the simultaneous operation of the two units from the control end of either one.

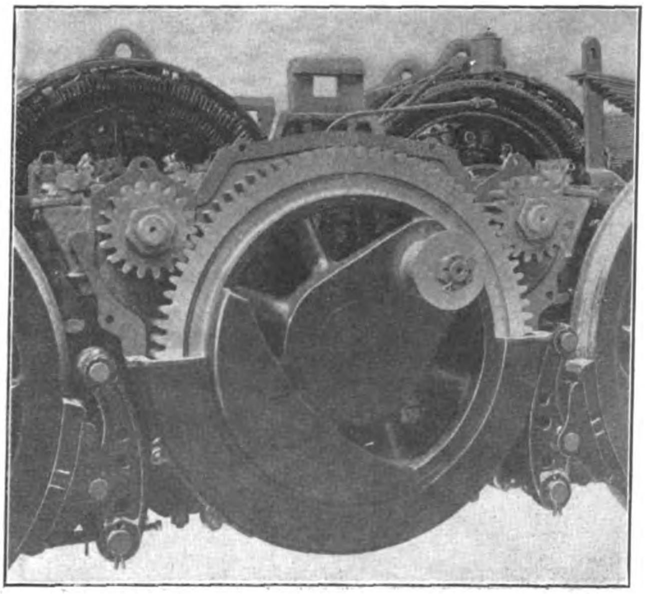
The single-phase current collected from the 11,000-volt line by the pantograph is fed through an oil-type circuit breaker to the main transformer. The phase-converter, which changes the single-phase current to the three-phase form, is connected to the low-tension side of this transformer, and it operates constantly when the engine is in service. To the extended shaft of the converter are coupled a ventilating blower for the motors and transformers and an air-compressor for the train brakes, the latter being connected through a clutch.



NORFOLK AND WESTERN ELECTRIFICATION—DIAGRAM INDICATING CONNECTIONS FOR PHASE CONVERTER AND TRACTION MOTORS

THE PHASE CONVERTER

The phase converter is a single-phase induction motor with a short-circuited, squirrel-cage rotor, or secondary and with two primary windings on the stator. One of these windings is connected across the secondary of a transformer, and when the rotor is running there is generated in the second winding an emf of 90 deg. phase displacement from that of the secondary of the stationary transformer. The use of this device in railway work is so novel that a review of the fundamental principle may be of interest before the other design details are taken up.

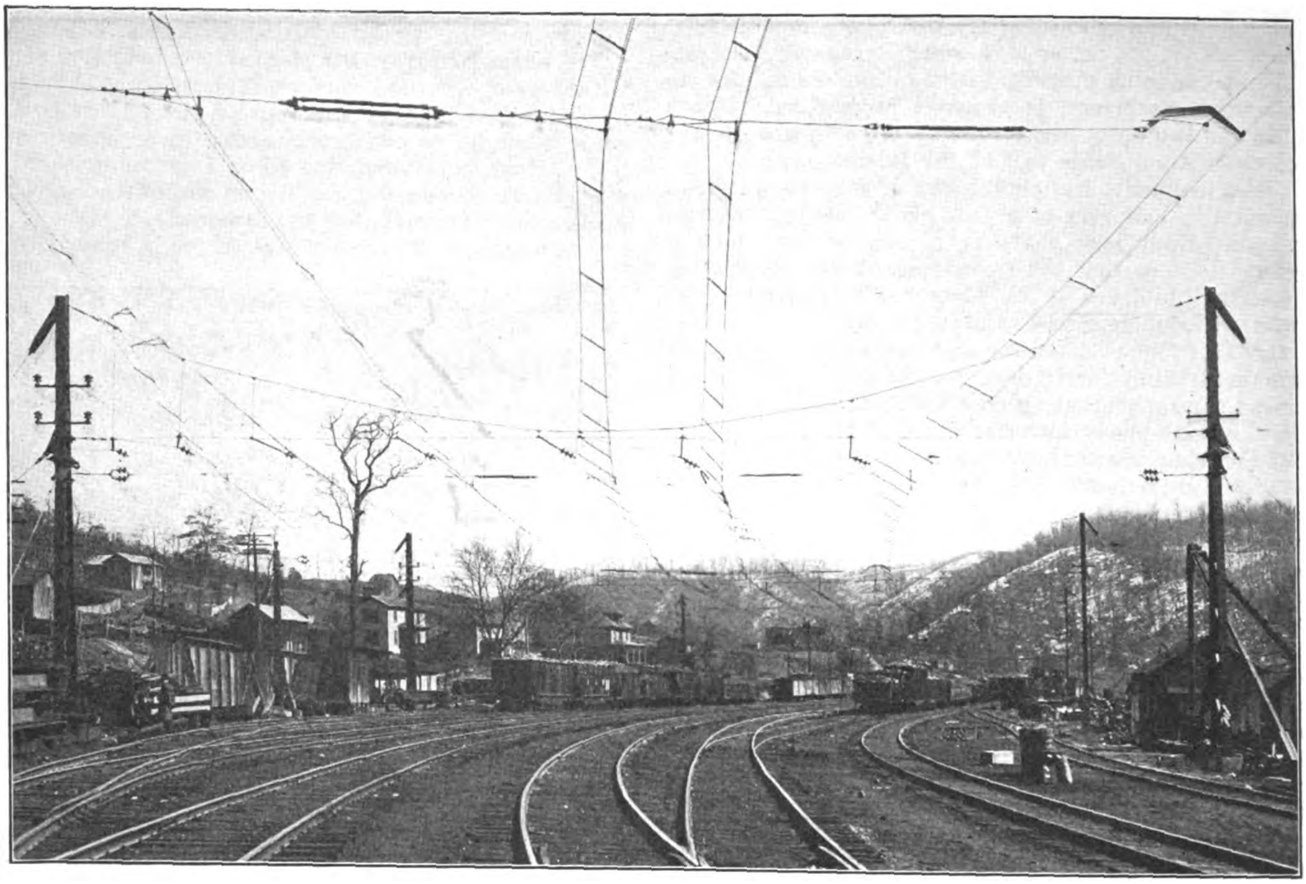


NORFOLK & WESTERN ELECTRIFICATION—MOTORS, GEARS AND JACK SHAFT ON LOCOMOTIVE

Any polyphase induction motor will operate as a single-phase motor on one phase of a polyphase circuit if the motor is brought up to its "pick-up" speed by some external or internal means. Thus if one wire of an operating two-phase motor is broken, leaving but one phase in action, it will continue to run. Moreover, a voltmeter, applied to the open primary winding will show a voltage practically equal to that in the line from which it was disconnected. The motor is, therefore, performing two functions, motor and phase transformer or converter. The reason why it does so is as follows:

Consider first that the motor is operating normally on the two-phase circuit. The two-phase magnetizing current produces a rotating magnetic field which, cutting the secondary conductors (cage-wound or phase-wound) generates emf and currents therein. The latter react upon the magnetic field and produce torque. The rotor maintains a speed slightly below the rotating speed of the field (synchronous speed), the difference or "slip" varying slightly with the load.

If a primary lead is opened with the motor running, as suggested above, there is only single-phase magnetizing current available. By transformer action, however, this produces in the rotor conductors surrounding the magnetic field a single-phase secondary current. At the same time the motion of the rotor conductors in the single-phase magnetic field produces emf and another current phase displaced 90 deg. from the first. Thus there are two rotor currents in phase quadrature and in different parts of the rotor winding. The speed-generated current acts as a second magnetizing current and, combined with the magnetizing current from the line, produces a rotating field, just as when the machine was operating as a two-phase motor. In this field the



NORFOLK & WESTERN ELECTRIFICATION—CROSS CATENARY USED FOR YARD TRACKS

rotor produces torque and will carry a mechanical load satisfactorily.

This rotating field cuts the open primary winding of the motor and generates in it an emf in quadrature with the line emf. From this winding current can be drawn as from the secondary winding of any transformer. It and the line current, taken together, form a two-phase current. A three-phase current can be generated in a similar manner.

In the diagram on page 1061, showing the connections used in the Norfolk & Western locomotives, a two-pole phase converter as described is diagrammatically represented with the rotor omitted, as the function of this is inductive only, as explained. The diagram also shows the familiar T-connection used to produce three-phase from two-phase current. One terminal of the quadrature winding is connected at *C*, at or near the center of the stationary transformer secondary winding. The converter winding is so designed that the voltage between *C* and *C* will be sufficient to produce equal voltages, equally displaced in phase, between *A* and *C*, *C* and *B*, and *B* and *A*. Thus three-phase current is provided for the traction motors. By this arrangement it is necessary only to convert a portion of the current used in the main motors as a large part comes directly from the main transformers.

For starting the rotor a single-phase, series, commutator-type motor is mounted directly on the converter shaft. The converter is forced ventilated, having a connection at its center to the main ventilating air duct of the unit.

OTHER LOCOMOTIVE DETAILS

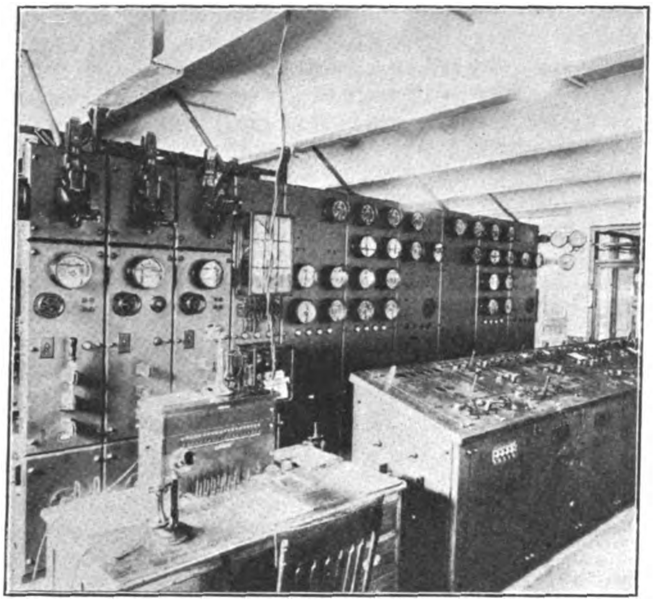
Two pantographs are mounted on the roof of each half-locomotive. These are unique in that they have been arranged to be fitted if necessary with end horns which will automatically fold in when the pantograph is lowered by the tunnel trolley wire, and in this way the unusually wide sliding surface will accommodate itself to the restricted tunnel clearances.

There are four liquid rheostats on each half-locomotive, one for each motor. These are operated in pairs, each pair having in common one storage reservoir and cooling tower, one circulating pump and one operating mechanism. The essential elements of each rheostat include a cast-iron tank in which are mounted electrodes consisting of certain metal plates connected to ground. A hollow plunger is located at the center of the tank for regulating the height of the liquid and this is raised or lowered by an operating mechanism. There is also a motor-driven centrifugal circulating pump by which the liquid is continuously circulated to prevent excessive heating. This forces the liquid up through the bottom of the tank and over the top of the hollow plunger when the plunger is raised, and back through the inside of the plunger to the storage reservoir.

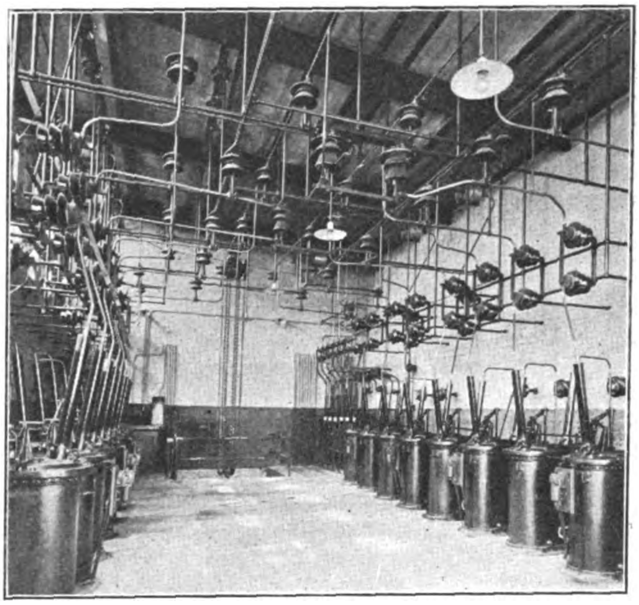
When the liquid is raised so as to submerge the lower ends of the plates, current may flow between the motor-connected plates and the adjacent ground-connected plates, the circuit between the three phases of the motor being thus established. The higher the liquid rises on the plates, the lower the resistance becomes. When the plates are entirely submerged, the liquid going all the way up, the resistance is reduced to the minimum.

To keep the temperature of the circulating liquid as low as possible, a portion is by-passed through a cooling tower containing a series of trays so arranged that the liquid will flow over them in a thin sheet and be cooled by air from the main ventilating duct to which the towers are connected.

This main ventilating duct is supplied by a 36-in. Sirocco fan mounted on the shaft of the phase converter. It is built into the cab floor under the deck, and runs lengthwise through the cab, being arranged with openings at various points where connections are made to the traction motors, converters, cooling towers, etc.



NORFOLK & WESTERN ELECTRIFICATION—TELEPHONE SET AND OPERATORS' BENCH BOARD IN POWER HOUSE



NORFOLK & WESTERN ELECTRIFICATION—INTERIOR VIEW OF HIGH-TENSION SWITCH ROOM

Table I shows the principal dimensions and weights of the complete locomotive:

TABLE I—PRINCIPAL DIMENSIONS AND WEIGHTS OF COMPLETE LOCOMOTIVE

Length over all	105 ft. 8 in.
Driving wheelbase, total	83 ft. 10 in.
Rigid wheelbase	11 ft. 0 in.
Truck wheelbase	16 ft. 6 in.
Height, rail to pantagraph (locked)	16 ft. 0 in.
Height, rail to top of cab (maximum)	14 ft. 9 in.
Width over all (maximum)	11 ft. 6¼ in.
Width over car body	10 ft. 3 in.
Diameter of driving wheels	62 in.
Diameter of pony wheels	30 in.
Weight on drivers	220 tons
Total weight of locomotive	270 tons

The performance of the locomotives under varying conditions of load is indicated by the ratings shown in Table II. However, on tests and in service the locomotives have developed a drawbar pull considerably in excess of the guaranteed maximum, the highest record with the dynamometer car being 180,000 lb. This corresponds to an adhesion of about 40 per cent.

TABLE II—LOCOMOTIVE PERFORMANCES UNDER VARYING LOAD CONDITIONS

	Train on 1.5 and 2 per cent grades	Train on 1 per cent grades	Train on 0.4 per cent grades
Weight of train—tons	3,250	3,250	3,250
Locomotives per train	2	1	1
Approximate speed, miles per hour	14	14	28
Drawbar pull per locomotive, pounds:			
Uniform acceleration	91,800	114,000	79,400
At speed on 2 per cent grade	75,400	.....	.....
At speed on 1 per cent grade	.....	85,800	.....
At speed on 0.4 per cent grade	.....	.....	4,600
Maximum guaranteed accelerating tractive effort per locomotive	133,000	133,000	90,000
Approximate maximum guaranteed horsepower developed by motors	5,000	5,000	6,700

POWER STATION

The power station at Bluestone that supplies power to the locomotives is of the usual type, using steam boilers and turbines for the prime movers. It is located on the Bluestone River about 11 miles west of the town of Bluefield. This site was chosen because it had almost the only available supply of water for boiler-feed and condensing purposes in the district and because the railway company had already constructed a dam and reservoir at the point for a water supply for its steam locomotives.

The plant is equipped with ten Babcock & Wilcox Stirling-type boilers, each having 6772 sq. ft. of heating surface. These operate at 200-lb. steam pressure with 150 deg. superheat. Coal is handled mechanically by conveyors built by R. H. Beaumont & Company, and ash-handling equipment furnished by the Shepard Crane & Hoist Company is installed. Westinghouse underfeed stokers are provided, these having capacity for the actual evaporation of 9 lb. of water per square foot of heating surface. Forced draft is supplied at a static pressure of 6 in. of water, the three fans being of the Sturtevant multivane type geared to 300-hp turbines. A 250-ft. x 20-ft. brick stack is provided also. The heaters are of the open type, and the feed pumps are centrifugal and turbine-driven, the exhaust from these and other auxiliaries going to the heaters.

The main units are three 10,000-kw Westinghouse double-flow reaction turbines operating at 1500 r.p.m., and provision has been made for the future installation of a fourth unit. The generators are designed for 11,000 volts and twenty-five-cycle current with a twenty-four-hour rating of 10,000 kw. A five-minute overload capacity of 25 per cent is provided, the ratings being based on 80 per cent power factor. The fields are of the two-pole revolving type designed to operate under a temperature rise of 60 deg. Cent., but they are capable of withstanding a temperature of 150 deg. Cent. without injury.

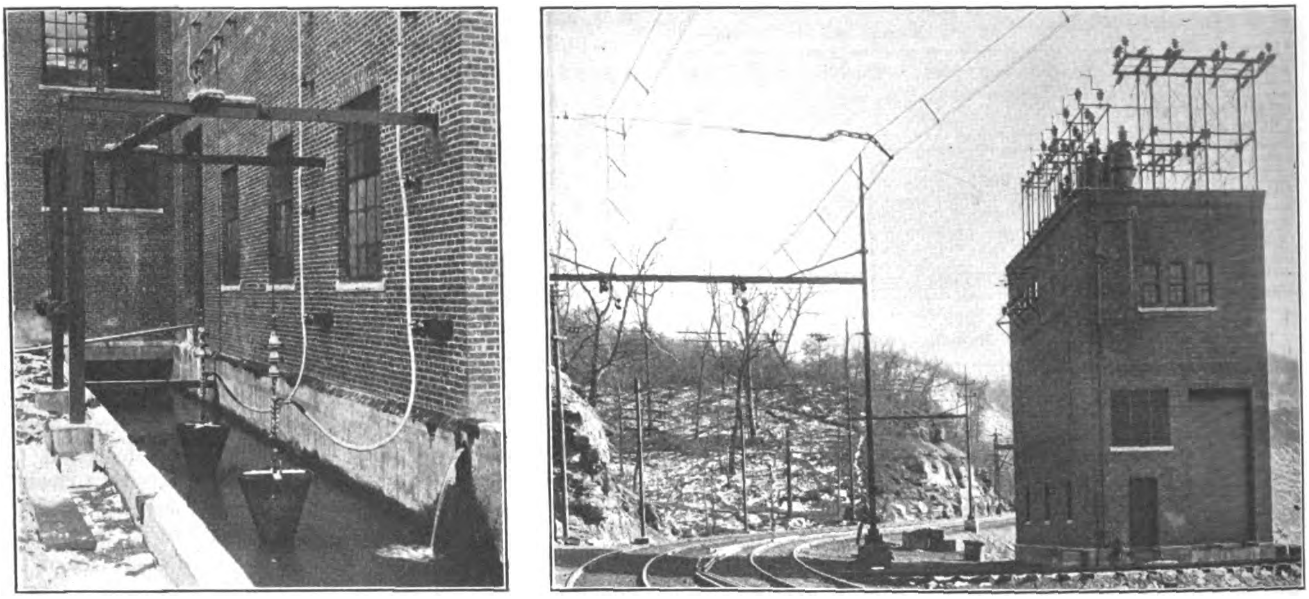
The generator armatures are designed to withstand a temperature of 90 deg. Cent. and are wound for three-phase current. Thermo-couples are embedded in the armatures, and these furnish continuous temperature records. Separate excitation is provided by two steam-driven units and one motor-driven unit, voltage regulation being effected by a Tirrill regulator.

The condensers are of the jet type with LeBlanc turbine-driven air and circulating pumps. Steam from the exhaust of these pumps is turned into the condenser automatically when the supply of exhaust steam from the other auxiliaries in the plant is more than sufficient for the feed water. A spray cooling pond has been installed on account of the muddy condition of the Bluestone River during certain seasons of the year. In addition, a reservoir has been provided by damming the river, and when the river water is clean it is circulated through the reservoir for a total distance of 1400 ft., thus permitting the shutting down of the spray nozzles. The pond may be drained by gravity through a sluice gate discharging below the dam.

Switching arrangements are provided in the usual operating galleries. The main 11,000-volt bus is sectionalized and three-phase power for auxiliary purposes is taken from it. No brick or concrete bus compartments are used, the bus being of copper tube carried on insulators mounted on a pipe frame work. Copper tubing and bare wire are used wherever possible, insulated wire being installed only where conductors are carried in conduit, the Fibre Conduit Company's product being largely used for this purpose. The generator voltage of 11,000 for one of the phases is raised to 44,000 by step-up transformers, the 44,000-volt bus being sectionalized, and two high-tension feeders are taken from each side of this for feeding the substations. The usual equipment of Pyrene fire extinguishers is distributed throughout the building.

REGENERATIVE LOADING RHEOSTATS

Excess regenerated power from locomotives on downgrades that is returned to the power house passes through the 11,000-volt bus through the various transformers back to the generators if the generators are running under very light loads. If no other load should be provided the regenerated power would reverse the generators and operate them as motors, and to prevent this a loading-device, consisting of electrodes immersed in the intake canal, is provided, this being controlled by suitable switches.



NORFOLK & WESTERN ELECTRIFICATION—WATER RHEOSTAT AT POWER HOUSE FOR DISSIPATING ENERGY OF REGENERATION—A TYPICAL SUBSTATION

The operation of the switches is made automatic by means of a group of relays and magnetic switches, current transformers, etc., so connected as to give the following results: When the amount of excess regenerated power reaches, say, 300 kva, the closing relays throw in one water rheostat on the 11,000-volt bus. As soon as the regenerated power exceeds the capacity of one water rheostat by 300 kva another closing relay throws in the second water rheostat on the 11,000-volt bus. The difference between the amount of excess regenerated power and the capacity of the water rheostats in service is made up by the generator.

When the excess regenerated power has become reduced to zero with one rheostat in service and all of the rheostat load is supplied by the generators, one of the tripping relays trips the circuit breakers and this cuts the rheostat off from the 11,000-volt bus. With two rheostats in service when the excess regenerated power drops to 2000 kva one of the relays opens the breaker which was closed first and cuts one rheostat out of service, the other rheostat remaining in until the excess regenerated power drops to zero, when this, too, is cut out of service.

The water rheostats are located outside of the transformer house at the power station. Each consists of a steel cone carrying a lead from the circuit breakers and a 6-in. iron plate located at the bottom of the intake canal and grounded to a copper plate embedded in the earth outside of the canal. The power-dissipating capacity is adjusted by varying the distance between the cone and the iron plate. The cone is raised or lowered in the water of the canal by means of a hand-operated winch and cable carried on a steel bracket across the canal.

TRANSMISSION SYSTEM AND SUBSTATIONS

High-tension power is transmitted at 44,000 volts, twenty-five cycles, single phase. The wires are carried on catenary supports except in the tunnels, where the line goes above ground over the summit. There are two single-phase lines, each of which consists of four No. 00, seven-strand, hard-drawn copper wire. A 3/8-in. steel ground wire is carried on the poles for the length of the line.

The high-tension insulators are of the four-petticoat, pin type, with a maximum diameter of 12 in., and these are tested at 165,000 volts and at 120,000 volts respectively for dry and wet flashover. Their ultimate mechanical strength is about 4000 lb., applied at right angles to the pin at the wire groove. The poles for the high-tension line over the tunnel summit are of chestnut. At present they carry three arms each having two wires. The two upper arms carry the 44,000-volt wires and the lower arms the 4400-volt signal wires. An 11,000-volt trolley feeder also is carried over the Elkhorn tunnel summit.

The cross-arms on all poles are connected to the ground wire, which in turn is grounded by means of a copper cable terminating in a copper plate at the base of every fourth pole. The high-tension lines are sectionalized at each substation by means of air-break switches on steel structures on the roof.

All power for trains is obtained from transformers which step down the voltage from 44,000 volts to 11,000 volts. These are located at five points on the line and are housed in suitable buildings except at West Vivian, where the apparatus is of the out-door type and unhoused. The primary reason for the out-door type of substation at this point is that the desirable and proper location for the building when the electrification is extended would be several miles west of the present location. Therefore the present arrangement is considered only temporary. One of the substations is located in the transformer and switching house of the power station, because the objectionable conditions which would result from short-circuits made it undesirable to feed the nearby sections of trolley lines directly from the 11,000-volt generator bus in the power house. The substation buildings are all of the same type as shown on one of the accompanying illustrations.

No attendants are required in the substations because the oil circuit breakers are remotely controlled from adjacent signal towers or passenger stations or from yard masters' offices. The location of the various substations together with their equipment is as follows:

Bluefield, two 3000-kva units.
Bluestone (power house), two 2000-kva units.
Maybeury, two 5000-kva units.
North Fork, two 3000-kva units.
Vivian, one 2000-kva unit.

The total capacity of all substations is 28,000 kva. All of the transformer units are of the Westinghouse, single-phase, oil-insulated, waterproof type, the water for cooling being taken from the company's pipe line. They are equipped with thermostats which close a bell alarm at high temperatures, thus giving warning at the operator's office. Two General Electric transformer-oil filter outfits have been provided, one for the power house and one for the substations. The latter is transferred from one location to another as required. Each outfit consists of a filter press, drying oven and motor-driven centrifugal pump, and has a capacity between 7 gal. and 10 gal. of oil per minute.

CATENARY SUPPORTING STRUCTURES

In the distribution system no supplementary feeders are required as the power supply is effected entirely by means of the contact lines. For supporting these two distinct types of structures are used. The one on the main line has wires suspended from overhead beams, and the other, which is used only in the yards, has an overhead cross catenary cable to support the longitudinal catenary wires for the several tracks.

A typical main-line structure is shown in the illustration on page 1066. This consists of two tubular steel poles set in concrete foundations and carrying between them a structural steel beam, which is partially supported by means of sag braces extending up to the pole tops. Extensions of the poles above the sag braces support cross-arms which carry the high-tension feeders and the signal lines, and the protecting ground wires are clamped to castings screwed onto the extreme ends of the poles.

On tangent tracks the bridge structure is unguyed, but on curved tracks guys are used at the outside of the curve to take the pull of the catenary system. This design has proved to be very satisfactory wherever there is room on the right-of-way for guying as it is simple and rugged in design, can be readily arranged to give any desired horizontal or vertical clearance, and is easy to erect. The use of sag braces instead of knee braces gives the desired clearance under the beam for the wires, although nothing is added to the height of the pole since it must be extended in any event to carry the high-tension and signal wires. On long stretches of tangent track the cross beams might interfere somewhat with a clear view of the signals, but in the present case there is but little tangent track and no long stretches at all, so that interference with the signal aspects is not noticeable.

The catenary supporting structures are nominally 300 ft. apart on tangent track and somewhat closer on curves. However, many adjustments and compromises in location had to be made on account of existing structures, and the spacing is not rigidly maintained.

Reinforced concrete foundations are used in all cases and a proper ground plate is set in coke underneath one of the two foundations for each structure. A substantial copper cable is carried up through the concrete for attachment to the pole with an expanded pin-type bond terminal. A reinforcing collar of ½-in. plate protects the pole at the top of the foundation.

The poles are made up of pieces of National Tube Company's steel pipe of various lengths, sizes and weights, these being swedged together. They change in size at the height of the cross-beams, thus making a shoulder on which rest the heavy steel castings holding the cross-beam. To these castings also are attached the guy rods when these are used. The poles, during construction, were grouted into cored holes that had been cast in the foundation.

Guy rods, which are attached to anchors of concrete containing two or more pieces of old rail, are provided with protection at the anchor end consisting of a boiler tube filled with grout. The end pieces of the rods are of uniform length, while the closing or middle pieces were cut on the ground during construction to the proper length, the final adjustment being made by means of turnbuckles. In general, double guys are used, the two making an angle of 20 deg. with the pole and being spread at the anchor ends so that they make an angle of about 40 deg. with each other. Structural bridges guyed longitudinally with the track are used where it is desired to anchor or dead-end the catenary system.

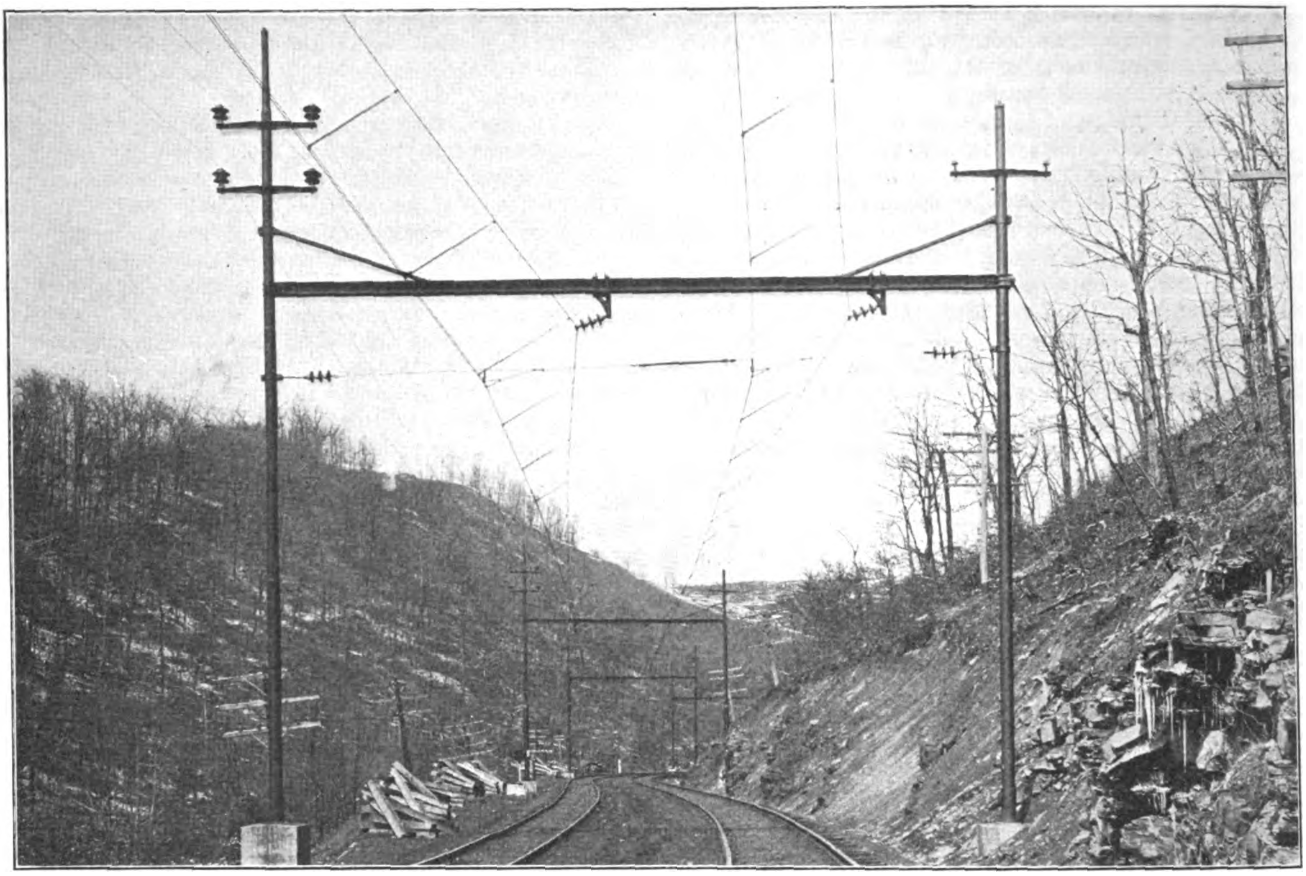
In the yards the catenary-carrying structure consists of two or more high structural-steel posts either guyed or self-supporting, from the tops of which a cross-catenary cable of extra-high-tension, galvanized, steel strand is run across the tracks to support the longitudinal catenaries.

THE CATENARY SYSTEM

The catenary system is designed to hold a No. 000 grooved, phono-electric contact wire at a uniform height of 24 ft. above the top of the rails in such a location that it will not vary horizontally more than 12 in. from the center of the track, allowing for superelevation. Above the contact wire is a horizontal auxiliary messenger wire, and above this is the main messenger wire that supports both of the other wires. In this section of the country the temperature ranges from about 110 deg. to minus 10 deg. Fahr., and this changes the stresses in the wires from almost zero to approximately the elastic limit.

Over tangent tracks the construction is simple. From each supporting structure a steel casting attached to the horizontal beam acts as a support for three suspension-type, Locke insulators. Each of these insulators is of itself good for a working voltage of 11,000, and the three are used as a special insurance against line troubles. The insulators are of porcelain and are 8 in. in diameter, somewhat over 5 in. long, having an ultimate strength of 12,000 lb. Since the initial energizing of the line about the middle of December there has not been a single failure of any of these strings of insulators.

There is attached to the bottom insulator a malleable-



NORFOLK & WESTERN ELECTRIFICATION—TYPICAL MAIN-LINE CATENARY CONSTRUCTION AND TUBULAR BRIDGE

iron casting which supports the messenger wire by being clamped to it. This casting has ample bearing for the wire and also has arcing horns so that in case of an insulator failing the arc would probably be from the casting instead of from the wire. The messenger wire is ½-in. extra-high-tension, galvanized, steel cable having a breaking strength of over 30,000 lb. It is jointed by forged sockets which were especially designed to develop the full strength of the cable. The nominal sag in the messenger wire is 5 ft. in a 300-ft. span, the actual sag, of course, depending upon the particular span.

Spaced at 30-ft. intervals along the messenger wire are bent-strap clips which hold the hanger straps. These latter are of galvanized steel and they are all of different lengths, depending upon the distance from the low point of the messenger wire, the length of each hanger being calculated so that the bottom of all hangers will be the same distance above top of rail. To the bottom of each hanger is bolted a pair of malleable iron trolley clips which, however, on tangent track do not grip the contact wire, but hold only the auxiliary messenger wire. This auxiliary messenger wire is a No. 0 round copper or steel wire, depending on whether the load conditions require the added carrying capacity of copper over steel. The various wires required for the overhead construction were furnished by the Bridgeport Brass Company, the Standard Underground Cable Company, and the John Roebling's Sons Company.

From the auxiliary messenger wire the No. 000 grooved contact wire is supported by a pair of clips bolted together and spaced 15 ft. apart. These are so spaced, however, that they are equi-distant from the hangers holding up the auxiliary messenger wire, and the result is an extremely flexible and smooth-running trolley.

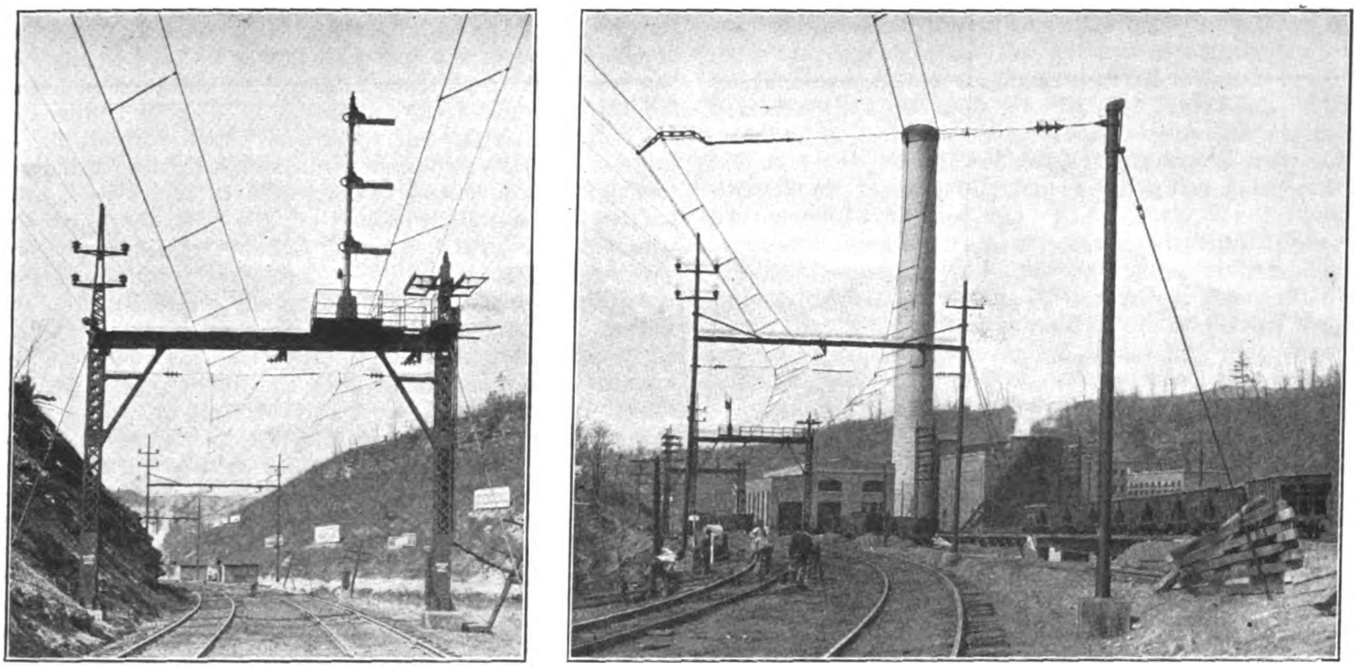
As all calculations were made for an average temperature of 60 deg., the winter temperature increases the tension in all wires and the contact wire rises somewhat in the center of the span. However, even a 6-in. rise in a 300-ft. span makes the trolley gradient of only 0.08 per cent, whereas gradients of even 0.5 per cent are permissible.

Steady strands are used on long tangent stretches. These are insulated from ground by strings of three suspension type insulators, and wherever one of these cross steady strands from pole to pole of a structure attaches to the wires over two or more tracks it is sectionalized between tracks by an impregnated, wood-stick insulator 4 ft. long. The latter are tested to 8000 lb. or largely in excess of the maximum load where they are used.

The trolley is sectionalized longitudinally where necessary by breaking the messenger wire with two parallel strings of three insulators each. Directly below the electrical break in the messenger wire the auxiliary messenger and contact wires are attached with turnbuckles to the ends of a heavy wood insulator. Tee-iron runners are supported from the trolley wires and from the wooden insulators, and as the runners are supported at opposite ends and sides of the insulators they have ample electrical clearance from each other. But since they are of the same elevation and overlapping longitudinally, the pantograph makes contact with the second before leaving the first, so that while the catenary system is sectionalized there is no interruption to the current supplied to the locomotives when they pass the break.

At the section breaks which are provided to permit isolation of parts of the line for repairs, but which are normally connected through electrically, specially-designed disconnecting switches are mounted on top of the wood insulators. These can be opened or closed by means of a long impregnated wooden switch-stick.

At certain locations the catenary system is anchored



NORFOLK & WESTERN ELECTRIFICATION—TYPICAL SIGNAL BRIDGE—PULL-OFF POLE ON MAIN-LINE CURVE

longitudinally, or dead-ended, by being solidly attached to the cross girders of special structural bridges provided to limit the zone of trouble should a wreck or unforeseen accident break a messenger wire. The normal messenger-wire support at the bottoms of the strings of insulators is so designed that in general the messenger wire will slip through. Hence, should a messenger break between anchors it is expected that it will slip through several supports adjacent to the break and distribute the abnormal strain over several bridges instead of concentrating the load on the structures at either side of the break.

Where the track is curved, as it is over the larger portion of the route, the trolley wire must also be curved so that it approximates the track curvature, but the system has been designed within limits such that the contact wire may be 12 in. off the center line of the track in one direction at the bridges or points of support, and 6 in. off the center line of the track in the other direction at the center of the span. This allows the trolley curvature to be less than the track curvature.

On curved tracks the hangers from the messenger wire are 15 ft. apart and the clips at the bottom hold both the auxiliary messenger and the contact wire. This is essential to keep the contact wire and the auxiliary messenger wire in a vertical plane. The holding of both wires by the same clip at the end of the hanger, however, does not result in hard spots in the trolleys. Since all such hangers lie on angles to the horizontal, the whole system is sufficiently free to move vertically under a slight upward pressure of the pantograph, and this assures smooth riding.

To avoid an uneconomically close spacing of structures on sharp curves pull-out poles are used in some cases between bridges. These are single tubular steel poles set in concrete foundations and having single guys of the same type as used on the catenary bridges. To the tops of these poles a wire strand is connected through three of the suspension type insulators to both messenger and contact wire, and this serves to bend the plane of a catenary system.

In the yards the catenary system is, of course, very similar to that on the main line except that only two of the suspension-type insulators are used between live wires and grounded structures. The auxiliary messenger wire is omitted, and the clips at the ends of the hanger straps hold the contact wire in tangent as well as in curve construction. This, of course, makes the contact wire in tangent, yard construction less flexible than where the auxiliary messenger is used, but it gives quite satisfactory results when the speed is low.

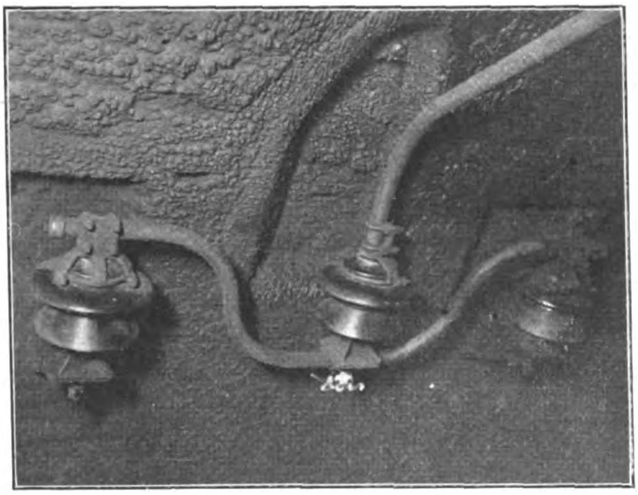
In the Elkhorn tunnel special catenary construction was necessary. The tunnel walls are 14 ft. apart at the spring line and 13 ft. apart at the base, the spring line being 11 ft. 1 in. above the top of the rails. The top of the arch is 19 ft. 3 in. high. Extended experiments with insulators and their arrangement were made by the engineers prior to the construction in a sample metal-lined tunnel where high voltages were submitted to the smoke and steam from a locomotive. The arrangement finally adopted was to have a supporting structure every 75 ft., the structure consisting of two cast-iron brackets on each side of the tunnel held to the brick lining by large bronze expansion bolts. Each bracket carries a 44,000-volt, transmission-line insulator. Supported by the pair of insulators on each side of the tunnel is a 2-in. brass pipe parallel to the tracks, and mounted on this piece of pipe is another line insulator upon which rests a cross pipe that is bent to follow the arch of the tunnel. The cross pipe is used as a support for the bronze messenger wire. All line catenary parts have, therefore, double insulation to ground. Notwithstanding the necessarily limited clearance, the overhead construction in this tunnel stood a test of three times the normal trolley voltage, and thus far has performed in a very satisfactory manner for the several weeks that it has been in service.

On branches and coal mine sidings a wooden-pole, bracket-type construction is used. In such cases only two of the suspension type insulators are installed. The messenger wire is 3/8-in. steel strand and the contact wire No. 00, no auxiliary messenger being used.

TRACK BONDING

A special type of track bond has been designed for this installation, the construction permitting it to be installed by removing only one bolt in the fish-plate. In this way the bonds may be installed almost as quickly as the exposed type, although they retain all the advantages of the concealed type. The method of installation requires a bond sufficiently rigid to be passed between the rail-web and the fish-plates so that the cable consists of thirty-seven strands of copper wire, making a bond equivalent to 0.275 in. diameter. As received from the manufacturer the bond consists of a 36-in. cable with a terminal welded on one end, the free end of the cable being tinned only, to prevent the separation of the strands. After the bond has been shoved through under the fish-plates the free socket terminal is soldered in place, and both terminals are expanded into the holes in the rail by means of steel drift pins. These track bonds together with the impedance bonds installed for the signal system were furnished by the Ohio Brass Company, the Electric Service Supplies Company, and the American Steel & Wire Company.

It may be mentioned here that the electrified zone was originally equipped with automatic signals of the d.c. type requiring primary storage batteries, these signals being usually mounted on posts along the track. Under electric operation, however, it was deemed advisable to make use of these signals, which were only recently installed and practically new, on other parts of the railway and to provide new a.c. signals in connection with a.c. track circuits, the signals being mounted on the catenary bridges. This part of the work was carried out by the railway company.



NORFOLK & WESTERN ELECTRIFICATION—CATENARY BRACKET SUPPORT IN ELKHORN TUNNEL

PROTECTION OF TELEGRAPH WIRES

Electrification made it necessary to move the telegraph pole line which originally had shifted from one side of the track to the other at frequent intervals. This was placed entirely to the north side of the track and at the extreme edge of the right-of-way. Ample clearance was thus provided against danger of physical contact between the telegraph wires and the high-voltage power wires in case the former should break and fall.

To provide against the effect of induction it was decided to place the transformer substations somewhat closer together than would have been required by considerations of voltage regulation and losses and to place the end substations near the ends of the line. This has resulted in feeding each important or long section of trolley from both ends, and in consequence the current fed to the trains in a section between substations goes in both directions in the trolley and track circuits, the induced voltage in parallel telephone and telegraph lines being thus largely localized and neutralized. In addition, however, in order to provide for such disturbances when one substation might be out of service, as well as for the excessively high currents which occur in cases of short circuits and grounds, it was decided to install the so-called "track-transformers," or boosters, in both trolley and track circuits at intervals of about 1 mile.

The track transformers are series transformers having the primary windings connected in series with the trolley and the secondary connected in series with the tracks at the middle points of the impedance bonds which are required at each signal location. These booster transformers are mounted on signal bridges, the track connections being carefully worked out so as not to interfere with the functioning of the signals. They cause the return current, of which a considerable amount would ordinarily leak through the ground, to flow in the track rails so that it is kept at a fixed distance from the trolley wire and the telephone and telegraph wires. The rails and the trolley wire occupy approximately symmetrical positions with relation to the telephone and telegraph circuits, and as the current is flowing in opposite directions in trolley and in track the effect is largely to neutralize the exterior inductive effect. While all of the above provisions were made primarily to protect the company's own circuits which are nearest to the track, they likewise serve to minimize the tendency to induced voltages in the telephone lines of other companies.

There are two sets of coils wound on the core of each transformer, one for the eastbound and the other for the westbound track. Hence only one transformer is required at each point. Since this arrangement has been in service it has been found that the telephone and telegraph service is not interfered with in any way by the operation of the electric trains.

FACILITIES FOR MAINTENANCE

A great deal of attention has been given to the provision of adequate facilities for the inspection and maintenance of all parts of the installation. The natural headquarters of the electric zone is at Bluestone, where the power house was necessarily located on account of the water supply, and it was decided to locate the inspection building and machine shop for maintenance of electric locomotives at that point also rather than to try to take care of electric engines at the steam engine shops at Bluefield. The line maintenance force is also located at Bluestone, and is in constant touch with all parts of the electrified section by means of a patrol telephone line having telephones placed at signal bridges in addition to the usual telephone facilities. Thus the general foreman and the foremen of all departments of the electrical maintenance work are located at one central point and provided with means by which constant connection is maintained with all points, including train despatchers, yard masters, and the superintendent and other division heads. To this end the company has provided dwellings for foremen and others on its property near the power house.

The locomotive inspection building is designed primarily for the electric locomotives, but the machine shop provided in connection therewith also serves the power plant, and thus the necessity of installing machine shop facilities in the power station is avoided. The building is 148 ft. by 68 ft. in size and is of the same type as the power station, which is just north of it. There are two main pits running for the full building length and each will hold one locomotive or two units. The pits are substantially constructed of concrete with sloping floors and numerous outlets to provide drainage, and they are equipped with electric wiring for lighting and power purposes as well as with compressed air.

At the west end of the shop is a short wheel-pit which is connected to the two other pits by means of a covered lateral pit. This pit is equipped with a narrow-gage track to handle the pneumatic jack by which the wheels are removed from the locomotives and are run to the storage track in front of the heavy wheel lathe.

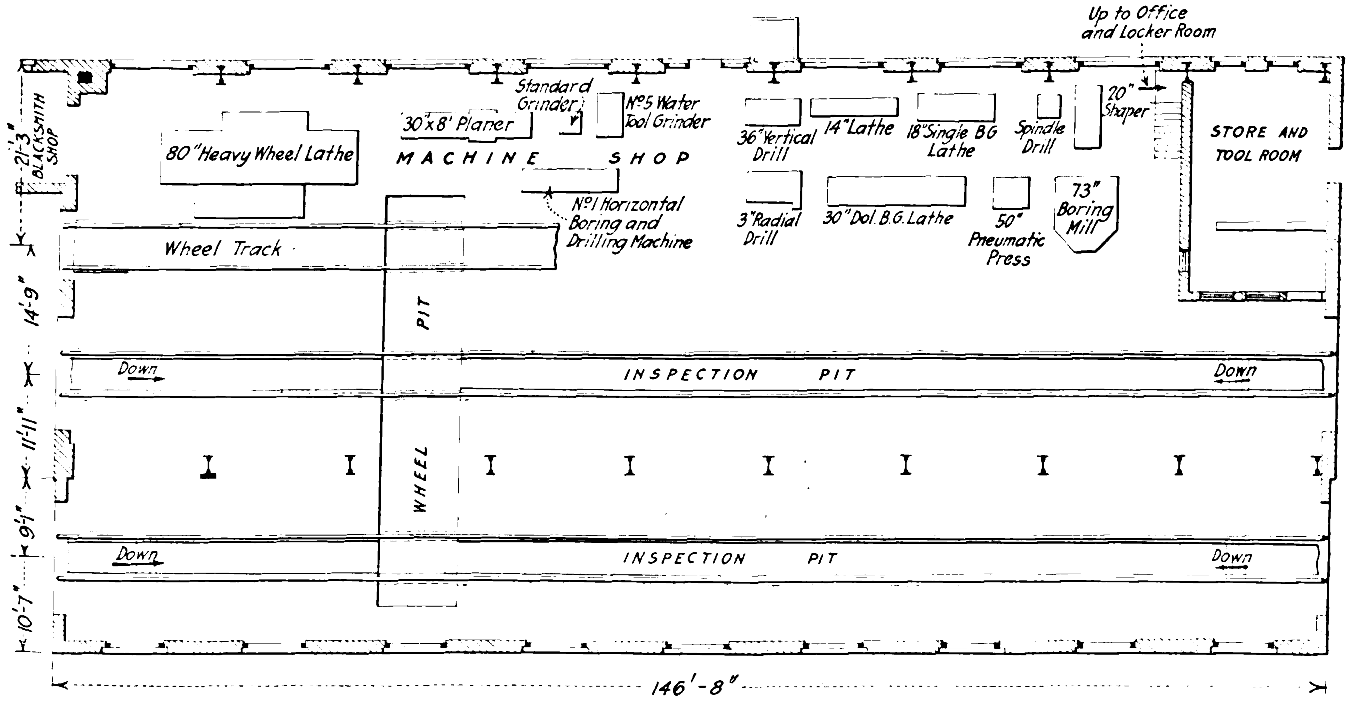
One of the pits is used almost exclusively for inspection, and for this purpose a 112-ft. platform has been located 12 ft. 8 in. above the rails, extending close to the side of a locomotive on the tracks. All repair work is done in the part of the building where the machine tools are located. This part of the shop as well as one inspection pit and the short wheel pit are spanned by a 30-ton Whiting crane. It is equipped with four General Electric motors and two hoists, the main hoist having a capacity of 30 tons and the auxiliary hoist having a capacity of 5 tons. The following machine tools are installed in the machine shop:

Motor Driven Tools

80-in. heavy wheel lathe.
30-in. x 8-ft. planer.
60-in. x 6-ft. horizontal boring machine.
3-ft. Mueller radial drill.
20-in. Stockbridge crank shaper.
73-in. boring mill.
36-in. double-back-geared lathe.

Belt Driven Tools

1 Diamond double emery grinder.
1 Diamond wet tool grinder.
36-in. Aurora vertical drill.
18-in. x 10-ft. single-back-geared lathe.
14-in. Barr two-spindle sensitive drill.
50-ton pneumatic press.



NORFOLK & WESTERN ELECTRIFICATION—PLAN OF ELECTRIC LOCOMOTIVE REPAIR SHOP

The pneumatic press and the pit wheel-jack were made by the railway company according to their own designs. Pneumatic pressure is used instead of hydraulic because of its extensive use in all buildings for other purposes.

LINE MAINTENANCE EQUIPMENT

A brick building at Bluestone, formerly used as a pumping station for locomotive water supply, is used as headquarters for the line inspection and maintenance force. Here a supply of line materials is carried, and part of the building will be fitted up as a bunk room for line repairmen, who will thus be available and subject to call at any time during the day or night. On a near-by siding is stationed an emergency repair train, consisting of a tower car, tool car and flat car, which is constantly held in readiness for heavy emergency repairs. The ordinary repairs, however, are taken care of by comparatively small gangs consisting of from three to five men for whom there are provided three small gasoline cars fitted to carry tools and an assortment of wire, insulators, and other repair parts as well as extension ladders.

Wherever possible repairs are made from the overhead bridges or from ladders. In order to avoid interruption to electric service to the greatest extent possible, specially treated and impregnated wooden ladders are provided and these can be used for light repairs to trolley fingers, clips, and other details on the 11,000-volt catenary system while it is alive. Very rigid rules permit the use of only one ladder at one point at any time and only one man is allowed on the ladder. The use of long lengths of wire which might reach across to other wires or to a grounded structure is prohibited. Certain of the line repairmen are regularly stationed at other points from which they can quickly respond to an emergency call by the use of gasoline cars.

The previously mentioned patrol telephone line is installed over the entire length of the electrified section and it has telephones in locked boxes at certain signal bridges spaced about 1 mile apart. This patrol line is connected with the power house and it is valuable for use in reporting either line or locomotive troubles.

Through the telephone operator located at the power house communication can be established with the train despatcher and other officials. The power director is located at the switchboard in the power station, and he is also in constant telephone communication with the signal tower operators, passenger station agents, yard masters, and others who are responsible for manipulation of switches in the substations or along the line. By means of these facilities power can be switched off or on quickly whenever necessary, or the line may be sectioned and service restored in part after interruptions.

Southwestern Association Question Box

Track, Shop, Distribution, Transportation and Management Topics Were Covered in Symposium Form

For the benefit of the members of the Southwestern Electrical & Gas Association, of which the annual meeting was held in Galveston from May 19 to 22, the "Question Box" was issued in pamphlet form in advance of the meeting. The pamphlet contained 125 questions, of which many were of interest to electric railway men, and a number of questions were accompanied by digests of answers received at the association office. The questions and answers of electric railway interest may be grouped under the following headings: Track and roadway, distribution system, shops, transportation and management.

TRACK AND ROADWAY

The pin terminal bond was recommended in response to a question as to the best method of bonding aside from welding or brazing. The latter should be well protected from corrosion.

The factors which determine the width of "devil strip" in city streets, in addition to the extreme width of car, were stated to be as follows: On tangent track side oscillation, uneven loading and uneven surfacing of track must be considered. Where the railway paves between tracks the cost of paving is also a factor. On curves the elevation of the outside rail of the outside track and clearance for the car overhang are additional factors. While in some cities clearance for persons standing between tracks is provided, this "safety space" is the cause of accidents rather than the preventative.

In regard to the crowning of paving between rails and tracks it was stated that, with T-rails, paving should be crowned slightly between rails, but not with grooved or girder rail. There should never be any crowning between tracks.

Unanswered questions related to screw and driven spikes, relative merits, and best sizes and methods of installing the former; the use of oxy-acetylene in rail bonding; the minimum radius of curve allowable with a single guard rail; the use of asphalt paving blocks against the rail; the proper relation of rail-head and wheel-tread widths; elimination of rail corrugation; building up special work by electric welding; the use of spring-point switches on high-speed, interurban lines; the traffic necessary to render the use of electric track switches economical, and the reclaiming of old materials from the scrap pile.

DISTRIBUTION SYSTEM

On the subject of bond testing the recommendation was made that such testing be combined with a general testing of the return circuit when possible. This can be done best when traffic is suspended. In regard to grounding of poles, it is not safe to depend upon a concrete setting of a metal pole for grounding.

A question as to the reliability of sherardizing and galvanizing of trolley wire and line fittings was asked. In reply the secretary explained the processes of coating metal objects with zinc oxide or zinc, stating that zinc oxide makes a non-porous "metallic varnish" which resists corrosion by many acids and alkalies. There are, however, some substances which attack zinc, particularly those carried in seashore air and in coal and gas smoke. In bending and otherwise handling zinc-coated fittings, there is danger of separating the coatings from the fittings, and rust will form under the coatings if the latter are broken. It is advisable to paint fittings, especially such as are subjected to bending or surface abrasion.

Several questions relating to poles and their preservation brought out information as follows: In eastern Texas both treated and untreated native yellow pine poles are used, but in the West, western cedar is the favorite on account of freight rates. Practically all kinds of poles can be economically "treated" without deleterious effect on the wood fiber. Improper manipulation in treating may injure the fiber by overheating or rupturing the cell structure.

Unanswered questions on distribution topics related to splicers for grooved trolley wire, mechanical trolley-wire ears, trolley-wire tension in city and interurban service and concrete poles in city span-wire construction.

SHOP PRACTICE

In reply to a question as to the useful life of axles it was recommended that axles be tested after making a mileage which allows a large factor of safety. For this purpose inspection in place is not sufficient but in general the axles must be stripped and thoroughly tested.

Unanswered questions related to the following topics: Results obtained with combinations of different kinds of gears and pinions; experience with roller and ball bearings in high-speed and low-speed service; mileage to be obtained with heat-treated axles; car ventilators; artificial light for car-sheds, pits and shops, and experience with sand-blasting of metal parts of cars.

TRANSPORTATION

A member asked as to the advantages and disadvantages of street sprinkling. The response was that there are no advantages to anyone concerned. The disadvantages to the railway are the making of slippery rail and soggy road-bed. It is recommended that the water wasted in sprinkling be used in washing the streets.

The discussion on methods for insuring intelligent reading of company notices by employees brought out the need for such methods, but no successful methods were described.

Regarding the possibility of holding conductors jointly responsible with the motormen for the observance of signals, it was pointed out that this would be highly undesirable as the conductor must concentrate on the duties which are peculiarly his own.

The replies on the subject of operating cars during lightning storms were unanimous in favoring such operation providing that suitable lightning arresters are used and the lighting circuits are kept closed.

A question as to the practice of companies as to allowing motor men to be seated while on duty brought out a response stating that motormen are allowed to sit in sections where vehicle and pedestrian traffic is light, providing their own stools for this purpose.

Unanswered questions on transportation related to the following: Possibility of using ordinary single entrance and exit cars in pay-enter service; practice in stopping cars near fire engine houses; relative advantages of near-side and far-side stops; practical results from the use of coasting clocks in city and interurban service; effects on schedules of the use of closed doors and folding steps; best alarm signal for city cars; disadvantages of devices for limiting car acceleration; use of the water jet for removing mud and leaves from rail, and water lubrication of wheel flanges on curves.

MANAGEMENT

On this broad subject the answered questions related to principally ejection of passengers, and the practice and esthetics of advertising. On the first topic the recommendation was that offending passengers be forcibly ejected only when necessary for the protection of other passengers or the employee. There is no one best method of informing the public regarding changes in schedules, etc. Advertisements and reading notices in newspapers, "notice boxes" on cars, slips handed out by conductors, etc., are all effective. Esthetic objections to certain kinds of advertising on cars are often very practical ones. Advertisements will be tolerated by patrons only when cars are not "mussed up" and no inconvenience or danger to passengers is caused.

Unanswered questions on management referred to these subjects: Effects of advertising on railway traffic; free transportation for trainmen when not in uniform; information to be allowed to non-concerned employees in accident cases, and results of paid publicity campaigns in the public press.

Convention of Missouri Association

Boat Trip on Four Rivers Enjoyed—Jitney Discussed

A convention of the Missouri Association of Public Utilities was held on Board the steamer *Quincy*, May 27-30, during a trip from St. Louis down the Mississippi River, up the Ohio, the Cumberland and Tennessee Rivers and back to St. Louis. During the trip stops were made at Paducah, Ky., and Cairo, Ill. The technical sessions of the association were held during the trip.

In a paper on "The Modern Public Utility—Its Duty Toward the Public It Serves," H. B. Porter of St. Joseph, Mo., said that the whole idea of modern business is service. Money is not earned nowadays when it enters the cash register, but only after complete satisfactory service has been rendered to the purchasers. Employees must see to it that there is never the least suggestion of insincerity in the utilities' attitude towards the public.

J. H. Van Brunt of St. Joseph, in a paper on "Public Utility Commissions," said in part: "If the public utilities and the Public Utilities' Commission of Missouri shall so co-operate as to bring extended and better service to the public, greater security to investors in utilities' securities and greater prosperity to the utilities themselves, the dream of the author of the public utilities' commission's bill will doubtless have been realized."

The most important paper, from an electric railway standpoint, was by P. J. Kealy, member board of control Kansas City Electric Railways, Kansas City, Mo. The subject was the jitney. An abstract appears below.

The election of officers for the ensuing year resulted as follows: President, George E. Hayler, Jr., of Joplin; first vice-president, Hugo Wurdack of St. Louis; second vice-president, Bruce Cameron of St. Louis; third vice-president, J. H. Van Brunt of St. Joseph; secretary-treasurer, F. D. Beardslee of St. Louis.

THE JITNEY

In his paper on the jitney bus Mr. Kealy first traced the responsibility for its existence, which, he said, was due to the tremendous output of automobiles during the past three or four years, the rapid change in models, and, as a result, the market of second-hand automobiles being flooded. Then the industrial depression threw many men out of employment, and the jitney craze brought together these two unproductive elements, i.e., the unsalable car and the man without employment. Any wages which these men could earn so long as the car they ran was serviceable, represented food and clothing to them. A second reason for the jitney was the rapid increase in population of American cities which had made it practically impossible for the electric railways to provide adequate transportation in the evening rush-hours in most communities.

Mr. Kealy then analyzed the cost of operation of the jitney and determined that it was approximately 10 cents a mile for a small car and 15 cents a mile for a large car, and that this operating expense could not be met if passengers were carried beyond a 3-mile zone for 5 cents. The question, Mr. Kealy said, was not how objectionable the jitney is to the traction company, but whether it is an economic possibility and whether it can render better transportation to the community at the same cost as the street railway is now doing.

The author then pointed out that the practical limits of the jitney radius of operation to but 3 miles would justify legislation driving it out of existence because otherwise the property values given to real estate beyond the 3-mile zone by the traction company would be destroyed. The speaker also referred to the great expense which has been undertaken in large cities to reduce street congestion by relocating freight terminals, building elevated railways, etc., but if the jitney supplanted the street railway there would be ten times the congestion within the business districts as at present. This would be an intolerable condition. Finally, the speaker quoted some English figures to show that the motor buses abroad had many times the total accidents per vehicle as the tramways.

In conclusion he quoted a man as having succinctly said: "Every time you take a jitney you are wronging your neighbor who lives beyond the jitney limits, abandoning the congested tenements for the open air and garden opportunities for his family. You wrong the children who must ride to school from the outlying districts on the street car. You are not considering the justice in the matter when you take a jitney for a short one-way trip and take a street car beyond the jitney limit. You are not considering the wrong you are doing your friends who live beyond the jitney in making it necessary to limit his opportunity for frequent service by the street railway company. You forget the possibilities of the street car system being prevented from extending their lines. The patronage of the jitneys is unfair to the city, unfair to renters, unfair to suburban property owners and unfair to the traction company."

Interstate Monthly Report on Accidents

The Interstate Commerce Commission, Division of Statistics, has issued a tentative draft of its rules governing monthly reports of railway accidents to carriers and others interested for the purpose of receiving criticisms and suggestions. Criticisms were requested by June 1. The new draft differs from the one distributed under date of Jan. 9, 1915, in that the number of forms is considerably reduced, only one form being provided for the several different classes of train accidents and train-service accidents. The proposed requirement for individual reports of non-train accidents has been withdrawn and only a summary statement of non-train accidents is provided for in the report. The proposed summary statement of train accidents and train-service accidents has also been withdrawn. A requirement for reports of rail failures resulting in train accidents has been added. The definition of reportable injuries to employees has been modified so as to make the minimum limit three days' incapacitation in the ten days following the accident, as is now in force. Numerous other, but minor, changes have been made which appear upon a reading of the draft.

In making the revision the commission says that it has had the benefit of the suggestions of the committee of the American Railway Association, composed of Julius Kruttschnitt, chairman; W. W. Atterbury and W. G. Besler.

The Chicago, Milwaukee & St. Paul Locomotives

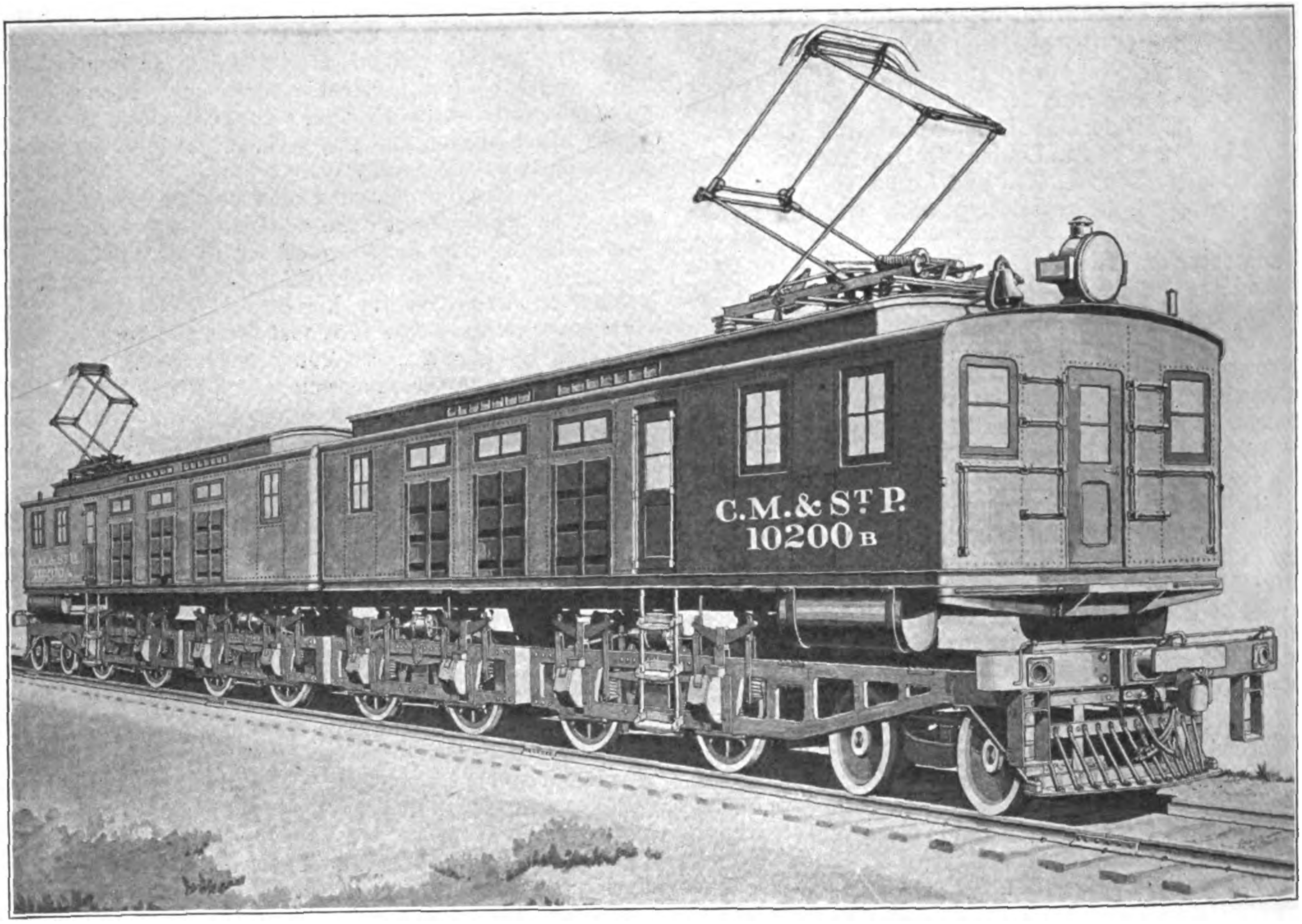
Among the Interesting Features of These New Electric Locomotives Are Large Motor Capacity with Axle Mounted Motors, Regeneration on Down Grades and a Novel Method of Current Collection

BY A. H. ARMSTRONG, ASSISTANT ENGINEER, RAILWAY AND TRACTION DEPARTMENT, GENERAL ELECTRIC COMPANY

The flexibility in design and operation of the electric locomotive afforded by the use of electric motors renders this type of motive power especially well suited to the hauling of trains, either high-speed passenger or slow-speed freight. In fact, the electric locomotive possesses inherent qualifications for haulage service that are becoming more fully appreciated as constituting the fundamental reasons for bringing about the change from steam to electricity, and interest in any new projected electrification therefore largely centers in the characteristics of the locomotives proposed. Work has progressed upon the Chicago, Milwaukee & St. Paul locomotives at the Schenectady and Erie works of the General Electric Company to such an extent as to make available certain facts as to construction and capacity that are of especial interest owing to the magnitude of the problems involved in this extensive electrification.

The general data applying to the St. Paul freight locomotives are given in Table I on the next page.

A very exhaustive series of tests has just been completed upon the first sample motor built at Schenectady, and has demonstrated that it has ample capacity to meet the heavy demands that will be placed upon it under service-operating conditions. The motors are wound for 1500 volts and connected two in series for 3000 volts. The power axles are driven by twin gears, in this respect being similar to the drive on the Great Northern, Detroit Tunnel, B. & O. and Butte, Anaconda & Pacific, except that springs are used in the axle gears. On account of the high voltage for which the motors are wound, the commutator width is small, thus allowing more space for armature iron and copper, with the result that the motor has a continuous capacity of 375 hp. In fact, special interest attaches to the large continuous capacity of the St. Paul locomotive as this is the first instance where such a liberal motor capacity has been required and provided for, and it should be noted that this large capacity is secured in an axle motor without departing from well known and thoroughly tried out forms of construction.

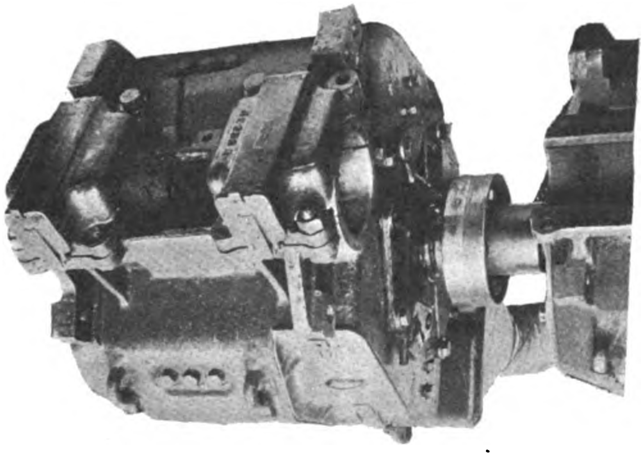


C., M. & ST. P. LOCOMOTIVE—VIEW OF COMPLETE UNIT OF WHICH TWENTY-ONE ARE NOW UNDER CONSTRUCTION. EACH LOCOMOTIVE HAS EIGHT MOTORS, TOTALING 3440 HP.

A study of the train dispatcher's sheet covering performance on mountain grade divisions of our steam railways shows that it is general practice to assign such a trailing tonnage to a locomotive on ruling grade as to demand a tractive effort at the driver rims equivalent to approximately 18 per cent to 19 per cent of the weight upon the drivers. In other words, steam practice calls for a locomotive which can operate for long periods at a coefficient of adhesion of from 18 per cent to 19 per cent, leaving the difference between this value and the slipping point of the drivers, as a sufficient margin with which to start on ruling gradients. Under like track conditions, the uniform torque of the electric motor should make available some 10 per cent more tractive effort than is possible with the reciprocating drive of the steam locomotive having the same weight upon the drivers. Until sufficient operating experience is available, however, to prove that an electric locomotive can be rated at 20 per cent coefficient of adhesion, it seems reasonable to adhere to the present steam practice of a somewhat lower value. The St. Paul locomotive, therefore, with its continuous motor capacity of 17.75 per cent and a one hour rating of 21.2 per cent of weight on drivers gives ample assurance of ability to handle its assigned tonnage under all service conditions.

TABLE I—GENERAL DATA ON CHICAGO, MILWAUKEE & ST. PAUL FREIGHT LOCOMOTIVES

Type of locomotive	3000 volts direct current
Length over all	112 ft.
Total wheel base	103 ft.
Rigid wheel base	10 ft. 6 in.
Total weight	520,000 lb.
Weight on drivers	400,000 lb.
Weight on driving axle	50,000 lb.
Weight on guiding axle	30,000 lb.
Diameter of driving wheel	52 in.
Diameter of guiding wheel	36 in.
Number of driving motors	8
Total output (continuous rating)	3000 hp.
Total output (one hour rating)	3430 hp.
Tractive effort (continuous rating)	71,000 lb.
Per cent of this T. E. to weight on drivers	17.75
Speed at this T. E. at 3000 volts	15.75 m.p.h.
Tractive effort (one hour rating)	85,000 lb.
Per cent of this T. E. to weight upon drivers	21.2
Speed at this T. E. at 3000 volts	15.25 m.p.h.

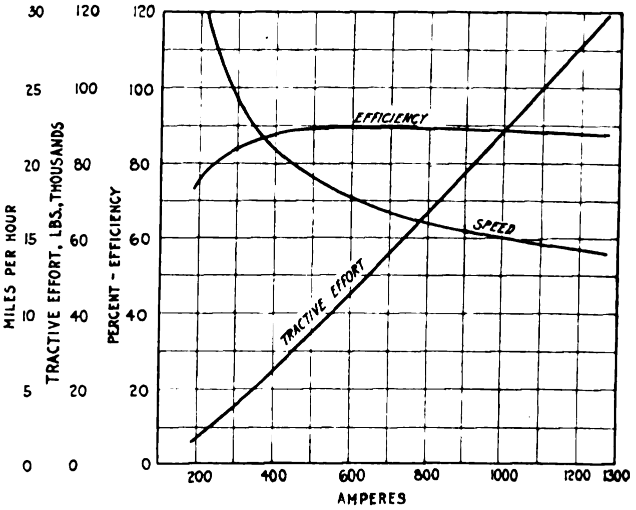


C., M. & ST. P. LOCOMOTIVE—END VIEW OF MOTOR ARRANGED FOR STAND TEST

The St. Paul freight locomotive is guaranteed to have a hauling capacity of 2500 tons trailing load on all gradients up to 1 per cent, and its heaviest duty will be to haul this load from Lombard to Summit over the Belt Mountains, a distance of 49 miles with a ruling grade of 1 per cent and an average grade of 0.7 per cent over the entire distance. Including the locomotive of 260 tons, the gross train weight of 2760 tons will require a tractive effort of approximately 72,000 lb. on the 1 per cent ruling grade, based upon a train resistance of 6 lb. per ton. This practically corresponds to the continuous rating of the locomotive, as tabulated above, and brings out the interesting fact that these locomotives are so proportioned as to motor capacity that they cannot be abused under normal service operation.

The necessity of rating main line electric locomotives upon a practically continuous basis is still further emphasized in the case of the St. Paul locomotives by the introduction of electric regenerative braking. The heavy demands upon the motors when operating upgrade may be nearly duplicated during the following down-grade running when regenerating, thus giving small chance for the time element of the motor heating to enter as a factor in proportioning its capacity for such exacting service. A 2 per cent grade requires a motor output of 46 lb. per ton up grade and gives 34 lb. per ton motor input down grade. Making due allowance for internal locomotive losses, it is evident that the motor output when operating as a generator down grade will approximate 60 per cent of its input when hauling the same train up a 2 per cent gradient. Hence the need of making provision for a practically continuous motor capacity in the St. Paul locomotives in order to meet the service requirements of the broken profile over which they are designed to operate.

It is interesting to compare the relative capacity of the new electric locomotives and the Mallet engines they will replace. This is shown in Table II:



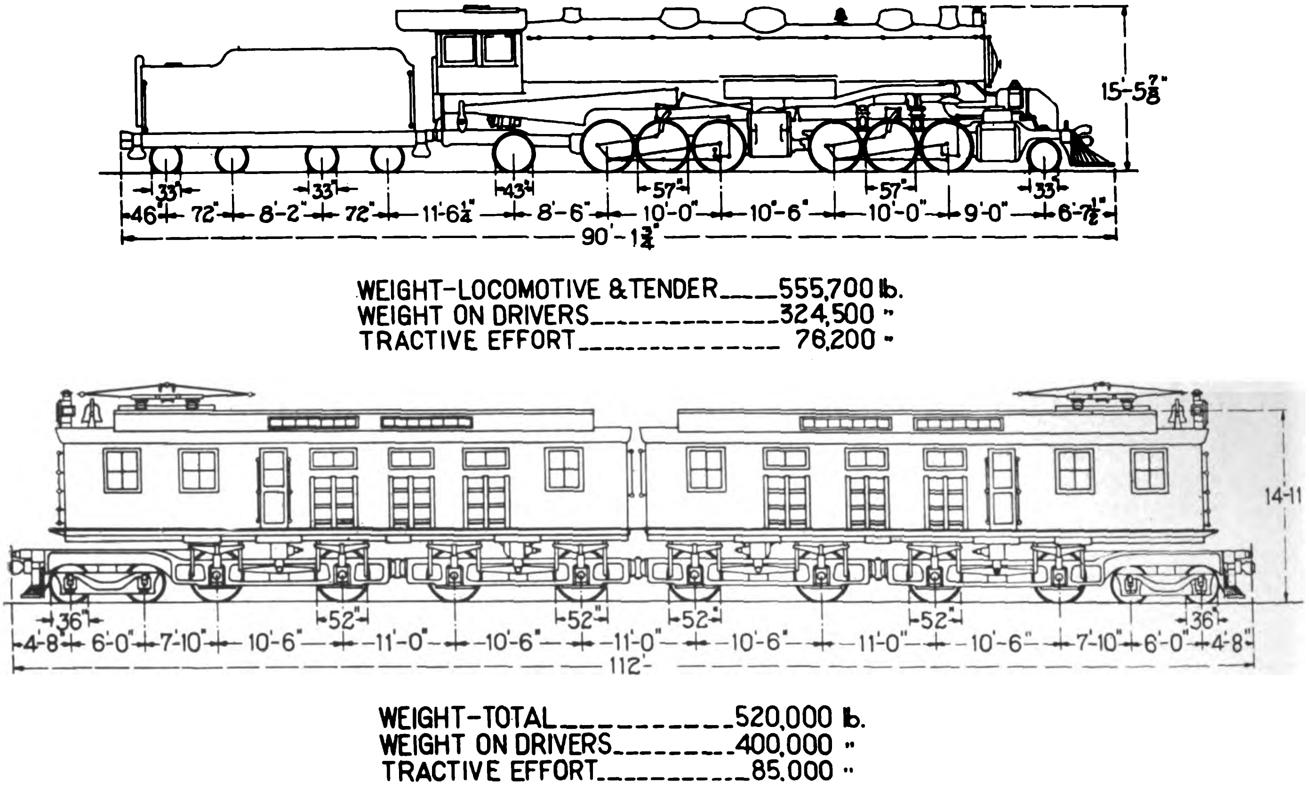
C., M. & ST. P. LOCOMOTIVE—CHARACTERISTIC CURVES OF 3000-VOLT D.C.-FREIGHT LOCOMOTIVE

TABLE II—COMPARISON MALLET AND ELECTRIC LOCOMOTIVES

	Mallet	Electric
Total weight	555,700 lb.	520,000 lb.
Weight on drivers	324,500 lb.	400,000 lb.
Rated tractive effort	76,200 lb.	85,000 lb.
Per cent of weight on drivers	23.5%	21.2%
Rated tonnage 1% grade	1,800 tons	2,500 tons
Tractive effort for above tonnage	54,000 lb.	71,700 lb.
Coefficient of adhesion	16.7%	17.9%
Wheels per guiding truck	2	4
Weight per driving axle	54,000 lb.	50,000 lb.
Total weight on one rigid wheel base truck	162,000 lb.	100,000 lb.

Under favorable conditions the Mallet engine can haul 2000 tons on 1 per cent grade, thus bringing its tractive effort up to 59,000 lb. and the coefficient of adhesion on its drivers up to 18.3 per cent. The electric locomotive weighs 94 per cent of the combined weight of Mallet engine and tender and has a tonnage rating of 23½ per cent greater, based upon using the same coefficient of adhesion in each case, that is, 17.9 per cent. This comparison indicates that the electric locomotive has a hauling capacity one-third greater than the steam engine and tender of the same total weight, has less weight per axle, is provided with four-wheel guiding truck in place of two-wheel, requires no turntable as it operates equally well in either direction, and, finally, eliminates the necessity for stopping to take on coal and water.

The same type of locomotive is used for both freight and passenger service, the only difference between the two being the gear ratio which is 4.56 for freight and 2.45 for passenger service. This interchangeability of all parts of the freight and passenger locomotive and the adoption of one uniform type for all classes of service should be reflected later in the low cost of maintenance of the locomotive as well as prove of great benefit in the economical handling of the traffic. For facility in shop repairs, the locomotive is constructed in halves, and in fact each half can be provided with draft gear in place of the articulated joint and operate singly in service up to its capacity. One passenger locomotive will haul a trailing load of 800 tons over all gradients of the road without assistance except upon the 2 per cent grade section over the main divide of the Rocky Mountains. Even on this grade a 600-ton train can be handled without assistance. This illustrates the exacting nature of mountain railroading which demands in this instance that the passenger locomotive shall have the necessary motor capacity and smooth running qualities to successfully haul an 800-ton train at 60 m.p.h. on level track and also operate over 20 miles of 2 per cent up grade. Add to this the regenerative braking feature and steam heaters for train heating, and the broad nature of the problem of designing an electric locomotive for main line mountain service becomes very apparent. The locomotive superstructure contains space for two oil-fired steam heaters, together with ample provision for storage of oil and water. All passenger locomotives and a certain number of freight locomotives intended as reserve passenger units will be equipped with heater boilers.



15'-5 7/8"
33"
33"
43"
57"
57"
33"
46"
72"
8'-2"
72"
11'-6¼"
8'-6"
10'-0"
10'-6"
10'-0"
9'-0"
6'-7½"
90'-1¾"
WEIGHT-LOCOMOTIVE & TENDER ____ 555,700 lb.
WEIGHT ON DRIVERS ____ 324,500 "
TRACTIVE EFFORT ____ 76,200 "
14'-11
36"
52"
52"
52"
52"
36"
4'-8"
6'-0"
7'-10"
10'-6"
11'-0"
10'-6"
11'-0"
10'-6"
11'-0"
10'-6"
7'-10"
6'-0"
4'-8"
112'
WEIGHT-TOTAL ____ 520,000 lb.
WEIGHT ON DRIVERS ____ 400,000 "
TRACTIVE EFFORT ____ 85,000 "

C., M. & ST. P. LOCOMOTIVE—DIAGRAM GIVING COMPARATIVE DATA OF COMPLETE ELECTRIC UNIT AND MALLET COMPOUND STEAM LOCOMOTIVE

CURRENT COLLECTOR AND OTHER DETAILS

A departure from the roller current collector of the Butte locomotive has been made in the St. Paul locomotives as the result of numerous experiments made upon the test tracks at Schenectady and Erie. These tests indicate that a double pan collector bearing against twin conductor trolley wires is capable of taking off a current of 2000 amp. at speeds as high as 60 m.p.h. This is several times the demand upon one collector of the St. Paul locomotives, and the double pan was adopted in place of the roller collector, although the latter has been giving excellent results, reaching a life of nearly 30,000 miles in the passenger service of the Butte, Anaconda & Pacific Railway.

Provision has been made in the control to enable two locomotives to be run together in multiple unit, but the enormous starting effort of two such locomotives, 240,000 lb. tractive effort at 30 per cent coefficient of adhesion, makes such a combination of use only when it acts as a pusher on the rear of a train. The motors and starting resistances are designed to permit of a starting effort of 120,000 lb., being maintained on one locomotive for a period of five minutes without destructive heating, and in this connection the thermal capacity of the heavy slow-speed motors will be of great assistance.

The first completed St. Paul locomotive will probably be placed upon the test tracks at Erie during September and shipment of these locomotives commenced soon thereafter. The construction work upon trolley and substations of the first engine division between Three Forks and Deer Lodge has been so far completed as to give promise of being finished and ready for the trial runs of the locomotives as soon as they are received this fall. Ample provision has been made for power and transmission line facilities by the Montana Power Company, so that electrical operation of the Chicago, Milwaukee & St. Paul Railway should soon be an accomplished fact.

A reduction of 511 in the number of accidents reported for February of this year as compared with the same month the year before is a record of the Detroit United Railway. There were 1655 accidents in February, 1914, and 1144 in February, 1915.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

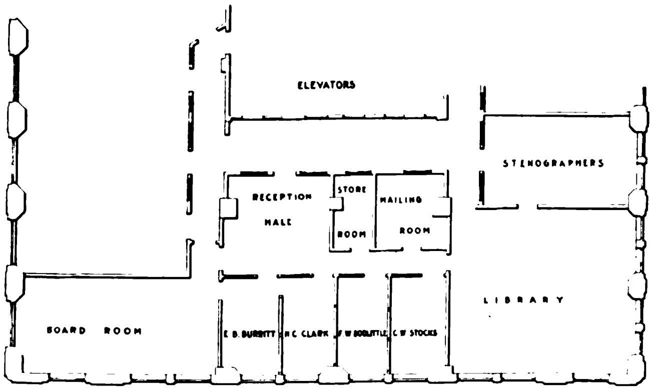
Association Headquarters Moved this Week to No. 8 West Fortieth Street—A Plan of the Offices is Given Below—Chicago Elevated Section Holds Its Second Meeting and Plans to Select Delegates to the Convention

THE NEW ASSOCIATION HEADQUARTERS

As was announced last week on this page the offices of the association in New York have been moved to No. 8 West Fortieth Street. A view of the building, a structure just completed, is given herewith. As the illustration shows, the new building is but a few doors from the Engineers' Club, which appears at the right.

VIEW ON WEST FORTIETH STREET, NEW YORK CITY, SHOWING NO. 8 AT LEFT AND ENGINEERS' CLUB AT RIGHT

The building is just west of Fifth Avenue, from which buildings are numbered east and west in New York City, and opposite one end of the New York Public Library, which extends from Fortieth to Forty-second Street on Fifth Avenue. The general layout of the association offices on the seventh floor is shown in the diagram printed above. In this layout the best possible use of the available space is made, and Mr. Burritt and his colleagues are grouped for convenience of communication.



PLAN OF NEW ASSOCIATION OFFICES AT NO. 8 WEST FORTIETH STREET, NEW YORK CITY

The moving was accomplished without interference with the work and so expeditiously that when the rules committee arrived on June 3 for the meeting announced below, the board room and offices had quite a "settled" appearance.

The association rooms stretch along the west side of the building, facing toward the Engineers' Club, while the end window in the board room overlooks the New York Public Library, of which a corner is seen at the left-hand edge of the photograph.

CHICAGO ELEVATED RAILROAD SECTION

The meeting of company section No. 6 was held on May 25 with 115 members in attendance. Secretary Dwight L. Smith announced that seventeen applications for membership had been received and passed by the executive council, and nine other applications are awaiting acceptance. This will bring the total membership up to 162.

Two interesting papers illustrated with lantern slides were presented at this meeting; one a description of a new double-deck bridge over the Chicago River, by C. M. Mock, chief engineer, and the other a description of the new steel cars recently purchased by the company, by H. A. Johnson, master mechanic. Both of these papers treated the subjects in an educational way, discussing them particularly from an engineering standpoint. For instance, the description of the bridge not only took up the engineering difficulties, but described how the construction would proceed and how it would affect operation. The steel-car paper discussed the engineering considerations entering the design, and compared the new cars with the wooden ones now in service.

Announcement was also made at this meeting of the plans for selecting the two delegates who are to be sent by President B. I. Budd to the San Francisco convention of the association. One representative will be the member of the section who submits the best suggestion tending to further the company's interests, along such lines as improving the service, increasing safety, reducing expenses, stimulating traffic, improving equipment, or outlining more efficient methods to be employed in the maintenance of equipment. The other representative will be elected by popular vote, after a primary election for the choice of five candidates.

COMMITTEE ON RULES

The final meeting of the T. & T. Association committee on rules met in New York at No. 8 West 40th Street, on June 3, with the following in attendance: W. H. Collins, Gloversville, N. Y., chairman; L. H. Palmer, New York, vice-chairman, and C. E. Morgan, Jackson, Mich. No new topics were considered, but the conclusions reached at earlier meetings were put into form for the annual report and in this form will be submitted to the entire committee at once. Recent important meetings of this committee were reported in the ELECTRIC RAILWAY JOURNAL as follows: Feb. 20, page 379; March 20, page 589 (joint meeting with block signal committee); April 10, page 713 (meeting of joint subcommittee appointed March 17).

COMING COMMITTEE MEETING

The committee on way matters of the Engineering Association will meet in Chicago on June 11 and 12.

COMMUNICATIONS

Mr. Sprague on Regenerative Braking

NEW YORK, May 19, 1915.

To the Editors:

I note that the ELECTRIC RAILWAY JOURNAL has been giving considerable editorial attention of late to the subject of regeneration of electrical energy in heavy electric traction. As I have been engaged in pioneer work along regeneration lines for many years you may be interested in a few historical notes regarding this work. It has been based upon the principles which first found their development and practical application in my constant-speed electric motors developed for stationary work some thirty years ago in the early days of this art. At that time I pointed out that in order to get constant speed under variable load, with a shunt motor supplied from a constant-potential circuit, it was necessary automatically to vary the field magnet strength inversely with the load, and therefore the motor or counter emfs, so as to vary the effective or differential emfs and currents directly with the load.

The principle underlying this regulation, applied to motors with shunt fields alternately driving a load or being driven by one, of course indicated that when so driven by a load the raising of the motor emf above that of the source of supply would produce a reversal of current and consequent delivery of energy to the line.

The first practical commercial application of this principle that I know of was in my use of shunt-wound motors to drive line shafts from which balanced freight elevators were operated by direct and reverse belts. In such cases when a load was being lowered it drove the motor at a slightly accelerated speed and delivered current to the line, thus making it possible to operate a very large number of elevators from a common source of supply with a minimum total expenditure of current.

I early developed this principle in its application to railway work, and in December, 1885, before the Society of Arts in Boston, outlined at length a method of electrifying and operating the Manhattan Elevated Railroad, so that by using shunt motors and the principle of shunt-field regulation it would be possible to save fully 60 per cent in the size of the central station and in the amount of power required, because every car or train running on a down grade, or approaching a station at a speed above a certain value, would constitute a moving supply station to supplement the main power station in providing current for cars accelerating, ascending a grade, or operating at constant speed.

Such operation was demonstrated for a considerable period on a platform car at the old Durant Sugar Refinery on East Twenty-seventh Street, New York, in 1886, and for some months on the Thirty-fourth Street branch of the Elevated Railroad in the winter of 1886-1887. At this time I used shunt field variation, not only for speed control but also for first delivering current back to the line in slowing down the speed of a car, and then, breaking away from the line, for bringing the car to rest by sending the current generated in the armature through a diminishing resistance until finally it became practically a short circuit, the field still being connected to the line. In the public tests in this connection the car was often handled entirely without the ordinary wheel brakes.

The method of operating trains with shunt-wound, constant-potential motors had two difficulties, one being a lack of starting torque as compared with a series-wound motor, and the other that success in using this method of regeneration required motors of similar characteristics and wheels of like diameters, or methods of adjustment to take care of any differences which might exist. With these factors equalized there was no question of the remarkable efficiency of control and saving of energy.

In 1886 I extended my patents to cover the application of the same principle to the recharging of storage batteries when used upon a street car. I think that I am correct in stating that these various patents and the principles outlined in them marked the first recognition of the possibility of the use of a regenerative principle in a practical way.

Since that time a great many uses have been made of this scheme. One very common one was that developed by me about 1890 in connection with elevators operated against gravity. In my earlier multiple-sheave screw machines the load was always against the machine, that is, even with no load in the car the weight was unbalanced by, say, 600 lb. or 700 lb., enough to rapidly overhaul the machine. The motors, therefore, on the up-trip always worked against a load, but on the down trip the armature was detached from the source of supply, closed upon an adjustable rheostat, and the speed of the car was governed by the retardation so established. The safety device at the bottom operating on failure of current also made use of this principle.

On the Central London elevators, which represented by far the largest elevator equipment ever put in at the time of its installation in 1897-1898, the operation was on similar principles, except that in this case the elevators were practically counter-balanced, so that the motors were sometimes driving and were sometimes driven in each direction of movement. This resulted in material economy.

Various attempts have been made in recent years to apply this principle to series-wound motors in operating street cars, and a number of tests were made in England in this connection. In the application of polyphase motors to railway service the principle of regeneration to line was, of course, the natural application of their shunt-wound motor characteristics. Following this application in Italy various plans have been advanced for using the regenerative principle in connection with single-phase motors, although the problem in this case is not by any means so simple, especially if it be desired to use all the motors of an equipment. Incidentally, I had, on the first modern electric railway installed in Italy by my assistant in 1890, used this same principle as a special safeguard made necessary by a grave accident occurring shortly after the opening of the road. After this accident it seemed important to put into the hands of the conductor the ability to take the control of the car acceleration out of the motorman's hands, and to make the car act as its own braking power.

Later, I proposed for d.c. motors on mountain duty the use of the regenerative principle, primarily for braking or checking the train on a down grade, using all the motors, not for sending current back to the line but for generating current under controlled resistances upon the locomotive, the motors being self excited with reversed armature connections. This was not done for purposes of power economy but primarily to avoid the disastrous consequences of over-heated brakeshoes and wheel rims after long brake applications, and the failure of air supply when perhaps unduly overtaxed. In this case the braking could be alternated or divided between motors and air brakes.

I proposed this plan practically for a suggested electrification of the Sacramento division of the Southern Pacific Railroad over the Sierra Nevada mountains in

1907, 1908 and 1909. A variation of this use of motors as self-exciting generators on a locally closed circuit is to use a line-excited motor-generator to excite the series field coils of the motors, leaving the armatures connected with the line so as to be able to receive current from, or send back current to it, with provision for changing the connections so as to get local self-excitation for rheostatic braking in case of necessity.

This later plan, like many others which I have found necessary to carry through in the face of doubt and criticism, did not meet early acceptance, but it is probably the method which must be adopted at least with direct current motors. FRANK J. SPRAGUE.

Investment Per Passenger

SLOAN, HUDDLE, FEUSTEL & FREEMAN
CONSULTING ENGINEERS
MADISON, WIS., June 2, 1915.

To the Editors:

I have noticed the article by D. J. McGrath in the ELECTRIC RAILWAY JOURNAL of May 8, and was much interested in finding that a study was being made to show more clearly to the public just what application was made of the fare received by street railway companies from its patrons. The studies described by Mr. McGrath represent, to my mind, the first step in presenting this matter properly to the public.

In my work with a considerable number of public service commissions throughout the country who are regulating rates for utility commodities, it has usually developed that when the consumer came to a clear understanding of the basis for the charge which was being made upon him, he was willing to pay fairly for the cost of the service which was being furnished.

Unfortunately, due to the operation of certain misguided public utility men, who were really financiers and not operators, the problem of convincing the public that utilities of various kinds are not a veritable gold mine has been a difficult one. The wide variation in the laws governing the issuance of utility securities has helped to increase the doubt in the public mind. Published extracts from annual reports of utility companies indicating satisfactory dividends, some times issued for financial purposes, have also added fuel to the fire of mistrust. As pointed out in Mr. McGrath's paper, the past practice of indicating the investment per mile of track or per dollar of gross revenue has been unsatisfactory not only to the public but to the trained operator. The varied conditions which obtain in small and large city construction, where street improvements and varying length of haul play such an important part, make these figures of little value. We must, therefore, find some method of presenting these facts in terms simple enough to be readily understood by the average patron.

I believe that further development should be made along the lines suggested in the article and units should be prepared which will further divide the average fare so that the patron can see at a glance its various applications. For example, in the case of the Manchester Street Railway Company, of Manchester, N. H., which was cited by Mr. McGrath, the investment per passenger would be somewhat misleading, as he points out, due to the fact that this company is purchasing power and does not have any investment in a power station. We would, accordingly, expect to find its operating expenses for power charges greater than that of a company furnishing its own power.

I believe, therefore, that it is necessary to take additional steps to show the application of the total amount of the average fare received per passenger to all the fixed and variable expenses which enter into the cost of furnishing street railway service. If this were done, in many cases patrons of the city lines would be very much surprised to find out the portion of the average 5-cent fare which goes toward paying a fair return on the investment, and that which goes for operating expenses and depreciation.

ROBERT M. FEUSTEL.

Traffic Characteristics

AMERICAN ELECTRIC RAILWAY ASSOCIATION
BUREAU OF FARE RESEARCH
NEW YORK, June 2, 1915.

To the Editors:

In the article on "Traffic Characteristics," appearing in the issue of the ELECTRIC RAILWAY JOURNAL of May 15, the descriptive titles of Fig. 3 and 4 (pages 927 and 928), have been transposed. Probably no confusion resulted from this, as the units of each scale are shown in the figures, but I am taking the liberty of calling the matter to your attention in this manner, in order to remove any possibility of confusion.

The method of construction of these models may be of interest.

On a sheet of cross section paper there was first laid off a horizontal line representing to scale the distance between points where traffic observations were made on a typical line.

Ordinates were next erected at each point of observation, representing to scale "total passengers" or "passengers per car" observed at that point. The plotted ordinates represent "hourly rates"; that is to say, where the total number of passengers passing a point of observation was, say 200 from 3:30 to 4:00 p. m. and 300 from 4:00 to 4:30 p. m. The ordinate erected at that point of observation would be drawn to represent 500 passengers per hour.

The next step was to connect the ends of the ordinates by a curve. The cross section paper was then pasted to a sheet of cardboard and cut along the base line and the curve connecting the tops of the ordinates. This process was repeated for each of the twenty-four hour-periods of a typical day. Values used in this work were averages determined from observations extending over a period of three days.

The twenty-four cardboard curves were next arranged in order, in notches sawed in the board which forms the basis of the model. The position of these cardboard strips is shown by the dark lines transversing the figures. Between the strips a plastic material was placed, and each of the twenty-four prisms was smoothed off to conform with the trend indicated by the adjoining prisms. The resulting surface was finally painted and varnished.

F. W. DOOLITTLE, Director.

The Nashville Railway & Light Company, Nashville, Tenn., profiting by the experience of the Knoxville Railway & Light Company, Knoxville, Tenn., is enlisting the interest of the pupils in the public schools in the safety-first work it is doing. Blotters on which there are pictures of typical accidents that are the penalties of carelessness and "hooking rides" have been distributed among the children of the schools and the teachers are having the pupils write short articles on the impressions gained from the pictures. The Knoxville Railway & Light Company provided a schedule of prizes, in the form of free-ride books, each containing tickets for fifty rides. The local company may follow the same course next season, but as the school term will soon be over no action of the kind will be taken this summer.

Equipment and Its Maintenance

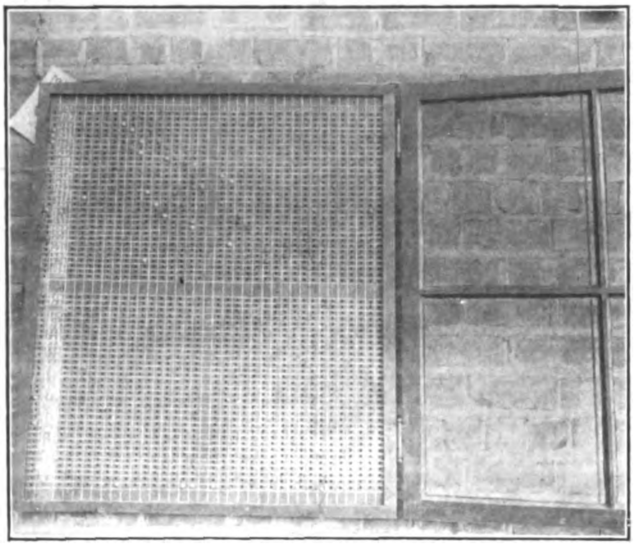
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

The Tri-City Railway Trouble Board

BY JOHN SUTHERLAND, MASTER MECHANIC TRI-CITY RAILWAY & LIGHT COMPANY, DAVENPORT, IA.

The trouble board has become an indispensable part of the shop records of the Tri-City Railway & Light Company, Davenport, Ia. This board is made as simple as possible, and, for the sake of accuracy, the record is kept covered with a locked glass door and no extra pegs are supplied. The essential features of this board are shown in the accompanying illustration. The records for two groups of cars appear on the board as pegs inserted in the proper vertical column to designate the date and on the same line as the car number. The upper group includes pay-as-you-enter cars and other cars in regular service, and the lower group all extra and open cars. The car numbers are recorded with chalk so that their position may be changed to show their track location. The unmarked column at the extreme left of the board is used only for extra pegs. Two columns at the extreme right of the board are for dead cars, those out of service on account of wrecks and those being overhauled or painted. A black peg in one of these columns indicates that the car has been in a wreck, and a white peg that the car is being overhauled or painted. In the dated columns, black pegs indicate when the car was last inspected and white pegs when the car was last oiled. The oiling pegs are inserted by the oiler and inspection pegs by the shop foreman, and, in addition to the trouble board, a book record is kept.



TRI-CITY RAILWAY TROUBLE BOARD

During the winter months only white pegs appear in the lower group, since the cars in this group are used only during the summer months. All cars are oiled and inspected every fifteen days, the time being changed occasionally according to the condition of the car. A rule has been made that an interval of at least two days shall elapse between an oiling and an inspection unless the car is in bad order, which is indicated by a black and a white peg inserted in adjacent holes. The track location of the car is shown by the line on which the number is written on the board. All car-storage spaces in the shops receive consecutive numbers which correspond to the line on which the car numbers are written.

Mysterious Derailments

BY R. P. WILLIAMS, INSPECTOR OF SPECIAL WORK BROOKLYN RAPID TRANSIT SYSTEM

Determining the cause of derailments is often a difficult matter, and investigation may show many conditions of a contributory nature. Each may be removed as found and yet the real reason still remain a mystery.

A notable case of this kind occurred on one of our lines some time ago, with the introduction of a new type of truck. The cars were operated successfully over the various switches about the carhouse, there being right and left-hand switches of 50-ft., 75-ft. and 100-ft. radii. But one particular switch on the main line of 150-ft. radius, at a short line terminus, could not be negotiated without considerable trouble. In many cases the air brake had to be abandoned, the hand brake used, and the process of jumping or jerking the truck in short movements resorted to. Examination of the switch and mate showed gage and surface to be good. Travel on the main line, the straight track, being much greater than on the curve, left the mate floor high. The tangent guards, also, having a 1¼-in. groove, showed ¾ in. above the level of the head.

The tongue of the switch was of manganese steel, and straight track wear gave the top guard edge a degree of sharpness that might tend to lift a wheel. The distance between the inner edges of guards was found to be nearly the limit in width. None of these defects was so pronounced as to be considered dangerous, and as no other type of truck gave trouble, it was decided to investigate truck condition. This showed various minor conditions tending toward derailment, but not sufficient to cause it.

Beginning with the switch, every known tendency to derailment was removed by grinding until the switch was in perfect condition, but derailments still continued. The truck then received its share of attention, the builders of the truck taking a lively interest.

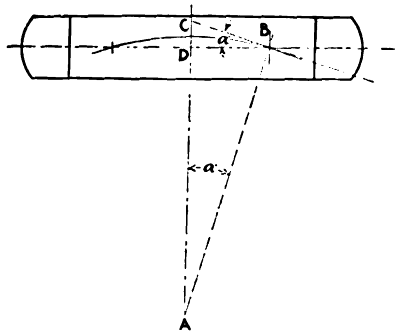
In one of these trials, after some new adjustment of the truck, conditions showing very little improvement, our engineer of surface lines suggested that possibly the trouble might be caused by the condition of the tangent track just ahead of the switch, the mate-side rail being low. But, inasmuch as all cars were brought to a full stop before entering the switch, the switch mate and guard rails themselves being level, this low spot, it was thought, could not have much bearing on the case. After some further adjustment of the truck without improving conditions, examination of the low spot referred to showed that it corresponded to the length of truck base. The track was leveled and derailments ceased entirely.

It was reasoned that, on account of this low spot, the weight of the car was thrown on opposite side bearings, the truck entering the switch having most of its weight thrown to the mate-side wheels, correspondingly lightening the tongue-switch side and accentuating all of the defects in the truck and track.

It would be of interest to know if the leveling of the track in the first place would have been sufficient to have prevented the derailments.

Truck Angularity on Curves

A correspondent in Kansas City, Mo., calls attention to a useful short-cut method for finding the angle which a truck makes with the car body when the car is on a curve. He states that he has found the practice in many drafting rooms to be to lay out on a curve all of the lines shown in the accompanying diagram in order to find the angle *CBD*. Here *AB* is the radius of curvature and *DB* is one-half the distance between truck centers. From the diagram it is evident that triangle *CBD* is similar to triangle *BAD* and, therefore, that angle *CBD* equals angle *CAB*. These angles have been designated by $\propto$. Now if any triangle similar to *CBD* be constructed such that the short side is proportional to one-half the distance between truck centers and the hypothenuse is, to the same scale, proportional to the radius of curvature, the desired angle can be found at once. The only drawing necessary is this one right triangle.



TRUCK ANGULARITY ON CURVES

If a table of sines is at hand the angle can be calculated without making any diagrams by noting that

$$\text{sine } \propto = \frac{DB}{BA}$$

That is, the angle which a truck center line makes with a car-body center line is that whose sine is one-half the distance between truck centers divided by the radius of curvature.

Paving Experiences at Joliet

BY JOHN B. TINNON, ENGINEER MAINTENANCE OF WAY CHICAGO & JOLIET ELECTRIC RAILWAY

The standard rail of the Chicago & Joliet Electric Railway for work in streets with brick pavement is 100-lb., A. R. A. "A" Illinois Steel Company section No. 10,020, although we still have a great deal of pavement with Lorain Steel Company section Nos. 60-263 and 80-335.

We have a single track on a 42-ft. street, the main business artery of Joliet, that was built and paved in the year 1906. This construction consists of Lorain No. 80-335 rail in connection with wooden ties, a concrete paving foundation of 1-3-6 mixture from the bottom of the ties up to 5½ in. below the top of the rail, a 1½-in. sand cushion and a brick paving with grout filler. Nelsonville filler and stretcher brick were used on this work, and the pavement is still in very good condition, although a count made last autumn showed that the vehicular traffic on this section is about 2000 vehicles in ten hours. If it had not been necessary on several occasions to disturb this pavement in order to repair and finally to remove all thermit joints and to put in 10-ft. sections of new rails where the joints were cut out, the paving would have been in almost as good condition as when it was laid. In some cases the stretcher bricks are beginning to show considerable wear.

We have no 100-lb. rail that has been in use longer than 2½ years. As the paving with this rail has not commenced to show any wear at all, we cannot give any data on it; nor is any wear shown on light travel streets with overhauled 60-lb. rail where this style of pavement has been used for the last four or five years.

This company has always used brick pavement in paved streets except that some asphalt was used about fifteen years ago. Originally, and until about 1905, we used a common small paving brick for stretcher, and building brick for filler. The foundation was of concrete made from natural cement, usually placed by a contractor and not very stable. The bricks were laid on a sand cushion and filled with sand. During the coming summer we expect to remove the last of this type of pavement because the rail, which is of Lorain 60-263 section, is too light for the cars. Although this pavement is in bad condition it would last for two or three years and possibly for five years more if some general repairs were undertaken. However, as the city expects to repave the streets affected, new paving is a necessity. The street in question is one of the heavily-traveled thoroughfares of Joliet and the amount of its traffic is about 1500 vehicles in ten hours.

Commutator Soldering Torch

BY J. C. DONOVAN, MASTER MECHANIC UNION ELECTRIC COMPANY, DUBUQUE, IOWA

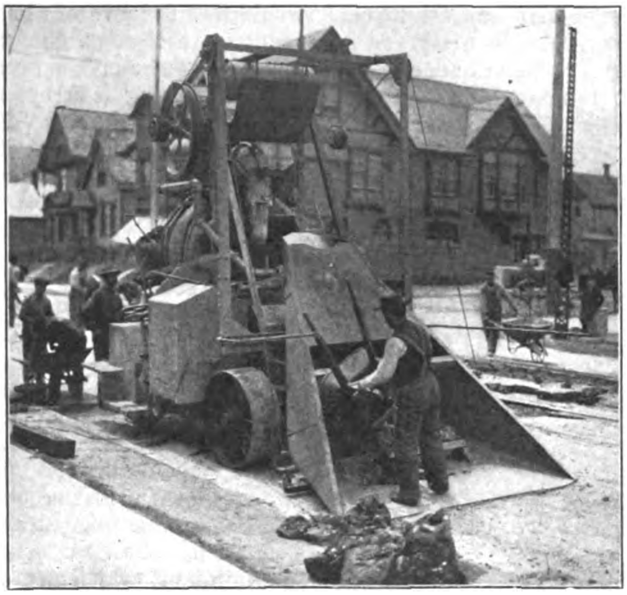
To preheat the commutator leads of armatures so that solder will flow in freely, a solder-melting torch has been provided in the armature repair department of the Union Electric Company, Dubuque, Ia. A view of this torch is shown in the accompanying illustration. The burner and mixer, which are of a standard type, are fitted with two hose connections, one to the shop compressed-air supply and the other to the shop gas supply. The flow of gas and air to the mixer is regulated by brass shut-off cocks at the point where the hose connects to the torch. Valves at the point where the hose connects to the shop gas and air systems, however, are used to admit air and gas to the burner. The burner is pivoted horizontally and may be fixed in any position by a set screw, and an extension feature in the standard permits vertical adjustment. This is obtained by connecting the burner on a rod which fits the ¾-in. pipe standard snugly, and the set screw at the top of this pipe fastens the burner in any position. The base of the standard was made of a defective gong filled with refuse babbitt. The outfit complete with hose, brass shut-off cocks and labor cost approximately $5.

DUBUQUE RAILWAY—COMMUTATOR SOLDERING TORCH

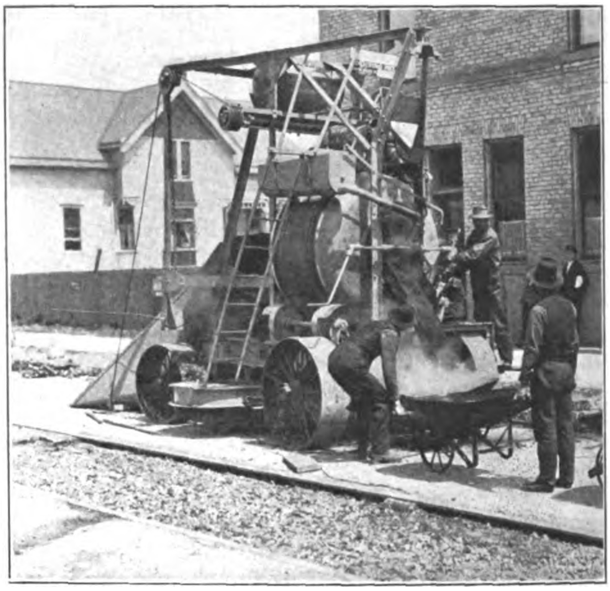
Economical Asphalt Relaying with Hot Mixer

The way and structures department of the Milwaukee Electric Railway & Light Company is obtaining successful results in patching and relaying asphalt street pavement by the use of a portable concrete mixer and a heating plant built in one unit. While this is used primarily for bituminous mixing, it is readily convertible for concrete mixing as well.

The Milwaukee company has a large mileage of asphalt pavement which requires the usual amount of resurfacing and patching, and all of this work formerly was done by contract. The company has a large stationary asphalt plant, but for relaying and patching jobs generally distributed in all parts of the city this small portable-unit has demonstrated superior economy. The hot mixer, which is shown in the accompanying engravings, was purchased from the Koehring Machine Company of Milwaukee and has recently been used with success on three jobs totaling about 3 miles of double track.



MILWAUKEE PAVING—LOADING OLD ASPHALT INTO HOT MIXER



MILWAUKEE PAVING—DISCHARGING HOT REMIXED ASPHALT

The machine is a combination heating plant and mixer designed for bituminous concrete road mixtures and for sheet asphalt, rock asphalt and cement concrete work. The capacity is a 22-cu.-ft. batch. The general design is such that the machine will pass under all overhead structures, and it is of narrow construction so that it may stand beside the curb and yet leave space for cars to pass on the near track while men are working between the track and the mixer. The machine is not special, except that for general use such plants are driven by gasoline or steam engines while this plant is driven by a 15-hp., 550-volt, 550-r.p.m. G. E. motor fed from the trolley. This motor serves to operate the entire mixer, with its mechanical charger and hot-blast apparatus, and also, through a set of transmission gears, it serves to propel the mixer at either of two speeds in either direction. For long moves, such as from one part of town to another, the outfit is drawn by a utility car or horses, but for progressing along a job the self-propelling feature is employed.

By disconnecting the blower and asphalt tank and connecting the water-measuring tank, the hot mixer may be used as an ordinary concrete mixer.

With this portable mixing plant and a gang of fifteen men the way department of the Milwaukee company has been able to take up and relay more than 180 sq. yd. of asphalt pavement between rails in a working day. The thickness of the paving is between 2 in. and 3 in., and the entire operating cost of the plant, including team charges but no depreciation or interest on the special investment, has been found to be about 42 cents per square yard for patch work. This includes tearing out, remixing and repaving with the old material, and adding such small amount of new material as may be required.

The procedure is to repair one track at a time and to maintain uninterrupted car operation over both tracks without blocking vehicular traffic except on one side of the street.

The gang is composed of the following men: One foreman, one man breaking up asphalt, five men preparing concrete sub-base and wheeling remixed asphalt, one man feeding charges to the mixer, one man painting paving stones with hot asphalt and applying cement to surface of finished pavement, one man running the mixer, three men raking, smoothing and tamping, and one night watchman, and one teamster. In addition to ripping up the old asphalt and relaying the pavement, this gang also keeps the street in safe operating condition. A two-horse general-utility team also is a part of this outfit.

On the job recently completed, a part of the work consisted in relaying the asphalt between the granite gage blocks on a busy double-track line. The procedure of the work from front to rear is as follows: The old asphalt surface is first picked up and broken into pieces about 6-in. square, the smaller sizes being more readily melted. The mixer is charged with approximately 8 cu. ft. of this old material and new asphalt in varying amounts, usually about 10 lb. per charge, is added in accordance with the character of the old mix.

About nine minutes' time is required for melting and mixing a charge. During the first six minutes the maximum hot blast is applied, the temperature being reduced for the last three minutes. The blast is furnished by a blower driven by the main motor. This blower operates in connection with two crude-oil burners, the flame from which is distributed in such a way that only the hot-air blast, and no flame, strike the mix, thus preventing burning. The construction of the mixer is such that the material is continually raised in large buckets inside the drum, and cascaded from top of the drum down through the incoming hot blast to the reversed discharge chute, which spouts it to the farther side of the drum. Thus all material is subjected to repeated hot-blast baths, and the material itself aids in maintaining high temperature in the remotest sections of the drum. The oil consumption is about 50 gal. per day. Crude oil is purchased in tank cars and delivered to the job in a steel tank which holds 310 gal.

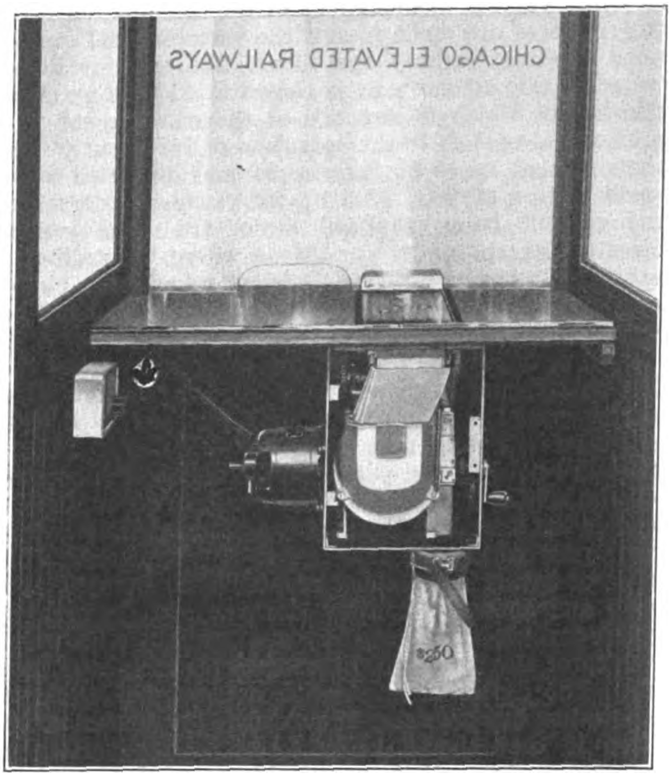
After a mix has been heated it is discharged into two-wheel Sterling concrete carts and immediately dumped in the track. Then the asphalt is raked, tamped and smoothed in the usual manner. Finally a surface is given it by rolling with a hand roller loaded with water.

Representatives of the railway company state that the quality and speed of work performed with this hot-mixing outfit will improve with experience in its operation and that they are now satisfied that the unit costs, particularly for pickup and patch work, are considerably lower than those which usually obtain for similar work executed under old methods or under contract.

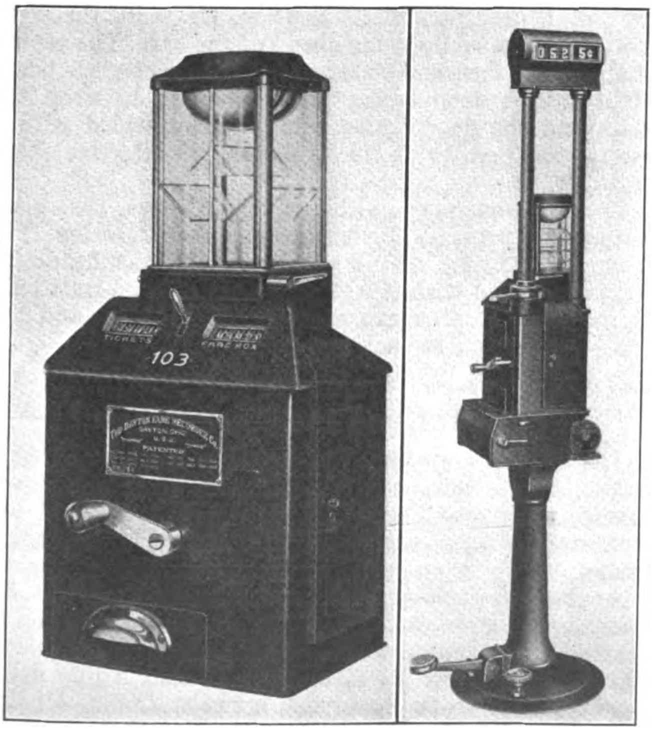
New Form of Cash and Ticket Fare Box

For some time inventors have been at work on the design of a registering fare box to handle tickets as well as coins. Otherwise, some other kind of fare register has to be used to register the tickets, a method more or less unsatisfactory when there is a large percentage of ticket fares, party because it necessitates a division of fares handled by the conductor and partly because the fares cannot be handled fast enough under heavy traffic conditions.

Several makes of fare boxes are now being put on the market adapted to receive and register in a single device both cash and ticket fares. The coins and tickets are separated automatically, the cash being registered and computed in dollars and cents, as in the ordinary fare box, and the tickets are counted, cancelled and delivered into a separate locked compartment of the box. One of the latest types of combination cash and ticket fare boxes is manufactured by the Dayton Fare Recorder Company of Dayton, Ohio, a description of which follows:



RECORDING FARE BOX WITH TRAVELING BELT ESPECIALLY DESIGNED FOR STATIONS



CASH AND TICKET FARE-BOX, MANUALLY OPERATED, AND ON ROTATABLE BASE WITH MOTOR DRIVE

The general appearance of the combination fare box is about the same as the cash fare box of the manufacturer that has been on the market for some years, the size and weight of the two boxes being practically the same. A view is shown in the first engraving. Cash fares and ticket fares are deposited in the same receiving box by the passengers, where they are examined by the conductor. When the handle at the front of the box is turned, the coins are separated from the tickets, and the total amount of money is computed in dollars and cents. The coins, after they are registered, pass into a money till, where they are immediately available for use by the conductor.

At the same time the ticket fares, as they are separated from the cash fares, are cancelled and delivered into the ticket box, from which they are removed at the end of the run or at the end of the day by an authorized employee of the company. The tickets are counted by means of a separate register contained in the fare box, the registrations being made by a small lever, which is pressed as each ticket is deposited in the fare box. A register bell is used to indicate the completion of each registration. An additional counter is provided when a register for transfers and other fares is desired.

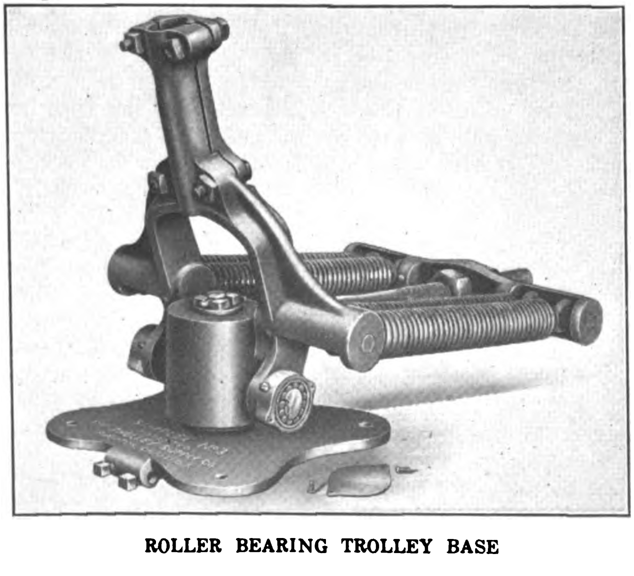
In one type of the combination cash and ticket fare box a visual trip register and fare indicator are used to give greater prominence to the classification of fares as they are registered. The second illustration shows a combination fare box-register of this type, mounted on a rotatable base, adapted to change the position of the machine to suit the direction of travel of the car. The type of machine shown in the illustration is designed for use on center-entrance cars, and is provided with a two-way fare indicator, which shows the indications as fares are registered on both sides of the device so that the indications can be seen from all parts of the car. The machine is shown fitted with treadle mechanism for foot operation, but it may be operated by hand as well. Various modifications of the combination fare box-registers are made to suit the variable local conditions of street railway operation. The machine illustrated in this second view is shown fitted with an electric motor, which is also one of the more recent improvements applied to the operation of fare boxes. All the different types of fare boxes may be fitted with small motors of, say, 1/25 hp for electrical operation, the current being supplied direct from the trolley circuit. Except under conditions where the traffic is exceedingly heavy, however, it is entirely practicable to operate these fare boxes either manually by hand or with a foot treadle.

Still another type of fare box manufactured by the Dayton company is shown in the third engraving. This device consists of the regular cash fare-box fitted with a special traveling belt, upon which the coins fall as they are paid by the passengers, and are then carried on the belt in full view a sufficient interval of time to enable the attendant thoroughly to inspect them before they pass within the fare box to be registered. This type of device is especially adaptable for elevated, subway and suburban railway stations, and its greatest value consists in the rapidity and accuracy with which the fares may be handled during heavy rush hour traffic. The device is fitted with a motor for electrical operation, but provision is also made for manual operation if that should be preferred. This variety of machines shows that manufacturers of fare register equipments are now able to furnish suitable fare boxes for every condition of operation where fare boxes are at all adaptable for use.

New Trolley Base and Headlight

The Trolley Supply Company, Canton, Ohio, has just placed upon the market two items of electric railway car equipment that possess a number of unique features. One of them is a roller-bearing trolley base which has been designed as a result of long experience in the manufacture of this type of equipment and it has the advantage of roller bearings on the side as well as around the center swivel pin. The roller bearings and their bushings are made of specially-treated, hardened steel, and they make the up and down as well as the sidewise motion as nearly frictionless as possible.

The tension bar is of solid steel, 1¼ in. in diameter. It is so placed that it takes up all the springs at the same time and thus prevents the possibility of adjustments that are not made evenly. One of the best features of the trolley base is that the tension increases as the pole rises and the further the pole is pulled the less tension there is against the wire. This insures safety at railroad crossings. In general, the new base contains a minimum number of parts, and owing to its flexibility, it permits an unusually large mileage to be obtained from the trolley wheels. The height of the base is 5½ in. and the weight is 100 lb.



ROLLER BEARING TROLLEY BASE

HEADLIGHT OF UNUSUAL LIGHTNESS

The new headlight that has been brought out by the same company is in line with the modern tendency to decrease weight in car equipment wherever possible. It is reported to be the lightest headlight ever designed, weighing but 7 lb. complete. However, strength and efficiency have not been sacrificed to attain this end, for the casing is constructed of No. 8 gage steel throughout, the front door being carried on an extra strong frame that is riveted in place. The head light is equipped with a triple-nickel-plated, polished brass reflector of special parabolic design which centralizes the rays of a concentrated-filament mazda bulb, throwing a strong beam of light far ahead of the car. The casing is absolutely dust and water proof, the front glass being fitted into a deep recess and the space between the glass and the door frame being tightly sealed with a special felt pad which serves also as an effective shock absorber.

This arrangement, although it renders the glass waterproof, provides for expansion and contraction. The front glass is 8⅜ in. in diameter, and the headlight can be supplied with either a 23-watt or a 36-watt bulb as desired. The overall diameter is 11½ in. and the depth from front to back is 6 in.

Spanish Bus Line Unsuccessful

The 37-mile motor-bus line between Huelva and Ayamonte, Spain, has been discontinued, after one year's service, owing to insufficient patronage. French cars were used, with a seating capacity of twelve passengers each.

A great obstacle to successful operation was the extremely bad state of the road. The line, in addition to serving the terminal towns, passed through Gibraleon, Cartaya and Lepe. It is understood that a line using Spanish cars is in operation between Cadiz, Medina Sidonia and Alcala de los Gazules, a total distance of about 35 miles.

Non-Splashing Electric Track Switch

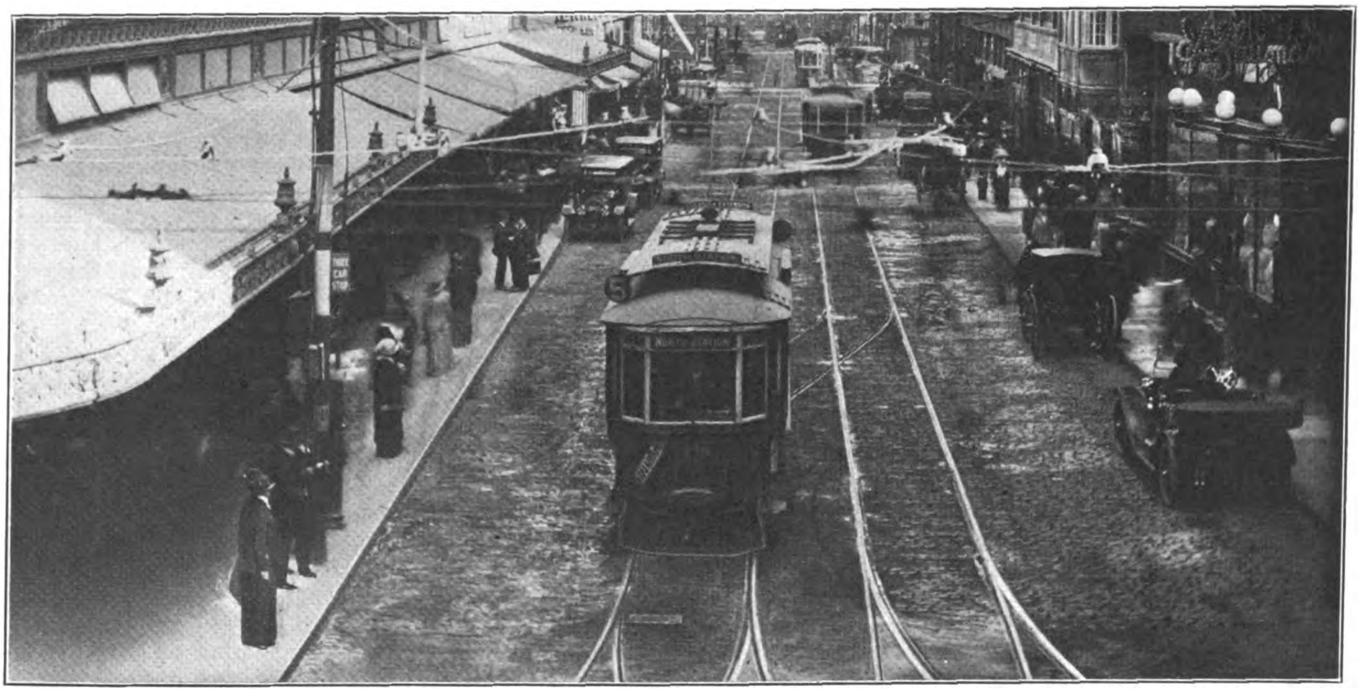
The savings in time and labor that are effected by electric operation of track switches in urban service are of such importance that the practice has become more or less general, notwithstanding certain mechanical disadvantages which have heretofore existed. Most prominent, perhaps, among the unfortunate features of the solenoid-controlled switch have been the splashing of muddy water when the switch point is shifted, giving rise to serious objections on the part of pedestrians, and, in addition, where no means for locking the switch-point in position is provided, there is always the possibility of derailment due to movement of the switch between the trucks of a passing car.

These two difficulties have been absolutely eliminated in the improved electric track switch that was developed during the past year by the Collins Switch & Signal Company, and was shown for the first time at the Atlantic City Convention last fall. The device is now being placed on the market by the manufacturers, the United States Electric Signal Company, West Newton, Mass. The results of service tests on ten electric railways during the past winter have proved to be most satisfactory in every respect. The changes that have been shown by the tests to be desirable are practically negligible notwithstanding that the new switch constitutes a radical departure from previous designs, the only point of similarity being the use of motor current to throw the switch in one direction and by the non-use of motor current to throw it in the opposite direction as the trolley wheel passes under a contactor in advance of the switch point.

The starting contactor has two contacts and is mounted on the trolley wire approximately 60 ft. ahead of the switch point. A stopping contactor is mounted in advance of the frog and it is located at a point such that the last wheel of the car must be on or beyond the switch point before the trolley wheel reaches the stopping contactor. A box containing the resistance and the relays is mounted on the trolley pole most convenient to the switch point and a conduit runs from this under the pavement to the street box.

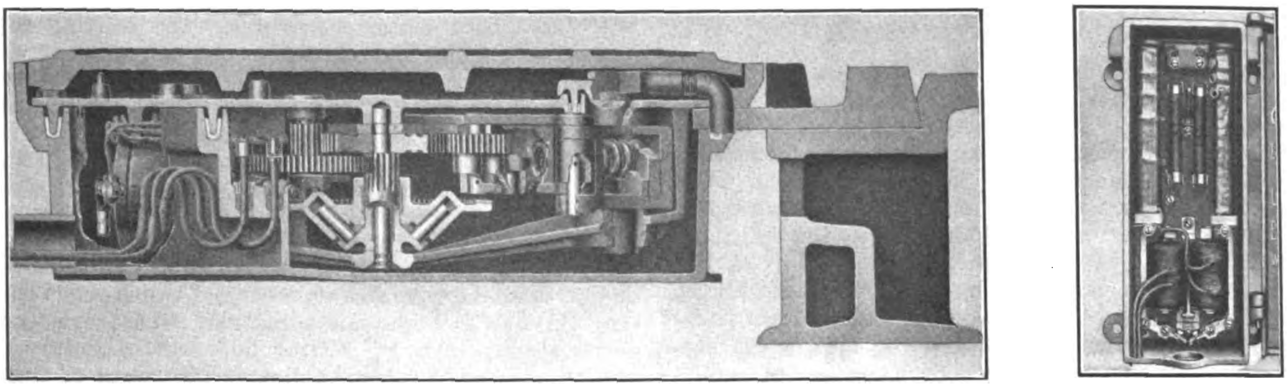
If the trolley wheel passes under the starting contactor with motor current on in the car, current will be fed from the trolley wire through a low-resistance relay in the relay box and thence to the car because the contact strip is insulated from the trolley wire and the car is supplied with power only through the relay when the trolley wheel rides on the contact strip the relay being connected to the trolley wire through a contact finger in the stopping contactor.

As soon as this relay is energized, its armature moves up and in so doing makes up a contact which sends current through a high-resistance relay whose armature moves slightly upward, resting under the armature of the low-resistance relay, holding it up. Both of these armatures remain up, as a stick circuit is fed through the high-resistance relay as soon as the armature of either relay reaches its top position. Should the trolley wheel stand on this contactor for an indefinite period, it would not burn out anything, for the circuits are made up only momentarily and as soon as the relays act the circuits are made up elsewhere.


NON-SPLASHING TRACK SWITCH—INSTALLATION AT SUMMER AND WASHINGTON STREETS, BOSTON

This stick circuit, which holds up the armature of the relays passes on through resistance to ground and a 110-volt tap is taken off of this resistance to run to a motor in the street box. The current to the armature of the motor is always fed in the same direction. The current to the fields of the motor, however, is fed first in one direction or the other, depending on which relay armature is uppermost. If the armature of the low-resistance relay is uppermost, the motor revolves in such a direction as to throw the switch for the curve. The motor is connected to the switch point through a chain of gears and a shaft which passes through an inner cover and is made water tight by means of a mercury seal. As the motor is geared it causes the switch point to move slowly.

As soon as the switch point has finished its stroke, the gears cause a clover-leaf-shaped cam to revolve, rubbing a roller and compressing a rigid spring. At a certain point in the revolution of the clover-leaf cam the spring takes the load off the motor and speeds up the gears, causing the pins of a simple clutch to fly up by centrifugal force. This disconnects the motor



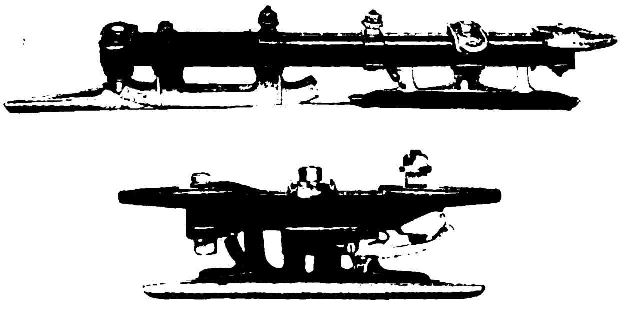
NON-SPLASHING TRACK SWITCH—INTERIOR VIEW OF STREET BOX; RELAY AND RESISTANCE BOX

from the gears and it remains disconnected so long as the motor runs. The disconnection is made so that the switch point can be thrown by the switch iron at all times, whether the motor is running or not. The same spring, which is a very positive one, acts as an anti-straddling device and holds the switch point rigidly in the position into which it is thrown.

As the trolley wheel leaves the starting contactor the motor is left running, and should a second car pass this contactor before the last wheel of the first car reaches the switch point, there will be no effect on the mechanism, for the circuits are already made up and the relay armatures are locked. Therefore, the motor could not be reversed to throw the switch between the trucks of the first car.

After the wheels of the car have all passed the switch point, the trolley wheel strikes the stopping contactor and raises for an instant a small lever. This temporarily opens the circuit that is feeding the motor and relays and allows the armatures of the relays to drop. As the circuit in the relay box is permanently opened when the relays drop, the opening of the circuit at the stopping contactor needs only to be temporary, and, although the contact is closed at the stopping contactor as the trolley wheel leaves it, there will be no complete circuit. The motor, therefore, will stop and the mechanism will be ready to operate again.

If a car approaches the starting contactor with the motor current off, there will be no action, as the trolley wheel crosses the first contact strip because only the low-resistance relay is connected to this first strip and this is so adjusted that the current consumed by the heaters, lights and compressor is not sufficient to lift its armature. As the trolley wheel reaches the second contact strip of the starting contactor, a circuit will be completed through the high-resistance relay and through a resistance to ground. This will complete the stick-circuit with the high-resistance relay armature above the other armature. The circuit will then be fed in the opposite direction through the motor fields and cause the motor to revolve in the opposite direction, throwing the switch for the straight track.



NON-SPLASHING TRACK SWITCH—STARTING AND STOPPING CONTACTORS

The starting contactor is very simply mounted on standard cars without taking up any slack in the trolley wire. It is only about one-third the size of any previous contactor used on electric track switches. The stopping contactor is about one-half the size of the starting contactor, and is mounted on a standard car. The relay and resistance box is also small. It is provided with a cut-out switch for deadening all the connections in the box. The main street box, of course, is the most interesting part of the device. It is 2 ft. x 1 ft. x 7 in. in dimensions and provided with a loose-fitting street cover to take the street traffic. There is an inner cover which has a flange running all the way around it and this flange sets into a ditch cast in the box.

The ditch is partially filled with mercury, so that by setting this cover in place the box is automatically sealed and made water-tight without depending upon workmen to make up any pipe joints or gaskets. The shaft which comes through this inner cover and which is connected to the switch point is also protected by a mercury seal. The wires running through the pipe under the street are brought to a hand hole and are here connected to wires running through stuffing boxes into the mechanism box so that if the workmen should fail to make the pipe water-tight still no water could get into the box. These wires coming up through the stuffing boxes have exposed ends which connect with spring contacts. The spring contacts, as well as the entire mechanism, are mounted on the inner cover so that the inner cover with all the mechanism can be picked up and another one slipped in its place just as one would replace a fuse, this being done without any pipe or wire disconnections. This is most advantageous, as it eliminates working in the street and dodging back and forth between cars when any repairs are to be made. The fact that only 110 volts are sent into this box instead of the full 550 volts previously used with street boxes is a most important one, for it largely eliminates the liability of electrical troubles due to moisture.

Summarized, the most important new features of this device are as follows: It does not splash mud and water; the switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard cars; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

LONDON LETTER

The Subjects Discussed Are Largely Those Growing Out of Conditions Imposed by the War

(From Our Regular Correspondent)

Owing to the increased cost of living due to the war, a spirit of unrest seems to have overtaken industrial workers in Great Britain. The tramways and electric railways, whether owned by municipalities or companies, have not escaped this general discontent.

The threatened strike of engineers and mechanical workers on the London electric railways has been averted by the decision of the companies to grant the demands of the men. The four companies affected, the District Railway, the London Electric Railway, the Central London Railway and the City & South London Railway, have agreed to withdraw the existing war bonus of 2s. a week to the trades affected, and to make instead a permanent increase of 3s. a week. The increases were obtained as the result of a joint trade movement, the principal unions affected being the Amalgamated Society of Engineers and the Electrical Trades Union.

Unfortunately the London County Council does not appear to have been able to meet the views of its employees and London is therefore suffering a strike involving about 7000 tramwaymen. For the last few days no cars have been run except a few in the vicinity of Woolwich, which carry workmen engaged in the manufacture of munitions of war. The men claim that 5000 tramwaymen have gone to the war and that for months past the remainder have had to make up for the deficiency in drivers and conductors by working as much as fifteen hours a day. They demand shorter hours, a war bonus of 15 per cent to meet the extra cost of living, the abolition of certain penalties for lost mileage, etc. The strike fever has also extended to the employees of the Metropolitan Electric Tramways, Ltd., so that London for a day or two past has been tramless except in a few cases. At its regular meeting the London County Council confirmed the offer of the chairman of the highways committee of early arbitration if the men would resume work immediately.

The threatened strike of the Newcastle tramwaymen has been averted. Last month the Board of Trade was asked to intervene and Sir George Askwith has delivered his award as arbitrator. He gives 2s. 6d. per week extra to employees who are householders; 1s. 6d. to employees who are single men; and 1s. to employees who are eighteen years of age or under. This is less than the men demanded originally.

The Salford tramways committee, which faced a strike, has agreed to accept the suggestion of the men that the subject of an advance in wages to meet the increased cost of living due to the war should be referred to arbitration. The original demand of the men was for a 15 per cent advance in wages. The tramways committee offered a bonus of 2s. a week on wages less than 28s. The threatened strike has thus been averted, but there is still resentment against the action of the committee in employing women as conductors on the tramcars.

The British Electric Traction Company, which operates many tramways, especially in the Midlands, is also threatened with strikes in the South Staffordshire area. The men there are asking for an increase of a halfpenny an hour in wages and are protesting against the employment of women. No definite action, however, has yet taken place.

At a recent meeting of the Plymouth Corporation Tramways committee it was reported that an agreement had been entered into with the Devonport & District Tramways for the sale by the company to the Corporation of the company's undertaking on Tramway Act terms. Under the agreement, it was stated, the company would transfer its lines to the Corporation on Oct. 2, 1915. The price to be paid for the property is to be fixed by arbitration, the payment of the purchase money to be made within a month of the Corporation obtaining the necessary borrowing powers.

An appeal has been issued for electrical engineers and others with technical knowledge of electrical matters to give spare time to an emergency service which is being organized to maintain the efficiency of the electric lighting, power, and tramway stations. Only men ineligible for military service are asked for, and they are required to make up the shortage of labor which at present exists in many electricity works in consequence of the war. Many switchboard attendants and other workers have enlisted or were called back to the reserve at the outbreak of hostilities, and this has left some of the stations with no margin for emergency and illness. Moreover, many young men are unable to join the colors because they cannot obtain immediate substitutes. Volunteers will be required to work four hours a day or four hours midnight service on alternate nights. They will be remunerated in accordance with the existing rates at the works at which they are to be employed.

The consulting electrical engineer of the Bristol Corporation, the city valuer, the city engineer and the city electrical engineer, have been instructed to value that portion of the Bristol Tramways which is purchasable by the town under Sec. 22 of the Tramways Act. The purchasable part includes 25 route miles out of a total of 31 route miles, and includes also the St. George and the Counterslip power stations and the depots of the company. It is reported that the general valuation amounts to £610,981, based on the present prices of material.

Cardiff tramwaymen have passed a resolution protesting against the employment of women as car conductors, and warning the Corporation that if it persists in the policy of hiring women the men will not work with the new members of the staff.

The highways committee of the London County Council reports that the number of fatal accidents caused by the working of the electric tramways in 1914 was twenty-five, as compared with thirty-seven in 1913. The proportion was one to every 21,391,734 passengers carried, as against one to every 13,802,000 in the previous year. The improvement is regarded as especially encouraging in view of the traffic conditions that arose on account of the war. The life-guard on the cars was brought into operation in seventy-four cases, and in not a single instance did it fail to act. The total traffic receipts from the tramways for the year ended March 31, 1915, were £2,323,053 from lines worked by electric traction, and £10,261 from lines worked by horse traction, or a grand total of £2,333,314. The receipts for the previous year under the same heads were £2,181,344, £21,146 and £2,202,490 respectively. The Council is recommended not to apply, at present, for powers to run trail cars north of the Thames, the Commissioner of Police having pointed out that in present circumstances it is not likely that the Council could secure delivery of the necessary additional cars from the manufacturers for some time to come.

As announced in the ELECTRIC RAILWAY JOURNAL of May 22, the Right Hon. Sir Edgar Speyer, chairman of the Underground Electric Railways, Ltd., London, has resigned his seat on the board. The directors have since appointed the Right Hon. Lord George Hamilton, the deputy chairman, to act as chairman of the company.

The companies under the control of the Underground Electric Railways, London, propose to deposit a bill in Parliament giving them power to bring the companies of the group into still closer association as regards their working and finances. The most important part of the scheme is the provision for payment into a common fund of the whole or part of the balances of the revenues of all the companies for each half-year after providing for interest on debentures, guaranteed stocks, preference shares or stocks (other than the second preference stock of the Metropolitan District Railway), depreciation, and reserve, and any other payments which may be specially provided for in the agreement. Another clause provides that the common fund may be used to make up any insufficiency in the net revenue of any of the companies to meet fixed and other charges.

For the last two months experiments have been in progress at certain tube stations where escalators are not in use with the object of evolving a means of saving passengers' time in getting from the trains out into the street. A new lift system has now been introduced at three important tube stations, Picadilly Circus, Euston and Great Central. These new lifts are electrically controlled, and carry no liftman, the gates opening and closing and the lift starting automatically. Men are stationed at the top and bottom of the lift to direct passengers. Similar lifts will be introduced at several other important centers in the near future.

A. C. S.

News of Electric Railways

NEW YORK'S PUBLIC SERVICE COMMISSIONS

Divergent Views Regarding Regulation Expressed Before Constitutional Convention

The proposal of Senator Foley to the Constitutional Convention of New York for an amendment making public service commissioners bi-partisan, constitutional officers, removable only by the Senate was attacked at a hearing on May 12 by Frank W. Stevens, former chairman of the Public Service Commission for the Second District of New York. Mr. Stevens said that bi-partisanship assumed that the Democrats were going to do something iniquitous and that they needed watching by the Republicans, or vice versa. Mr. Stevens also objected to the provision to give the Senate the right to confirm the appointment of public service commissioners. He did not believe that the qualifications of the commissioners were improved because the men nominated for appointment were approved by the Senate. It was his idea that public opinion should be brought up to a point where it would be difficult to put into the office of public service commissioner a man not fully qualified to do the work. He did not take kindly to the suggestion of making Supreme Court justices members of the public service commission. In this connection he said that a public service commissioner must often ignore precedent and not be afraid to reverse himself. This was opposed to the attitude of the judiciary on most questions.

On May 19 William R. Willcox, formerly chairman of the commission for the first district, advocated making commissioners constitutional officers removable only by the Legislature or the Senate, on recommendation of the Governor. He also suggested that the term of office of the commissioners be made ten years instead of five as at present. He favored commissions of five members, but said they should be bi-partisan. He rejected the suggestion that the commission for New York City should be selected by the Mayor. He also opposed the transfer of subway construction from the commission to the Board of Estimate. There should be no review of commission orders by the courts except as to questions of law. The power of the commissions to regulate the issue of stocks and bonds should not be curtailed. John N. Carlisle, former member of the commission for the second district, also urged constitutional protection for the members of the commissions.

Seymour Van Santvoord, chairman of the commission for the second district on May 26 advocated that the public service commissions be made constitutional bodies and that the office be surrounded with all the safeguards afforded justices of the Supreme Court. There was no department of the state government in which personal integrity and moral courage were so necessary as in the public service commissions. The terms of office of the commissioners, their powers and duties, their method of removal, and perhaps their salaries should be fixed in the constitution. The salaries should be large enough and the office so secure and honorable that no member could be tempted to act otherwise than in the public interest. Mr. Van Santvoord opposed the inclusion of the bi-partisan idea in the statute. This automatically injected politics into the commission. Mr. Van Santvoord expressed himself in favor of a court review of the commission's decisions and in favor of the removal from the Legislature of the power to regulate rates by enactment. Corporations and individuals should feel that they do not have to "tend their fences" in the Legislature in order to secure justice in the matter of rates. Chairman Van Santvoord's views were generally concurred in by Edward E. McCall, chairman of the first district commission, and by Martin S. Decker, who has just finished his second term as a member of the up-state board.

On the other hand an amendment to the constitution that would abolish the present two public service commissions, and replace them by two public utilities commissions, with the same powers but a different status, has been recommended to the Constitutional Convention by W. M. K. Olcott. Mr. Olcott would leave intact the organizations built up by the present commissions, and would pass them over with all the records and unfinished business of the commissions to the two new public utility commissions he would create. These would have the same jurisdiction, scope and authority as the present commissions, and the new commissioners, like the existing ones, would be appointed for five years at $15,000 a year. Mr. Olcott's board would be a bi-partisan one.

MEXICO TRAMWAYS A WAR VICTIM

How the Mexican Reign of Terror Has Affected the Mexico City Utilities

The directors of the Mexico Tramways have issued a circular to the bond and shareholders of that undertaking, together with those of the subsidiary concerns in which it is interested—namely, the Mexican Light & Power Company, the Mexican Electric Light Company and the Pachuca Light & Power Company. According to the London *Financial Times* the condition disclosed is serious in the extreme. The control of the tramways has been taken out of the directors' hands, and the board sets forth the events which have led up to the present position. First of all, however, the directors emphasize the fact that the existing situation has not arisen from any financial weakness on the part of the companies affected, all of which have been prosperous from inception, and but for successive political crises should still be earning their bond interest and satisfactory dividends.

The frequent changes of administrative control of the country have each been accompanied by large issues of paper money, with the result that the exchange rate of the peso is now not more than 5d., as against the normal rate of 25d. As further emissions of paper money are expected, it is anticipated that exchange will continue to decline. Unfortunately the company was obliged to accept this paper currency for fares, with the result that a large proportion of its gross receipts was useless for buying exchange on London and Toronto for the purpose of paying coupons or purchasing materials for maintenance and current operations. Matters appear to have come to a crisis in October last, for the circular states that, after the capture of the city of Mexico by General Carranza some eight months ago, labor unions were formed by the employees of the tramways company, and the following demands made upon the management: An increase of 25 per cent in wages; recognition of the unions; an agreement that all changes in employees must be approved by the unions; various operating conditions which would have had the effect of subjecting the company to the control of the unions. The company was given only forty-eight hours in which to accede to these demands, and as the conditions would obviously have ruined the business a refusal was returned to the men; thereupon a strike was immediately proclaimed and the operation of the tramways ceased in consequence. The company maintains that it could have found plenty of independent employees to operate the cars had it been provided with protection, but this could not be obtained.

After a few days the authorities took over the operation of the system themselves, on the ground that the service must be maintained for the convenience of the public. They then doubled the salaries of many of the staff employed by the month, and gave to the remainder of the employees a 25 per cent increase in wages. The tramways have since been in the hands of and operated by officials appointed by the leaders temporarily in power. As a result of this procedure operating costs rose speedily, while the character of the service and the condition of the equipment deteriorated rapidly, the new officials having had no experience in tramway operation or the handling of men. In addition, the maintenance of the cars was badly neglected, so that a very considerable proportion of the rolling stock is now laid up awaiting repair. For a short time the receipts were paid to the company's bankers, but subsequently the authorities directed that the earnings should be paid to the Government treasury. It is now practically impossible to communicate with the company's officials in Mexico, but the latest information states that when Carranza's representative was recently driven from the city of Mexico by Zapata he took with him the controllers of the cars, thereby rendering them unfit for service, and all traffic has, consequently ceased.

So far the authorities have not taken over control of the business of the Mexican Light & Power Company, the Mexican Electric Light Company and the Pachuca Light & Power Company, and the property of these undertakings has, therefore, been very little injured. The employees have, however, had to be given higher wages, while, as receipts are to a large extent in paper, there remains no available surplus after providing for the maintenance which is absolutely necessary to keep the plant in operation. The board is conferring with the trustees for the bondholders as to what further steps should be taken to protect the bondholders' interests, but the members feel that the future of the enterprises they control must necessarily depend upon the development of political conditions in Mexico and the attitude of the United States towards that country.

CHICAGO WORKING AGREEMENT TO BE ARBITRATED

Refusal to grant the employees of the Chicago (Ill.) Surface Lines an increase in wages has closed the first stage of the negotiations. This was followed by a poll in which 96 per cent of the employees voted to support their leaders in obtaining a satisfactory wage and working agreement. Although this was essentially a strike vote the possibilities of such a move are considered remote, because both the employees and the company have expressed themselves as ready to accept arbitration.

Similar steps have been taken by the employees of the elevated railroads. A delegation met President Britton I. Budd, who offered to renew the old contract despite diminished income and voluntarily agreed to make concessions with respect to working conditions. In view of the decreased patronage and the general business depression, however, Mr. Budd refused to consider an increase in wages at this time. The result of this conference has been submitted to the employees and they also have voted on the matter. Arbitration will be employed to reach a final agreement.

PROPOSED RESERVE CORPS OF ENGINEERS

Early in the present year an informal conference was held in New York at which the establishment of a volunteer reserve corps of engineers for the United States Army, representing all branches of the engineering profession, was discussed. The following five national engineering societies were represented: American Institute of Consulting Engineers, American Society of Mechanical Engineers, American Institute of Mining Engineers, American Society of Civil Engineers, and the American Institute of Electrical Engineers.

The matter was considered at the meeting of the board of directors of the A. I. E. E., held on Feb. 19, and resolutions were adopted at that time to the effect that the board was in hearty sympathy with the proposed movement, and with a view to giving enthusiastic support and cooperation in any plan or method of procedure proposed by the war department, President Paul M. Lincoln was authorized to appoint a committee to represent the institute in connection therewith. In accordance with this action, President Lincoln has appointed the following committee: Bion J. Arnold, chairman, Chicago, Ill., John Harisberger, Seattle, Wash., Ralph D. Mershon, New York, A. M. Schoen, Atlanta, Ga., and Charles W. Stone, Schenectady, N. Y.

The other national engineering societies named previously have also appointed committees with the following chairmen: A. I. C. E., Ralph D. Mershon, New York; A. S. M. E., Maj. William H. Wiley, New York; A. I. M. E., Dr. Henry S. Drinker, South Bethlehem, Pa.; A. S. C. E., William Barclay Parsons, New York.

These various committees will, it is understood, form a joint committee representing the entire engineering profession, to co-operate with the war department, which is now giving careful study to the matter with a view to formulating a comprehensive plan of a permanent nature, whereby the services of the members of the profession, who so desire, will be available if needed.

THE CLEVELAND CARHOUSE CONTRACT

The committee on street railways of the City Council of Cleveland, Ohio, spent May 20, 21 and 24 hearing the evidence on the charge of favoritism in making contracts by the Cleveland Railway Company and the alleged connivance of Peter Witt, street railway commissioner, in the matter. This charge, made by Roderick D. Grant, a contractor, was filed in writing with the City Council on May 10 by Councilman Fitzgerald. On the third day the Cleveland Railway submitted a tabulation of all the building contracts that have been made during the last four years. This showed that every contract had been awarded to the lowest bidder. The committee expects to have its report ready for submission to Council at the next regular meeting. In commenting on the case Councilman Reynolds expressed the opinion that the whole matter was the outcome of competition between contractors and the natural bitterness that a defeated contractor might entertain.

On May 25 the Council approved an additional allowance of one-half of 1 cent per car mile to cover the increase of 2 cents per hour in the wages of motormen and conductors which was agreed upon some time ago. This will amount to about $150,000 a year.

The company received a franchise for a line on West Thirty-fifth Street from the West Twenty-fifth Street line to the city limits.

TOLEDO FRANCHISE DISCUSSION

A conference of the special franchise committee of the City Council of Toledo, Ohio, and representatives of the Toledo Railways & Light Company was held on May 27. Several phases of the tentative twenty-five-year franchise prepared by the committee were discussed. One of the questions was that the city shall have an appraisal of the property if the franchise should run twenty-five years. Attorney Thomas H. Tracy, representing the company, insisted that the city should pay half the expenses of such an appraisal. This was passed over, but he also argued that if any other company should purchase the property at that time, it must pay the appraised value and that any other company receiving a franchise must take over the present company's properties. No definite agreement was reached on this point. It was agreed that some changes, mostly relating to phraseology, should be made in sections 18, 19 and 23. No agreement has been reached as to the amount of interest earnings to be allowed the company during a twelve-month try-out period and as to whether this period shall be an uninterrupted one.

SUPPLEMENTARY ARBITRATION IN DETROIT

The agreement made at the time of the decision to arbitrate the Whaling case provided that any grievances the members of Division No. 26 of the Amalgamated Association might have against the Detroit United Railway would be considered at the close of the Whaling case. In consequence the union has presented several requests to F. W. Brooks, general manager of the company. The most important request, perhaps, is that questions of discipline in which the union is not satisfied with the decision of the general superintendent shall be referred to a representative of the company and a representative of the union for adjustment and, failing agreement, shall be referred to the state commissioner of conciliation.

CLEVELAND TERMINAL PROJECTS

The application of Cleveland, Akron & Canton Terminal Railroad for a franchise for a subway under East Fifty-fifth Street at Cleveland was discussed at an open meeting at the Chamber of Commerce on May 26, and again before the committee of the whole of the Council on May 28. O. C. Barber, who is at the head of the movement, said that he did not know who would furnish the funds for construction. Both he and Attorney W. M. White declared that no railroad had anything to do with the proposition, but that they hoped to interest the railroads in the service the new terminal will furnish. The construction of the line would involve the expenditure of about $15,000,000. The four-track line would be operated by electricity from a power house located in the southern part of the city where it is proposed to have the road come to the surface.

Council as a committee of the whole also heard arguments of the Cleveland & Youngstown Railroad for the vacation of forty streets between East Ninth and East Thirty-fourth Streets in order to give it sufficient ground for its right-of-way. Several property owners objected to the plan. They contend that it would cut their property off and damage it in other ways. The company, however, has purchased 700 parcels of ground and 800 houses, all valued at about $1,500,000, in the section where it desires to build its terminal, and it is believed that it will be able to force its way through under existing laws. Attorney John L. Cannon, representing the company, said he had no intention of attempting this, as he believed the company and the city would be able to arrive at an agreement satisfactory to both.

This company will operate an electric railway reaching Shaker Heights, an elegant residence district, but it will also be in position to bring the cars of all the roads that cross it into the city at one point where it is believed a combined steam and interurban passenger station will be constructed. A law was recently enacted that will allow steam and electric roads to co-operate in the construction of union stations, but Mr. Cannon refused to say whether any of the steam roads will be financially interested in the terminal project.

The case to test the right of the city, under its new charter, to build a street railway without the consents of owners of abutting property was filed in the Supreme Court on May 27. This is the case involving the section of Euclid Avenue between East Twenty-second and East Fortieth Streets, or "Millionaires' Row." The hearing for a temporary injunction was set for June 3.

Pasadena Considers Municipal Railway.—A committee of fifty citizens of Pasadena, Cal., to be known as the advisory transportation committee, was appointed on May 18 to obtain data on the proposal to build a municipal railroad from Pasadena to Los Angeles.

Massachusetts Compensation Lost. — The Massachusetts Senate has killed by a voice vote the six bills attached to the report of the special commission appointed by Governor Walsh to consider workmen's compensation. This ends any further attempt to secure workmen's compensation legislation in Massachusetts this year.

Interurban Consolidation Bill Passed.—The interurban consolidation bill permitting the consolidation of interurban lines in Texas has been passed by the Legislature. The object of this bill is to allow the interurban lines from Denison to Dallas, and from Dallas to Waco, controlled by the Strickand interests, to be merged under one management.

Richmond Blanket Franchise Proposal Withdrawn.—Henry W. Anderson, representing the Virginia Railway & Power Company, Richmond, Va., in a short statement, supplemented by a personal talk, recently withdrew the petition and tentative ordinance introduced in the City Council by the company, asking for a blanket franchise, and left the entire proposition to the street committee of the Council.

Toledo Newspaper Case.—The Toledo Newspaper Company and Negley D. Cochran, editor of the Toledo *News-Bee*, which were fined for contempt of court by Judge John M. Killits of the Federal District Court in connection with news items and editorials relating to the street railway injunction suit, have appealed their case to the United States Circuit Court of Appeals at Cincinnati on May 26. It is said that the case may not come up until May or June of next year unless there is a request from the appellants to advance it for hearing.

Brooklyn Marginal Bill Signed.—Governor Whitman has signed the Brooklyn marginal railroad bill. The bill makes possible the conclusion of a contract between the city and the trunk line railroads under which the road, when constructed, will be operated jointly by all the railroads. Plans for the railroad call for an electrically operated elevated line to cost $15,000,000, including the property acquired. The road will link together terminals along the South Brooklyn waterfront such as those of the Bush Terminal Company and the New York Dock Company.

Public Utilities Commission for Alberta.—The Alberta Legislature has passed an act for the creation of a public utilities commission for the Province. It provides for the appointment of three commissioners to hold office for ten years, one of whom shall be chairman. The commissioners are to devote their whole time to the commission's work and may be reappointed upon the expiration of their ten years' term, but no commissioner may remain in office after attaining seventy years of age. Otherwise a commissioner can be removed only by the Lieutenant-Governor upon an address of the Legislature.

Right to Compel Extension Lacking.—The Public Service Commission of Pennsylvania declared recently that it had not the power, under the act creating it, to compel a public service company to extend its facilities beyond the territory covered by its charter or amendments thereto. The city of Scranton passed an ordinance authorizing the extension and operation of the lines of the Scranton Railway from the present end of the tracks on Luzerne Street to other localities. The company refused to accept the ordinance or make the extension and the city of Scranton filed a complaint with the commission.

Terminal Talk at Columbus.—H. M. Daugherty, well-known attorney, stated recently that all the land needed for the proposed electric railway terminal bounded by Front, Rich and Town Streets is now owned in fee simple by the projectors of the improvement. He said that the terminal building will be connected to High Street through a building on High Street and Wall Alley. An office building will be erected on this site. The franchise requires that work on the terminal structure be begun by Jan. 1, 1917. The Scioto Valley Traction Company, the Columbus, Delaware & Marion Railway and two or three other electric railways are expected to be tenants of the terminal structure.

Bus Bids in New York.—Three bids were submitted on May 31 for new motor bus routes in New York. The Fifth Avenue Coach Company, which operates the existing bus service, made an alternative proposal, suggesting that the city might enter into a contract with it for the extension of its present lines on the same principle as has been followed in the extension of the elevated roads. The People's 5-Cent Bus Line failed to make any offer, but its place was taken by a new company, represented by O. C. Brunner and W. T. Ridley, who want to run buses on the zone plan, with the city divided into three zones in each of which 3 cents would be charged. The third bid was received from the New York Motor Bus Company.

Governor's Charge to the Pennsylvania Commission.—Governor Brumbaugh of Pennsylvania has laid down a definite policy to be followed by the reorganized Public Service Commission. In the course of his remarks the Governor said: "The commission must be fair to the corporations, but it must not be fair to them at the expense of the public. It must take the place of that competition which has virtually ceased to exist in public utilities and see that public service companies charge no higher rates than they would if they had direct competition. You have a great opportunity for service to the people of the Commonwealth. You are expected to act as regulators of conditions in public utilities. It is my desire that business of the body be attended to with promptness and dispatch. It is to be a full-time commission and will, although it has judicial functions, sit like a business board."

Service Abandoned in Alexandria.—Receivers have been appointed for the Southern Traction & Power Company, Alexandria, La., and the company has abandoned the operation of its lines. This action followed the failure of negotiations for the sale of the property to the city and the imposition by the city of requirements with respect to improvements considered by the company to be too onerous. In a statement which he issued I. B. White, vice-president and general manager of the company, said: "We dealt with the city in good faith, believing that it would take over the property. At a considerable loss to the stockholders we continued to operate it. Now since all hopes of the city taking it at the price and upon the terms named have been abandoned, and since it is called upon to make expenditures which it is utterly unable to meet, there is nothing left for us to do, except to cease operation."

PROGRAMS OF ASSOCIATION MEETINGS

National Electric Light Association

At first it was proposed to crowd the work of the convention of the National Electric Light Association, beginning June 8 at San Francisco, into three days, but various reasons forbade limiting the sessions to Tuesday, Wednesday and Thursday; and the extra sessions will therefore allow the subject-matter to be treated in a more leisurely way, favorable to fuller discussion. Moreover, as the special trains do not pull out on their return trips until Saturday and Sunday, good use will be made of some of the intervening time. Another feature of interest is the proposed shifting of the public policy meeting from Wednesday to Thursday evening, owing to the difficulty in securing a suitable hall for Wednesday night. Usually at the conventions there have been no sessions on Wednesday afternoon, because of the objection to holding the delegates together for sessions morning, afternoon and evening. With the public policy meeting on Thursday evening, the afternoon recess will also fall on that day, and the afternoon will be devoted to an official visit to the electrical exhibits at the Panama-Pacific Exposition.

Central Electric Railway Association

Arrangements have been made for the movement of two special cars from Indianapolis, Ind., to Cleveland, Ohio, and return, for the summer meeting of the Central Electric Railway Association, on the S. S. *City of Erie*, leaving Cleveland on the morning of June 17. The cars will be moved on the following schedule on June 16, 1915:

Interstate Public Service Company

Leave Indianapolis, Ind.	6:00 A. M.
Arrive Columbus, Ohio	12:35 P. M.
Arrive Marion, Ohio	2:35 P. M.
Arrive Bucyrus, Ohio	3:15 P. M.
Arrive Cleveland, Ohio	7:35 P. M.

Fort Wayne & Northern Indiana Traction Company

Leave Indianapolis, Ind.	7:00 A. M.
Arrive Muncie, Ind.	9:15 A. M.
Arrive Fort Wayne, Ind.	11:50 A. M.
Arrive Lima, Ohio	2:15 P. M.
Arrive Cleveland, Ohio	7:50 P. M.

Returning, these cars will leave Cleveland Saturday, June 19, 1915, shortly after the arrival of the boat. No provision has been made in these schedules to stop for lunch, but arrangements will be made for box lunches at Columbus, Ohio, and Fort Wayne, Ind.

These cars are available for railway and supply members, their families and invited guests. The program of papers for the meeting was published in the ELECTRIC RAILWAY JOURNAL of May 29.

Central Electric Railway Accountants' Association

The twenty-seventh meeting of the Central Electric Railway Accountants' Association will be held at the Severin Hotel, Indianapolis, Ind., on June 11 and 12. The executive committee will meet on the morning of June 11. Following the presentation of the report of the executive committee and the address of Charles L. Henry, president of the association, the following papers will be presented:

"The Relation of the Accounting Department to the Mechanical Department," by R. N. Hemming, superintendent of motive power of the Union Traction Company of Indiana.

"Analysis of the Balance Sheet," by L. T. Hixson, auditor of the Terre Haute, Indianapolis & Eastern Traction Company.

After the reading of these papers the compiling committee and the standard passenger and freight committee will report.

The program of papers for the session on June 12 follows:

"The General Principles of Accounting as Between Common Carriers and Manufacturers," by P. C. Johnson, general auditor of the Prest-O-Lite Company, Indianapolis.

"Electric Light & Power Accounting by Combined Railway and Light Property," by Oren A. Small, auditor of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.

"The Small Electric Line Handling Carload Freight," by James S. Clark, auditor of the Marion & Bluffton Traction Company, Bluffton, Ind.

Financial and Corporate

ANNUAL REPORTS

Portland Railway, Light & Power Company

The comparative statement of income, profit and loss of the Portland Railway, Light & Power Company, Portland, Ore., for the calendar years 1913 and 1914 follows:

	1914	1913
Gross earnings	$6,273,171	$6,723,742
Operating expenses	2,695,356	2,856,981
Net earnings	$3,577,815	$3,866,761
Taxes	$568,527	$441,329
*Bridge rentals	45,198	46,936
Interest	2,127,480	1,961,666
Total fixed charges	$2,741,205	$2,449,931
Surplus	$836,610	$1,416,830

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*Additional bridge rentals amounting to $16,267 in 1914 and $16,903 in 1913 are included in operating expenses.

The record for 1914 shows that the gross earnings decreased $450,571 or 6.7 per cent as compared to 1913. The operating expenses decreased $161,625 or 5.7 per cent, so that the net earnings decreased $288,946 or 7.5 per cent. Fixed charges increased $291,274 or 11.9 per cent, mostly on account of an increase of 28.8 per cent in taxes and 8.5 per cent in interest, with the result that the surplus showed a decrease of $580,220 or 41 per cent.

The report states that this unsatisfactory showing is due to a continuation of the depressed business conditions prevailing in 1913, and to the competition of the Northwestern Electric Company. The effect of the general depression in business is shown by a decrease of 6 per cent in railway earnings, passengers carried having fallen from 94,014,368 in 1913 to 89,934,644 in 1914. Only one small part of the railway system, the Mt. Hood line, showed any increase in passenger earnings. The electric sales were affected both by the business depression and the competition of the Northwestern Electric Company, the number of customers being reduced from 42,062 to 37,938 and the earnings 7.8 per cent. The operating expenses were cut as low as consistent with good service and proper maintenance of the property, so that, in spite of the heavy decrease in gross earnings, the operating ratio for the year stood at 43 per cent, compared with 42.5 per cent in 1913.

Since the first of 1915, it is said conditions have not improved, and the company is now facing further losses in its railway department, owing to competition from jitney automobiles and motor buses, which have increased rapidly in this part of the country. Relief by ordinance compelling fair competition, however, is expected. The company does not anticipate further material losses of existing business on account of its electric competitor. Moreover, by reason of greater economy in public expenditures and the lowering of the tax levy, taxes payable in 1915 will be materially less than in the year 1914. The capital expenditures required in 1915 will be the smallest in ten years. The Willamette Valley Southern Railway, controlled by the Portland Railway, Light & Power Company, started operation Jan. 31, 1915. This line, thirty-two miles in length, should build up a large business both in passengers and freight.

Very little new construction work was undertaken in 1914 except railway work required by the city authorities or to connect up new light and power customers. The total of $531,130 was only slightly more than one-sixth of the average annual capital expenditures made during the years from 1906 to 1913, inclusive.

Utah Securities Corporation

The Utah Securities Corporation, New York, N. Y., which controls the Utah Power & Light Company and the Utah Light & Traction Company, has issued an unusually complete sixty-page report containing detailed financial data for each of the companies and a consolidated profit and loss statement and balance sheet for all the companies. The report also gives descriptions and photographs of the properties owned. The street railway property in Salt Lake City has 145 miles of track.

Since the incorporation, in 1912, the company's management has been largely occupied in acquiring additional properties, retiring underlying securities, clearing titles, rearranging rates and readjusting franchise conditions. The construction period for the immediate future and the work of readjustment and reorganization is now practically completed, and the company finds itself for the first time in position to proceed along ordinary operating lines. From now on President S. Z. Mitchell expects an improvement in operating results.

The total gross earnings from all sources of the operating properties now controlled, intercompany charges eliminated, for the twelve months ended March 31, 1915, were $4,640,126, as compared with $4,474,261 for the previous twelve months. The net earnings were $2,284,477, as compared with $2,361,320 for the previous twelve months. Earnings were affected by the depressed condition of the copper and other mining industries in the territory served, occasioned by the European war. These industries are now resuming operations along normal lines and an improvement in business conditions and power output is expected.

The consolidated income statement of the Utah Securities Corporation and subsidiaries, after including the profit on the redemption at a discount of ten-year 6 per cent notes, shows a balance of $987,659 after all charges. The consolidated balance sheet shows total reserves of $2,935,905 and a total surplus of $2,813,997.

Republic Railway & Light Company

The Republic Railway & Light Company, New York, N. Y., and subsidiary companies report consolidated earnings for the year ended Dec. 31, 1914, as follows: Gross earnings, $3,001,461; operating expenses and taxes, $1,856,467; net earnings, $1,144,994; interest charges, $679,987; net income, exclusive of depreciation, $465,007; previous surplus, $1,180,099; total surplus, $1,645,106; other deductions, including preferred dividends, $738,328; final surplus, $906,778. The gross earnings increased $31,443 for the year.

The amount expended during the year for improvements was $602,127. The report states that the directors are now working upon plans for refunding on Jan. 1, 1916, $3,000,000 of 5 per cent secured gold notes of the Republic Railway & Light Company and $4,844,000 of first consolidated refunding mortgage 5 per cent gold bonds of the Mahoning & Shenango Railway & Light Company, which mature on that date.

During the year steps were taken to consolidate as many properties as possible to save taxes, facilitate operation, reduce expenses and improve conditions for refinancing. Thus far six companies have been eliminated. The Mahoning & Shenango Railway & Light Company absorbed by purchase the Sharon & New Castle Railways and the Youngstown-Sharon Railway & Light Company, and by merger the Sharon & Wheatland Street Railway, the Valley Street Railway and the Wheatland Street Railway. The Youngstown & Sharon Street Railway purchased the Youngstown Consolidated Gas & Electric Company.

The J. G. White Companies

The J. G. White Companies has issued its report for the ten months ended Dec. 31, 1914. As the company has changed its fiscal year to conform with the calendar year instead of the year ending Feb. 28, no comparison of earnings is available. Following is the surplus and undivided profit account as of Dec. 31: Balance March 1, 1914, $780,268; written off for depreciation of securities acquired prior to Jan. 1, 1914, or March 1, 1914, and for doubtful accounts contracted prior to that date, $120,820; balance, $659,448; profit for ten months from March 1 to Dec. 31, 1914, all companies, $44,817; total, $704,265; preferred dividends, $145,363; profit and loss surplus, $558,902.

A revaluation of securities owned on April 24, 1914, on the basis of sales prices agreed for those sold but not delivered, market prices for a few other large blocks and balance-sheet prices for the remainder would show an increase in surplus of more than $250,000, bringing this actual present surplus to more than $800,000.

The report states that the amount of cash of all companies on hand on Dec. 31 last was $509,668, and bills and accounts receivable, after having made ample provision for doubtful accounts, $516,300, making total current assets of $1,025,969. The total debts of the company on the same date, exclusive of dividends on the preferred stock declared and since paid, were $629,602.

It is stated that general financial and business conditions, intensified by the European war, made it impossible to secure large engineering or construction work, and even more impossible to arrange any large flotations or promotions of either new projects or consolidations of existing business. During the last few months, however, new business in encouraging, though not large, volume has been arranged and prospects are more encouraging.

INTERBOROUGH-METROPOLITAN PLAN APPROVED

Consolidation Will Bring Capital of New Company Into Conformity with Net Value of Assets of Old Holding Company

Stockholders of the Interborough-Metropolitan Company, New York, N. Y., the holding corporation of the subway and elevated lines, on June 1 approved the readjustment plan providing for the consolidation of the company with the Finance & Holding Corporation, the new company to have a nominal capital of about $50,000,000. The vote on the plan stood 1,106,527 shares for, of which 355,445 were preferred and 751,082 common, and 5635 shares against.

Under the plan the present 5 per cent cumulative preferred stock will be replaced by a 6 per cent non-cumulative issue. New common stock is to be issued in shares without par value. The project as outlined by the directors is to permit the restoration of dividends as soon as possible on the preferred stock in lieu of the sacrifice by the stockholders of their claims on back dividends of the present cumulative 5 per cent issue, now amounting to about 40 per cent.

Prior to this stockholders' meeting the Public Service Commission had decided that the proposed consolidation was not in violation of Section 54 of the Public Service law. This section prohibits a street railroad corporation from acquiring the capital stock of a similar corporation without the consent of the commission. Theodore P. Shonts, president of the company, wrote to the commission stating that neither the Interborough Rapid Transit Company nor the New York Railways formed a contracting party in the consolidation, which would in no way affect the relation of these roads to the public. He said the plan had the hearty support of the bankers who had purchased the bonds of the rapid transit company, and added:

"With respect to the proposed consolidation, it is proper to bear in mind that the necessary effect will be to place the declared capital of the new company at a sum in conformity with the net value of the assets of the Interborough-Metropolitan Company over and beyond its debts. For a long period the company has recognized the desirability of taking this course, and thereby writing off upon the books of the company the very large depreciation which has ensued in its original investments in the stocks of the Metropolitan Street Railway and the Metropolitan Securities Company."

The Interborough-Consolidated Corporation has been incorporated with a capital of $50,403,634 to succeed the Interborough-Metropolitan Company and the Finance & Holding Corporation, operating in the counties of Greater New York and Westchester. The directors include August Belmont, T. P. Shonts, Andrew Freedman and Edward R. Bacon.

SAN FRANCISCO-OAKLAND VALUATION

The California Railroad Commission on May 24 issued its findings upon the value of the properties of San Francisco-Oakland Terminal Railways, Oakland, Cal. These properties consist of the Oakland Traction Company, owning the street railway system in Oakland, and the so-called "Key Route System," which owns the interurban railway and ferry system between San Francisco, Oakland and Berkeley. The valuation of the commission included also the property of the Oakland Terminal Company, which is a large land-owning corporation owned by the San Francisco-Oakland Terminal Railways.

The commission finds the reproduction cost of all of these properties, with all allowances, to be $26,912,865. These allowances include land multiples, etc., amounting to approximately $900,000. The reproduction cost less depreciation amounts to $23,641,893. The net indebtedness of the railways and the Oakland Terminal Company, including all outstanding bonds, notes, etc., amounts to approximately $21,000,000. A large portion of the lands owned by the San Francisco-Oakland Terminal Railways and by the Oakland Terminal Company are non-operative property. In its report the commission states that the reproduction cost of the properties actually used in the operation of the railways amounts to $20,354,746 and that the reproduction cost less depreciation of these operative properties amounts to $17,314,213.

The engineers of the railways and of the commission came to a practical agreement on all of the physical properties. The differences, when the case was finally submitted, amounted to only a few thousand dollars. The chief remaining item of difference was the matter of lands. The company had claimed the value of its lands to be $17,687,000, but the engineers of the commission had estimated these lands at $6,843,000, the chief difference being in the appraised value of the company's tide lands. The real estate expert for the railway estimated these lands to be worth $21,780 per acre, while the engineers of the commission had estimated $7,500 per acre. The commission finally found a value of $12,500 per acre for these lands for the purpose of the present proceeding. No value has been fixed on the property of the entire system as a "going concern."

NEW YORK MERGER AUTHORIZED

The Public Service Commission for the Second District of New York has approved the corporate merger of the New York, Westchester & Boston Railway and the Westchester Northern Railroad. The New York, Westchester & Boston Railway at present operates over the Harlem River & Port Chester tracks from Harlem River to 174th Street, New York, and thence over its own tracks to North Avenue, New Rochelle. It also operates a branch from Mount Vernon to White Plains and is to construct a road to Port Chester. The Westchester Northern Railroad is to be built from the New York, Westchester & Boston Railway terminus at White Plains, forming a continuous line of road, through Westchester County to Danbury, Conn., with a branch to Brewster. The Westchester Northern Railroad is to construct its line in Connecticut under the Connecticut statute. The time within which it must expend 10 per cent of its capital stock and complete the construction in New York State was extended by the last Legislature to five and ten years respectively from March 1, 1915.

The consolidated road will connect with the New Haven lines at various points, including a connection with what is called the Poughkeepsie Bridge Route, thus affording the New Haven a new New York tidewater point for coal. It will also open up to commuters new sections of northern Westchester County. The capital stock of the new company, the New York, Westchester & Boston Railway, will not exceed in amount the sum of the stock of the two present companies at par. No bonds or other evidences of indebtedness are to be issued in consideration of the merger. More than two-thirds of the capital stock of each company has consented to the merger. No stock or other securities will be issued without the further approval of the commission.

Bay State Street Railway, Boston, Mass.—At a recent hearing before the Massachusetts Public Service Commission on the application of the Bay State Street Railway to issue $1,500,000 of preferred stock, as noted in the ELECTRIC RAILWAY JOURNAL of May 8, counsel for the company stated what work has been done in the way of new construction and improvements and what the financial standing and requirements of the company are. The commission took the petition under consideration for the purpose of making an independent valuation of the new property before passing on the issue.

Calumet & South Chicago Railway, Chicago, Ill.—The Calumet & South Chicago Railway has petitioned the Illinois Public Utilities Commission for authority to issue $500,000 of additional first mortgage 5 per cent bonds.

Carolina Power & Light Company, Raleigh, N. C.—W. C. Langley & Company, New York, has sold at 93½ a block of first mortgage 5 per cent bonds of the Carolina Power & Light Company, dated 1908 and due in 1938. Of an authorized issue of $5,000,000, $2,582,000 is outstanding.

Chicago (Ill.) City Railway.—The Chicago City Railway has applied to the Illinois Public Utilities Commission for permission to issue $3,050,000 of first mortgage bonds.

Chicago (Ill.) Railways.—The Chicago Railways has applied to the Illinois Public Utilities Commission for authority to issue $3,145,000 of first mortgage 5 per cent bonds.

Cincinnati (Ohio) Traction Company.—The Ohio Supreme Court by affirmation recently held that the Cincinnati Traction Company under its 1896 franchise is accountable to the city for 6 per cent of its gross earnings from all traffic within the city limits, including the part retained by the interurban lines. A judgment was awarded to the city for $5,410 for additional tax on fares collected in 1905, and it is reported that a demand for a similar tax in later years will be made.

Columbus Railway, Power & Light Company, Columbus, Ohio.—E. W. Clark & Company, Philadelphia, has sold at 99½ and interest, to yield 5½ per cent, $1,200,000 of 5 per cent one-year gold coupon notes, series B, of the Columbus Railway, Power & Light Company. These notes are dated June 1, 1915, and due on June 1, 1916. They are a direct obligation secured by a deposit of first refunding and extension mortgage 5 per cent gold bonds of the company at 80 per cent of their face value.

Electric Short Line Terminal Company, Minneapolis, Minn.—The Electric Short Line Terminal Company is offering for sale $500,000 of full-paid stock. The proceeds will be used for the improvement of the terminal properties and the extension of the Electric Short Line Railway. Besides this line the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company operates into the terminal.

Fairmount Park Transportation Company, Philadelphia, Pa.—The property of the Fairmount Park Transportation Company will be offered for sale on June 22, subject to the first mortgage of $750,000. Previous reference to this sale was made in the ELECTRIC RAILWAY JOURNAL of May 15.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—Three-year 6 per cent notes of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company to the amount of $750,000 have been bought jointly by the J. G. White Engineering Corporation and the General Electric Company, New York, and Stevens, Chapman & Company, Minneapolis. The money secured will be used to complete the "Dan Patch" line into the Minneapolis terminal and to furnish new equipment.

Pacific Gas & Electric Company, San Francisco, Cal.—The California Railroad Commission has issued a supplemental order in the matter of the application of Pacific Gas & Electric Company for authority to issue 19,226 shares of common capital stock. The commission's original order provided that the company should make certain adjustments as to depreciation accounts, and also that it should present in writing to the commission an agreement that the authorization of this stock should not be used as a basis for the determination of rates. The company has now complied with these conditions. Announcement is made that from the date of the initial offering on June 3, 1914, to April 30, 1915, a period of eleven months, 4,430 subscriptions, aggregating $9,895,200, have been received for the company's new issue of first preferred 6 per cent cumulative stock. Of this amount $6,039,600 (60 per cent) was taken by stockholders under the original offering and $3,855,600 (40 per cent) has been subscribed for by employees and customers of the company, and others. Since Jan. 1, 1915, $1,089,800 has been sold, little or none being disposed of outside of California.

People's Railway, Wilmington, Del.—The Wilmington & Philadelphia Traction Company is reported to have purchased the People's Railway property, including the lease on Brandywine Springs Park. The consideration is not stated.

Southern Traction & Power Company, Alexandria, La.—On the application of the City Savings Bank & Trust

Company, trustee, I. B. White and C. F. Crockett have been appointed receivers for the Southern Traction & Power Company. An explanatory statement of the management is noted elsewhere in this issue.

United Railroads, San Francisco, Cal.—A discussion of some tentative plan for the reorganization of the affairs of the United Railroads of San Francisco to comply with the recent order of the California Railroad Commission is current in financial circles. President Lilienthal said that since "the State has told us how it expects us to handle our affairs, we may have to work out a definite plan to carry out its directions." It has been reported unofficially that there may be a reduction of from 25 to 40 per cent in the face value of the outstanding 4 per cent bonds, which at present total about $23,000,000. The bondholders would be partially compensated by an increase in the interest rate to 5 per cent. These bonds are quoted in the market at about 46½. A readjustment of the outstanding stock might also be undertaken.

United Railways of St. Louis, St. Louis, Mo.—The Board of Aldermen on May 21 voted in favor of appointing a committee of five to confer with officers of the United Railways of St. Louis in an endeavor to compromise the mill-tax cases now pending in the courts.

DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

El Paso (Tex.) Electric Company, 3 per cent, preferred.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$342,337	$15,298	$327,039	$40,833	$286,206
1 " "	'14	337,223	8,963	328,260	29,167	299,093
12 " "	'15	3,946,539	137,607	3,808,932	466,667	3,342,265
12 " "	'14	3,076,962	93,863	2,983,099	239,729	2,743,370

EL PASO (TEX.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar.,	'15	$78,329	*$45,188	$33,141	$4,230	$28,911
1 " "	'14	88,469	*49,945	38,524	4,669	33,855
12 " "	'15	1,020,918	*559,699	461,219	50,672	410,547
12 " "	'14	925,120	*505,657	419,464	50,921	‡376,999

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar.,	'15	$160,200	*$101,329	$58,870	$35,409	$23,461
1 " "	'14	195,536	*113,739	81,797	38,931	42,866
12 " "	'15	2,327,395	*1,268,159	1,059,236	434,574	624,662
12 " "	'14	2,423,574	*1,375,477	1,048,097	431,326	616,771

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar.,	'15	$21,699	*$13,057	$8,642	$5,456	$3,186
1 " "	'14	24,039	*13,952	10,087	5,635	4,452
12 " "	'15	269,991	*177,431	92,560	66,884	25,676
12 " "	'14	291,847	*176,352	115,496	67,316	48,200

JACKSONVILLE (FLA.) TRACTION COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar.,	'15	$53,498	*$37,426	$16,071	$15,644	$427
1 " "	'14	64,342	*38,965	25,377	12,901	12,476
12 " "	'15	688,368	*463,721	224,647	156,522	68,025
12 " "	'14	704,689	*448,701	255,988	149,532	106,456

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$279,281	$183,537	$95,744	$51,423	$44,321
1 " "	'14	287,718	173,321	114,397	50,331	64,066
4 " "	'15	1,101,351	709,451	391,900	204,437	187,463
4 " "	'14	1,080,883	668,301	412,582	200,155	212,427

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar.,	'15	$23,307	*$15,166	$8,141	$7,796	$345
1 " "	'14	25,237	*16,236	9,001	7,679	1,322
12 " "	'15	299,729	*191,946	107,783	91,683	16,100
12 " "	'14	298,017	*195,434	102,583	90,976	11,607

PENSACOLA (FLA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar.,	'15	$19,183	*$11,339	$7,843	$7,268	$575
1 " "	'14	23,051	*14,536	8,515	7,238	1,277
12 " "	'15	255,205	*162,205	93,000	86,951	6,049
12 " "	'14	284,206	*180,930	103,276	83,712	19,564

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*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

New York Commission on Recent State Measure—Dallas, San Antonio and Youngstown Developments

The State law in New York governing the operation of the jitney bus went into effect immediately upon its being signed by Governor Whitman. The Public Service Commission of the Second District received so many requests for an expression as to the effect and enforcement of the provisions of the statute that the following unofficial statement was made at the commission's offices on May 28:

"It appears that the auto bus law which has been in effect for the last two years has been repealed by the enactment of the jitney bus law, and that it is no longer necessary for persons and corporations desiring to operate auto bus lines on State highways to come to the commission for certificates of approval. It will be necessary, however, for all persons and corporations owning and operating stage routes, bus lines or motor vehicles carrying passengers for a fare of 15 cents or less upon any street, avenue or public place in any city of the State, except the city of New York, to procure first the consent of the local authorities and next a certificate of convenience from the Public Service Commission. The commission is not prepared to announce any general policy in considering such applications in advance thereof."

The Board of City Commissioners of Dallas, Tex., has passed an ordinance regulating jitneys in lieu of the ordinance passed by the previous administration which was to have become effective a few days ago. The new ordinance eliminating the bond feature went into effect on May 25. Under the new ordinances the applicant for a jitney license must submit to an examination by the City Health Officer before the license is granted; he must run his car continuously not less than six hours each day except Sunday; he must follow a stipulated route; must be examined by the city automobile inspector as to his knowledge of running an automobile. A license good until May 1, 1916, is to be issued upon payment of $75. Violation of the regulations of the ordinance is punishable by a fine of $200, and the Judge of the Corporation Court has authority to forfeit licenses without any refund on unearned portions. A protest has been made to the commissioners requesting the license be reduced to $50 a year.

Judge S. G. Tayloe of the Forty-fifth District Court at San Antonio, Tex., announced recently that he would render a decision sustaining the general demurrers of the City of San Antonio in the jitney case. As a result the ordinance regulating the operation of jitneys passed several months ago by the City Council is declared constitutional. Application for a temporary injunction to restrain the enforcement of the San Antonio ordinance was filed in the Forty-fifth District Court on March 27 by R. P. Green, president of the Jitney Owners' Association. The ordinance was to have gone into effect on March 28, but Judge Tayloe granted a temporary restraining order and set a hearing on the plea for perpetuation of the writ for April 9. The case, however, was continued from time to time, awaiting the decision of the Court of Criminal Appeals of Texas in the Fort Worth case, decided against the jitney as noted in the ELECTRIC RAILWAY JOURNAL of May 22, page 1005.

A regulatory ordinance was passed recently in Youngstown, Ohio, to go into effect on June 1. An indemnity bond in the sum of $5,000 is required for each machine operated. There is also a provision fixing a license fee of $25 a year for each car. In Youngstown the regular eight and twelve hour jitneys have been dropping out fast after a little experience, but the cars operated for only a few hours have remained as a source of trouble. These machines are operated mostly between 5 p. m. and 8 p. m. by people with other means of livelihood. With stipulations requiring a bond demanding a premium of $200 a year and a license fee of $25 it is expected that the ordinance will eliminate the rush-hour jitneys.

In Vancouver, B. C., the City Council was scored on May 15 by the grand jury for its neglect in not passing suitable regulations for the control of the jitney traffic, and for allowing jitneys to enter into unfair competition with the British Columbia Electric Railway.

ILLINOIS COMMISSION ON JITNEY

Following Hearing Jitney Company Is Restrained from Operating Without Certificate of Necessity

Jurisdiction over jitney buses was assumed by the Illinois Public Utilities Commission in a ruling made on June 2 by Judge Owen P. Thompson, one of the commissioners, following a hearing on the petition of the Jacksonville (Ill.) Railway and W. B. Miser versus L. F. O'Donnell et al., doing business as the Motor Transportation Company of Jacksonville. The hearing was held in the commission's office in the State Capitol at Springfield.

The defendant company is restrained from operating motor buses on the jitney plan until it has obtained a certificate of convenience and necessity from the utilities commission. In his oral ruling, which will be the basis for a ruling by the full commission to be issued within a few days, Judge Thompson held that motor buses attempting to do the same sort of transportation business as is done by street railways are amenable to the same restrictions and come within the jurisdiction of the commission under the State Utilities Act. Furthermore, he expressed the belief that the commission will not grant permits to jitney companies to operate along streets in any city where there is adequate street railway service. The jitney owner must also incorporate his business under the laws of the State and come to the commission armed with the proper franchise or other permit from the city in which he expects to operate.

T. J. Condon, an attorney of Springfield, represented the O'Donnell company at the hearing. He argued that a jitney was nothing more nor less than a bus. It had no established line from which it could not deviate and had no established system. For this reason it should not be classed as a public utility unless buses operated by transfer companies and others were to be so classed.

H. I. Green, Champaign, attorney for the Jacksonville Railway, declared that the jitney was a bidder for the business of the street railway, and that it operated cars at regular intervals along designated streets and for the same fare as was charged by the street railway. He said it was in every respect a public utility.

C. J. Sero, of the Tri-City Railway, Rock Island, attended the hearing and assisted the Jacksonville company in its arguments.

The text of Judge Thompson's decision, announced after the hearing, is as follows:

"Just what degree of control should be exercised by public utility commissions having jurisdiction over those engaged in public service similar to that conferred upon this commission by the Legislature of this State has not been passed upon by this commission or any other body of like jurisdiction or by any of the courts of the State. In other words, this question is a new one, and must be governed by the act relating to the supervisory control over public utilities by State authority.

"From general information obtained through newspapers and periodicals, we learn that some of the cities in the United States where the so-called jitney buses are in use have passed various ordinances restricting such use by requiring the payment of a license fee for the use of the streets and in some instances requiring the entering into a bond by the company to indemnify against property loss or for personal injury on account of the negligence of the operators of such vehicles.

"It seems clear from the reading of the law under which this commission acts that the use of the jitney bus as shown by the evidence in this case brings the character of business within the jurisdiction of this commission. This commission has jurisdiction over common carriers, and where the service rendered is to the public generally, or where the person or corporation holding himself or itself out as offering to the public transportation from place to place for hire and with an established route and a fixed schedule, such facts are amply sufficient to bring the business of that character under the law and require their regulation and control.

"While the means of transportation is other and different from that furnished by the ordinary street car, it is of the same general character. Street cars operating upon the streets are subject to regulation and control by law. This commission has authority under the law to inquire into the character of the service rendered and the rates or charges made for such service. They are required to furnish a schedule as to the rates and also as to the movement of the cars.

"A street railroad is necessarily a monopoly along the streets where it operates. So long as it can furnish adequate service at reasonable rates no other street car company would be authorized to invade the territory where it renders service. Public corporations, like street railroads, have no means by which to obtain money for the operation of their business except such as is obtained from the public. The public are interested in a public utility for the reason that they rely upon it for service. The public utility can render that service only through the support that is given it by patronage. The public's interest goes to rates and service and is not concerned as to the individual or what the corporation is that renders the service.

"It follows, therefore, that if the jitneys enter upon the use of the streets to carry people for hire and ply their business along streets occupied or used by street railroads engaged in the same general class of business, the result must necessarily be that the operation of the jitney bus will reduce the income or revenues of the street railroad in proportion to the business it takes from the railroad, and if the service being offered by the utility already organized and operating in the field is adequate and reasonable in rates, there would be no necessity for another public utility to operate in that field.

"Prior to the enactment of the public utility law of this and other States, the only means for the regulation of the service and rates of public service corporations rested in competition. With such comprehensive law for the regulation of public utilities as exists in this State, competition is no longer essential to the protection of the public, but that protection is found in the authority granted the commission to investigate all matters concerning rates and service and make such rules concerning the same as are found to be just and equitable.

"We do not wish to be understood as holding or intimating that cases may not arise where it would be a public convenience and necessity to have the so-called jitney buses in operation. A certificate of convenience and necessity might be granted for the transaction of such business along streets and avenues of the cities and villages where no adequate or sufficient transportation is offered by any other public service corporation, and when such a case is presented to this commission, and if it is held that such certificate should issue, the commission will do so upon the condition that the company wanting to conduct such business shall first obtain all necessary licenses or permits which the local authorities shall require.

"In what is here said with reference to this case, we are simply following the law concerning public utility companies and giving renewed expression to the principle that this commission will not favor granting the right to any new public utility to invade the field where another utility operates and is able to render adequate service at reasonable rates.

"Since the law authorizes this commission to say what rates are reasonable and what character of service is adequate, it must go a step farther and make such rules as will protect the life of the public service corporations which are required under its control to serve the public."

RAILWAYS ENTER THE BUS FIELD

W. H. McGrath, vice-president of the Puget Sound Traction, Light & Power Company, Seattle, Wash., announced recently that the company, beginning on June 1, would place three twelve-passenger stages in operation between Auburn and Buckley, a distance of 21 miles. The business will be conducted under the name of the Washington Auto Bus Company, for which incorporation papers have been filed in Olympia. The new corporation is capitalized at $25,000, and the trustees will be the managers of the Stone & Webster properties in the various cities in the State. These are: L. H. Bean, Tacoma; A. L. Kempster, Seattle; D. C. Barnes, Everett; and L. R. Coffin, Bellingham. Mr. McGrath is quoted as stating that if conditions warrant the company may extend its field from the long hauls in the comparatively sparsely settled sections to the cities.

Some of the officers of the Southwest Missouri Railroad, Webb City, Mo., have organized the Auto Transportation Company and have purchased two Indiana and two Packard trucks. Each of these cars has a capacity of twenty passengers. One of these cars is being operated from the terminal of the electric railway in Carthage to Jasper, a town of about 2000 inhabitants, 12 miles away. Another is being operated from the terminal of the electric railway in Galena, Kan., to Baxter Springs, a town of about 1000, 9 miles away. The other two are being operated between Joplin and Neosho, a town of about 4000, 20 miles away.

JITNEY AN ELECTION ISSUE AT LOS ANGELES

On June 1 the citizens of Los Angeles elected a new administration and voted on a number of referendums. Among the latter was one on the jitney bus, fathered by the Jitney Bus Association. The ordinance proposed by the association contained no provision for franchises, taxes or indemnity and even proposed a cut in the license fee from $2.50 to $1 a month. It also proposed to transfer traffic regulation from the police department to the Board of Public Utilities.

At the election the voters rejected the jitney men's ordinance by a majority of 8100. The ordinance of the Common Council, against which an injunction had been obtained, will now come up before the Superior Court of Los Angeles County, which has already decided in favor of an exactly similar ordinance in Venice. Splendid campaign work was done voluntarily by the railway employees.

To expose the worthlessness of this ordinance, the employees of the Los Angeles Railway organized voluntarily a trolleymen's welfare league. One work of this organization was the preparation of a pamphlet entitled "The Street Car and the Jitney Bus," in which the economics of the problem were discussed from every angle. This pamphlet was distributed among the employees of the company and among a number of outsiders.

One of the circulars used in the campaign was headed "Vote 'No' June 1." It said in brief that the proposed initiative ordinance fostered by the autobus owners and operators association would repeal the city's present ordinance, passed unanimously by the City Council; eliminate the $5,000 bond required of jitney bus operators for the protection of the public; make it possible for the jitney operators to charge any price they choose; fix a monthly license tax of only $1; reduce the distance prescribed to govern jitney stops, and eliminate the requirement that jitneys operate all the way between advertised terminals.

The pamphlet by Norman Sterry, "The Street Car and the Jitney Bus," distributed by the Trolleymen's Welfare League, was concluded as follows:

"Is it fair that the condition described should prevail? We leave it to the sober and intelligent judgment of the people of this community, confident in the sense of justice and of fair play that we believe pervades the minds and sentiments of a great majority of the people of this wonderful commonwealth, and we respectfully urge that as the first step in settling this question you vote against the adoption of the initiative jitney bus ordinance at the election next Tuesday."

In addition the Los Angeles Railway placed its attitude on the initiative jitney ordinance before the public. It sent a letter dealing with the curtailments forced upon it by the jitney, to all manufacturers and supply houses in Los Angeles, with whom it has commercial dealings and to large manufacturers generally. This letter was signed by C. A. Henderson as purchasing agent. A similar letter, except that it began "Since you are interested financially with us in the welfare of the city," was sent to all banks and large business interests generally. This letter was signed by Mr. Henderson as treasurer. One of the significant statements contained in the letter follows:

"Because of the competition to which we are subjected through unregulated jitney bus sniping, it has been necessary to reduce our shop work to five days a week instead of six, and to seven hours a day instead of eight, with consequent decrease in the amount of supplies purchased, and a decrease of about $430,000 a year in pay rolls, which money eventually would find its way through the business channels of the city. This decrease in the payroll is equal to laying off 477 men."

Seattle Service Order Modified.—The Public Service Commission of Washington recently filed a second order against the Puget Sound Traction, Light & Power Company, Seattle, relative to service on the Faunteleroy and Alki Point lines, a previous order to the commission requiring cars sufficient to seat all passengers having been declared unreasonable by the Federal District Court. The commission now proposes to require seating capacity equal to about 90 per cent of the traffic during the rush hours of the late afternoon.

Handling Informal Complaints.—Upon motion of Commissioner William Hayward, the Public Service Commission for the First District of New York has appointed a committee of two on informal complaints. The chairman appointed Commissioners Hayward and George V. S. Williams as the committee. At least once in two weeks this committee will review all informal complaints and the correspondence connected therewith, and report to the commission what action should be taken to obtain effective results.

New Rules for Baggage.—The new rules for checking baggage made necessary by a recent amendment to the Interstate Commerce Act went into effect on June 2. Hereafter persons checking baggage for interstate transportation will be required to sign a declaration of its value on a form which the baggage master will provide. The new act makes it a misdemeanor to misrepresent the value of baggage or any interstate shipment. It will not be necessary, however, for owners of baggage to sign these declarations in person.

Standard Seating Space Fixed.—The Public Service Commission for the First District of New York has established the standard seating space for each passenger to be allowed on the longitudinal seats of street surface railroad cars as 17.78 inches. This is the average space occupied by each passenger upon such cars according to 800 different cases observed by the commission's inspectors. The establishment of a standard by the commission is mainly for the guidance of the transit bureau in determining the loading and overloading of cars.

Five-Cent Fare Within City.—In the case of the City of Seattle against the Puget Sound Electric Railway the Public Service Commission of the State of Washington hold that the company is required to carry passengers from Yesler Way to all points within the city limits of Seattle for a 5-cent fare. At present the 5-cent fare extends only as far as Spokane Street. The charge from Yesler Way to Davis Station is 12 cents and that to Floraville 14 cents. The order of the commission does not affect the rate to The Meadows, which is just outside the city limits.

Rhode Island Booklet Issued.—The Rhode Island Company, Providence, R. I., has issued an official timetable covering all lines under its operation, which is to be distributed free to the public. The book also contains the closing time and receiving stations for the electric railway express service. The timetable and guide was authorized by the trustees of the company and prepared for distribution by President A. E. Potter. The booklet contains thirty-two pages, with an index for the guidance to the various tables. Placards have been placed in a conspicuous place for the benefit of the public, informing them where the timetables may be obtained.

Traffic in Toronto.—On account of the reduction in receipts the Toronto (Ont.) Railway has found it necessary to reduce expenses, and the company has laid off seven men from the blacksmith shop, three from the fender room and twenty-five shedmen. One hundred other men are to be used as extra crews on the extra runs during the rush hours. R. J. Fleming, general manager of the company, says that the receipts for April were about $35,000 less than for April last year, and that during the first seventeen days of May they were $30,000 less than for the same period a year ago. Mr. Fleming admitted that the business has been affected somewhat by the jitneys, but he attributed the decrease in the traffic to conditions generally, to the number of soldiers who have gone to the war, and to the closing of factories and laying off of hands by manufacturing concerns. The city solicitor has been instructed by the Board of Control to take immediate action to prevent the company from reducing the number of cars in commission.

Personal Mention

Sir Edgar Speyer, who resigned recently as chairman of the Underground Electric Railways, Ltd., London, England, arrived at New York on the *America* on June 3. He expects to spend the summer at Bar Harbor, Maine.

Lord George Hamilton, deputy chairman of the Underground Electric Railways, Ltd., London, England, has been elected chairman of the company to succeed Sir Edgar Speyer, resigned.

Mr. Freeman T. Eagleson, Akron, Ohio, special counsel in the office of Attorney General Edward C. Turner, has been designated as counsel for the Ohio Public Utilities Commission to succeed Mr. Lawrence K. Langdon, whose appointment as a member of the commission is referred to elsewhere in this column.

Mr. Allen F. Edwards, vice-president in charge of purchases of the Detroit (Mich.) United Railway, was elected treasurer by the board of directors at a meeting held May 27 to fill the vacancy caused by the death of George H. Russel. Mr. Edwards will add the duties of treasurer to those of his present position. The board did not elect a director to succeed Mr. Russel.

Mr. C. O. Jenks, general manager of the Spokane, Portland & Seattle Railway at Portland, Ore., has been elected also a member of the board of directors and vice-president and general manager of the Spokane & Inland Empire Railway, Spokane, Wash., succeeding W. D. Scott, deceased. He has been elected also vice-president and general manager of the Pacific & Eastern Railway, with jurisdiction over the operating, mechanical and purchasing departments, succeeding Mr. William Gerig, resigned.

Mr. Lawrence K. Langdon, of Warren County, Ohio, was appointed a member of the Ohio Public Utilities Commission on May 27 to succeed Mr. Charles C. Marshall, resigned. Mr. Langdon was a member of the seventy-eighth and seventy-ninth General Assemblies. During the latter session, in 1911, he virtually prepared the original public utilities law. When Governor Willis assumed the reins last fall, Mr. Langdon was appointed counsel for the commission. His term as member of the commission will expire on Feb. 1, 1917.

Mr. L. O. Veser has been appointed electrical superintendent of the works of the Aluminum Company of America at Massena, N. Y. Mr. Vesser is a graduate of Cornell University and until recently was electrical engineer for the Northern Ohio Traction & Light Company, Akron, Ohio. He had for a number of years been associated with the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, in the capacity of superintendent of construction and chief engineer, and was also with the West Penn Traction Company as assistant superintendent of transmission.

Mr. Herbert L. Harries has become general manager of the Washington-Oregon Corporation, with headquarters at Vancouver, Wash. He was until recently assistant operating superintendent of the Central Hudson Gas & Electric Company, Poughkeepsie, N. Y., having been theretofore assistant general manager of the Louisville Gas & Electric Company, Louisville, Ky., of which his father, Gen. George H. Harries, is president. Like his father, Mr. Harries was enrolled at West Point. He is a first lieutenant in the ordnance department of the District of Columbia militia under presidential appointment.

Mr. Francis H. Dewey, president of the Worcester (Mass.) Consolidated Street Railway, has been elected president of the New England Investment & Security Company to succeed Mr. J. T. Harmer, resigned. Mr. Dewey was born at Worcester, Mass., on March 23, 1856, and was graduated from Williams College in 1876 with a degree of A. B. In 1879 Williams College conferred upon him the degree of A. M. Meanwhile, in 1878, he received from Harvard the degree LL.B. He has been solicitor and a trustee of the Worcester Mechanics' Savings Bank and the Mechanics' National Bank since 1880. He has been president of the Mechanics' National Bank since 1888, of the Worcester Consolidated Street Railway since 1898, and is also vice-president of three other street railway companies. He is a director of the Norwich & Worcester Railroad, the Worcester Gas Light Company, Massachusetts Bonding & Insurance Company and the New England Telephone & Telegraph Company. He is president and treasurer of the Bay State House, a trustee and vice-president of the Worcester Railways & Investment Company and an officer of other corporations. He is a trustee, vice-president and treasurer of Clark University and Clark College, vice-president of the Worcester Art Museum, a director of the associated charities of Worcester, chairman of the commission for city hospital funds of Worcester, a trustee of the Memorial Hospital at Worcester, and a member of the Worcester County Bar Association.

Mr. Clark V. Wood, vice-president of the Springfield (Mass.) Street Railway, has been elected president of the company to succeed Mr. J. T. Harmer, resigned. Mr. Wood has also been elected a vice-president of several small roads in the Springfield system, these including the Milford, Attleboro & Woonsocket Street Railway, the Attleboro Branch Railroad and the Webster & Dudley Street Railway. Mr. Wood was born in Woodstock, Vt., on June 8, 1863. He was graduated from the Woodstock High School with the class of 1881 and at once entered the service of the Grand Trunk Railway as a telegraph operator. After serving on the Grand Trunk at various points between Montreal, Can., and Portland, Maine, he took a more important position with the Boston & Maine Railroad as agent and then shifted to the New York & New England Railroad. He worked with this railroad, now a part of the New York, New Haven & Hartford, first as freight cashier and later as agent at Providence, R. I. The Pittsburgh & Lake Erie Railroad offered Mr. Wood its general passenger agency, and he went to Pittsburgh and made his office there during his period as passenger agent. He was later appointed private secretary to Mr. J. G. Odell, the vice-president of the road, and next became superintendent of the West Side Belt Railroad and the Pittsburgh Terminal Railway & Coal Company. Later he accepted the superintendency of the Wabash Railroad with supervision over the operation of the whole system consisting of more than 400 miles of track and coal and iron ore docks at Cleveland and Toledo. In 1900 at the request of Judge James H. Reed, president of the Philadelphia Company, Mr. Wood assumed the task of developing freight traffic on the lines of the Pittsburgh Railways. This Mr. Wood showed remarkable ability in doing. Having completed this work satisfactorily he resigned from the Wabash System, which he had temporarily left, and became connected with the electric railways in Springfield, Mass., then under the control of the New York, New Haven & Hartford Railroad. In 1906 Mr. Wood assumed charge at Boston of all traffic on the lines owned and controlled by the New England Investment & Security Company. His success in the operating department led the directors to create a new office for him, and Nov. 1, 1913, he was made vice-president in charge of the operating and traffic departments of the Worcester (Mass.) Consolidated Street Railway, Springfield Street Railway, Milford, Attleboro & Woonsocket Street Railway, Interstate Consolidated Street Railway and the Attleboro Branch Railroad. In this position he took over part of the work done previously by President J. T. Harmer, who has just resigned.

CLARK V. WOOD

OBITUARY

Thomas Green, superintendent of transportation of the South Covington & Cincinnati Street Railway, Covington, Ky., is dead at his home here after an illness of several months of dropsy. Mr. Green had been in the employ of the company for twenty-eight years, rising from the post of driver of a horse car to motorman, inspector and finally superintendent.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Bangor, Maine.—The Bangor Railway & Electric Company has received a franchise from the Council to double-track its line on Union Street, Bangor, for a distance of about 1200 ft.

Baltimore, Md.—Application will be made to the Council by the United Railways & Electric Company for a franchise to divert its Mount Washington line from Calvert Street to Charles Street between Center Street and German Street, Baltimore.

East Boston, Mass.—The Bay State Street Railway has asked the Council for a franchise to alter its tracks on Walley Street, East Boston, from Gladstone Street to Waldemar Avenue.

Kansas City, Mo.—The Metropolitan Street Railway has received franchises to lay a single track on Prospect Avenue from Forty-seventh Street to Seventy-second Street and to make the following extensions in Kansas City: Thirty-first Street south of Indiana Street; Twenty-fourth Street from Hardesty Street to Brighton Street; Twelfth Street east from Winchester Avenue and Broadway from Twenty-fourth Street to Southwest Boulevard.

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to double-track its line on West Ferry Street and to extend this line through Gelston Street to a junction with Niagara Street, Buffalo. The company has also asked for a franchise to build a line on Michigan Street from Elk Street to Ohio Street and westerly along Ohio Street.

North Columbus, Ohio.—The East Linden Traction Company has asked the Council for permission to present a request for a franchise to build a cross-town line in North Columbus. The proposed route will be west on Hudson Street from Atcheson Pike to Neil Avenue, north to Dodridge Street and west to the east bank of the Olentangy River. Philip B. Gaynor, New York, president. [April 17, '15.]

TRACK AND ROADWAY

Fort Smith Light & Traction Company, Fort Smith, Ark.—New rails have been delivered along North Thirteenth Street, Ft. Smith, for use on that division. The double-track construction on the Electric Park Division is about completed.

British Columbia Electric Railway, Vancouver, B. C.—The Town Council of South Vancouver has offered to pave the center strip and to lay the tracks on Victoria Road and the unfinished portion of the line on Main Street.

Fresno, Coalinga & Monterey Railway, Fresno, Cal.—This company reports that on account of financial conditions it has not been decided when construction will be begun on its line between Fresno and Monterey. A construction company is being organized to build and equip the entire road. Ernest R. Shaw, 704 Mutual Bank Building, San Francisco, general manager.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to spend at once $75,000 in improving its double track on American Avenue from Anaheim Street to Sixth Street, Long Beach, 3 miles. The improvement will consist of laying 127-lb. grooved or Trilby rails, paving between and at the sides of the rails from Anaheim Street to Sixth Street, reballasting the entire roadbed and repaving other portions of the street where necessary. The company has recently made improvements in Long Beach amounting to $25,000.

Municipal Railways of San Francisco, San Francisco, Cal.—Plans are being considered by the Public Utilities Committee of the Supervisors for an extension across Golden Gate Park, San Francisco. The proposed line is to extend from Tenth Avenue and Fulton Street through Golden Gate Park to Fourteenth Avenue and Lincoln Way. Its terminus will be at Fourteenth Avenue and Judah Street. The roadway through Golden Gate Park will be depressed.

Norwalk & New Canaan Street Railway, Norwalk, Conn.—This company reports that owing to financial conditions construction has not been begun on its proposed line between Norwalk and New Canaan, 7 miles. The charter has been renewed by the Legislature of 1915 and efforts will be made to have the road built. James T. Hubbard, Norwalk, is interested.—[Aug. 15, '14.]

Alton, Granite & St. Louis Traction Company, Alton, Ill.—Preliminary arrangements are being made by this company to build an overhead crossing at the Chicago, Burlington & Quincy Railroad tracks and a subgrade crossing under the Chicago & Alton Railroad tracks so that the electric line may be extended to the site of the proposed hospital, 1 mile east of Upper Alton.

Southern Traction Company of Illinois, East St. Louis, Ill.—Plans are being made by this company to resume construction on its line across the municipal bridge. The company proposes to operate an electric line through the coal fields of Illinois to Du Quoin, passing through several important cities. The line between East St. Louis and Belleville is almost completed.

Aurora, Plainfield & Joliet Railway, Joliet, Ill.—Plans are being considered by this company to double-track its line on North Chicago Street between Webster Street and Ruby Street, Joliet.

Murphysboro & Southern Illinois Railway, Murphysboro, Ill.—Plans are being made to begin at once the construction of this company's 8-mile line between Murphysboro and Carbondale. A. B. Minton, Murphysboro, president. [Feb. 27, '15.]

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—Plans are being made by this company to extend its line in Gary from Broadway east to Virginia Street and north to the mill gates.

***Vincennes, Ind.**—Plans are being considered to build a railway from Bicknell, via Bruceville and Aliceville, to Vincennes. John T. Oliphant, Vincennes, is interested.

Keokuk-Jefferson City Electric Railway, Keokuk, Ia.—Surveys have been made of this company's line from Keokuk to Newark. It is proposed to build an electric railway between Keokuk, Ia., and Jefferson City, Mo., via Wayland, Williamtown, Labell, Newark, Bethel, Shelbyville, Shelbina, Paris, Mexico and Fulton. H. W. Knight, Chicago, is interested. [March 6, '15.]

Mexico Investment & Construction Company, Mexico, Mo.—Plans are being made by this company to begin construction on its Molino-Sante Fe division about June 10. It is proposed to extend the line 14 miles southwest of Mexico if a bonus of $30,000 can be secured from the citizens.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Colonial Civics Club of Trenton is circulating petitions to the effect that an extension of this company's line on Hamilton Avenue and Olden Avenue be made to the Municipal Hospital.

Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded the contract for the construction of section No. 2 of Route No. 49 to Oscar Daniels Company for $863,775. This section is a part of the Culver rapid transit railroad in Brooklyn, which will connect with the Fourth Avenue subway. The route runs through Gravesend Avenue and Shell Road to Coney Island. The part just placed under contract extends from Bay Parkway (Twenty-second Avenue) through Gravesend Avenue and Shell Road to Avenue X. The road will be an elevated line, and the contractor must complete it within 18 months. The new road will be operated by the New York Municipal Railway Corporation in connection with the Fourth Avenue subway.

International Railway, Buffalo, N. Y.—This company will double-track its line on Virgil Avenue from Hertel Avenue to Kenmore Avenue, Buffalo.

Wallkill Transit Company, Middletown, N. Y.—This company is considering plans to extend its line to connect with the Orange County Traction Company's line at Walden. Surveys have been made of the proposed extension.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has recently purchased from the Algoma Steel Company of Canada 500 tons of steel rails.

***Custaloga, Ohio.**—Plans are being considered to build an electric railway from Custaloga to Big Prairie, 1½ miles. John C. Lake, Big Prairie, is interested.

***Bristow, Okla.**—Surveys have been begun by St. Louis capitalists for a railway to be built from Bristow to Drumright and from Bristow to Okmulgee. W. Mathews, St. Louis, is among those in charge of the engineering work.

Berlin, Ont.—Ex-Mayor W. D. Euler, Berlin, district vice-president of the Ontario Hydro-radial Union, has sent to the municipal councils of the cities of Berlin and Guelf and the townships of Waterloo and Guelf resolutions for endorsement, requesting that the hydro-electric commission make a survey for a hydro-radial railway from Berlin, via Bridgeport, Bloomingdale and New Germany, to Guelf.

Sudbury-Copper Cliff Suburban Electric Railway, Sudbury, Ont.—Plans are being made by this company to resume construction this month on its line between Sudbury and Copper Cliff. All of the grading has been completed, most of the ties placed and some track laid. J. H. Mackey, Sudbury, president. [Dec. 19, '14.]

Toronto (Ont.) Suburban Street Railway.—Track has been laid on this company's line from Islington almost to the west bank of the Humber River and a temporary bridge erected over Mimico Creek. The piers and abutments for the bridge across the Humber River are practically completed and it is expected that the material for its construction will be delivered soon. Ballasting has been begun along the line to Georgetown and tracklaying has been begun west of Georgetown.

Portland, Eugene & Eastern Railway, Portland, Ore.—This company plans to spend $15,000 this summer on improvements to its line.

***Huntingdon, Pa.**—Plans are being considered to build an electric or steam railway between Huntingdon and McAlevys Fort. H. G. Tussey, McAlevys Fort, is interested.

Conestoga Traction Company, Lancaster, Pa.—At a recent meeting of the Lancaster Chamber of Commerce announcement was made that within the next few weeks work will be begun on a $300,000 underground conduit system to be used exclusively for the wires of this company and the Edison Electric Light Company.

***Milford, Pa.**—Residents of Milford are making a united effort to secure a railway from Milford to Port Jervis, N. Y. The Business Men's League of Milford have received a proposition for the town to pay a part of the cost of the improvement. Solicitors of Milford are now canvassing for the money.

Phoenixville, Valley Forge & Strafford Electric Railway, Phoenixville, Pa.—Plans are under consideration by this company to extend its lines into Montgomery County from Phoenixville.

Reading (Pa.) Transit Company.—During this year this company plans to expend $180,000 in Reading for track renewals and paving. About $100,000 will also be spent on improvements at Lebanon and other places along the company's lines.

West Chester (Pa.) Street Railway.—New ties are being laid by this company and its overhead system renewed in West Chester.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—A by-law to compel this company to extend its lines to St. Malo and Belvedere Wards will shortly be voted on.

Three Rivers (Que.) Traction Company.—Construction has been begun on this company's line in Three Rivers and the suburban extension to Cap de la Madeleine, 7 miles. It is expected that the line will be completed by Sept. 1. T. McDougall, president. [Mar. 20, '15.]

Regina (Sask.) Municipal Railway.—The Council of Regina has authorized the expenditure of $10,000 to build an extension of the Young Street line to connect the new power house in Regina with the Canadian Pacific Railroad line.

Savannah, Piedmont & Western Railway, Columbia, S. C.—Financial arrangements are being completed for the construction of this company's line between Greenwood and Augusta, 60 miles. Preliminary surveys have been made and rights-of-way obtained for practically the entire line. J. Peyton Clark, 43 Cedar Street, New York, is interested. [April 3, '15.]

Carolina, Greeneville & Northern Railroad, Greeneville, Tenn.—Plans are under consideration by this company to extend its line from Kingsport to Bristol, 25 miles, and from Newport to Knoxville, 40 miles. The proposed main line is from Kingsport via Greeneville to Newport, 75 miles. This would make the entire line 140 miles. It is expected that construction will be begun soon. H. S. Reed, 205 Grant Building, Los Angeles, Cal., president.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Plans are being made to resume construction on this proposed line between San Antonio and Austin. About 60 per cent of the right-of-way has been obtained and it is expected that it will be possible to begin work late in the summer or early in the fall. V. P. Brown, San Antonio, is interested. [April 3, '15.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—Grading has been begun and track laid on this company's extension to Huntsville.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—An extension of its North Hoquiam branch from the present terminus at the Lytle Mill to the Little Hoquiam Bridge, 1 mile, is being considered by this company. The franchise for the right-of-way was granted the company some time ago.

Walla Walla (Wash.) Valley Railway.—This company is reconstructing some of its track in Walla Walla. The rails are 72 lb., and the ties and rails are being laid in concrete.

Princeton (W. Va.) Power Company.—The construction of track has been begun on this company's line from Princeton to Bluefield, 12 miles, and the work will be steadily continued to completion.

Southern Wisconsin Railway, Madison, Wis.—In connection with improvements which the city is expecting to make before Nov. 1, 1915, this company plans to reconstruct and pave its roadbed between Park Street and Mills Street and to pave the roadbed on Williamson Street between Blair Street and Jenifer Street.

SHOPS AND BUILDINGS

Shore Line Electric Railway, Norwich, Conn.—This company expects to build a new carhouse on Montauk Avenue, New London. The structure will be 75 ft. x 220 ft., one story with basement. The trim will be limestone, granite and terra cotta and the sashes and doors will be steel. The floors will be reinforced concrete. The structure will eventually replace the present wooden carhouse, but the initial construction will be that of a building at the south of the present carhouse. Plans for the new carhouse will be ready in the office of Cudworth, Woodworth & Thompson, Norwich, in about two weeks.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Fire early on the morning of May 19 destroyed the carhouse of this company at Twenty-sixth Street and Kossuth Street, Lafayette, as well as eight closed cars, five summer cars, a snow sweeper, a sand car and the $10,000 electric brake test car "Louise." The loss is estimated at $75,000.

Boston (Mass.) Elevated Railway.—Plans have been completed by this company for the erection of a concrete and steel transfer station at Lake Street, Chestnut Hill, to be placed in service by the fall of 1916. The station will supersede an umbrella-type open-air station at the junction of the Boston Elevated Railway and Middlesex & Boston Street Railway. The new installation will include platforms at two levels, with loops and inclines providing for the separation of in-bound and out-bound traffic, with quick transfer between parallel lines. The new station will do away with the present shelters and eliminate two of the four tracks now in service. The cost is estimated to be $60,000.

Worcester (Mass.) Consolidated Street Railway.—This company has completed its freight and trolley express station at Adams Street, Leominster. Connecting tracks from the Union Street branch of the cross-town line have been laid.

Toronto (Ont.) Civil Railway.—A temporary carhouse has been built by this company on its Bloor Street line between Dorval Road and Indian Road to accommodate the cars now operating on that line. It is a frame structure, 85 ft by 21 ft. with a pit track.

Manufactures and Supplies

ROLLING STOCK

Toronto (Ont.) Civic Railway will receive tenders up to June 8 for four city cars for its Lansdowne Avenue extension.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., at a recent fire which destroyed its car barns, lost eight closed cars, five summer cars, a snow sweeper, a sand car and an elaborately equipped electric brake test car. It is reported that the cars will be replaced at once.

TRADE NOTES

Sangamo Electric Company, Springfield, Ill., has removed its office at Rochester, N. Y., to the Mercantile Building.

Ohio Brass Company, Mansfield, Ohio, has received an order for Tomlinson M. C. B. couplers for ten cars of the Wilkes-Barre & Hazleton Railway and automatic air couplers for ten cars of the Lehigh Valley Traction Company.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has received an order from the Pressed Steel Car Company for thirty SR-95 headlights for the new cars of the New York, Westchester & Boston Railway.

Pyrene Manufacturing Company, New York, N. Y., is reciprocating with the automobile trade by motorizing its sales department. The company recently bought six Ford automobiles, which are in use in several different branch offices and which will be used entirely by salesmen and not for deliveries. Each automobile will be equipped with a Pyrene fire extinguisher.

Ohmer Fare Register Company, Dayton, Ohio, on May 20 held its twenty-fourth semi-annual distribution of prizes to the employees in the company who had made the best suggestions during the past six months for improvements in fare registers, for more efficient practices of manufacture or for the betterment of the employees and the business in general. After a talk by the president, John F. Ohmer, eighteen men received cash prizes for their suggestions.

Standard Railway Supply Company, Cincinnati, Ohio, has purchased the manufacture, sale and ownership of the "Kisinger (K-I)" patented splicing sleeve from the Standard Pulley Company of Cincinnati. This sleeve is made in various lengths and for all types of trolley wires and cables, and with it an effective and permanent splice can be easily and quickly made, requiring only the insertion of two small tempered steel wedges into the sleeve. No soldering is necessary. John D. Berger is manager of the Standard Railway Supply Company.

Sanderson & Porter, New York, N. Y., report that the first four sections, comprising about 47 miles, of the oil pipe line for the Valley Pipe Line Company, a subsidiary of the Shell Royal Dutch Company, which was designed and is being built by Sanderson & Porter, was placed in successful operation on May 15. This line is 170 miles long, extends from the Coalinga oil fields to a tidewater terminal near Martinez in San Francisco Bay, and will have a carrying capacity of 25,000 barrels per day. In order to comply with the wishes of the Shell Company for prompt completion, the constructing engineers, Messrs. Sanderson & Porter, have pushed this work through in what is believed to be record time.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a folder on its tank-car tanks.

Pressed Asbestos Products Company, New York, has issued a catalog describing its Papco products for various uses as an electrical dielectric and heat-resisting material.

Trolley Supply Company, Canton, Ohio, has issued two folders, one on the McLain No. 25 extended dash headlight and the other on the Simplex roller-bearing trolley base No. 3.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34-U, which contains instructions for controlling and operating its class N-SO fuel-oil-driven compressors.

Robert W. Adams, Providence, R. I., has issued a folder describing the new "Engineers' Edition" of his transmission line calculator for determining voltage drop and power loss in a.c. circuits.

Westinghouse Traction Brake Company, New York, N. Y., has received an order for air-brake equipment with emergency feature for the two trailer and two motor cars recently ordered by the Alabama Power Company from the Southern Car Company.

Ohmer Fare Register Company, Dayton, Ohio, has issued a card on its fare registers. The card announces an order from the Albany Southern Railway to equip its entire system with fare registers of this company as a result of satisfactory trial service.

Trussed Concrete Steel Company, Detroit, Mich., has issued a catalog illustrating the Kahn Pressed Steel type of building construction for industrial plants. In floors these pressed steel beams eliminate inflammable wood joints, giving a permanent construction of great strength. Upon these beams which are placed 23½ in. on centers, is laid ⅜ in. Hy-Rib and concrete applied. Where wood floor is desired wood sleepers are attached to the pressed-steel beams by nailing between the channels. For the ceiling under the beams the ⅜-in lath is readily attached by means of prongs on the underside of the beams.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued two switchboard publications, DS 1439 and 1456, which give unusually complete information on this subject, the former covering a.c. switchboards with hand-operated switchboard-mounting oil circuit breakers, and the latter rotary-converter panels. Complete detailed information is given on these types of boards, including a number of diagrams, and suggestions as to the best method of assembly. Another publication has been issued by this company entitled "The Relation of Trolley Feeder Taps to Machine Flash-Overs," which is a reprint of an article which recently appeared in the ELECTRIC RAILWAY JOURNAL. This article discusses the above-mentioned subject, giving the reason for the application of the tap and the various conditions affecting the flash-over, quoting numerous instances where rotary converters had flashed over.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 41,013, giving a detailed description of its type RC d.c. commutating-pole motors. These motors are built with a frame of cast steel of medium weight with symmetrical section. They can be used with a sliding base which maintains a correct driving alignment, and which, with the adjustable shields, permits the installation of the motor on either the floor, wall or ceiling. As these motors may be equipped with covers rendering them semi-enclosed, totally-inclosed, or self-ventilated, they are wound for 115, 230 and 550 volts d.c. circuits, with permissible voltage range of 110 to 125, 220 to 250 and 500 to 600 volts. Bulletin No. 44,406 describes and contains characteristic curves of the GE-247 ventilated commutating-pole railway motor, for city service. By the adoption of the box type of frame and a specially effective system of ventilation and by the use of pressed steel for certain parts, it has been made sufficiently light in weight for use in light cars without any sacrifice of strength or reliability. This motor has hourly rating of 35 hp on 600 volts and 30 hp on 500 volts.

The Northwestern Elevated Railroad, Chicago, Ill., has recently issued a booklet which contains an illustrated description of its line and the character and extent of its service. An interesting comparison is made of the urban and suburban transportation problems of Chicago with those of other large cities. New York, London, Paris, Boston, it is shown, are cities which have in a measure become set along certain lines, making the providing of transportation a determinable problem. Chicago, however, has been free to grow in all directions save one. With this enormous and rapid growth in a territory which offered no impediments, the open prairie of Illinois, there has always been "plenty of room to spread out." The transportation problem has, therefore, been to serve an urban population only slightly less than that of Manhattan Island, but occupying a very much larger area.

Electric Railway Journal

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MASTER MECHANICS ELECTRICAL COMMITTEE The dominant note in the report made by the committee on maintenance of electrical equipment before the Master Mechanics' Association this week was clearly reassuring to the mechanical men who were advised that they would float rather than sink in the rising tide of electrification. That no insoluble problem for the steam-railroad official exists in the change from steam to electricity, in fact, is borne out by the success of the individual members of the committee with electrical operation, because the majority of them were trained only in the school of steam. Primarily, there is no important difference in the shop equipment used for repairing locomotives of the two types, and the common difference in organization, which is based on the greater difficulty in finding defects in electrical equipment and the correspondingly greater ease of remedying them is by no means essential. This, at least, has been demonstrated by the policy of the committee's chairman, C. H. Quereau, as he has followed the steam-railroad practice of eliminating, as far as possible, separate forces for inspection and repairs, at the same time keeping up for nine years on the New York Central Railroad the remarkable maintenance figure of 3½ cents per engine mile. Even in the field of operation, electrification can bring no difficulty for the mechanical department heads, for steam engineers can get along perfectly well with electric equipment, and there is no necessity for breaking-in new enginemen. Indeed, the committee points out that the major part of the alleged extensive knowledge of locomotive engineers pertains to other matters than locomotives, and to anyone who has had dealings with them, this is a most conservative statement.

STANDARDIZE EQUIPMENT-FAILURE RECORDS One very important point brought out in the report was the recommendation to adopt the unit, "miles per detention," as a standard basis for equipment failure records. For years the reliability of the steam locomotive has been judged solely by its record of engine failures which, on a mileage basis, is exactly the unit advocated by the committee. But with the introduction of electricity, which thus far has been confined largely to passenger service, this fact has apparently been overlooked, and electrical reliability records have been frequently based upon "miles per minute of detention," a unit that has been brought into use through its convenience rather than its intelligibility. Of course, the latter unit best serves the needs of the transportation department as a purely operating record, and it has to be made up in any event. This does not, however, entitle it to be imposed upon the mechanical department, whose interest is confined to the attainment only of an ideal wherein the rolling equipment never breaks down. Once a failure of some locomotive part has occurred, the question whether it has caused a delay of five minutes or fifty minutes is not even of academic interest to the officials in charge of maintenance. What they need to know is that the failure occurred and the cause, and the actual number of detentions due to the equipment is what they should be charged with regardless of the lengths of the delays. As the committee suggests, it would be well to standardize this unit now, rather than to wait until the growing use of electricity for mixed traffic renders the time element in detention records altogether abortive.

HUMAN NATURE AND THE RAILROAD A book with this title written by Ivy L. Lee, formerly executive assistant Pennsylvania Railroad and now a member of the staff of John D. Rockefeller, has recently been issued by a firm of Philadelphia publishers. Mr. Lee begins with the thesis that the railroad problem is after all a human problem. It is built by human beings, run by human beings, regulated by beings who are very human and serves human beings. The great problem is to make the railroad manager, the employee and the public, in their mutual relations, understand one another's point of view. To help get this mutual understanding, Mr. Lee gives some very simple arguments and illustrations. To illustrate the rate question, for example, he compares it to that of a hotel built in a rapidly growing city like, say, Indianapolis. Originally, the hotel was designed so that each room would contain only a bed, a washstand and a dresser, and the price of the room is assumed to have been restricted to, say, $2 a day. Later, laws were enacted providing that the hotel should gradually be made fireproof, that a bathroom should be added to every room, that there should be elevators, more attendants, that every guest should be supplied with a drinking cup, and other facilities should be added by law so that the hotel should be more comfortable. During this time, however, Mr. Lee assumes that the public insists that the price of the room should remain at $2 a day. How many people, he then asks, could be induced to engage in the financing of future hotels under conditions of this kind. This practically represents the situation of electric railway companies at the present day. Additions in the way of greater facilities and longer rides have been made at the demand of the public and by the requirements of commissions, but the public insists that the 5-cent fare must remain in force.

THE ERIE CAR

The all-steel car, described elsewhere in this issue, that has been designed by the firm of L. B. Stillwell for the Erie Railroad, possesses features worthy of note, not so much because of their spectacular character but rather because of their simplicity. In effect the car body is nothing but a long box with all the advantages of transverse and vertical strength that accompany a box-construction. Members which do not contribute to that general idea have been rigidly excluded. This characteristic is best emphasized, perhaps, by referring to the omission of belt rails from the side framing, because a car without belt rails, according to practically universal custom in car design, seems to be very much like a ship without a rudder. As a matter of fact, however, if one were not so used to seeing this member in car construction its retention would be the surprising matter rather than its omission, because, when full advantage is taken of the weight-supporting qualities of the car side, it must lie close to the neutral axis of the beam and thus become practically ineffective.

Judged by the standards of the average interurban railroad the weight of the car body is not exceptionally low. The reason for this is a definite one, however, and is obvious enough when the strength of the construction is considered. Its ability to resist buffing and pulling strains has an ultimate calculable value approximating 1,200,000 lb., the center sills, whose sole duty is to resist these forces and not to carry weight, being prevented from springing either vertically or horizontally by cross-bearers from the side framing. The floor is, in fact, constructed to act as one side of the box-construction that applies to the car body as a whole, and the same thing is true of the roof. Sufficient strength is incorporated in the latter so that the car can be turned upside down and supported on the roof without serious damage. It is designed even to withstand the shocks incident to rolling over, when the entire weight would be imposed upon the line of the eaves, the side posts being bent over into heavy knees at their tops and connected by a continuous deck sill. This forms the equivalent of a flange for the exaggerated girder made up by the car side. In general, the car body members are designed for the equivalent of 13,000-lb. fiber stress, and the car is capable of supporting itself without serious overstrain even when carried at the extreme ends with the trucks removed.

Although the car is to be used for the present, at least, in steam-operated trains, it has been designed throughout with a view to its ultimate equipment with motors and control for multiple-unit operation, and this feature is very significant. At the same time it is a most important consideration for steam railroads, because whether such roads are electrified or not, provision for electrical equipment on passenger cars can be easily made and involves practically no additional expense at the time of reconstruction. If there is no such provision, however, the introduction of electricity means the purchase of new cars and trucks or else expensive reconstruction of existing equipment.

"SAFETY FIRST" NOT A CUT-AND-DRIED PROGRAM

Despite the progress of the past two years in safeguarding the power plant, we are not likely to see the time when a complete recipe for eliminating the danger points can be written with universal applicability. There will always be room for intelligent study of local conditions, although in dealing with many kinds of equipment certain safeguards worth while in one installation will be found equally useful in another.

The installation of guards about gearing and belts, the use of extension pieces on galleries to prevent the dropping of tools and loose metal on the heads of operators, the placarding of high-tension wiring and dangerous contacts, the adequate railing-in of machinery, the protection of switch cells, etc., are methods that may now be said to be of general application, but in practically every station a safety survey goes farther than this. Differences in station design alter clearances and change dimensions of passageways; they necessitate the relocation of piping and valves in extensions, perhaps, or they involve difficulties of access which in themselves tend to cause trouble in emergencies. Just as each plant has individual characteristics, so the acute study of its accident possibilities reveals special hazards which may not be present in a neighboring installation. The ability to see these hazards by imaginative analysis is therefore a very important factor in the protection of the equipment and its operators.

If the safety movement were confined exclusively to the use of standard methods of protection, it might easily become a good deal of a bore to the engineer. There is danger of multiplying safety "standards," so-called, which should never be allowed to take the place of the best solution of the problem in each local case. Something can safely be allowed for the adaptability of mankind. If the safety movement were carried to the extremes sometimes advocated, we should always have the same height of risers and width of treads in stairways; ladders would be affixed to a stated maximum angle with the floor, and clearances would become uniform to the extent of giving the station operator too much room in some cases and perhaps too little in others. This does not mean that consideration should not be given to all the well-known normal methods of safeguarding equipment, but it does signify that there is still ample space for the exercise of originality in discovering possible dangers and in avoiding their occurrence.

In work of this kind more attention is going to be given in the future to the location of auxiliary apparatus of various kinds. It is far better to put the station power and lighting transformers, for instance, on a gallery behind a railed-in space which can be reached without passing in close proximity to high-voltage circuits than to put them into a cramped location near a bank of lightning arresters against which one easily may lean in opening a disconnecting switch or in replacing a fuse. It all goes back to the perennial problem of anticipating the needs of the operating man when working on the embryonic plans of the station, and the safety movement has its place in the mind of the power-station draftsman of the first order no less than it has its proper hold upon the attention of the man responsible for the productive service.

MORE NOTES ON REGENERATIVE BRAKING

In the issue of the ELECTRIC RAILWAY JOURNAL for May 15 attention was directed by the editors to certain features of regenerative braking. The live character of the subject is indicated by the fact that even while the paper was in press A. H. Armstrong was explaining the application of the principles of regenerative braking in the Chicago, Milwaukee & St. Paul electrification at the A. S. M. E. meeting in Chicago. In last week's issue a letter from Frank J. Sprague, one of the pioneers in electric traction referred to in the last editorial, was printed. There were also articles describing the electric locomotive equipment of the Norfolk & Western and that under construction for the Chicago, Milwaukee & St. Paul Railway. This general revival of interest is, of course, due to the electrification of important divisions of these railways on both of which very heavy trains are to be braked.

There seems to be some confusion as to the advantages and disadvantages of regenerative braking, the point of view being determined more or less by the experience and interest of the person holding it, as well as upon the conditions under which it is applied. In one case it is principally the energy saving which counts, in another it may be the reduction in power house cost, in another ease of control and in a fourth reduction in risk of wheel breakage and brakeshoe saving, while in other cases complication in control equipment and increase in motor capacity appear to be of overwhelming disadvantage. It may therefore be worth while to summarize the situation briefly, merely touching upon the points developed in the last editorial.

Energy saving is an attractive proposition as is indicated in Mr. Armstrong's statement on page 1073 of last week's issue to the effect that, on a 2 per cent downgrade, 55 per cent of the up-grade power consumption can be restored to the line. The average saving, even on a system having considerable 2 per cent grade, is very much smaller than this. It is worth while, however, especially if the energy is purchased from a power transmission company, but the principal result is likely to be in the reduction in service charge in the case of purchased power or its equivalent power house investment cost where power is generated by the railway. In the latter case, as previously stated, the kw-hour element of the cost may be negligible due to excess of supply of water power. The conditions cited apply principally in electrifications where considerable density of traffic is involved. There are undoubtedly other circumstances under which the whole matter of energy saving may be of negligible moment.

The advantages of regeneration from braking considerations come principally in the reduction in risk of injury to the wheel flange or to the whole tire. While, as was pointed out in the editorial referred to, it may not always be possible to demonstrate a direct money saving in brakeshoes, wheels and track sufficient to warrant the complication of regenerative braking, yet, during long periods of heavy mechanical braking the concentration of heat on wheel treads and flanges may produce serious results, due to internal stresses developed, and it is even possible that tires may be loosened and flanges broken. In this connection a former superintendent of motive power of a large steam railroad recently said that under these conditions of continued mechanical braking he had seen the paper centers of Pullman carwheels charred for a depth of 2 in. under the tires, indicating a violent overheating. This condition has undoubtedly been very influential in forcing the development of electrical regeneration.

The objections to regeneration are really not serious when conditions otherwise warrant its use. The induction motor is a natural generator when polyphase excitation is furnished, with or without the phase converter. Its constant-speed characteristics are not insuperably objectionable in the only class of service in which regeneration is practicable. The series motor can be made into a good generator by the plan suggested by Mr. Sprague, or its equivalent, without unwarranted complication. The General Electric Company has actually undertaken to build regenerating d.c. locomotives on a large scale. And the motor-heating item is not so serious either under mountain-grade conditions for this reason. Hauling heavy freight trains up long grades at slow speed involves a considerable time element, in some possible future electrification several hours. The motors have time to attain nearly steady temperature, which motors with forced ventilation do very quickly. This is evident from the data, given last week by Mr. Armstrong, showing that the motors for the C., M. & St. P. locomotive have a continuous rating only 12½ per cent less than the one-hour rating. The operating conditions here are radically different from those where intermittent load is carried by non-ventilated motors. Under the latter conditions, as was pointed out in the editorial four weeks ago, electric braking, regenerative or otherwise, means larger motors. If all the motors are used in braking, the load on them is less than the climbing load by twice the friction load, and the heating is more than proportionately less. Hence a motor that is not overloaded on an up-grade sufficiently long to bring it to steady temperature will not, by a large margin, be overloaded in holding the same train on a down-grade of the same percentage. It follows, then, that less than the total number of motors can be used in braking without overloading by the proportion which twice the train resistance bears to the up-grade load. On the Norfolk & Western, one-half the motors only are used on the down grades.

Whichever main advantage of regeneration, better braking or energy saving, weighs more in the minds of the officials responsible for the choice of electrification systems, they all agree that regeneration should be used when heavy grades are involved.

All-Steel Cars for Erie Railroad

New 44-Ton Cars 72 Ft. Overall Have Been Placed in Steam-Operated Suburban Service on This Line, the Design Providing for Future Installation of Electric Motive Power Equipment Although the Strength of Structure Has Been Based Upon the Heaviest Steam-Railroad Standards

There have just been placed in suburban service by the Erie Railroad several all-steel passenger cars which possess unusual qualifications of structural strength combined with moderate weight. The design, in fact, provides for shocks due to derailment and overturning as well as collisions without distortion of the primary structure. The weight complete with trucks and car-body equipment, but without motors or the storage-battery lighting outfit at present installed, is 87,400 lb. This is approximately 8 per cent lighter than the class of steel-underframe cars that preceded the new cars, although the former have materially less ability to withstand abnormal strains.

For the present, of course, the new cars are to be operated as trail cars drawn by steam locomotives, but the Erie Railroad, in common with the Pennsylvania, is providing for future electrification by so planning the new cars that they may be equipped with motors and electric control at any time without necessity for replacing any of the material or altering the arrangement in any way. The wheels and axles, of course, are designed especially for trailer service, but the trucks are arranged so that these can be replaced by larger wheels and axles that are suitable for a geared drive. In addition, space has been left so that inside-hung motors may be set in between the axles and the transoms, the latter being specially designed for the support of the motor nose.

Provision for installing switches and control equipment has been made in the vestibule sheathing at each end of the car and certain of the floor members have been installed with sufficient reserve strength to carry the switch group, resistance, compressor, blower, transformer and other apparatus that might be installed under the floor when the cars are equipped for electric operation. Over each truck the car roof has been given ample strength to carry pantographs or similar current-collecting devices, and the height of the roof has been made suitable for this purpose. All of these provisions have been designed with a view to the establishment of the most advantageous facilities for electrical operation, and, in addition, special consideration has been given to the questions of thorough inspection methods and easy accessibility for maintenance. However, the suitability of the car for operation in steam-train service has been in no way impaired.

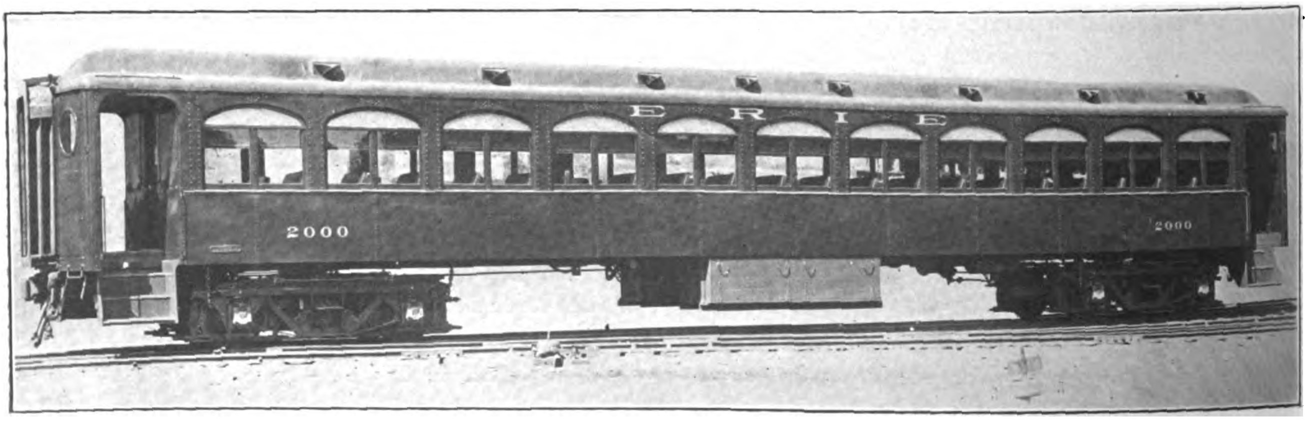
GENERAL FEATURES

The general features of this car were selected by F. D. Underwood, president Erie Railroad, and the car was designed under the direct supervision of William Schlafge, general mechanical superintendent of that system, by the firm of L. B. Stillwell, consulting engineers. Throughout the design the following characteristics were kept in mind as essential: Safety and comfort of passengers; low cost of operation; low cost of maintenance; moderate first cost.

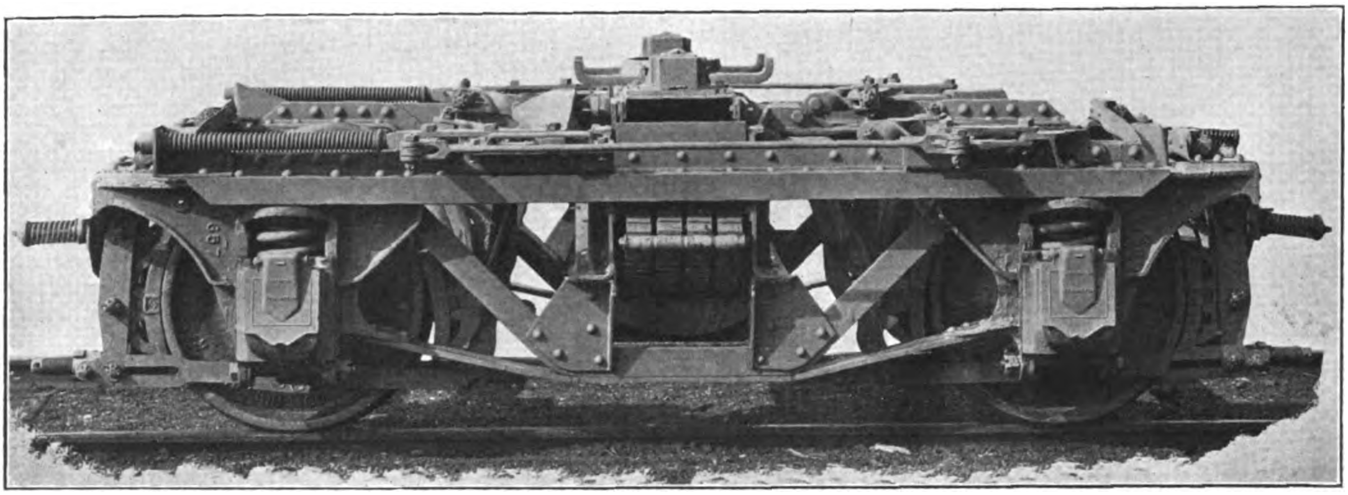
The feature of safety of passengers was covered by a special study of the behavior of railroad cars when subjected to the stress of derailments and collisions, and is secured by surrounding the passenger-carrying space with heavy, shock-resisting members, the superstructure being an integral part of the car and providing the equivalent of a solid box construction. Not only is the floor construction of ample strength, but the members forming the side walls are so disposed as to resist collapse or telescoping even should the car be overturned. The form of roof also adds greatly to this protective feature, as the side posts are bent at the top to form heavy knees and connected by a continuous deck sill made of 5-in. x 3/16-in. plate. This construction serves in effect as a flange for the high girder that is formed by the side of the car.

The vestibule end posts consist of 9-in. I-beams framed into the sills and to the vestibule ceiling construction. The body and walls or bulkheads are fitted with ¼-in. pressed-steel corner posts 12 in. deep, and gusset connections of ¼-in. flanged form extend from the bulkheads to the side sills and to the top plates, thus bracing the end walls against collapse in case of a heavy blow.

Comfort of passengers is contributed to by a special truck construction to give easy riding qualities, by the design of the seats and by the lighting arrangement, which avoids the use of large units that concentrate centers of intense light at several points. Instead, the reflection from the ceiling is used to effect thorough diffusion.



ERIE CAR—VIEW OF FULLY EQUIPPED CAR



ERIE CAR—NON-EQUALIZED TRUCK WITH CLASP BRAKES

CAR WEIGHTS

The cost of operation of any car involves the factor of dead weight as related to seating capacity. The results secured in this case, as indicated in the accompanying table of comparative weights, show that the all-steel car weighs less per seated passenger, and closely approximates the weight per foot of overall length, when compared with the lightest wooden car in the same company's service:

TABLE I.—COMPARISON OF WEIGHTS OF NEW AND OLD PASSENGER CARS OF ERIE RAILROAD

	All Steel	Steel Under-frame	Steel Under-frame	All Wood	All Wood
Number of seats...	86	72	72	72	72
Average weight, lb.	95,400	96,500	100,500	83,200	86,600
Weight per seated passenger, lbs...	1,100	1,340	1,400	1,140	1,200
Weight of lighting equipment, lb....	St. Bat. 8,000	St. Bat. 8,000	St. Bat. 8,000	Gas 2,000	Axle Gen. 6,500
Net weight ex. lighting equipt.	87,400	88,500	92,500	81,200	80,100
Weight per seated passenger, exclusive of lighting equipment	1,017	1,230	1,284	1,128	1,112
Length overall.....	70′ 4″	66′ 3½″	66′ 3½″	66′ 3½″	66′ 3½″
Weight per ft. ex. of lighting equip....	1,243	1,333	1,395	1,225	1,210

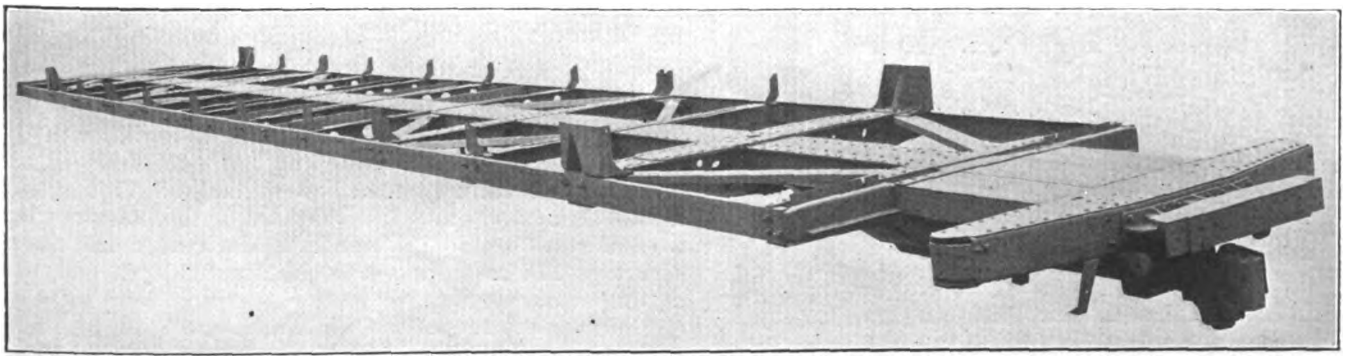
The comparison per foot of overall length is especially interesting, as it is unaffected by the seat spacing. It should be said also that the new cars are fitted with heavy friction buffing devices and friction draft gear, as well as large draft sills, whereas the lightest wooden car has only the spring platforms and wooden draft sills with tandem spring draft gear customary with cars of that type.

The lighter weight of the new car, as compared to other steel cars in similar service, can be attributed to the system of design orginally developed by L. B. Stillwell and Frank M. Brinckerhoff for the Hudson & Manhattan Railroad and the New York, Westchester & Boston Railway. This system involves the rigorous exclusion of all unnecessary members and also the co-ordination of all members that are installed so as to develop their full structural value. The uneconomical and heavy center-sill construction of the fish-belly type has been eliminated, and a center sill of uniform section whose sole function is to absorb buffing and pulling strains extends from end to end of car. In order to develop the full strength of the center sill as a column it is supported from the deep side-frame by cross bearers at each main side post, these being on approximately 65-in. centers.

RIGIDITY OF STRUCTURE

The cost of maintenance of all-steel cars is a matter regarding which few data are yet available, and the influence of structural strength upon the rate of deterioration is a question that will require time before it can be definitely answered. However, it is obvious that the maintenance of a rigid structure will be less than that involved by one in which even slight flexure occurs at the joints. This principle has been followed in the new design by making the girder or truss that supports the load extend over the entire height of the car side.

No belt rail, in fact, has been included in the design, because the side structure of the car is composed of a series of T-shaped pressings with diagonal braces at the bottom, such as are shown by the accompanying line cut. These make up the complete supporting frame work. The sheathing serves only to house the interior of the car, and it is made up from 1/16-in. sheets of American ingot iron, this metal being chosen in preference to steel on account of its rust-resisting qualities when rolled in thin sheets. The sash rests are supported directly by the side posts, being welded to them to secure waterproof joints.

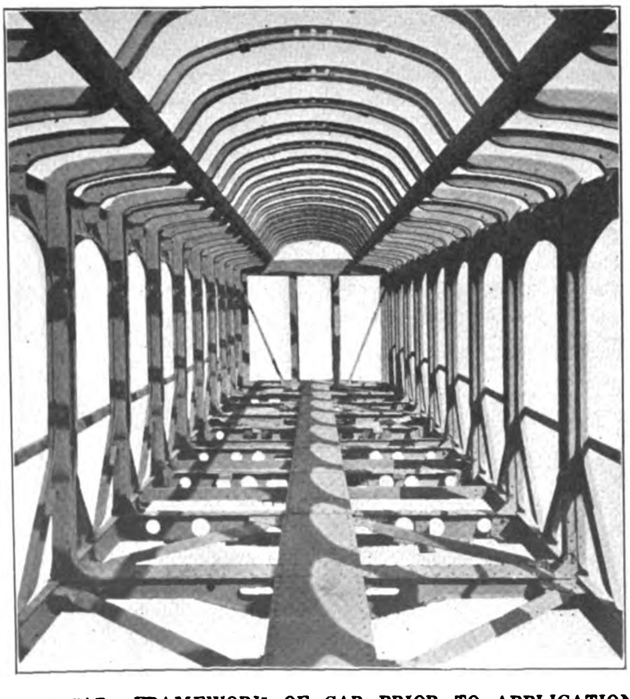


ERIE CAR—VIEW SHOWING LIGHT FLOOR FRAMING AND CENTER-SILL CONSTRUCTION

ERIE CAR—INTERIOR VIEW

As a result of this construction the truss-side of the car is 7 ft. 5 in. high, or about two-and-one-half times the height of girder that is possible in the type of construction where a heavy belt rail at the window sills serves as the compression member. As deflection varies with the cube of girder height while strength varies only with the square of the height, it is manifest that the rigidity of the structure for the cars in question is more than two-and-one-half times as great as it would have been with equal strength had the side-girder been limited to the height between the window sills and side sills.

In comparison with the underframe type of construction where there is no side girder at all, the rigidity of the new car is actually some seven times greater even with cars of equal strength. Naturally, the limitation of the deflection decreases the tendency for spring in the joints in the roof and between the top plate and side posts and, in turn, decreases the opportunity for overstraining riveted joints and having them work loose.

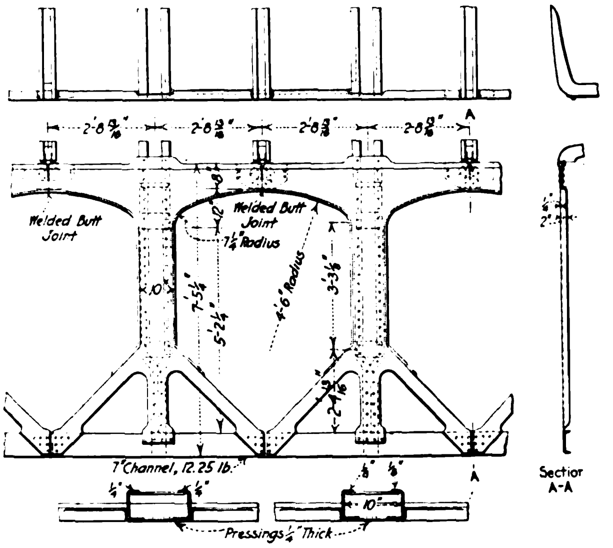


ERIE CAR—FRAMEWORK OF CAR PRIOR TO APPLICATION OF SHEATHING

The cost of car structures bears a general and approximately fixed relation to weight, and consequently, unless unusual refinements of workmanship are involved, reduction in weight means reduction of first cost. That this feature has been given consideration in the new design has been shown in the foregoing table. In general, it may fairly be assumed that a reduction of 1 lb. in weight of car will effect a saving of 10 cents in first cost.

As the rigidity of an all-steel car underframe makes the use of a friction draft gear practically imperative and the installation of an effective buffing device equally necessary, the new cars are fitted with equipment of this type that has sufficient capacity to absorb the most severe shocks that may be expected in service. The general design of the center sills is based upon an ability to absorb an ultimate force of 400,000 lb. at 18,000 lb. fiber stress.

The center sill construction forward of the bolsters is supported by the high side frames through the body and sill and bulkhead construction. The bending moment occurring at this point due to the eccentric draft gear forces is resisted by deep pressed-steel draft sills extending through the bolsters and is transferred by the body and sill and bulkhead construction to the high side frames. The center sills between bolsters are thus relieved of any eccentric loading from the draft gear, and the full section is available to resist the consequent direct compression because the sills are supported and aligned by the high side frames and heavy cross bearers as previously mentioned.



ERIE CAR—PRESSED-STEEL UNITS FORMING SIDE FRAME

DETAILS OF CONSTRUCTION

The center sills between bolsters consist of two 8-in. 16.25-lb. channels, spaced 14 in. back to back, with a 19 in. x 3/8 in. top cover plate and two 4-in. x 3½-in. x 3/8-in. angles reinforcing the bottom flanges. This gives a total section of 22 sq. in. Forward of the bolsters the pressed-steel draft sills reinforce the center sill construction and at the point of maximum depth add 10 sq. in. to the section.

The side frames of the car which are 7 ft. 5¼ in. from bottom of sill to top of side plate are designed like a bridge girder, with a pressed-steel compression member at the top plate and a channel tension member at the side sill. The posts connecting these members are of 10 in. pressed channel form, ¼ in. in thickness. The posts are furnished with integral diagonal braces below the windows and with flanged gussets at portal arches. They are reinforced with other pressings to form a box shape, the thickness increasing from ⅛ in. to ¼ in. at the posts which are subject to the greater horizontal shear. At the point of maximum shear the post is further reinforced by 2-in. x 3/16-in. angles inside of two corners of the box post, the shearing force here being 11,000 lb. on the one post. The maximum stress assumed in the design of these side frames was 16,000 lb. per sq. in. This stress is based upon the moment established by the total dead weight of the car resting on the center plates, plus the maximum load of passengers that could stand in the car, and with 25 per cent of the total dead load and live load superimposed in addition. Under these conditions, also, the stress in the bolsters is maintained at 12,000 lb. and that in the truck frame, which is not spring supported, at 8000 lb. The sides of the car, as previously described, are provided with transverse strength by bending over the tops of the posts to form a sort of flange. This has an estimated ability to withstand the strains imposed by the car rolling over side wise, thus loading the eaves on one side with the entire weight of the car.

The roof structure is formed of pressed channel carlines and is of the compound arch type. This outline of roof is not only strong, light and inexpensive, but gives good ventilation, good distribution of reflected light and is particularly suitable for the support of electric current collectors on cars fitted with electrical motive equipment. The roof sheathing like the side sheathing is made of 1/16-in. non-corrodible American ingot iron. The joints are riveted and flame-welded.

The trucks of the new cars are of the non-equalized type and are fitted with spiral journal-box springs and 38-in., quadruple, elliptic springs. The proportioning of the springs is such as to produce the easy-riding qualities so essential in steel car construction, not only for the comfort of the passsengers but for maintenance of equipment and roadbed. The trucks, complete with clasp brakes and 33 in. wheels with 5 in. x 9 in. journals, weigh 12,500 lb. each. A feature of interest on the trucks are Coleman bolster-locking center pins which prevent the separation of car body from truck in case of derailment or collision and thus aid in preventing telescoping of the cars.

Illumination of the cars is secured by eleven electric fixtures arranged in the center line of car. The form of ceiling outline is such as to reflect and distribute the light evenly over the seats and aisle without producing shadows. One 25-watt lamp is used in each fixture. The cars are equipped with Wilson storage batteries of 800 amp hour capacity.

The interior sheathing is of fire-resisting Agasote throughout. The insulation of the car is made up of ¾-in. Flaxlinum fastened to the outside sheathing by pins that are spot welded to the frame, and bent over washers that hold the insulating material in place. In all cases the railway company's standard parts have been incorporated in the construction, so that wherever renewals are involved stock material will be available in the company's store rooms.

Employees of the Pensacola (Fla.) Electric Company were guests of the officials of the company at a banquet on the evening of May 6 at the San Carlos hotel. The banquet was held in honor of the red team in the safety-first campaign, this team having made the best record during the last six months in accident prevention.

Wage and Labor Conditions in Steam Railroad Car Building and Repairing

The bureau of labor statistics of the United States Department of Labor recently published, as Bulletin No. 163, a report on wages and hours of labor in the building and repairing of steam railroad cars. The report is based on information obtained from the principal representative establishments in the industry. Figures are presented in this bulletin for rates of wages per hour and full-time hours of labor per week for the years 1907 to 1913 and for full-time weekly earnings for 1910 to 1913.

Full-time weekly earnings of the employees in the principal occupations in this industry in 1913 were 5.5 per cent higher than in 1912, 6 per cent higher than in 1911, and 8.9 per cent higher than in 1910. Average rates of wages per hour for 1913 were 6.3 per cent higher than in 1912, 6.4 per cent higher than in 1911, and 9.9 per cent higher than in 1910. The full-time working hours per week in 1913 were 0.7 per cent lower than in 1912, 0.4 per cent lower than in 1911, and 1.1 per cent lower than in 1910.

The data for 1913 were obtained from seventy-three representative establishments and covered more than 42,000 employees. The average full-time weekly earnings in 1913 in the principal occupations in these representative establishments were as follows: Cabinetmakers, $19.03; carpenters and car builders, wood, $17.11; car repairers, $15.15; fitters, $15.99; laborers, $10.58; machine woodworkers, $16.26; machinists, $17.81; painters, $17.77; pipe fitters, $18.56; riveters and buckers, $19.41; tinners, $19.28; truck builders, $15.31; upholsterers, $19.50.

In 1913 the full-time hours of labor per week were under fifty-four in quite a number of the establishments visited and over sixty in but very few. The predominating full-time hours per week were fifty-four, and the average about fifty-six.

Jitneys at El Paso, Tex.

El Paso was one of the first cities to be afflicted with the jitney. The first ten cars were placed in operation in November, 1914, by a concern known as The Jitney Company. Later it bought eight cars more, but did so without reckoning seriously on competition. The result is that while this concern is still in business it is operating apparently without profit. The maximum number of cars in 5-cent service at El Paso is now about 160. One of the results of the jitney competition has been a cut in auto livery service from an average of $4 to $2 an hour. The jitneys will perform the same service at the rate of $1.50 an hour.

The jitneys do not operate on any specified routes or according to any schedule. Many of them also frequently give up the 5-cent business to carry soldiers to and from local posts for 15 cents one way or 25 cents a round trip.

El Paso also has ten 5-cent auto-buses which seat fourteen passengers each. These were operated at first by the Auto-Bus Company, which has since been absorbed by the Jitney Company.

The total business of all these auto vehicles, exclusive of livery service, is estimated to be less than $4 per car per day. Quite a large number of the jitneys, as in other cities, are operated only during the peak hours on the spare time of their owners. No ordinance to regulate this business is in effect.

The *Tramway Bulletin*, published in the interest of the Denver (Col.) Tramways Company, will in the future publish items of interest concerning the Denver & Intermountain Railway and its operation.

Convention of N. E. L. A.

The Convention of the National Electric Light Association Was Held at San Francisco June 8-11. Abstracts of a Number of the Papers Are Published

The annual convention of the National Electric Light Association was held this week at San Francisco, the meetings being at the hall of the Native Sons of the Golden West. Two special trains were run from New York. The convention began with a general executive public policy session on the morning of Tuesday, June 8. At its conclusion the association held several parallel sessions, three during the afternoon of Tuesday, three on Wednesday morning, two on Wednesday afternoon, three on Thursday morning and two on Friday morning. These divisions were termed respectively, technical and hydroelectric, accounting, and commercial. There was another general session of the evening of Thursday at which the report of the public policy committee was presented by W. W. Freeman, and when there was an address on "Municipal Regulation of Public Utilities" by John H. Roemer, formerly member Wisconsin Railroad Commission and now general counsel H. M. Byllesby & Co. The final general session was held on Friday morning, at which papers were presented on topics of general interest, and officers for the ensuing year were elected.

Abstracts of some of the papers follow:

PRESIDENT'S ADDRESS

In his annual address President Scott said, in part:

"We sometimes boast that our industry has attracted, on the whole, a very intelligent and industrious class of employees, but I wonder if the employee who is in contact with the consumers and the public could answer only a few of many questions that arise daily. Could he explain in a simple manner how and why corporations were created? Does he know what a mortgage or a bond is, and could he explain the provisions of a mortgage if there is one on his particular property? Could he explain the difference between an ordinary mercantile business and the public utility business? Does he know that, when averaged over a period of time, it is necessary to provide $5 of capital for each $1 of increased gross business, and could he explain how new capital is raised for public utility enterprises? These and many other questions that could be asked seem elementary to some of you, but I am very sure that many of us have assumed that our employees are better informed than is the case, and that it might be well to investigate the matter. It only seems to me to prove another excellent reason for employees' or company section meetings through which valuable information can be disseminated.

"The tendency of the times is making it hard for public utility companies to raise capital, and if this continues it will retard the wonderful possibilities in the growth of the electrical business and the public will suffer. For instance, if our regulating bodies will not allow a return sufficient to attract capital, fewer extensions to residential customers will be made and the extensions to the rural districts will be postponed. It is a fact that the public is more interested in the ability of public utility companies to keep pace with the growth of the communities and to render good service than in the rate for the service. I am not a pessimist, for we know the men in our industry have solved many big problems in times past and they are capable of convincing the public ultimately that capital and brains should be rewarded liberally."

REPORT OF COMMITTEE ON PRIME MOVERS

The report of the committee on prime movers expressed the opinion that probably the most important recent developments have been in surface condensers. Data were given regarding the performance of economizers installed in the Fisk Street station of the Commonwealth Edison Company, Chicago. Attention was called to the importance of providing instruments in the boiler room to show firemen the performance of furnaces and boilers. Among other subjects treated in the report were the effect of air leakage on fuel economy, methods of improving the performance of old condensers, electrical-resistance method of determining surface-condenser leakage, ventilating and cooling of electrical equipment, the deleterious effects of sodium carbonate on boilers, methods of burning coal dust, and means for computing the commercial value of various grades of coal from the ash content. A statement was given of the fuel-oil production and probable supply in the United States and Mexico, which indicates that vast quantities of this fuel are available.

The progress of Diesel engine development in this country was outlined and brief reference was made to installations of Humphrey pumps and gas engines. A letter from Prof. R. H. Fernald, which concluded the report, contained an outline of gas-producer practice in this country and Europe. In the appendix were described several methods of measuring plant feed-water under test and under operating conditions.

OIL FUEL FOR STANDBY PLANTS

According to the paper entitled "Oil-Burning Standby Plants," by C. H. Delany, the Pacific Gas & Electric Company has found that oil fuel has many advantages over coal for operating standby stations, especially when such plants must be kept in readiness to carry indefinite loads without notice. Boiler efficiencies as high as 80 per cent have been obtained, for the reasons that less excess air is required for oil combustion, very little energy is required to carry away furnace gases, leakage through the boiler setting is small because of the lower draft employed, and banked fires are not required. From 1 to 4 per cent of the total steam generated is required to atomize the oil so that it can be burned efficiently. About 0.3-in. draft has been found sufficient to operate boilers at 200 per cent rating. Starting with cold water in the boilers, it has been possible to raise steam with oil-burning equipment in twenty-five minutes to thirty minutes.

At the standby station in San Francisco all of the boilers necessary for supplying city service are kept under a light load continuously so they may be forced to carry extra load whenever hydroelectric service is interrupted. At the Oakland and Sacramento plants groups of boilers are fired in rotation so that they will always be hot and ready to generate steam quickly. Tests have shown that starting with a light load, carrying a short peak load, and then returning to the original condition in three minutes, about 0.08 lb. of oil is required per rated boiler-hp. The amount of fuel required to maintain 160 lb. steam pressure when no steam is being used has been as low as 0.038 lb. per hour per rated boiler-hp, or about 1.4 per cent of the quantity required to operate the boiler at its rated value. Other tests to determine the amount of fuel required to restore normal pressure in boilers showed unit fuel consumptions, ranging from 0.105 lb. to 0.685 lb. per boiler-hp, depending on the construction of the dampers and on the number of hours the boilers had been standing unfired or disconnected from the steam mains. During normal operation of the Oakland plant about 1.22 lb. of oil is used per day per rated boiler-hp to keep the nine boilers hot. In addition to this there is the cost of labor, making a monthly unit expense of about $3.18 per kw of equipment installed, which is in addition to the amount involved in keeping the turbines in operation.

Assuming that turbines in standby stations must be kept on the line, some economy can be effected by arranging to give the station notice when it will be required to carry a heavy load. Auxiliaries should be electrically driven, where practicable, so that there will be no excess exhaust steam when the plant is running with a light load. Although the fuel burned when a standby station is not operating is much less than when it is carrying a load, the standby losses are nevertheless considerably more important than the operating losses, since the latter continue for only about 5 per cent of the time.

REPORT OF COMMITTEE ON ELECTRICAL APPARATUS

Descriptions of recently developed electrical apparatus and a switchboard manual intended to serve as a guide in selecting switchboard and instruments made up the bulk of the report of the committee on electrical apparatus. Attention was called to the gradually increasing ratings which can now be obtained in single generating and transforming units. Reference was also made to portable and automatic substations, which are operating satisfactorily at pressures as high as 100,000 volts and ratings as high as 3000 kva, and a description was given of one used on the Piedmont-Northern Railway comprising a 1500-volt generator, a 2200-volt synchronous motor and a three-phase 44,000-volt transformer, said to be the first portable railway substation with as high a voltage as 1500. The mercury arc rectifier on the 1000-hp locomotives on the New Haven Railroad is reported to be working satisfactorily and to have made more than 20,000 miles.

COMMITTEE REPORT ON UNDERGROUND CONSTRUCTION

The report of the committee on underground construction contained three sections—the first relating to manhole and conduit construction, the second to cable data and protection, and the third to equipment, devices, etc. Reports received from companies owning approximately 75 per cent of the underground equipment in this country show that they have 100,862,587 duct-ft. of subway intended for electric-service conductors. According to the committee report, there exists a greater difference in practice among these companies than appears to be justified. When pressures of 10,000 volts or over are used in cable systems, careful consideration should be given to causes of heating, among which are the losses in the conductor and in the dielectric material. Loss due to leakage through a dielectric appears to be greater with some resinous compounds than with some of the mineral oil compounds, and varies greatly with changes in temperature. Attention was called to the fact that the radiation from cables changes according to the season of the year. It was suggested that some scheme for ventilating conduit be devised. To prevent disastrous fires the committee has recommended the bonding of all lead cable sheaths, the use of concentric cable and the use of fireproof cable coverings in every manhole. The advantages and disadvantages of concrete shelves, split-tile ducts, asbestos rope, cement coatings with rope bond and asbestos tape saturated with silicate of soda or bound with metallic tape were discussed. There was a difference of opinion regarding the desirability of sealing ducts opening into manholes, but separating the ducts into groups by barriers of concrete or earth was recommended. For the benefit of companies desiring to have subway construction done by outside contractors specification and contract forms were included. The report was concluded with descriptions of labor-saving and accident-preventing devices.

REPORT OF THE LAMP COMMITTEE

According to the report of the lamp committee, the disturbed condition of the country has had its effect upon the lamp business, and during 1914 the aggregate sales of domestic incandescent lamps, exclusive of miniature units, totaled slightly under 100,000,000, which was the output for the preceding year, 1913. The 1913 sales represented an increase of about 11 per cent over 1912. Sales of tungsten lamps now amount to 70 per cent of the total domestic lamp sales. The tantalum lamp has disappeared from the market. The average size of the lamps sold during 1914 was 38.2 cp and 48 watts, making the average efficiency 0.8 cp per watt.

Nearly 1,000,000 gas-filled lamps were sold during 1914. Improvements in these lamps have been along the line of securing a more uniform product. The principal change in design has been to adopt a new line of bulbs in standard sizes. It is customary to insert a mica disk deflector between the stem and filament of these lamps, thereby deflecting hot gases from the glass seals and base. Usually these lamps are constructed for but one position of burning, namely, tip-down.

The improvements in vacuum lamps during the last year are noticeable principally in increased efficiency. Since last year's report this improvement has been in the neighborhood of from 7 to 10 per cent in sizes below 150 watts. The practice of introducing chemicals to delay the discoloration of the bulb has been extended to include 10-watt, 15-watt and 20-watt lamps and has permitted the operation of all vacuum lamps at higher efficiencies with improved maintained candle-power. According to the committee, inferior tungsten-filament lamps, of both the vacuum and gas-filled types, are making their appearance on the market in increasing numbers.

REPORT OF COMMITTEE ON PUBLIC POLICY

The report of the committee on public policy was signed by the committee consisting of W. W. Freeman, E. W. Burdett, H. L. Doherty, C. L. Edgar, Gen. George H. Harries, Samuel Insull, John W. Lieb, J. B. McCall, T. E. Murray, H. H. Scott, Samuel Scovil, Charles A. Stone, H. A. Wagner and Arthur Williams.

It expresses gratification that the conclusions and recommendations made by the committee in past reports have been accepted so generally by member companies and that further experience continues to confirm the soundness of the association policies. It says that the past year has been one of anxious uncertainty in most business quarters. Beginning with contraction in business activities due to political and legislative changes, and followed by the outbreak and active continuance of the European war, the entire commercial fabric has been subjected to severe strain. It is evident, however, that for several months conditions have been improving surely, if slowly, and the industry has demonstrated again the stability and reliability of its investments and earnings under adverse business conditions.

The report then quotes recent figures of earnings for steam railroads and public utilities to show that the utility companies, and especially electric light companies, are affected in much less degree by varying financial and industrial disturbances than most other business enterprises, and says that as this fact becomes recognized more fully by the investing public, the securities representing electrical properties should become established still more thoroughly in their confidence and esteem. Member companies will do well to broaden the market for their securities by keeping their local investors informed as to the relative merits of electric lighting and other securities, and by a policy of frank publicity as to their earnings and financial condition. It would also be well, the committee adds, to give special attention to legislation restricting or affecting the investment of savings and trust funds, so that electric lighting bonds may receive due recognition as conservative and safe investments.

The committee then points out that thirty-two states and the District of Columbia now have commissions regulating electric light utilities but notes with regret a tendency recently in several states to give commissions a political complexion. If partisan politics seem to demand an occasional change in personnel to correspond to changed party control, such substitutions, the committee says, should be made with great care and always with due regard to the responsibilities and requirements of the office.

The question of what is a reasonable rate of return has been passed upon in specific cases by the commissions of at least fifteen states and, in cases of electric properties, 8 per cent is the figure which has been adopted generally; 7 per cent has been fixed in two cases and as high as 10 per cent in as many others. It has been recognized generally by the commissions that the prime necessity, from the public standpoint, is to insure adequate and reliable service, and that the measure of return to be allowed an electric company should be at least the measure of wages which must be offered to capital to secure its ready employment in the business.

As to the necessity or advisability of a definite appraisal of existing property for the determination of rates, a marked difference is indicated by the action of the various commissions and the laws of the several states. In some states the laws require an appraisal in advance of the fixing of rates by the commission. In Ohio and Oklahoma orders have been issued by the commissions calling for appraisals of the properties of all utilities, irrespective entirely of pendency of rate cases. Such sweeping orders, in the opinion of the committee, involve large expenditures of money and labor on the part of the companies, without corresponding advantages to the public. Furthermore, if such appraisals are to be of admitted value to the public, they must be verified by the commissions, thereby involving further large expenditures of money and labor on their part. In view of the sweeping appraisal order of the Ohio commission, the committee notes that in the first electric rate case—and thus far the only one determined by that commission (that of the company in Bucyrus)—the commission reported, after the completion of a detailed appraisal, that it would be necessary to increase rates in order to yield a return of even 6 per cent per annum on the appraised value; and because of that fact, and since the company did not wish to increase rates, the commission proceeded to fix a new and lower schedule which represented its judgment as to the rates at which consumers were reasonably entitled to obtain electric service, and which, in the judgment of the commission, would serve promptly to effect such growth of business as would yield a reasonable and satisfactory return. This somewhat novel case was concluded by the acceptance by the company of the schedule imposed by the commission. In the New York Edison Company case, in which reduced rates became effective on May 1, 1915, opinions were filed by each of the five commissioners, and all agreed that in order to avoid further delay rates should be fixed without definite valuation. The committee agrees with the Massachusetts Commission in the Northampton gas case, that the matter is not one of "mathematical demonstration" but must involve the exercise of "sound judgment." But where appraisals are undertaken (and they may be of distinct advantage in proving the intrinsic value of capital securities), the committee says that it is important that companies be careful to include all of the elements of value, both physical and intangible, which go to make up a proper and complete appraisal.

Reference is made by the committee to the decision rendered on Dec. 9, 1914, by the New Jersey Court of Errors and Appeals, and reported in this paper, in the matter of franchise value as affecting rates of the Public Service Gas Company in the Passaic division. It also says that many prominent students of public affairs, after investigation, have announced themselves clearly as in favor of regulated monopolies in preference to competition, and, as conspicuous cases, the committee quotes from addresses of President Wilson, ex-President Roosevelt and Senator Underwood of Alabama.

The issue of municipal ownership, the committee says, is probably where it was a year ago. The committee continues to believe that municipal ownership and operation of lighting utilities is against the public interest excepting where, on account of local conditions, private capital is not readily available for such service. As an economic proposition, municipal ownership has not "made good."

The committee refers to the decision of the United States Supreme Court in the case of the Norfolk & Western Railway Company, decided on March 8, 1915, as of special interest to companies doing a combination business, such as electricity and gas, or electricity and street railway, and it may possibly apply to different divisions of the business of an exclusive electric company. In this case it was contended that earnings from the freight business should be considered as offsetting the reduction involved in limiting the passenger fare to 2 cents per mile. It was held that the rate was confiscatory because when applied to the passenger business alone, separately considered, it was found to yield but a narrow margin above the cost of such traffic.

In referring to the subject of public relations the committee says that for years it has been preaching the gospel of first-class service, reasonable rates and liberal treatment of the public as essential to the permanent prosperity of any utility company. It believes that the time has come to stop talking about the shortcomings of years long past as excusing a disinclination to give credit where credit is now due, and it asks whether the time has not now arrived when it is fitting to say something about the obligations of the public to recognize and reward services faithfully and efficiently performed. The companies are, in a very real sense, public servants; their prime obligation is to serve the public, but their measure of reward ought to be reasonably proportionate to the value of the service rendered.

The report continues that there is danger through too drastic restriction that the desirable incentive to unusual efficiency will be destroyed, and that the public will be the greatest sufferer thereby. There is real need to-day of an intelligent conception of the respective duties of public master to public servant as well as of public servant to public master. A servant who is ill fed and underpaid cannot render good service, whether such servant be an individual or a public service corporation. What is needed most is an appreciation of the actual facts, with a knowledge of which the public is inclined to be fair.

In conclusion, the report says it is undeniable that a strong and efficient public utility in any community is a distinct asset to the entire community. It is invariably one of the largest taxpayers, and through its service promotes industrial development and general business activity. In view of these facts, it is entitled to the good will of at least the intelligent members of the community, and the withholding of such good will is of direct disadvantage to all business interests. From selfish motives, if not otherwise, the business people in every community should exert every reasonable effort to promote a sympathetic understanding of the difficulties and problems confronting utility companies, in order to secure the measure of public co-operation to which they are entitled by reason of a service honestly and efficiently supplied, and in which the general public, whether they appreciate it or not, are essential partners. The committee suggests that member companies should insist upon the recognition of their just claims for public support, believing that an aggressive policy with this object in view will attract attention and win respect.

OVERHEAD LINE CONSTRUCTION

This committee had no meetings during the year but the chairman's report outlines the general situation. It called attention to the general acceptance given to its previous reports as well as to the necessity of making changes in standard practice as construction methods develop. The committee considers the most important work of the year from an overhead construction standpoint is that of the national joint committee on overhead and underground line construction, on which the N. E. L. A. is represented by three members. The work of this committee has been divided among four sub-committees: structural, installation, conductors and clearance, and these sub-committees are investigating the subjects assigned to them in a thorough manner. The report continues that United States Bureau of Standards issued in April a preliminary set of "Safety Rules and Regulations," and the importance of this work has been recognized by the N. E. L. A. in the appointment of a public policy sub-committee for conference with the Bureau of Standards. While modifications have been made in the first draft of the proposed safety rules, the committee believes that these rules "as now presented, both in their general methods and in their specific provisions, still contain many features which are objectionable for general adoption, and the member companies should avail themselves fully of the opportunity offered by the Bureau of Standards for general thorough criticism of the preliminary rules." The committee also calls attention to a proposed set of regulations for high-voltage lines in cities being drafted by the International Association of Municipal Electricians, to an order on overhead standards recently issued by the Idaho Public Utilities Commission and to the preparation by a joint committee in Pennsylvania of overhead line specifications which may serve as a basis for an official order by the commission in that state. The report concludes by mentioning the adoption by the California Railroad Commission of rules tending to minimize inductive interference, drafted by a joint committee representing the various interests involved.

ELECTRIFICATION OF MAIN LINE RAILROAD

This report, presented by a committee of which B. F. Wood is chairman, called attention to the advantages of the supply of power to main line railroads from a central system serving an extensive territory with diversified power requirements. In a specific case that has been called to the attention of the committee, the power system of an electrified steam road, including station, substations and transmission lines, represented approximately one-half of the new capital requirements above the amount chargeable to renewals and replacement, or about one-third of the total cost, and the road could have afforded to have purchased energy from a central station and still obtain a net return nearly 50 per cent greater than by developing its own power supply. The committee gives other arguments for the purchase of electric power instead of its generation by railroads, and says that if the railroads provide their own generating and distributing facilities, they will find it difficult later to convert these facilities to the use of central station energy if such a plan should be desirable.

MUNICIPAL REGULATION OF PUBLIC UTILITIES

At the public policy meeting on Thursday evening a paper by John H. Roemer, general counsel H. M. Byllesby & Company, Chicago, and formerly chairman Railroad Commission of Wisconsin, was presented. The author showed that through natural causes the advantages of state regulation as opposed to municipal regulation or ownership of public utilities were becoming increasingly apparent. In the early days public utilities largely confined their operations to the various municipalities in which they happened to be located, but now these operations are becoming less and less nearly coextensive with the boundaries of any one municipality. This applies to electric railways, telephones, electric light and power, and even water and gas systems.

This condition seems certain to continue as the economic development of electric public service companies' systems has been found to require larger and larger units of production. An example of the benefits resulting to the public from the combination of small public utilities is the Central Illinois Utilities Company, which serves twenty-three or more communities in Illinois from a single station. Formerly these communities were served by nine small separate generating plants.

When one appreciates how increasingly inter-related and inter-dependent public service companies are becoming, both as to their physical operation and their corporate control and ownership, it is easy to see that municipal ownership would not be in the direction of the most economic development of public utilities. The author quoted here some abstracts from the decision in South Pasadena v. Terminal Railway Company (1895, 109 California, 315) in which the court described the difficulties which would arise in case extra-territorial municipal power should be permitted. He also quoted City of Texarkana v. Southwestern Telegraph & Telephone Company (48 Texas Civil Appeals, 16) to show the interest of the state at large, even in municipal ordinances relating to utilities. Again, it is to the interest of the state as a whole that there should not be over-development in one locality and under-development in another. With municipal ownership it is almost impossible to conceive of sufficient continuity of policy and breadth of view to cope successfully with the problems presented.

The speaker then criticised the theory that municipal ownership is an adequate substitute for state regulation and pointed out that municipal plants as a rule furnished poorer service than privately owned or operated utilities; they are less responsive to new discoveries and improved methods; they practise flagrant discrimination in rates and are backward in their methods of bookkeeping. In conclusion the speaker stated that there should be certain standards of service uniform throughout the state, but subject to modification, of course, when a local situation of an unusual nature demands it.

Electrification of the Jamestown, Westfield & Northwestern Railroad

This Line, Which was Originally Built to Handle a Freight Transfer Business Among Several Trunk Roads, Has Been Transformed into a High-Speed Interurban Railway to Develop a Passenger Traffic Among the Many Summer Resorts Along the Line

The Jamestown, Westfield & Northwestern Railroad is an interesting case of the transformation of an old steam road, originally built as a connecting link for freight interchange among several trunk lines, into a high-speed interurban electric railway.

Formerly called the Jamestown, Chautauqua & Lake Erie Railroad, this railway connected the Lake Shore & Michigan Southern and Nickel Plate Railroads at Westfield with the Pennsylvania Railroad at Mayville and with the Erie at Jamestown. Because of changes in traffic conditions the property was no longer a paying proposition while dependent for its revenue upon freight haulage only. To secure the additional income from passenger and freight traffic between Jamestown and Westfield and intermediate towns, as well as to obtain the advantages of electric operation, the road has recently been electrified.

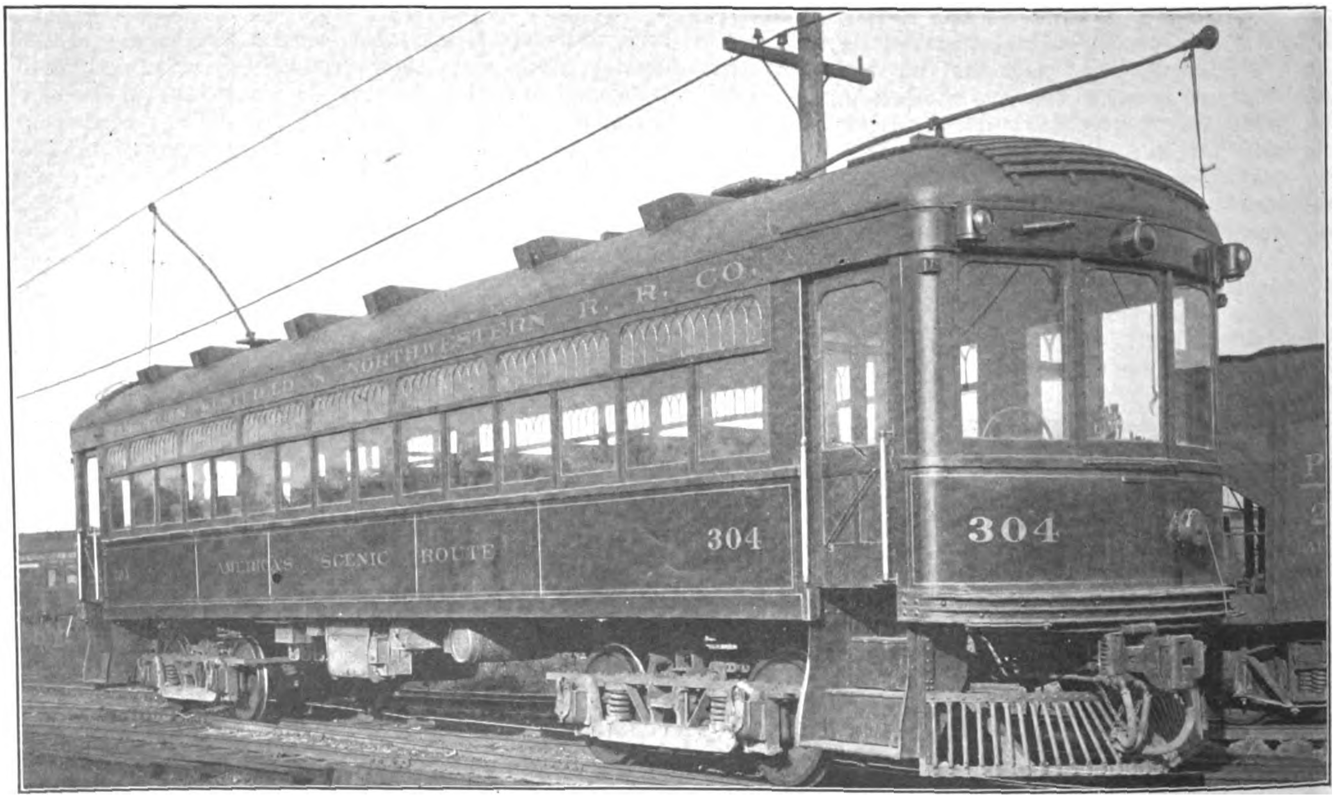
Beginning at Westfield, which is near the Lake Erie shore, the road ascends a very steep grade to the top of the bluff bordering the lake. On a clear day it is possible to obtain a splendid view of the lake from the car windows. The road then drops down slowly, through Mayville into a valley, passing through the picturesque villages and summer resorts on the north side of Chautauqua Lake. The passenger traffic will come largely from the many summer resorts along the route and consequently will be far heavier in summer than during the winter months.

The freight traffic which this railroad expects to handle will consist not only of interchange freight among the trunk lines which it intersects but also ice from the icehouses bordering Lake Chautauqua, coal to manufacturing plants in its territory and, most important of all, freight and farm produce for the farmers all along the line. To handle this traffic, the Jamestown, Westfield & Northwestern Railroad proposes to haul mixed freight trains of from four to eight cars. The old steam locomotives are still used for this service.

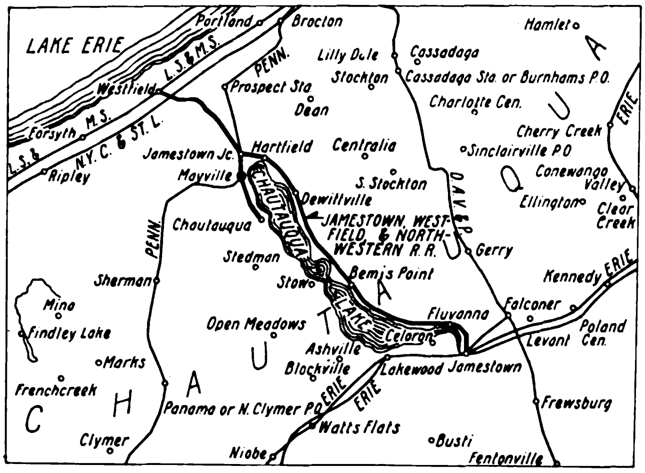
ENERGY DISTRIBUTION

Power to operate the road is purchased, at a cost of 1½ cents per kilowatt-hour, from the Jamestown Street Railway, which is also controlled by A. M. Broadhead, president of the Jamestown, Westfield & Northwestern Railroad. The Jamestown Street Railway has a large power plant at Jamestown, and its subsidiary, the Chautauqua Traction Company, maintains substations at Stow and at Mayfield. By tying in the feeders and trolleys at Jamestown, Stow and Mayville, it has been possible to obtain fairly good power distribution for the interurban road without necessitating the use of additional generating apparatus.

By reference to the map, it will be seen that the town of Stow, where one of the substations is located, is on the opposite side of the lake from the tracks of the Jamestown, Westfield & Northwestern Railroad. Lake Chautauqua is very narrow at this point, and the energy is transmitted across by two ungrounded lead-covered



JAMESTOWN ELECTRIFICATION—MOTOR CAR ON JAMESTOWN, WESTFIELD & NORTHWESTERN RAILROAD, QUARTER VIEW


LAKE ERIE
Portland
Brocton
Hamlet
Lilly Dale
Cassadaga
Stockton
Cassadaga Sta. or Burnhams P.O.
Westfield
L.S.&M.S.
PENN.
Prospect Sta
Dean
Charlotte Cen.
Forsyth
M.S.
L.S.&
N.Y.C. & ST. L.
Cherry Creek
ERIE
Jamestown Jc.
Hartfield
Centralia
Sinclairville P.O
Ripley
Mayville
S. Stockton
Conewango Valley
Dewittville
Ellington
Clear Creek
CHAUTAUQUA
JAMESTOWN, WEST-FIELD & NORTH-WESTERN R.R.
D.A.V.&P.
Chautauqua
Gerry
PENN.
Stedman
Bemis Point
Kennedy
Sherman
Stow
LAKE
Mina
Fluvanna
Falconer
Findley Lake
Open Meadows
Celoron
Poland Cen.
Levant
Marks
Ashville
Blockville
Lakewood
Jamestown
Frenchcreek
Frewsburg
Panama or N. Clymer P.O.
ERIE
Clymer
Watts Flats
Busti
Niobe
Fentonville
CHAUTAUQUA

JAMESTOWN ELECTRIFICATION—MAP SHOWING ROUTE OF THE JAMESTOWN, WESTFIELD & NORTHWESTERN RAILROAD

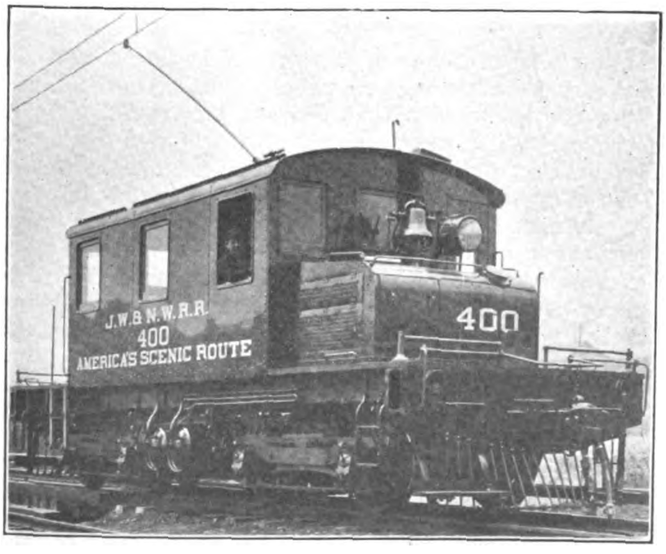
submerged 500,000 circ. mil. cables. Double-throw switches are installed at each end, so that if the positive cable should become grounded it will be possible to change over and use the negative cable as the positive conductor until the other cable can be repaired.

A permanent substation will shortly be built at Westfield in order to take care of the heavy pulls which occur on this part of the road in going from Westfield to Mayville. At present a portable substation is located at this point. This portable substation was provided only after a close study of the operating conditions, and it has already proved its usefulness in caring economically for the wide fluctuations in traffic which arise particularly during the summer season. One of the illustrations shows this substation in service at Bemis Point, where it was first used to handle an unusually heavy load due to a convention.

The equipment of the portable substation, which is of Westinghouse Electric manufacture, consists essentially of a three-phase, 550-kva, 16,500-volt transformer of the outdoor type, and a 500-kw, 600-volt rotary converter. The rotary, switchboard, meter, transformers, etc., are housed in a cab which is also equipped with a desk, telephone, etc., for the use of the operator.

The high-tension circuit is controlled by a three-pole Burke horn-gap switch with choke coil, lightning arrester and fuse. All of the high-voltage switching apparatus is mounted on the roof of the cab, although the switches are operated from the switchboard by means of a standard remote control handle.

The cab is 18 ft. long, and the car has an overall length of 28 ft. The general construction of trucks, draft gear, etc., is in accordance with M.C.B. standards.

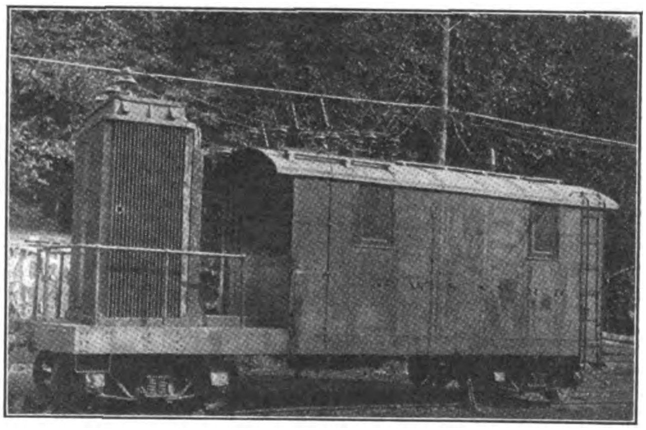

J.W.&N.W.R.R.
400
AMERICA'S SCENIC ROUTE
400

JAMESTOWN ELECTRIFICATION—VIEW OF 45-TON FREIGHT LOCOMOTIVE

ROLLING STOCK

The passenger cars, one of which is illustrated, are of the usual interurban type, seating sixty passengers. One-third of the car is partitioned to form a smoking compartment. The cars are of all-steel construction and are insulated throughout with compressed cork to keep out heat and cold. They were built by the Cincinnati Car Company. The principal dimensions follow:

Length over all	53 ft. 6 in.
Length over dash	52 ft. 2 in.
Height (rail to top of roof)	12 ft. 10⅛ in.
Extreme width	8 ft. 9¼ in.
Door openings (clear)	30 in.
Rail to first step	14¾ in.
Width of seats	38½ in.
Width of aisle	23¾ in.
Bulkhead door opening (clear)	36 in.
Partition door opening (clear)	22 in.



JAMESTOWN ELECTRIFICATION—500-KW, 25-CYCLE, 600-VOLT ROTARY-CONVERTER PORTABLE SUBSTATION

The electrical equipment of each car consists of four Westinghouse No. 306-A-2 railway motors rated at 52 kw (70 hp) at 600 volts, and the HL unit switch control system. The split frame is of cast steel, divided along the horizontal center line with hinges on the opposite side from the axle.

A Baldwin-Westinghouse freight locomotive will be put in active service within a few weeks. It is a 45-ton machine, of the double-truck type. It will handle standard railway rolling stock, and is intended to traverse curves of 170-ft. radius with a trailing load, and of 40-ft. radius without load. It is arranged for double-end operation, and has a central cab, with sloping hoods at each end, as shown in the illustration.

The electrical equipment consists of four Westinghouse No. 562-A-6 motors, each rated at 100 hp at 600 volts with HL electropneumatic control. An interesting feature of the design of the motors is that they are fitted both for self-ventilation and forced cooling. A motor-driven blower is furnished to provide a blast of air irrespective of the speed of the motors. However, should the blower be put out of commission, fans on each armature provide sufficient ventilation to allow the locomotive to operate at three-quarters of its rated capacity. The principal dimensions are as follows:

Wheelbase, rigid	6 ft. 6 in.
Distance between truck centers	16 ft. 0 in.
Diameter of wheels	36 in.
Size of journals	5 in. x 9 in.
Width	10 ft.
Height to top cab	12 ft.
Length between coupler knuckles	34 ft. 9½ in.
Weight	90000 lb.

Meeting of C. E. R. A. A.

Three of the Papers at the Annual Meeting at Indianapolis This Week Discussed Respectively "Analysis of the Balance Sheet," "Electric Light and Power Accounting by Combined Railway and Light Property," and "Small Electric Line Handling Carload Freight"

The twenty-seventh meeting of the Central Electric Railway Accountants' Association was held at the Severin Hotel, Indianapolis, Ind., on Friday and Saturday of this week. Abstracts of three papers presented at that meeting follow. A report of the proceedings and abstracts of the other papers presented at the meeting will appear in a later issue.

ANALYZING THE BALANCE SHEET

BY L. T. HIXSON, AUDITOR TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, INDIANAPOLIS, IND.

After a balance sheet has been prepared in accordance with the best accounting practice, there remains much to be done before all the available information is put into condition to be quickly grasped. In order better to illustrate the analysis of a balance sheet, the following usual form statement is taken as the basis:

ASSETS

Fixed property	$26,000,000
Current assets	700,000
Accrued and prepaid accounts	45,000
Deferred or pending accounts	7,000
Reserve funds	20,000
	$26,772,000

LIABILITIES AND CAPITAL

Bonds	$7,500,000
Capital stock	17,000,000
Current liabilities	600,000
Accrued liabilities	400,000
Reserves	272,000
Surplus	1,000,000
	$26,772,000

This balance sheet, when analyzed, will show:

Invested assets:	
Fixed property	$26,000,000
Less capital stock and bonds in hands of public	24,500,000
Excess invested assets over stock and bonds	$ 1,500,000
Appropriated assets:	
Reserve funds	$ 20,000
Book reserves	272,000
Balance reserves for which no specific assets have been set aside	$ 252,000
Balance invested assets, after providing for reserves	$ 1,248,000
Current assets	$ 700,000
Current liabilities	600,000
Excess current assets	$ 100,000
Balance	$ 1,348,000
Accrued and prepaid accounts—assets	$ 45,000
Accrued liabilities	400,000
Excess accrued liabilities	$ 355,000
Balance	$ 993,000
Deferred or pending accounts—assets	7,000
Balance, unappropriated assets in excess of stock and bonds (surplus)	$ 1,000,000

This shows the amount of permanent or fixed investment in excess of the capital stock and bonds in the hands of the public; also the amount of book reserves which are invested in the general company property, such amount being the excess of book reserves over assets specifically set aside for reserve funds. These book reserves may represent amounts set aside for injuries and damages, bonds purchased and canceled, and so forth. They may also represent bonds purchased and not canceled but held by the sinking fund trustee. In this paper such bonds are not shown as a part of the contra account (sinking fund), inasmuch as they have been deducted from the total bonds and only bonds "in hands of public" shown.

The statement also shows the excess of current assets over current liabilities, and excess of accrued liabilities over accrued and prepaid accounts—assets. The balance, or excess of unappropriated assets over stock and bonds, represents the surplus earnings and will be in agreement with the analysis of the income statement, together with direct charges and credits to surplus.

There may be some question as to the advisability of showing the excess reserves over assets specifically set aside, as invested in fixed property of the company. There would seem to be no ground for this objection so far as the reserve represents bonds purchased; but if it represents injuries and damages, or some contingent liability, for which it might be necessary to pay out a considerable sum, it would perhaps be best to set up an additional amount to provide for contingent liability reserves in excess of the amount specifically appropriated, so that the statement would show clearly the comparison between unappropriated current assets and current liabilities. When treated in this manner, assuming that such contingent liability reserve amounts to $200,000, the statement would read, in part:

Excess invested assets over stock and bonds	$1,500,000
Appropriated assets—	
Reserve funds	$ 20,000
Current assets set aside for contingent liability reserve in excess of specific appropriations	200,000
	$ 220,000
Book reserves	272,000
Balance reserves invested in fixed property	$ 52,000
Balance invested assets after providing for reserves	$1,448,000
Current assets	$ 700,000
Less amount set aside for contingent liability reserve as above	200,000
	$ 500,000
Current liabilities	600,000
Excess current liabilities	$ 100,000
Balance	$1,348,000

There would be no change in the remainder of the statement.

If this plan is followed, there would be no need to set aside any certain group of assets to offset the book reserves, for the reason that the analysis would always show clearly just what amount of assets was available after making provision for the reserves. This would meet the objection of those who contend that it is poor policy to take a sum out of the business and place it on deposit at interest, when the needs of the business may then require the borrowing of a similar amount at the same or perhaps a higher rate. Moreover, for those who take the view that there should be a fund to represent all book reserves, the analysis will show just how the company would stand if such amounts were set aside.

The foregoing should show clearly how the surplus has been invested. Yet, for the benefit of those who are asked the following question: "The books show that the surplus is $1,000,000, but the cash balance is $200,000 —what has become of the money?" a statement of surplus on a basis of cash or its equivalent may be of some benefit.

Surplus per books	$1,000,000
Add—	
Accrued liabilities which have been deducted in the income statement, but cash not paid out	400,000
Excess accruals for reserves over cash set aside	252,000
	$1,652,000
Deduct—	
Accrued revenue which was taken into the income statement, but cash not received	$ 30,000
Prepaid accounts which have not been included in the income statement as items of expense on account of applying to a later period	15,000
	$ 45,000
Surplus, on cash basis	$1,607,000
Cash from loans, etc	600,000
Total to be accounted for	$2,207,000
Invested in—	
Fixed property	$1,500,000
Deferred and pending accounts	7,000
Accounts receivable	200,000
Stores	300,000
	$2,007,000
Cash balance	$ 200,000

This latter statement will not ordinarily be required except by the active head of the concern with relation to the disposition of the surplus for that period.

ELECTRIC LIGHT AND POWER ACCOUNTING

BY OREN A. SMALL, AUDITOR BENTON HARBOR-ST. JOE RAILWAY & LIGHT COMPANY, BENTON HARBOR, MICH.

The uniform classification issued by the Michigan Railway Commission, taking effect Jan. 1, 1915, provided in the case of combined railway and lighting properties for making a showing of investment in light and power department, as nearly as it was possible to ascertain, prior to Jan. 1, 1915, in a lump sum, and accounts were required to be set up subsequent to that date in accordance with the text of the uniform classification.

Our company does not carry any accounts for stocks, bonds or mortgages for the light and power department, these accounts covering the property as a whole. Power station apparatus is also covered by whole-property accounts. We purchase power coming to us at our sub-station at 26,000 volts at the transformers and 2300 volts on the bus-bar. These transformers are the property of the supplying electric company, so that our investment in the power station for the light and power department consists mainly of switchboard apparatus.

The following accounts have been set up and are being kept in accordance with the commission uniform classification of accounts:

Investment Accounts

Underground conduits and subways
Poles and fixtures
(These accounts are sub-divided, to show investment in each community served.)

Distribution System

Land
Overhead conductors and devices
Service wires
Underground conductors
(These four accounts are sub-divided in the same manner as the underground conduit and subways, and the pole and fixture accounts.)
Meters
Transformers
Arc lamps
Municipal street lighting system
(This account includes all items pertaining to street lighting arc lines, except the cost of lamps.)
Office furniture and fixtures
Shop equipment
Storeroom equipment
Stable and garage equipment
Miscellaneous equipment:
  (a) Laboratory equipment
  (b) Tools and implements

Income Accounts

Commercial lighting
Commercial power
Municipal street lighting, arc
Municipal street lighting, incandescent
Municipal building lighting
Municipal power
Miscellaneous electric revenue
Non-operating revenue
(All income accounts are sub-divided to show revenue from each community served. The sub-division of these accounts requires, at the present time, the keeping of thirty-two accounts.)

Power

(On account of purchased power, only one account is carried under this head, this being charged with the cost of power utilized in the light and power department, as ascertained by meter measurement.)

Operating Expenses

Distribution—Operation

Wages:
  (a) Superintendence
  (b) Wages
Supplies and miscellaneous expenses:
  (a) Maps and records
  (b) Office expense
  (c) Miscellaneous expense
Distribution lines:
  (a) Labor and expense subways
  (b) Labor and expense overhead conductor.
  (c) Labor and expense underground conductor
Meters:
  (a) Salaries and expense
  (b) Testing
  (c) Miscellaneous expense
Setting and removing meters and transformers

Distribution—Maintenance

Underground conduit
Overhead lines
  (a) Repairs—conductors
  (b) Repairs—pole lines
Underground conductors
Service wires
Transformers
Meters

Utilization—Operation

Renewal incandescent lamps
Inspection customers' premises
Customers' installation
Municipal street arc lamps
Municipal street incandescent lamps
  (a) Installation
  (b) Renewals

Utilization—Maintenance

Municipal street arc lamps
Municipal street incandescent lamps

Commercial Expense

Officers' salaries and expense
Salaries and expense meter readers
Salary and expense collection bureau
Office supplies and expenses
Discount light and power
Discount electrical supplies

New Business

Officers' salaries and expense
Miscellaneous supplies and expense
Solicitation:
  (a) Salaries—canvassers
  (b) Expense—canvassers
Advertising
Promotion wiring
Promotion signs and devices

General Expense

Garage expense
(Any portion of expense in this account which is properly assignable to investment accounts, is so apportioned.)
Printing and stationery
General office expense
Injuries and damages:
  (a) Medical expense
  (b) Injuries to employees
  (c) Injuries to others
Depreciation
(Under this heading is accrued each month an amount equal to one-twelfth of 6 per cent of the record value of investments, this value being taken at the close of the fiscal year preceding.)
Uncollectible bills
Miscellaneous non-operating expense
Store and stable expense

While these accounts are not all which the uniform classification calls for, they are all that might affect a company of our magnitude. The question of operation and maintenance expense is as finely drawn in the light and power classification as in the Interstate Commerce Commission classification for electric railways.

Entries are made direct from meter readers' books into the customers' ledger, proper extension being made at the same time. These extensions are transferred to the customers' invoice blanks, previously prepared on an addressograph, and the latter are mailed in window envelopes. Fifteen days are allowed in which the customer may secure a discount for prompt payment, the proper credits be posted into the ledger from the collection sheets, and the ledger balanced with the cash book and the controlling account in the general ledger.

All expense and income accounts are closed through the profit and loss account. The amount of accrued depreciation is deducted from the balance of profit and loss, and the net profit and loss is carried to the profit and loss account for the railway, this last account reflecting the profit and loss of the property operated as a whole. From this interest on funded debt and other fixed charges are deducted in the manner provided by the Interstate Commerce Commission classification. In compiling the annual report for the commission the item of profit from light and power department is carried to the income account under auxiliary operations.

CAR-LOAD FREIGHT ON SMALL LINES

BY JAMES S. CLARK, AUDITOR MARION & BLUFFTON TRACTION COMPANY, BLUFFTON, IND.

The Marion & Bluffton Traction Company, which operates 32 miles of electric railway, has associated with it under the same operating organization the Bluffton, Geneva & Celina Traction Company, which runs from Bluffton to Geneva, a distance of 18 miles, through a very rich agricultural region. This short line penetrates a territory which had been without any transportation facilities of any kind. The Clover Leaf Railroad saw its opportunity to develop some traffic for its line and encouraged the development of the car-load business by arranging for a connection between the steam and the electric line at Bluffton. Later the car-load business extended to the Marion line also. Two elevators and a milk condensory which were erected along the electric line depend upon it to handle their business to the steam roads. The elevators draw from a radius of 5 to 8 miles and, in the course of a year, deliver and receive from the steam roads from 500 to 600 cars of coal, hay, grain, lumber, tile, etc.

In 1913 arrangements were made for a steam line connection with the Cincinnati, Bluffton & Chicago Railroad. Through this we were solicited to interchange with the Lake Erie & Western Railroad, thus giving an interchange of freight and equipment with all three of the steam roads operating into Bluffton.

In reality the company serves as a feeder to the steam roads. There is no through billing with them except on stone, however, and that is only a switching rate on the steam line. On cars of coal, hay, grain, etc., we handle on a local tariff rate, between point of origin and steam road junction. We find these rates more profitable than if we were to pro-rate with the steam roads. Of late, however, we have had some complaint and believe that in the near future we will be handling this class of freight on through billing. This tariff is constructed as a commodity tariff and names rates in cents per hundred pounds. Any commodity not named in this tariff takes the regular classification rate.

Our own equipment consists of two freight motor cars. The Marion & Bluffton Traction Company owns one freight motor car equipped with four 60-hp Westinghouse 93A railway motors and the Bluffton, Geneva & Celina Traction Company has one freight motor car equipped with four 60-hp GE 87 motors. Both cars have automatic and straight air equipment and M. C. B. couplers for handling standard steam cars. We use one car to handle the L. C. L. shipments for both roads and the other car to handle the car-load shipments. When we need more cars we always get them from the steam lines, paying at the regular per diem charge of $0.45 per day while on our line. We watch this item very closely and try to hold it down to a minimum. Another item that we watch is demurrage. If we were not governed by our strict demurrage rules, we would need another 5 per cent increase in our freight rates to pay our per diem bills. Up to this year we have always collected demurrage on the straight demurrage plan, but now we are using the average plan with stone shippers. We believe this plan is very satisfactory to the large shippers.

The Erie Stone Company, one of the largest manufacturers of crushed stone, has a large quarry at Bluffton and for the last five years we have been able to secure all of this kind of freight that we could handle. This stone business as a rule starts May 1 and lasts until Oct. 1. The plant is located along the steam roads and the stone is delivered on our tracks on a switching charge of 10 cents per ton. We haul this stone in trains of three to seven cars, depending upon grade conditions. We can handle a train of four cars with a capacity of 300 tons on any grade on our line and a train of nine or ten cars with a capacity of 750 tons on level track. Last year in four months, we handled 816 cars that averaged 50 tons of stone to the car. We use both gondolas and hoppers. As our sidings are large enough to accommodate eight or ten cars, some of the shippers have their own unloaders, whereby they are able to handle the stone very rapidly.

As most of the stone is handled on sidings at non-agency points, in order to keep our records complete on the car service, our freight conductor is supplied with blanks with which he takes a receipt for every car he sets on a siding, showing the car initial and number and also the time and place. This is signed by an authorized agent of the consignee. The conductor also gets a receipt from the same agent for all cars released. These slips serve as a receipt for the freight and as a basis for computing demurrage.

We have no track scales on our line but we have no trouble in securing the correct weights. All the stone is weighed at the plant. The elevators located along our line have their own scales, and the Snider Preserve Company has two weighing stations where the tomatoes which we handle in carload lots are weighed. Those few cars on which we are unable to secure the correct weights before leaving our lines are weighed by the steam lines, who are able to give the correct weights within a week.

The additional accounting connected with the handling of carload shipments is comparatively small, as the billing of all cars is handled by the agents. They make all collections of freight and demurrage except that on stone, this collection being handled in the accounting department on account of most of the stone being delivered to sidings at non-agency points. The daily interchange of equipment is taken care of by our dispatcher because he is most familiar with the cars handled. Reclaim statements are issued each month on all cars handled on switching tariffs, such as the coal that we switch from the steam lines to the city water works and light plant. The privilege of making this reclaim of five days takes care of the per diem on these cars. The city paid for the siding and receives a credit of $1 on every car received at the plant until it is reimbursed. This switching charge is 15 cents per ton, with a minimum of 40,000 lb.

We believe that this freight business is much more profitable than L. C. L. shipments, as in the handling of 1700 cars during 1914 we did not have a claim. Moreover, every car-lot shipment that can be secured by the traffic department is a development of business that would not otherwise be handled, and the only additional expense for the handling is the cost of power and car-service charges. There will, of course, be some additional expense for track maintenance but this is not found excessive.

The following for 1914 is a fair example of the various commodities handled in one year:

Stone	816 cars	Oats	22 cars
Coal	240 cars	Pipe	21 cars
Hay	226 cars	Horses	20 cars
Corn	121 cars	Bolts	19 cars
Tomatoes	51 cars	Brick	18 cars
Tomato crates	46 cars	Tile	15 cars
Miscellaneous	42 cars	Lumber	11 cars
Wheat	27 cars	Milk	6 cars

Master Mechanics' Association

At the Forty-eighth Annual Convention at Atlantic City, June 9-11, Reports Were Presented on Electric-Locomotive Maintenance, Headlights and Other Subjects of Interest to Electric Railways. An Account of the Exhibits Is Published

The forty-eighth annual convention of the American Railway Master Mechanics' Association was held at Atlantic City, June 9-11. A number of the committee reports were of direct interest to the electric railway industry and these are published in abstract below. At this convention the association took up for the first time the subject of electric operation through its newly appointed committee on maintenance and operation of electrical equipment, the members being: C. H. Quereau, New York Central Railroad, chairman; G. C. Bishop, Long Island Railroad; G. W. Wildin, New York, New Haven & Hartford Railroad; J. H. Davis, Baltimore & Ohio Railroad, and R. D. Hawkins, Great Northern Railway.

MAINTENANCE OF ELECTRICAL EQUIPMENT

In its first report this committee has confined itself to a broad outline of the additional tools and the new organization involved by a change from steam to electricity as a motive power. The committee also has pointed out for the first time the need for establishing standards for operating records, the use of the unit "miles per detention" being considered preferable to the more common "miles per minute detention" as a basis for judging the reliability of operation of electrical equipment.

In part, the report states that up to Jan. 15, 1915, electrification had been introduced on fourteen steam railroads, to the extent of 591.3 route miles, including 1761.65 miles of track, and that for nearly ten years electricity has proved its ability to handle successfully a heavy and exacting traffic. The experience gained has demonstrated the fact that the only question to be settled regarding further electrification is that of first cost.

With regard to the new problems placed before those who may be called on to maintain electric equipment, the committee considers that experience with steam equipment is the best possible training for the new responsibilities. Indeed, few additional facilities are required for maintaining electrical equipment in a steam railroad shop. This is borne out by the following statement from the superintendent of motive power of an important eastern railroad which has considered electrified mileage: "The only additional machine required by the electric car work was a journal-truing lathe to repair both inside and outside bearings on the motor-truck axles without having to dismount the wheels. We also built a few wooden-frame, light, gantry hoists for use in applying the motors to the motor trucks. These hoists were made to span the erecting shop tracks on which the work was done and were required because the shop had no overhead crane facilities. The armature work on the cars is done on wooden horses and in a standard engine lathe. A testing transformer was also provided, together with a certain miscellaneous equipment of lifting hooks, checks and clamps, which do not deserve listing separately."

In connection with the experience with electrification, the following list shows the additional tools which were found necessary for handling the electric equipment at a certain shop which was originally equipped only for the maintenance of steam equipment: A 190-ton portable hydraulic press used in removing crank pins from discs and discs from motor shafts; hook for lifting front end of electric locomotives; lifting beam for motors; lifting beam for removing and replacing cabs; special chuck for boring jack-shaft and motor bearings; tension device for re-banding armatures on a driving wheel lathe; a 3-kw insulation-testing transformer; cradle for holding armatures after removing them from the locomotives.

Referring to the above list, the local master mechanic said: "This covers about all the special tools which we have found necessary to take care of the electrical work. The manner in which the electric equipment is handled is exactly the same as that in which we handle any other equipment."

The committee considers that a feature worthy of note in connection with the maintenance of steam and electrical equipment will be found in the comparatively small machine tools and light cranes installed in electric locomotive repair shops. The reason for this is the relative lightness of the individual parts of the electric locomotives. Another feature is that, on the average, the age of the employees in an electric equipment shop is less than in a steam equipment shop. A maintenance organization should have one or two electrical experts, mechanics rather than engineers. However, experience has shown that at least 90 per cent of the work to be done and of the problems to be solved are mechanical. There is this characteristic difference between steam and electric equipment: With steam locomotives it takes about five minutes to locate a defect and from a day to a week to make repairs; with electric equipment it takes an hour or two to locate the cause of the trouble and from five minutes to a day to repair the defect.

At the time of introduction of electric operation on any railroad, the usual plan is to qualify the regular steam locomotive engineers and firemen for service on the electric locomotives. A few days' instruction by a qualified traveling engineer and a few trips over the road under his supervision are sufficient. Knowledge of the book of rules and of the significance of signals and train orders, experience in handling the air brakes and an intimate acquaintance with the route constitute at least nine-tenths of the qualifications of an efficient engineman. These are the same for electric and steam operation. Many division superintendents and mechanical officials have qualified hundreds of their steam enginemen to operate safely and successfully their most important trains with electric equipment, the time required per man not exceeding a week. Of course, the motorman, when first qualified, is not as competent as after a longer experience, but he can "safely and successfully" operate the most important trains.

In connection with records the report points out that numerous statistics relating to electrically operated roads have been published, including the cost of labor and material expended in repairs, and the efficiency of apparatus and maintenance methods as shown by the number of delays. Several of these statements use, as a basis for judging the efficiency of the equipment and its maintenance, the unit "miles per detention," and also the unit "miles per minute detention," but the majority of those published do not show the former item.

For the operating officials the unit, miles per minute detention, is of decided value, but this is not the proper basis on which to judge the efficiency of the apparatus nor of the force that maintains it, because the length of the delay is affected in most cases more by operating conditions than by the nature of the failure originally causing it. In three cases on one electrified road detentions due to broken tires were respectively thirty-eight minutes, sixty minutes and ninety-two minutes. Inasmuch as the length of the train delay due to this single class of failure varied from thirty-eight to ninety-two minutes, it makes the unit, miles per minute detention, of absolutely no use to the superintendent of electric equipment. The fact of importance to him and to those who are interested in the efficiency of the equipment is that the tires broke. Including the length of the delay only confuses matters. It appears to be advisable, therefore, to consider only the unit, "miles per detention," in connection with the records of the maintenance department.

It seems also to be desirable to subdivide the cause of train delays due to electric equipment under three general headings: "man failures," "electrical" and "mechanical." The headings "electrical" and "mechanical" are self-explanatory. The heading "man failures" is intended to cover failures of equipment which are due to the men operating it, and obviously this item should not be included in the statistics by which either the equipment or the force responsible for maintaining it are judged. However, man-failures should be included in the delay statistics for the benefit of the division superintendent and other operating officials.

LOCOMOTIVE HEADLIGHTS

Among the other committee reports which are of interest to the electric railways is that on locomotive headlights. This committee submitted a series of standards for use in connection with the incandescent lamp headlight, stating that the Columbus tests show that an incandescent lamp of approximately 50 mean horizontal candle-power will give sufficient light to meet the recommended maximum requirement of 3000 apparent beam candle-power.

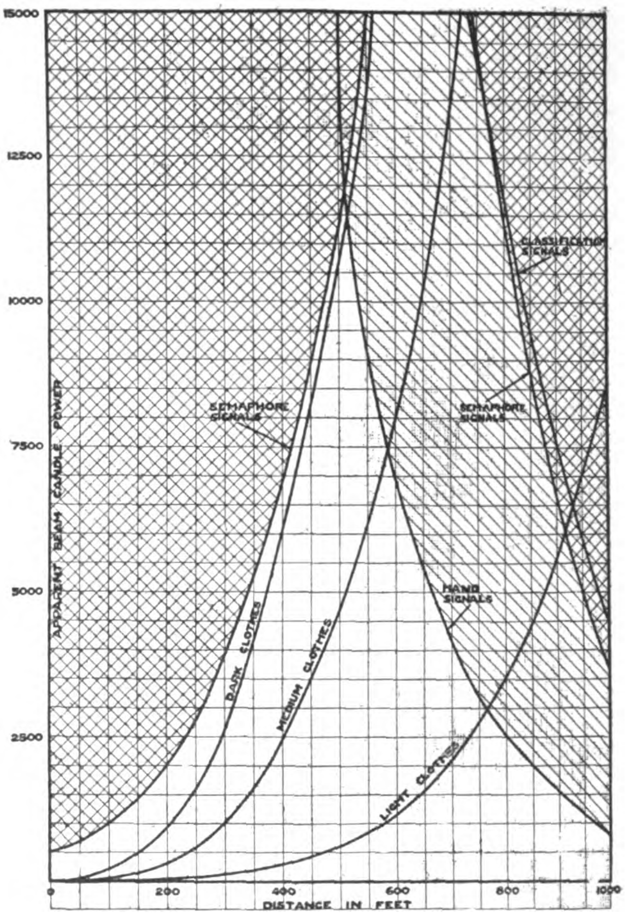
The proposed specifications therefor call for 50-cp, 7 volt, G-20 clear bulb, Edison screw bases (style 100), loop-back, tungsten filament, multiple-burning, headlight lamps. In case gas-filled lamps are used, the filament winding should be of such form and shape as to correspond closely with the form and shape of filament used in the lamp above described, and "gas-filled" must be specified when ordering. For use in cab, for markers, etc., 6-cp, 7 volt, G-10 clear bulb, double-contact bayonet candelabra base (style 100), tungsten filament, multiple-burning lamps are recommended. When metal reflectors are used, the minimum nominal diameter should not be less than 16 in. When parabolic glass reflectors or semaphore type lenses are used, the minimum nominal diameter should not be less than 12 in.

The report also contained details of a method of photometering, and a summary of headlight laws in the United States, together with a curve indicating the relations existing between arc and incandescent-lamp headlights. This showed that any object that may be seen with an arc headlight of 800,000 apparent beam candle-power may be seen just as readily with an incandescent-lamp headlight of only 100,000 apparent beam candle-power.

Another set of curves which was based on the Columbus tests is reproduced herewith. All of the curves indicating dangerous conditions, as referred to in the last year's report, have been reduced to a common scale and plotted on one sheet. The cross-sectioned space is the "danger" zone and the blank space is the "clear" zone. In selecting a safe headlight it is evident that its apparent beam candle-power value must lie within the limits of the blank space.

OTHER REPORTS

The committee on locomotive stokers stated that the past year's experience with the locomotive stoker strengthens the conviction that it is not only accomplishing its purpose but withstands the test of continuous service with remarkable durability. While it may be said that nothing novel has been presented during the past year, a great deal of very good work has been done along already established lines. The effort has been chiefly in the refinement of details. Watching the progress from the outside, one may be impressed with the thought that on the one hand there is fear of added complication, while on the other the fear that vital features may be disturbed. Still, simplicity is always desirable without the sacrifice of utility, each design is a study in itself, and efficient development can only be made by degrees.



MASTER MECHANICS' HEADLIGHT REPORT—DIAGRAM SHOWING DANGER ZONES FOR POWERFUL HEADLIGHTS

The committee on smoke prevention conducted no new tests of smoke-preventing apparatus on steam locomotives during the past year, but received inquiries from several members relative to the improved methods and results concerning this problem in the city of Chicago. A brief description of Chicago methods was presented in the belief that the development of similar arrangements in other cities may be productive of equally good practical results.

Another year's use of the steam-air jets, quick-action blowers, etc., as recommended in the report to the 1913 convention, has further confirmed the belief that locomotives so equipped may be kept comparatively free from smoke, provided the engine crews are instructed in the proper use of these devices and carry out such instructions at all times.

The feature of the report of the committee on forging specifications was the inclusion of a requirement for a proof test on all forgings "unless otherwise specified by purchaser." With this was a recommended table for heights of drop ranging from 1 ft. 3 in. on a 5-in. shaft to 33 ft. 9 in. on a 15-in. shaft, when a 1640-lb. tup is used. With a 2000-lb. tup these heights are, respectively, 11 in. and 24 ft. 8 in. For quenched-and-tempered carbon steel forgings up to 7 in. thick the elongation is specified at 2,000,000 divided by tensile strength with a minimum of 20.5 per cent, and with forgings from 7 in. to 10 in. thick the elongation is 1,900,000 divided by tensile strength, the minimum being 19.5 per cent. With quenched-and-tempered alloy steel forgings a diameter of 7 in. calls only for minimum elongation of 20 per cent, and for 7-in. to 10-in. forgings this is reduced to 18 per cent.

THE EXHIBITS

Diversity was, perhaps, the notable feature of the Railway Supply Manufacturers' exhibits at the convention. A number of track accessories were shown as well as apparatus only indirectly connected with locomotive and car maintenance, such as a speed-limiting device, tanks of oxygen for autogenous welding, calculating machines and the like. A total exhibit space of 70,000 sq. ft. was reported, the average space occupied by each individual exhibit being rather larger than the figure of last year.

Among the car coupling devices was shown a new-type M. C. B. coupler that had been subjected to a destruction test, the knuckle finally failing at a pull of 820,000 lb. by a break through the knuckle-pin hole. Another coupler had been subjected to a 500,000-lb. pull but remained in fully operative condition, showing that the new coupling devices have kept pace fully with the new locomotives having extraordinarily large drawbar pulls. An automatic connector for train-line and signal hose and electrical jumper cables was shown in operation, the device being hung under standard couplers that were brought together and separated to show the reliability with which the devices were latched and unlatched pneumatically.

A marked increase in the exhibits of 70-ton trucks indicates that the extra-large-capacity freight car is here to stay. The trucks were generally provided with cast-steel side frame, but one forged truck-side was made up throughout of steel-plate pressings. This tested to 300,000-lb. load on one truck side with a deflection of 0.7 in., and at the same time was subjected to 20,000-lb. transverse load, the transverse deflection being 0.1 in. Roller side-bearings were in evidence to some extent as an indication of the desire for flexibility, and none of the freight trucks shown had transoms, being held square only by the spring planks which were in most cases angles riveted to the truck sides.

The cast-iron wheels designed for use under the 70-ton cars were splendid examples of foundry work, the weights ranging from 750 lb. to 925 lb. for a 33-in. wheel.

The most striking novelty displayed among the track appliances was a "continuous rail-base," designed to take the place of tie plates and to permit the use of lighter rails and fewer ties by stiffening the construction. This rail base is rolled in lengths of from 8 ft. to 32 ft. as required, the sections being rigidly fastened together by toothed joints. The shape is that of a trough which has the sides flattened down at 2-ft. intervals, or at the ties, to give extra space for bearing as well as for the spikes. The rails rest in the trough and are held also by the spikes. At joints the joint plates are rigidly fastened to the rail base to prevent creeping of the rail, provision for expansion and contraction being made at the bolt holes.

There was shown also a steel tie which was perfectly insulated from the rail so that it could be used in automatic signal territory. The insulation is effected by a plate of fibre that rests on top of a block attached to the tie. On top of the fibre plate is an inverted trough-shaped tie plate, and the rail rests on this. The whole structure is held down by steel spikes driven into holes cored 4 in. deep in the block, these holes being lined with bushings of fibre ¼ in. thick. A spirally-split track bolt was also shown, the warped surfaces of the two halves providing a certain amount of elasticity that was stated to keep the nut from coming loose under vibration.

The value of the wedges for use with heavy castings was brought out in two devices, one a guard rail brace in which the lugs were held against the rails by wedges in a broad base, and the other an ingenious scheme for holding rerailers against the rail while the derailed wheels are moving up on them. The holding device, which can be used with any make of rerailer, consists of a bar-shaped malleable casting with one end bent over to catch onto the flange of the rail and with a sliding lug at the other end to fit against the base of the rerailer. The lug is wedged tightly in place by a flat wedge sliding between the moveable lug and a stationary lug at the end of the casting. The casting, it may be said, is bent slightly so that by pressing down on the end outside the rail the end at the inside is raised and can be caught on the rail flange, thus eliminating any necessity for going underneath the car.

The all-steel box car also was in evidence in one of the exhibits. This had flat steel-sheathed sides and corrugated ends, the roof being of wood supported on steel carlines. The interior sheathing and floor were of wood. The capacity was 100,000 lb., the length inside being 40 ft. 8 in., and the weight was 45,900 lb.

Among the other novelties displayed was a sliding guard for parcel racks in passenger cars. This is put up in pairs either one of which slides past the other when it is desired to get access to the rack, and as the guard is attached by brackets it can be easily installed on old equipment. Self-lubricating bearing metal in which the lubricant was contained in the alloy itself was also shown. The exhibition of several sanding devices showed that the problem of getting sand on the rail with certainty and economy was still a live issue. One device made an ingenious application of the almost obvious plan of introducing air in the discharge pipe just beyond the sand chamber for the purpose of cleaning out the pipe by air from time to time, preventing it from freezing or clogging up. A ball joint for pipes was shown as a competitor for steam-heat hose and air hose. This was made up with a special composition gasket on a brass ball, the gasket being good for a life of about 100,000 car miles and being replaceable at a cost of about 15 cents, with a working movement of 18 deg. each way from the centerline.

Forty-one pupils representing six schools rode free on the Knoxville Railway & Light Company cars, each having been presented with a book of fifty car tickets for their best essays on safety-first topics. The company renewed its offer for May and distributed blotters with lists of subjects, and illustrations, from which the teachers in the various schools selected topics for the essays. Needless to say, the company had the hearty co-operation of the teachers in the competition.

Manganese Steel Track-Work Specifications

The joint standardization committee of the Manganese Track Society and the Manganese Steel Founders' Society has issued booklet of standards No. 5 containing specifications for manganese steel track work for steam railroads. Since these specifications will no doubt form the basis of those for manganese steel special work in paved streets, the essential features are presented.

Regarding the general condition of the castings, the specifications require that they shall be free from such blow holes, sand holes, cracks, cold shuts and other defects which may impair the serviceability. Castings must also be out of twist and reasonably true, both as to general surface and alignment, and must not show any signs of straining or undue denting as a result of the straightening process. Tread surfaces within 2½ in. of the gage line and the side of the groove 1 in. down from the tread must be free from physical defects of all kinds, unless they are so small that they may be removed in finishing the casting. Castings must also be free from shrinkage cracks running vertically in the web members of solid work, or horizontally at or near the ends or in the corners at the junction of projecting members, or longitudinally in grooves.

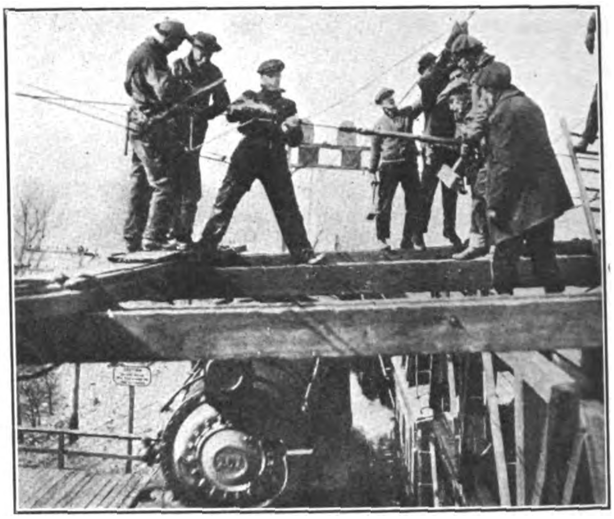
Shrinkage cracks that will not materially weaken a casting are acceptable but must not exceed ¾ in. downward across the tops of guards. Cracks are considered acceptable that do not exceed half the width of the bottom flanges of solid work and which do not extend up more than ¾ in. from the bottom of vertical members in railbound work. Cracks in the bottom of the groove transversely and not extending beyond the lower fillet, and horizontal cracks in the web members, not at or near the ends, will pass inspection. Exception to these rules is taken where two cracks are close together or nearly opposite on the two sides of a casting. Repairs to cracks with an electric welder are not permitted on the running surfaces, but imperfections on the other parts which do not affect the strength may be welded to improve the appearance.

These specifications also provide that the running surfaces shall be finished in practically the same manner as rolled rails, variations from true level of not more than 1/16 in. in 5 ft., and not more than ⅛ in. in the total length of the structure, are permitted. Where the side of the casting lies up against the rails a fit with a 1/16-in. tolerance is required. Grooves must conform to the Manganese Track Society's standard contour with tolerances permitting them to be 3/16 in. deeper but not more than 1/16 in. shallower. Tolerances at joints provide that when they are bolted up tight the rails shall line correctly with the casting, with no greater variation than 1/32 in. in either line or level. The bottom parts of castings that rest on ties must be reasonably straight, with no greater variation than ⅛ in. in 5 ft. from the true plane, and shall be free from other imperfections which would prevent a good bearing.

Other tolerances provide for variations from the given dimensions in the gage lines not to exceed 1/16 in., the over-all lengths not to exceed ⅛ in. under size to 1/16 in. over size. In special frogs and crossings a variation of ⅛ in. short or 3/16 in. long for each 10 ft. in length is allowed, and in cases where two or more pieces connect these tolerances apply for each 10 ft. of combined length. The tolerance in the spread of angles permits frogs and crossings to be ⅛ in. wide or narrow between gage lines at the extreme ends of the arms. The gages in crossings may also be ⅛ in. wide or ⅛ in. narrow. The spacing of fish-plate holes in solid frogs and crossings is allowed to vary ⅛ in., either vertically or horizontally and on railbound work not more than 1/16 in. variation is permitted. The size of the holes in solid manganese steel work is required to be not more than ⅛ in. over size in solid work and not more than 1/16 in. over size in railbound work.

Overhead Construction in the Philadelphia-Paoli Electrification

An extended account of the equipment for the electrification of the main line of the Pennsylvania Railroad from Philadelphia to Paoli was published in the ELECTRIC RAILWAY JOURNAL for April 18, 1914, and an article on the method of training the enginemen for train operation appeared in the issue for May 22, 1915.



CONSTRUCTION GANG ON PHILADELPHIA-PAOLI ELECTRIFICATION STRINGING WIRES WITHOUT INTERRUPTING TRAFFIC

In a recent statement issued by the company the cost for the equipment of this line, 20 miles in length, is given as $4,000,000, or at the rate of $200,000 per mile. Undoubtedly this expense was due in considerable part to the difficulties of performing this work without interruption of traffic. Through the six track approach at the first interlocking tower west of Broad Street Station, Philadelphia, where sixty-five switches and fifty-two signals are located, no less than 2295 separate movements of trains and engines occur daily, and means had to be devised by which the construction gang could work without interruption to this immense traffic. In all the work of electrifying this 20 miles of railroad included the stringing and restringing of 660 miles of electric wires, the erection of 760 poles, thirty-six signal bridges and four substations, and the installation of a wholly new type of automatic block signal system. In this system all moving parts have been eliminated, the semaphore arms being replaced by a series of electric lamps so arranged that their position indicates the horizontal, diagonal or vertical position which would be taken by the semaphore arm.

The accompanying illustration shows the method followed in the erection of the overhead wires. Strong scaffolding, erected on flat cars, was used to get the men up to the level of the wires with which they were working, and large gangs of men were employed in order that they could work very quickly during the limited time they were permitted to occupy a track in this manner. The view shows a train just pulling into a station with the electric workers busy overhead.

COMMUNICATIONS

A. C. Testing of Railway Motor Insulation

NEW YORK MUNICIPAL RAILWAY CORPORATION
BROOKLYN, N. Y., June 8, 1915.

To the Editors:

I have noted the editorial on testing motor insulation which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for June 5. In this connection I firmly believe that the recommended practice of the A. E. R. E. A. for trolley roads, specifying 2500 volts alternating current for five seconds on new armatures and fields and 1000 volts alternating current for five seconds on old armatures and fields, is entirely proper and desirable, where there is severe service placed upon the equipment and reliability in service is one of the main factors.

Of course, this is quite a high standard for maintenance and repair of old equipment, but I am firmly convinced that it is absolutely necessary where it is essential that cars be kept on the road, and this test should be applied to all motors, at definite periods, depending upon the class of service in which the equipment is operated.

I do not believe it to be a fact that the insulation is unduly strained by these alternating current tests when they are properly applied and when the above voltages used, as there should always be a sufficient margin of safety in the insulation of both armature and fields to withstand the continued shocks from voltage surges, and weaknesses due to abrasion, moisture, etc., from various causes will be thereby picked out and the proper safety factor maintained.

WM. G. GOVE, Engineer of Car Equipment.

Flange-Bearing Special Work

UNION TRACTION COMPANY OF INDIANA
ANDERSON, IND., May 27, 1915.

To the Editors:

Your editorial in the issue of May 8 on flange-bearing special work was very interesting, and I believe is in line with the best practice of to-day. Flange-bearing special work is increasing the life of special-work pieces, and by using the welder the life of these pieces may be prolonged considerably. The length of the approach in the special-work flangeway or the rate at which the flangeway rises to its maximum height, however, is a question which is just as important as the flange-bearing. The flangeway should be smooth, and the rate at which the flangeway rises should be uniform. In using the welder it is very easy to get a rough surface, in fact, a rough surface will be obtained, and grinding is necessary to make it smooth. The hand grinding which is necessary makes a uniform rate of rise rather difficult to obtain. It is possible, however, to obtain this uniform rise by constructing a templet with the desired slope, upon which the hand grinder can slide. If this is done the welded material can be ground to a smooth and uniform bearing surface.

Probably most of the trouble attributed to raised flangeways from the standpoint of chipped wheels has been due to a too rapid rise in the flangeway. The heavy blow struck on account of too steep an incline will, I believe, prove as injurious to the special work as to the wheels. I believe that the rate of rise should be not more than 1/32 in. vertical to 1 in. horizontal. In cities where both interurban and city cars are operated and where the depth of wheel flanges differ it may be difficult to decide which flange should have the bearing in special-work pieces. Of course, if the city car wheel flanges have the bearing the interurban car flanges will also ride. The treads of the wheels, however, will be raised from the ball of the rail by the difference in the depth of the two flanges. At the rate of incline above mentioned I do not believe that interurban car wheels would be injured. In cities of from 20,000 to 50,000 inhabitants I believe that it would be sufficient to raise the flangeways to take care of the interurban car wheels only, provided both types of cars are operated over the special work. This question must be decided on the basis of local conditions, but in general we should have raised flangeways.

L. A. MITCHELL, Superintendent of Roadway.

Traffic Characteristics and Investment per Revenue Passenger

FORD, BACON & DAVIS
PHILADELPHIA, PA., June 1, 1915.

To the Editors:

Traffic surveys are not expensive. It is not always possible to show that they produce direct financial results, but they enable a manager to say "I know" instead of "I think." In these days a man is not covering his job unless he has examined every possibility of improvement. And even if a method or a disposition is right or best, he must know that it is so and prove it so far as it can be proved.

Besides the obvious immediate value of a traffic survey in making schedules, its usefulness extends to routing, transfer regulations, choice of economical size of car, determination of value of fostered traffic and to restraining demands for extensions of lines when not warranted by the density of travel.

The net and surplus earnings of street railways represent the final answer to the transportation problem which involves a great many operating conditions or factors. The variations in these factors from year to year have curiously balanced one another so that for twenty-five years we have been able to carry passengers under vastly changed conditions at the same nominal rate of fare. Thus:

Raises in wages which seemed overwhelming have been balanced by gains in efficiency of apparatus and management.

Increases in length of haul have been balanced by increased density of traffic.

The relentless decline in net earnings per passenger has been balanced by the increase in number of passengers per unit of investment.

Of late years this comfortable equilibrium has been rudely disturbed. If a company cannot wait upon its nominal increase in density to restore its balance, there are only two remedies, namely, still greater efficiency and higher rates of fare. In efforts to apply both of these remedies, the traffic survey will help. Its usefulness in the promotion of efficiency has been mentioned. Gains in efficiency are not easily made at this stage of the art, but increases in fare or even hopes of increases are much more elusive.

A traffic survey may substantiate several good arguments for higher fares, but principally it gives accurately the average length of ride.

The fare question ought to be settled ultimately on a logical basis, due weight being given to length of haul and density of travel. Correct fare zones are not necessarily circular but bulge where density is high and draw in where density is low. A plea for a higher fare on a given line should be backed up by proof that the favorable factor of density does not overbalance the burden of the long car trip or the long average ride per passenger.

The service performed by a street railway may be defined or described as follows:

(1) During the rush hours it provides the necessary

number of passenger spaces at the point of maximum loading in the direction of heaviest loading. Whether a passenger rides a long or short distance, this passenger space must make a round trip over the designated route of the line in order to furnish the passenger space required at the point of maximum loading in the heavy direction. This portion of the service therefore consists of "passenger space miles."

(2) During the period between the morning and evening rush hours, sufficient seats must be provided at the point of maximum load. These seats must be moved over the designated route of the line whether they are occupied or not. This portion of the service therefore consists of "seat miles."

(3) Before the morning rush and after the evening rush, schedules are generally governed by headways mandatory or practical. This means that cars large or small must be passed over designated routes at certain intervals. This portion of the service therefore consists of "car miles."

The street railway man's general problem is to find the routes, schedules and types of equipment which will perform these varied duties most efficiently. The writer is of the opinion that it would pay to order our accounting system so that the cost of service of each character can be determined without too much analysis and calculation. One of the results of such an analysis of the cost of service would be to shatter the mistaken and harmful notion that strap-hangers pay the dividends. Electric light and power people discovered long ago that the customer who uses electricity only at the peak is expensive and undesirable. It is not hard to show that business does not pay which requires the purchase of equipment for four or five hours' use out of twenty-four hours and then to carry a load, however large, in one direction only.

If street railways did not already have their rush hour equipment on hand, with interest charges accruing on it, they might not find jitneys an unmixed evil. For if jitneys thrive at all, they do so during the rush hours. In many cities the track capacity of some streets is already reached during the rush hours. In such cases the fixed charges on track must be figured against the peak load, and this gives rush hour traffic a considerably worse financial aspect.

Referring to Mr. Doolittle's very interesting and comprehensive outline of his subject and plan of treatment, the models will be worth while if they have a definite purpose in giving specific instruction to traffic men, or in demonstrating to and impressing on the public mind the relation of service to traffic. Diagrams seem better than models for this purpose, but anything which helps in any way is welcome.

The writer would suggest that "traffic factor" and "service factor" would be preferable to "concentration index." The former terms correspond to the well known and accepted "load factor" in central-station work.

Not with the intention of anticipating Mr. Doolittle's conclusions regarding standard methods of procedure for traffic surveys, the writer would state his belief that the destination count as made in Philadelphia is entirely practicable for any city. It can be made complete with all compilations at a cost of not over $30 per car counted. It gives information which can be confidently relied upon in questions of routing and transfer regulations. Unless a city is growing or changing very rapidly, the information obtained by such a count should be useful for five years or more.

The ratio of investment to gross revenue has undoubtedly been overworked and misapplied, but the writer is not favorably impressed with Mr. McGrath's suggestion that the "revenue passenger" be used generally as a basis of comparing investments. This unit would correspond to the "kilowatt hour" in central-station work, and we know that no electrical man would consider figuring his investment per kilowatt hour. While the demand costs are not so large a proportion of the total in railway as in central-station service, they are nevertheless very important, and nobody desires to belittle them. We want to make the rush hour passenger realize that the investment necessary to carry him when he wants to travel is greater than that required for the non-rush passenger, even though the former sometimes gets only standing space.

For railway and financial people the cost per mile of track is the most useful presentation of investment. The cost per mile of track varies principally with the amount of equipment necessary per mile of track, and with the general character of construction. Both of these factors vary directly with the density of traffic and, therefore, with each other. So that if we know the maximum number of forty-seat cars required per mile of track we have a direct line on the cost of equipment and, indirectly through the density, a measure of the average character of construction required. It is true that at present the maximum number of forty-seat cars—or an equivalent unit—is recorded for very few railways. It is a simple figure to compile, however, and it undoubtedly will be taken up in the future as it shows the important element of demand. The cost per mile of track for systems having various numbers of cars per mile of track could be platted on a simple diagram and a reasonable basis for judging any other property obtained. It goes without saying that any unusual conditions should be taken into account.

In the absence of the maximum number of forty-seat cars or an equivalent demand unit, a fairly satisfactory basis of comparison can be had by using the car miles per mile of track. This has the disadvantage of not taking account of load factor or size of cars.

For use before the public, the investment "per capita" would seem to carry more weight and to be more appropriate than the investment "per revenue passenger." A resident of a city, for example, would obtain a better idea of the street railway problem if he thinks of the company's investment in his service as $75 rather than as 30 cents for every time he rides.

J. A. EMERY.

Safety First in Manila

The Manila Electric Railway & Lighting Company, Manila, P. I., has taken up the safety-first propaganda, and, under the direction of C. Nesbitt Duffy, vice-president, with the active assistance of his department heads, the company has inaugurated a safety-first campaign. The matter was first considered at a meeting of the company's officials and department heads on June 26, 1914. A few days later a safety committee was appointed, consisting of twelve departmental heads not officials of the company. The executive committee was composed of C. H. Van Hoven, who is the claim agent; Oscar Keesee, superintendent of transportation, and Ramon Lopez, superintendent of distribution. Lectures have been given in the public schools by C. H. Van Hoven in English, and by F. P. Santiago in Tagalog. Circulars in English and in Tagalog have been sent to cocheros, chauffeurs, owners of automobiles, garages and livery stables. Placards or posters have been placed in the cars operated by the company. According to Mr. Duffy 1512 accidents were reported in 1914. Of this number 610 were caused in boarding or alighting from cars, while 646 were caused by collisions with vehicles. These two forms of accidents were 85 per cent of the total reported. C. H. Van Hoven is in general charge of this movement.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

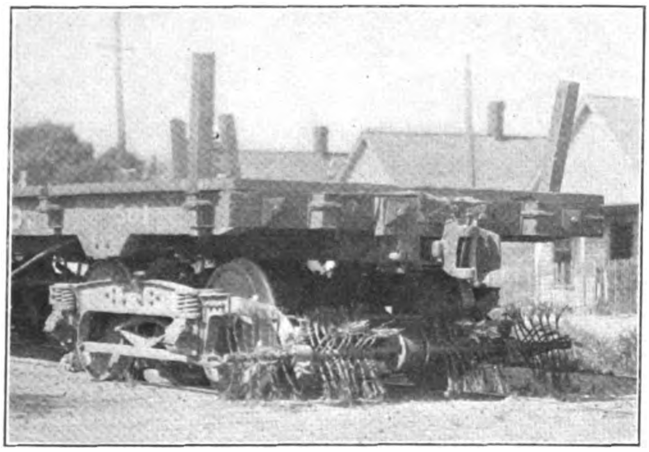
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Northern Texas Traction Weed Cutter

BY R. E. GRIFFITHS, NORTHERN TEXAS TRACTION COMPANY, FORT WORTH, TEXAS

To reduce the expense of cutting weeds and grass on its right-of-way the Northern Texas Traction Company has built the weed cutter shown in the accompanying illustration.

An ordinary flat car was utilized for the weed cutter, a revolving wire brush being mounted from the truck at one end. The core of the brush or cutter consists of a 1½-in. shaft revolving in bearings mounted directly over the rails and carrying at the center an 8-in. driving pulley. Except in the pulley and the bearings the shaft is drilled with holes on half-inch centers, adjacent holes being at right angles to each other. Wire strands are mounted in the holes, each consisting of a piece of strand from a 1¼-in. switch cable. This strand is made up of seven No. 10 wires and it is raveled for 4 in. from each end, further ravelling being prevented by a wrapping of wire.



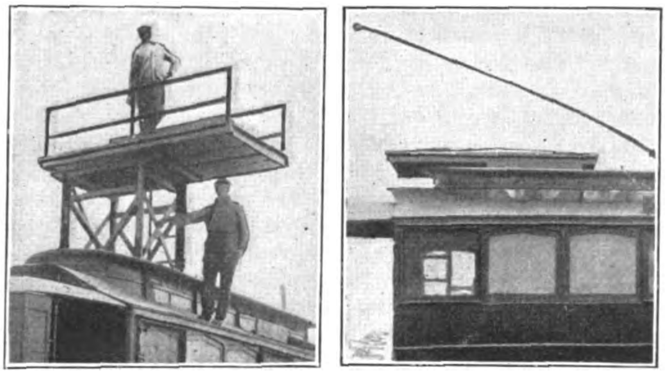
WEED CUTTER IN USE BY NORTHERN TEXAS TRACTION COMPANY

The shaft revolves in simple bearings carried on brackets attached to the side frames of the truck, the upper member being formed of 1-in. x 4-in. flat steel and the lower member of ¾-in. x 3-in. flat steel. A tie-rod serves to brace the brackets sidewise. The cutter is driven through a flat belt from a 22-in. pulley on the rear axle of the truck and makes about 900 r.p.m. when the car is running at 30 m.p.h.

In operation the car is run ahead of the motor car, with the cutter in front. With the belt uncrossed the bottom of the cutter moves backward with respect to the car motion, which is the normal arrangement. The direction of rotation of the cutter can, however, be reversed by crossing the driving belt. It is only necessary to run the car over the road once to cut down all grass and weeds even with the top of the rail, excepting those directly under the driving pulley. There is no particular objection to leaving the weeds in the center of the track as they cannot be ground under the car wheels.

The Three-in-One Car

BY E. C. SHERWOOD, SUPERINTENDENT OF EQUIPMENT MANHATTAN & QUEENS TRACTION CORPORATION, LONG ISLAND CITY, N. Y.

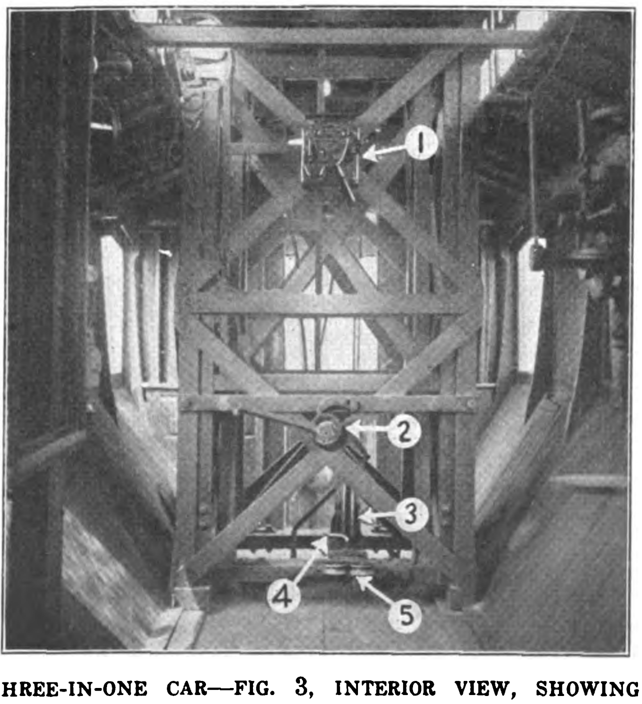


THREE-IN-ONE CAR—FIGS. 1 AND 2, PLATFORM IN RAISED AND LOWERED POSITIONS RESPECTIVELY

This company recently decided to remodel an old single-truck passenger car into a line car at a minimum of expense. In doing so it was found possible to design the car so that it would act as a snow scraper and an arc-welding outfit also. The car was built and has proved very satisfactory, becoming known among the employees of the company as the "three-in-one" car.

THREE-IN-ONE CAR AS A LINE CAR

The car available measured 31 ft. 6 in. over bumpers, 7 ft. 8 in. in width and 11 ft. 5 in. in height. In remod-



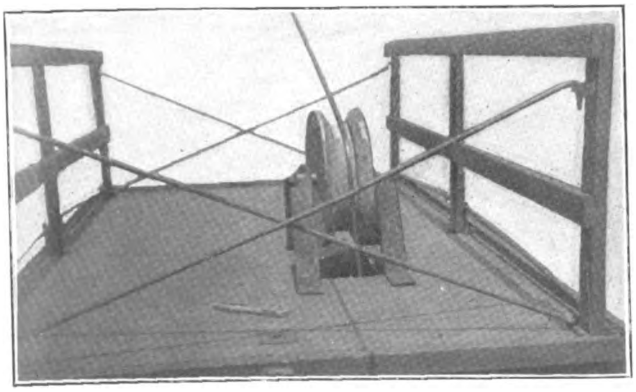
THREE-IN-ONE CAR—FIG. 3, INTERIOR VIEW, SHOWING TOWER FRAMES, GUIDE SHEAVES, ETC.

eling, the two longitudinal seats and the heaters were removed. The cables were then pushed back against the sides and covered with a protecting boarding of tongue-and-groove flooring, running diagonally from the bottom of the sash to the car floor. This arrangement left ample space for the new purpose. One end of the car from door-post to corner-post was removed and so arranged that it could be replaced and held in position by means of hooks. This opening provided ample room to admit a reel of cable or trolley wire. As a guide for the tower a frame consisting of four upright posts, 3-in. by 3-in. in size, was built between the floor and the corners of a hole 42 in. square in the roof. The posts were cross-braced and bolted both to the floor and the roof. The sliding tower is a frame made of four uprights, 2½-in. by 3-in. in size, suitably cross-braced. On top a fifth wheel was arranged to swing the platform, which is about 5 ft. x 8 ft. in size.

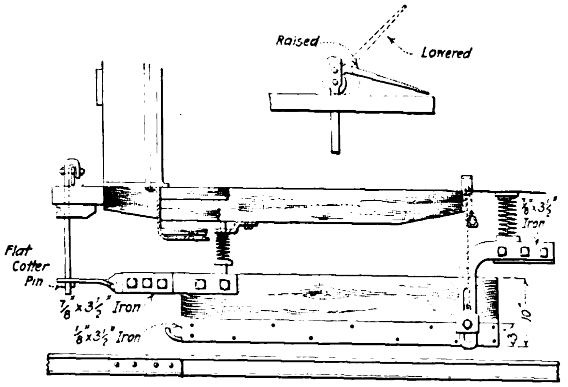
When the tower is down the platform fits close to the roof and must be raised 3 or 4 in. before the platform can be swung out. There is therefore no danger that it will swing out when the car is in motion and the tower is down, and no clamp is necessary to hold the platform in position. The tower is raised by means of a winch, cables being fastened at the bottom of the uprights and running over sheaves which are set in the cross-pieces fastened in the opening of the roof. The platform is provided with hinged railings at the side, held in place by diagonal hooks when in use and folded flat on the platform when not in use. The platform is shown in Figs, 1, 2 and 4.

The arrangements for stringing trolley wires are as follows: A rack inside the car supports the reel. From the reel the wire passes between a pair of 5-in. sheaves (*5*, Fig. 3), mounted on the bottom of the tower, through a tension clamp (*4*, Fig. 3), around a 16-in. sheave (*3*, Fig. 3) with a 2-in. by 1-in. groove, through the tower platform (Fig. 4) and out over a 16-in. sheave with a 2-in. by 3-in. groove. The tension clamp (*4*, Fig. 3) consists of two pieces of flat iron, grooved to fit the wire and shod with fiber to prevent chafing of the wire. The lower piece is fastened to the bottom of the tower, and the upper piece is raised and lowered by means of a threaded spindle. The side-by-side arrangement of 5-in. sheaves furnishes a guide for the wire no matter what its direction may be in coming from the reel. These sheaves also take any kink out of the wire. The platform sheave has a wide, shallow groove so that the wire can shift from side to side.

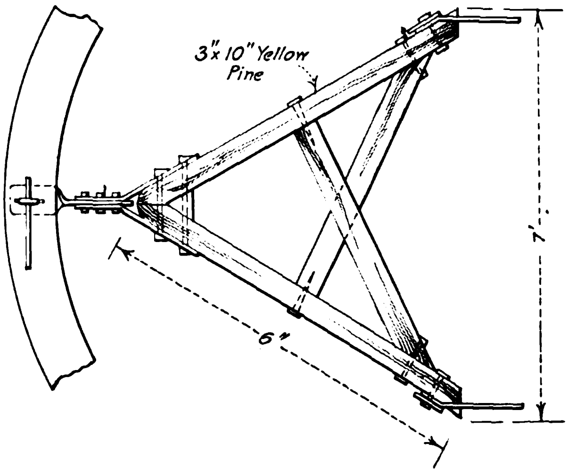
After the trolley wire has been fastened or anchored all that is necessary is to raise the tower to the desired height, set the tension clamp, and start the car, when the wire will be paid out perfectly straight and free from kinks. The wire can be run without pulling or lifting, and as everything connected with the tower is insulated the wire can be strung alive. As the wire inside the car is alive we made good use of this fact by tapping off the trolley base, running a lead to a circuit breaker (*1*, Fig. 3) located on cross-braces of the tower guide frame, thence to a trolley wheel back of the 16-in. inside sheave. This wheel makes contact with the wire coming off the reel. Thus by pulling down the trolley pole and closing the circuit breaker the car can be operated from the current drawn through this wheel. This is very convenient in stringing trolley wire where the track is laid but where no trolley wire has been placed.



THREE-IN-ONE CAR—FIG. 4, PLATFORM OF LINE TOWER



THREE-IN-ONE CAR—FIG. 5, DETAIL OF LEVER AND CAM; FIG. 6, SIDE ELEVATION OF SNOW SCRAPER



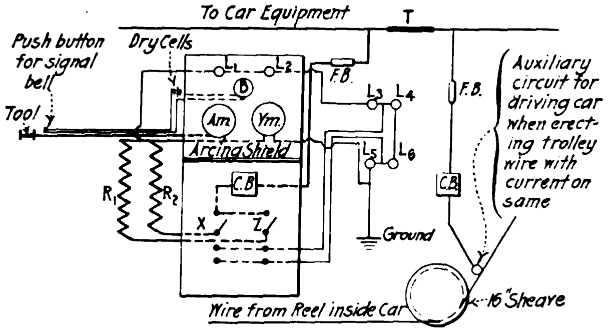
THREE-IN-ONE CAR—FIG. 7, PLAN OF SNOW SCRAPER

In addition to the trolley-stringing apparatus the car contains a work bench, a hand drill-press, an emery wheel, a vise, bins for supplies, etc. This equipment makes the line force more or less independent of the shop and saves time waiting for drilling, etc.

THREE-IN-ONE CAR AS A SNOW SCRAPER

In order to increase the usefulness of the car, which was not in constant demand as a line car, it was equipped with snow scrapers of the type shown in Figs. 5, 6 and 7. Applications have been filed for patents on this type of scraper, which has proved very satisfactory in operation. It consists of a plow made of 3-in. by 10-in. lumber and shod with ⅛-in. by 3½-in. band iron at the bottom to take the wear. The plow is 6 ft. in length and 7 ft. wide at the back. The nose is rounded, and from the bottom of the nose an upward-curving toe projects to prevent catching on obstructions.

At the heel the plow is held in position longitudinally and sidewise by means of bolts which slide in slots in brackets attached to the truck frame. By cutting out three rivets on each side of the truck on both ends it


To Car Equipment
T
Push button for signal bell
Dry Cells
Tool
L1
L2
B
Am
Vm.
Arcing Shield
F.B.
L3
L4
L5
L6
F.B.
C.B
C.B
R1
R2
X
Z
Ground
Auxiliary circuit for driving car when erecting trolley wire with current on same
16" Sheave
Wire from Reel inside Car

THREE-IN-ONE CAR—FIG. 8, WIRING DIAGRAM OF ARC-WELDING OUTFIT AND AUXILIARY CIRCUIT

was possible to bolt on the flat brackets as shown in Fig. 6. These are made of 7/8-in. by 3½-in. flat iron and are bolted firmly through the rivet holes. The slots permit the heel of the scraper to rise and drop when riding over high spots on the road.

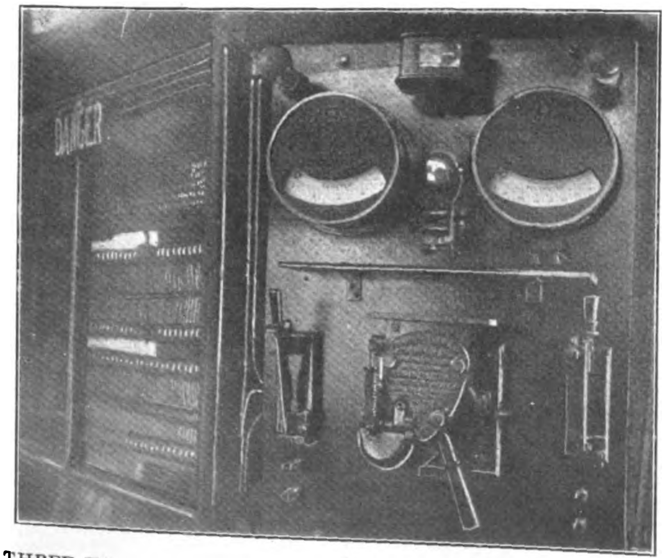
At the nose a coiled spring under the platform presses the plow downward and an extension made of 7/8-in. by 3½-in. flat iron projects outward to a point under the car drawhead for the purpose of supporting it on a rod which hangs from the bumper. This rod passes through a hole in the extension and a flat cotter key through it takes the weight of the front end of the plow. The rod passes up through the bumper and is bent over at the upper end to form a bearing for a cam-ended lever, by means of which the plow nose can be raised and lowered. At the heel chains are provided for raising the rear of the plow when it is out of use. The chains are hung over split hooks.

THREE-IN-ONE CAR AS AN ARC-WELDING OUTFIT

For the purpose of using the car as a welding outfit suitable resistance boxes were provided, a switchboard with measuring instruments was installed and provision was made for the necessary signals between the welding men and the switchboard operators.

There are four resistance boxes made up of regular car resistance grids, each measuring 42 in. in length. They are mounted on two 2-in. by 4-in. uprights running from the floor to the roof of the car, three being placed horizontally and one vertically. By the use of this method of mounting, a space 37-in. by 52-in. by 26-in. only was required.

Current for welding is taken from the trolley base through a fuse box from which the fuse is removed when the welder is not in use. From the fuse box the line runs to a circuit-breaker on the switchboard, then through two operating switches to the resistance boxes and the ammeter and through a conduit out over the truck to the outside of the car.



THREE-IN-ONE CAR—FIG. 9, SWITCHBOARD FOR ARC-WELDING OUTFIT

The ammeter referred to has a capacity of 400 amp, and a 700-voltmeter is also supplied on the switchboard. On the board are also a signal bell operated by a push button on the handle of the welding tool, and signal lamps for indicating the condition of the circuit.

The terminal of the wire from the trolley has sweated on it one-half of a two-way clasp connector, and the lead wire connecting to the welding tool has the other half of the connector sweated on it. The ground wire from the truck of the car is similarly equipped.

In using the car in welding, the welding tool is connected up to the terminals either on the positive or the negative side as is desired, and the workman when ready to start welding signals the switchboard operator who closes the circuit-breaker. This lights up two indicating lamps located under the drip rail of the car on either side, and two others on the switchboard indicating that power is available. The outside signal lamps are so connected that when either one or the other of the resistance switches, *X* and *Z* in the accompanying electric circuit diagram, is thrown down, short-circuiting the auxiliary contacts, one outside lamp on each side of the car is extinguished. This indicates to the welder the amount of current which he may expect to get. The welder is able to signal for full current, half current or no current by means of the signal bell, and to know that the switchboard operator understands his signals. All of the electrical connections described are indicated in the diagram. By the arrangement described welding on overhead work can be done from the raised platform just as well as welding on the ground.

Cooling Plant at Bluestone

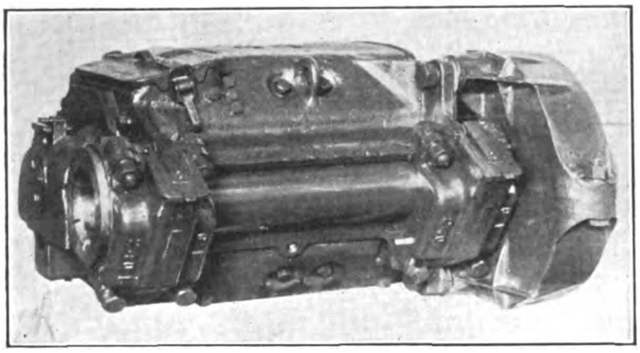
Some additional facts in regard to the cooling plant used in the power station of the Norfolk & Western Railway at Bluestone, described last week, and supplied by the Spray Engineering Company, Boston, may be of interest. The pond is used when the supply of river water is low or too muddy for boiler use, the water then being sprayed into the pond and then discharged into the intake canal. If there is sufficient cooled river water of suitable quality, the water from the condensers is not sprayed but is discharged into the pond from which it is allowed to flow into the river reservoir several hundred feet below the intake and circulates upstream to the intake, the complete circuit being about 1400 ft. The pond is 90 ft. wide, 296 ft. long and 5 ft. deep, and the basin is formed of a concrete retaining wall and an 8-in. bottom, laid on rolled ground. The basin may be drained by a sluicing gate.

The nozzles and pond are fed by three 24-in. pipe lines from the power station. There are four rows of concrete piers supporting branch arms, each carrying three or four sets of spray brackets. Altogether, there are 280 nozzles with space for 140 more. At the end of each of the four main branch lines is a bronze release valve arranged to open automatically when the water pressure exceeds a predetermined value. The valves discharge downward on concrete slabs which prevent the erosion of the basin bottom. With the exception of the 2½-in. wrought iron spray brackets, all piping is of cast-iron, painted inside and out with tar pitch varnish. The nozzles are of bronze and are designed each to discharge 62 gal. per minute with a nozzle pressure of 5 lb. per square inch. The pond is capable of cooling 16,800 gal. per minute.

GE 240-C Motor and PC-2 Control

Information is now available of the GE 240-C motor and the PC-2 control with which six of the cars to operate through the Belmont tunnel in New York are equipped. This line, which is controlled by the Interborough Rapid Transit Company, though not now physically connected with the existing subway system, runs from Forty-second Street, Manhattan, at a point midway between Lexington and Third Avenues to Jackson Avenue in the Borough of Queens. The distance is about 6680 ft. Of the twelve cars six are being equipped with the 240-C motor and PC-2 control of the General Electric Company and six with the 302-F-2 motor and 214-A control of the Westinghouse Electric & Manufacturing Company.

The GE 240-C motor is a recent design of the box type with nose for motor support cast integral with the frame. Its weight complete, with gear, gear case, pinion and axle linings is 4000 lb. A high continuous capacity is obtained by the use of the General Electric Company's system of double or multiple ventilation. A fan that has two sets of blades and that has a greater diameter than the armature, is made integral with the pinion-end armature head. Hooded openings are provided in the commutator end-frame head for the entrance of cooling air. As the air enters it divides into two parallel streams, one passing around the field coils to the fan, the other being drawn through the commutator shell and the armature core. The streams unite after passing through the fan and are exhausted to the atmosphere through openings provided in the frame. Air at atmospheric temperature is thus introduced almost directly into the armature core, effectively cooling it and largely increasing the service capacity of the motor.



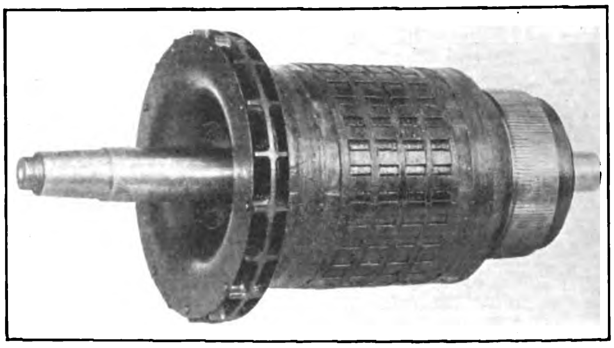
BELMONT TUNNEL EQUIPMENT—MOTOR ASSEMBLED COMPLETE

The control furnished with the motors is the Sprague, G. E. Type-PC-2 multiple-unit electro-pneumatic type, the apparatus consisting in general of two parts, a main or motor controller located below the car, and a master controller which regulates the operation of the motor controller.

The motor controller is a series-paralleling group of ten switches or contactor units, a reverser, two line breakers, overload, potential, and current limit relays, all assembled in a single case. The series-parallel connection of the motors is accomplished by the "bridge" method, the circuit through the motors not being interrupted during the transmission from the series to the parallel connection. The tapped field motor permits the use of a heavy accelerating current on full field, and a higher armature speed on tapped field, and in addition allows one resistance step to be cut out, the motors operating on tapped field on both series and parallel with a saving in rheostat losses. The contactor units making the different electrical combinations for the motors are closed mechanically by means of cams mounted on a shaft which is revolved by a rack and pinion. The rack is operated by two air cylinders whose valves are electrically controlled by the master controller.

The construction of the contactor units will be understood from the view of one that is reproduced. To close the circuit a cam engages with the roller mounted on the lowest part of the hinged arm, and raises it until the contact surfaces come together, at the same time compressing the spring. When it is released, the spring returns the arm to its original position, thus breaking the circuit. The unit is of rigid and substantial construction, and special attention has been given to interchangeability of parts. The contactor is self-adjusting, the spring automatically taking up any wear.

All of the contactor arc chutes are grouped in one unit similar in construction to that used in the ordinary drum controller. This unit is suitably hinged so that it may be swung downwards, thereby exposing all of the contacts and operating mechanism of the contactors. Individual side burning plates are used in the arc chute, and these can be readily removed by releasing a simple spring catch.



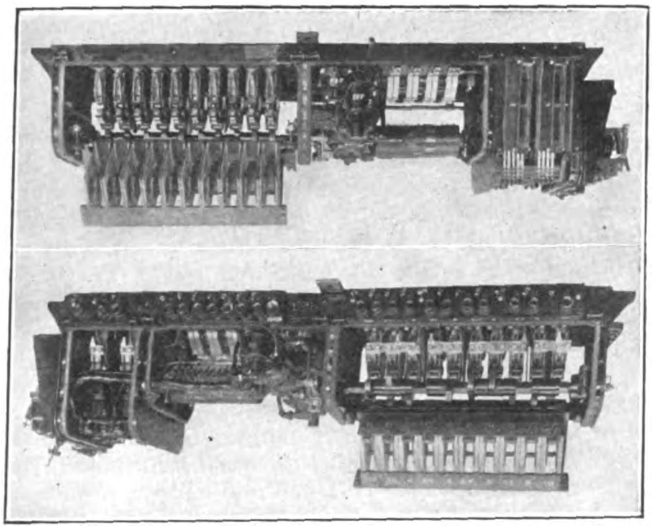
BELMONT TUNNEL EQUIPMENT—MOTOR ARMATURE WITH MULTIPLE FAN

The rack that controls the position of the cam shaft is mounted between two air cylinders. The valves controlling the admission of air pressure to the cylinders are controlled by the master controller.

The line breakers are also operated pneumatically and controlled electrically. In construction, they are similar in principle to the contactor units. In operation a movable arm carrying a removable copper tip makes contact with a similar tip. The arm is lifted to close the circuit by an air cylinder the valves of which are directly operated by the master controller each time it is turned on or off. When the control circuit is interrupted air is exhausted from the cylinder and a strong spring, together with the weight of the arm, causes it to drop, and open the power circuit. An overload trip is provided for the line breakers so that an excess current will cause the main current to be broken. The reverser is also actuated by air pressure, and is electrically controlled for throwing it into either position.

Current for operating the control circuits is furnished by a storage battery at a potential of 32 volts. This is charged in series with the air compressor whenever the latter is in operation. Air pressure for the cam shaft cylinders, line breakers and reverser, is obtained from the air brake system.

The master controller is similar in general construction to that used with the Sprague G. E. Automatic Type-M control, and consists of a single cylinder which energizes the various train wires for forward or back-



BELMONT TUNNEL EQUIPMENT—FRONT AND BACK VIEWS OF MOTOR CONTROLLER, WITH ARC CHUTE LOWERED

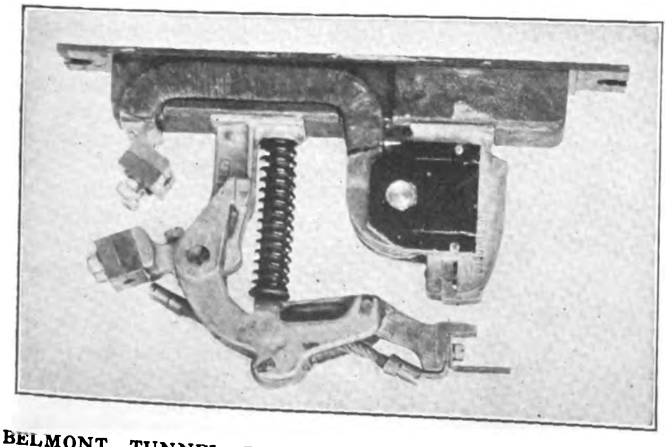
ward movement. The handle is moved in one direction for forward car movement and in the opposite direction for reverse.

There are four positions for forward movement: Switching point in series; accelerating point in series; lap point in parallel; accelerating point in parallel. There are but two positions in the reverse direction corresponding to the first two mentioned for forward motion. Switches are also provided for the control-circuit cutout, and line-breaker reset.

When the controller handle is turned to the switching position, all reversers in the train are first thrown for whatever car direction is indicated on the controller in use. The circuit controlling the operation of the line breaker is next established. To insure a correct sequence of operations the line breaker is not allowed to close and complete the motor circuit until the reverser has thrown to the proper position.

When the handle is moved to the accelerating points, the train accelerates automatically at a pre-determined current per motor. A current-limit or notching relay limits the accelerating current and stops the rotation of the cam shaft when the pre-determined current is reached. When the motor current drops to the correct value the progression is again started.

The controller handle is automatically returned to the off position by a spring so that power is cut off whenever the motorman releases his hold. The release of this handle permits a knob to rise and thereby actuate a small air valve in the controller for applying the brakes simultaneously with the cutting off of power. These two features are provided for the purpose of bringing the train quickly to rest in case the motorman becomes incapacitated. In the event of the line breaker opening, due to an overload, the motorman re-establishes the closing circuit by operating the resetting switch in the cab.

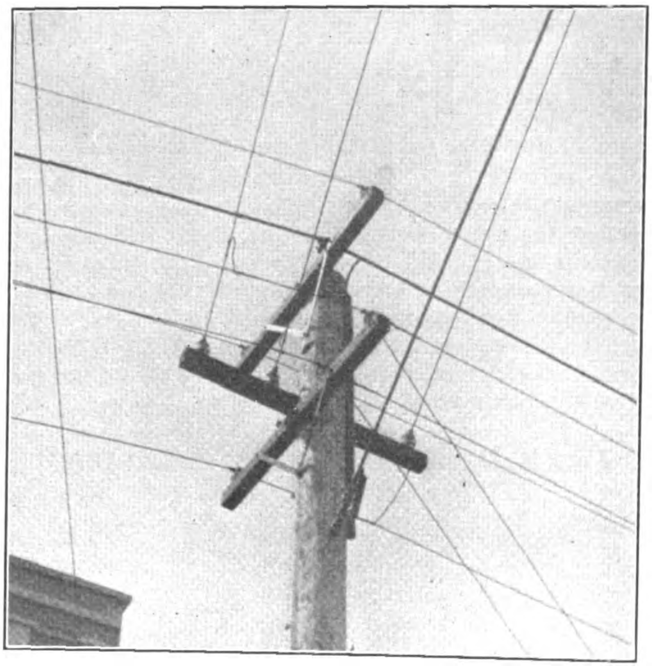


BELMONT TUNNEL EQUIPMENT—CONTACTOR UNIT FOR MOTOR CONTROLLER

The special features of the new control are reported as follows: A definite sequence of contactor operation is established both when going off and on, due to the mechanical control of the contactor units, and this prevents trouble that might occur from improper functioning of independently operated contactors. Interlocks on the contactors are eliminated. The electric control circuits are simple. The simplicity and compactness of the apparatus permits the assembly of contactors, reverser, line breaker, relays, etc., in one box as a single unit, making the installation easy and reducing the possibility of improper connections. The arc chutes are grouped as a single unit which can be swung down, exposing all contactors. The design and grouping results in a considerable saving in weight of control apparatus.

Fiber Conduit Insulation for Feeder Taps in Dubuque

Fiber conduit instead of metal conduit is used by the Union Electric Company, Dubuque, Ia., to insulate its feeder-tap connections. The 550-volt d.c. trolley feeder is supported on a five-pin arm attached to the top of the wooden pole. On the same cross-arm with this feeder and on another below it are 2300-volt and 110-volt a.c. lighting and power wires. In order to make a connection to the trolley wire by way of a span wire which is attached to the pole below the cross-arms, the feeder tap must pass down along the side of the pole for a distance of 5 ft. or 6 ft. To protect the linemen when working on the pole, a section of 1½-in. fiber conduit is slipped over the feeder tap and fastened to the pole with metal straps. In addition to furnishing full insulation, the conduit is light, inexpensive and neat-looking.

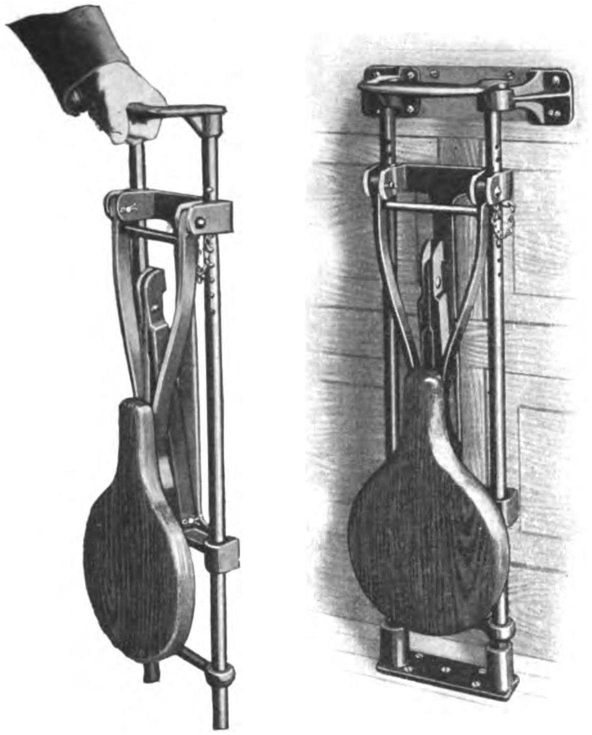


DUBUQUE RAILWAY—FIBER CONDUIT USED TO INSULATE A FEEDER TAP

A feeder tap installed in the manner described is shown in the accompanying illustration.

Removable, Collapsible Motorman's Seat

A new removable type of Keystone motorman's seat is being manufactured by the Electric Service Supplies Company. This allows the seat proper to be transferred from one end of the car to the other with a minimum amount of difficulty. All of the quick collapsible and adjustable features of the standard Keystone seat are retained as will be noted in the accompanying illustrations. One pair of brackets for supporting the upper ends of the standards and one floor plate for securing their lower ends are the only stationary parts and these are so arranged that the seat can be readily disengaged by raising the standards a few inches. Special upper brackets are furnished to take care of the curvature of the inside of the dash or to overcome other existing obstructions.



REMOVABLE, COLLAPSIBLE MOTORMAN'S SEAT

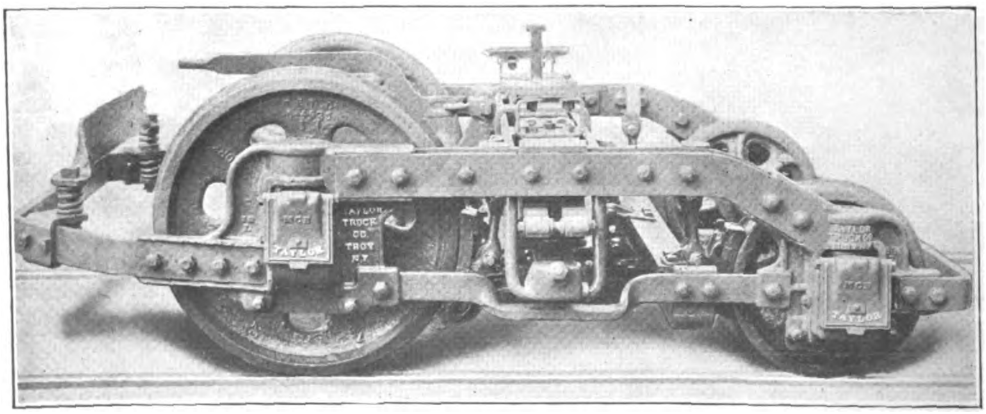
A Truck Designed for Low Maintenance Costs

The maximum traction truck of to-day with its improved arrangement of bolster with swing motion and center-bearing principle has come to be widely used for city service, and to meet the demand for this design the Taylor Electric Truck Company, Troy, N. Y., produced the Taylor maximum-traction double truck arranged for single motors, and providing from 65 per cent to 70 per cent tractive power on the driving wheels.

The details of this design received most careful consideration to include the latest and most up-to-date principles demanded in truck construction, and yet the important factor of simplicity has been retained throughout, especially in the brake mechanism as there are no offsets in brake levers or connection rods. The brake throughout is provided with case-hardened steel bushings and pins, and adjustment is easily and quickly made.

The easy riding qualities of the truck are not only due to the use of full elliptic springs, but to the one-piece, improved, bolster bale-hanger, the arrangement of which absolutely overcomes any side oscillation of the car body. The springs, both coil and elliptic, are manufactured at the Taylor plant, and are accurately proportioned and tested to insure the most satisfactory results in riding as well as in their qualities of endurance.

Reference to the accompanying cut shows that the pedestals are provided with improved wearing shims, and the deep-arched wrought-metal bolster and transom bars are arranged as well with easily-renewable take-up shims. The same simple means of adjustment of the truck side bearing with renewable wearing shoe is provided. As the truck is light in weight, yet carefully proportioned to sustain the maximum of overloading and frequent emergency braking strains that are common to city operation, it operates most satisfactorily with lowest maintenance costs.



MAXIMUM TRACTION TRUCK DESIGNED FOR LOW MAINTENANCE COST

Carbon-Vanadium Forging Steel

To meet the modern demand for steel of high elastic limit, the railroads have recently turned to heat-treated carbon and heat-treated alloy steels in many cases notwithstanding the lack of equipment for heat treatment in most of the railroad shops. This applies particularly to repair work, where for any reason the forging has to be locally heated, destroying thereby the effect of the heat treatment. In consequence, the American Vanadium Company has developed a type of simple carbon-vanadium steel which, without heat treatment other than annealing, equals all the requirements specified for heat-treated, plain carbon-steel forgings of like section. Furthermore, these results are obtained from steel with lower carbon than is generally used to obtain the physical requirements for heat-treated carbon-steel axles and forgings.

TESTS OF PLAIN CARBON-VANADIUM STEEL

Analysis, in per cent	Carbon	Manganese	Phosphorus	Sulphur	Vanadium
	0.47	0.90	0.012	0.020	0.15

Physical Properties:

Description	Treatment	Yield Point, lb. per sq. in.	Elastic Limit, lb. per sq. in.	Ultimate Strength, lb. per sq. in.	Elongation in 2 in., Per Cent	Reduction of Area, Per Cent
7-in. axle	Natural	71,200	68,000	123,000	16.0	30.0
7-in. axle	Annealed 1450 deg. Fahr.	56,000	52,000	90,000	24.0	50.0
7-in. axle	O. Q. 1600; T. 1160 deg. Fahr	85,000	82,000	112,500	22.0	55.0
11-in. axle	Natural	75,000	70,000	117,000	16.0	28.5
11-in. axle	Annealed 1450 deg. Fahr.	58,000	54,000	94,000	22.0	47.0
11-in. axle	O. Q. 1600; T. 1160 deg. Fahr	87,000	80,000	115,000	20.5	52.0

Through the elimination of alloys other than vanadium, the cost of this steel is only a little higher than plain carbon steel, although the strength is materially higher. This is indicated in the accompanying table, which gives results of actual tests on the new type of metal. The effect of the vanadium in this case has been to increase very greatly the elastic limit and strength of the steel without lowering the ductility.

In general it may be said that vanadium has a very strong influence chemically and physically through its combination with carbon, in retarding segregation. Vanadium steels are all remarkably responsive to heat treatment, and this simple carbon-vanadium steel is no exception. Where still higher strength is desired than can be obtained by simple annealing, results can be obtained from this simple carbon-vanadium steel that will approximate those obtained from the more expensive alloy steels.

The heat treatment recommended is to heat the forgings uniformly to about 1600 deg. Fahr. and quench in oil. In case water is preferred as a quenching medium the temperature should be about 1550 deg. Fahr. The forgings should then be drawn back or tempered by heating to a temperature between 1100 deg. and 1150 deg. Fahr.

An Original Application of Signals for City Service

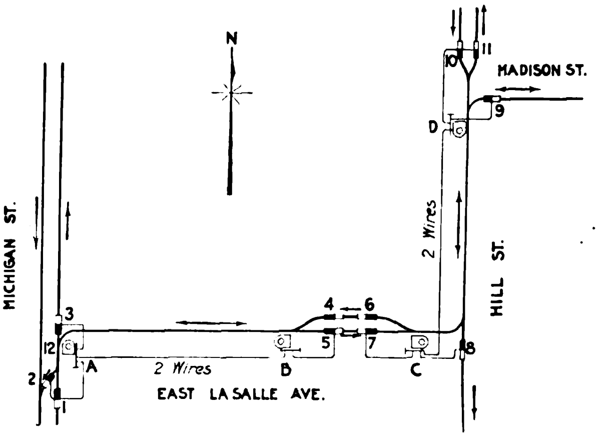
The Chicago, South Bend & Northern Indiana Railway Company has made some installations of Nachod Automatic Signals, Type CD, on its city lines in South Bend which are worthy of note as showing how the company has applied the signals to peculiar situations. There are eight signals in service, and the accompanying cut shows the layout of two blocks. Signals are located at the bases indicated for the signal poles, and the trolley contactors are installed in the overhead construction as indicated by the centers of their respective symbols.

The first single-track block extends between Michigan Street and the through-type turn-out on East La Salle Avenue. The second block extends from the other end of this turn-out to the turn-out on Hill Street just north of Madison Street. Each of them includes a turn at right angles so that the ends of the same block are not mutually visible. It may be noted by the position of the contactors that part of the first block is also traversed by the North Michigan Street cars, and part of the second by the Notre Dame Line on Hill Street. The Madison Street Line also enters the second block at Madison Street, leaving the first block on Michigan Street. Contactors 1, 2 and 3 are wired to signal A, contactors 4 and 5 to signal B, contactors 6, 7 and 8 to signal C, and contactors 9, 10 and 11 to signal D.

A car of the Madison Line passing under contactor 1, northward, sets signal B at "stop," (red light and red disk), and signal A at "permissive," (white light and white disk), and clears both these signals at contactor 5. At contactor 7 it sets signal D red and signal C white, and clears both these at contactor 9. The return trip is made under the same contactors in the opposite order, except that the car passes under contactor 2 on the cross-over on Michigan Street, instead of contactor 1. The Notre Dame cars run on Hill Street only, entering the second block at contactor 10 and leaving at contactor 8.

The contactors at signal A are so planned as to permit the northbound Michigan Street cars to operate without being interfered with by the signals. These cars do not observe signal A at all. If that signal should be neutral because no car is in its block, passage under contactor 1 would set signal A white and signal B red, but the same car continuing under contactor 3 will immediately restore both signals to their original condition. If this should be white, a following movement will be recorded by a second notch on the revolving switch, which will be stepped back again one notch by the car at contactor 3.

The control of the signals is such that even if signal A should be indicating red for the diverging route, a North Michigan car will merely count at contactor 1 without changing the signal indication, and will cancel that count at contactor 3. Contactor 3, therefore, may be regarded as a contactor to cancel the effect of running under contactor 1, which is, perforce, located on Michigan Street. It might be suggested that contactor 1 should be moved up past the switch on La Salle Street, but if such were the case a westbound car at contactor 4 might set signal A red when the first car had just left Michigan Street and would be compelled to back up on a busy double track, a very inconvenient proceeding.



ORIGINAL APPLICATION OF SIGNALS ON CHICAGO, SOUTH BEND & NORTHERN INDIANA RAILWAY

A selective method of protecting the same situation would be in combination with a Cheatham automatic switch to throw the switch-point marked 12. In this case contactor 1 would represent a Cheatham contactor. The Michigan Street car passing under contactor 1 with power off would throw switch-point for Michigan Street and the signal would not be operated. A Madison Street car, however, passing contactor 1 with power on would throw the switch-point and set signals for the diverging route on La Salle Street.

All of the signals in this installation are supported from cast-iron brackets on iron poles, and insulated from them by neat wood blocks with sunken bolt heads, the wires being run inside the pole. The wiring for wood poles is run in conduit which extends from the top of the pole to the fuse and control box located near the ground with an outlet branch at the signal. Locked fuse boxes give a manual control of the signals and also afford a convenient means of testing and disconnecting them. The trolley contactors are of the wiping type and the relay mechanism oil immersed.

Non-Splashing Track Switch

By a typographical error in the description of the non-splashing track switch on page 1084 of last week's issue, the location of the contactor employed was referred to as being on the "car" instead of on the "ear" in the overhead system. The accompanying illustrations showed the proper position of the contactor which is very simply mounted on standard ears without taking up any slack in the trolley wire.

News of Electric Railways

CHICAGO WAGE NEGOTIATIONS

Working Conditions Adjusted Satisfactorily. Question of Wages Still Being Considered

Negotiations leading to a new working agreement between the Chicago (Ill.) Surface Lines and its employees have reached the point where practically all questions regarding working conditions have been amicably settled. L. A. Busby, president of the company, in response to the demand for an increase in wages offered to readjust the existing graduated scale so as to reduce the difference between the maximum and minimum. Under the present contract the minimum wage is 23 cents and the maximum, after six years' service, is 32 cents. The new offer of Mr. Busby provides a 25-cent minimum with the existing maximum for the first year, a 25½-cent minimum for the second year and a 26-cent minimum for the third year, but no increase in the maximum. The company's records show that approximately 60 per cent of the trainmen receive the maximum wage. The employees requested a 33-cent minimum and 36-cent maximum, the maximum to be received after the first year of service.

Final answer by the representatives of the employees was delayed, however, awaiting the decision of Britton I. Budd, president of the elevated railroads of Chicago. These negotiations, like those for the surface lines, have resulted in disposing of the working conditions without difficulty, but the wage question is yet to be considered.

Mr. Busby wrote a letter to the employees in explanation of the company's position. Regarding the new working conditions he said that in 1912 the percentage of week-day straight runs was fixed at 27½ per cent and the new agreement provides for 40 per cent. In the old agreement the percentage of runs under fourteen hours was 62 per cent and the new agreement provides that 80 per cent of all week-day runs shall be completed within fourteen hours. In the 1912 agreement 14 per cent of all runs were more than sixteen hours, while all runs have now been brought within the sixteen-hour period. In the old contract the average time allowed for fallbacks was twenty minutes. The new agreement increases this allowance to twenty-five minutes. In addition the men have an allowance of thirty minutes for reliefs on the streets for meals.

Regarding wages the letter states that the management has acted not as individuals but as trustees. The last agreement was reached through arbitration. As a result the highest wage scale paid in any large city in the United States east of the Rocky Mountains was put into effect. To substantiate this a table showing the maximum wages paid in all the important cities was presented. Mr. Busby said that he did not believe it would be seriously contended that it cost more to live in Chicago than it does in New York, Boston or Philadelphia. On the other hand, the companies under the unification ordinance carried additional burdens in the shape of a universal 5-cent fare as against a 10-cent fare in some districts, and a universal transfer in lieu of cash fares formerly received in certain districts. This meant a loss in 1914 of not less than $3,000 a day. Superimposed upon this, the increase in the gross earnings, which was approximately 6 per cent, succeeded in reducing the deficit to about $500,000 in 1914. For the first four months of the current year the gross receipts showed a falling off of approximately $200,000 as compared with the same period last year. In 1913 the average receipts per car hour were $2.56, while the average receipts of 1914 per car hour were $2.50. Mr. Busby closed his letter as follows:

"In submitting this proposition we wish you to understand that our offer in our judgment is in nowise warranted by the existing financial and traffic conditions in this city, or by reason of any expected improvement in these conditions in the near future. We have, however, endeavored to meet a very difficult situation in the spirit of the utmost fairness and in the hope that some time during the life of the agreement such improvement in existing conditions may come about as to afford some excuse or warrant for the offer we are now making. . . . If, however, the proposition is not satisfactory we hereby offer to submit every question upon which we are not agreed to a board of arbitration."

On June 10 the surface and elevated railway employees refused the offer of the companies for increased wage and improved working conditions and also refused to submit to arbitration, stating that the experience of three years ago had proved that they would fail to secure their demands. Both Mr. Budd and Mr. Busby offer to arbitrate the differences. Mayor Thompson also urged arbitration. The ultimatum of the employees called for a strike at the close of all runs on June 11, but early on that day the strike order was temporarily revoked largely through the efforts of the Mayor. Adverse public opinion and failure to obtain the support of the press also influenced the last-hour truce. W. D. Mahon of the Amalgamated Association arrived in Chicago on June 11 to confer with the Mayor on the terms of arbitration.

HOPEFUL OUTLOOK IN DES MOINES

Mayor Hanna and other city officials are hopeful of an early settlement of the street railway franchise question in Des Moines. The ruling of the State Supreme Court gives until June 22, 1915, for the securing of a franchise by the Des Moines City Railway. A committee of the Des Moines Chamber of Commerce has been working with the City Council and representatives of the company for a settlement and an agreement practically has been reached. The capitalization of the company probably will be fixed at $5,000,000 as contended for by the company, but there may be concessions as to fares. Under the proposed plan of settlement there will be a board of directors composed of business men of the city, with Emil G. Schmidt, president of the company, as chairman. Provision is made for the purchase of the company's property by the city if desired. The proposed ordinance will be submitted to a vote of the people as soon as the terms have been agreed upon by the company and the Council. If the franchise is granted at an early date an end will be put to court proceedings now in progress to protect the rights of bondholders of the company under the present situation, in which the company is operating without legal status, according to the ruling of the State Supreme Court. Three members of the City Council, enough to control, favor a speedy settlement of the controversy, and it is coming to be generally recognized that the industrial and commercial prosperity of the city is threatened because the company is held back from making necessary improvements and repairs on account of financial difficulties into which it has been plunged through its inability to negotiate a franchise with the governing body of the city.

CLEVELAND CHARGES DISMISSED

The Cleveland (Ohio) Railway and Peter Witt, street railway commissioner, were acquitted of the charges of favoritism in awarding contracts for construction work in the report of the special committee of the Council filed with that body on June 1. The committee made a thorough investigation of the charge of Roderick D. Grant that he had been offered $12,000 to withdraw his bid on the Harvard Avenue carhouse a year go. Representatives of the company accused claimed that the offer was for the purchase of the contract and that nothing was said in regard to withdrawing it. The report reads in part as follows:

"The weight of evidence seemed to be that the $12,000 was not a bribe, but was an offer to purchase the contract of a competitor. The contract was awarded to the lowest bidder at a fair price. The charge that the street railway commissioner allowed excessive expenditures by the company is entirely without foundation. The office of the street railway commissioner is equipped to check the expenditures of the company and does fully check them."

The report was adopted by a vote of twenty to six.

The Ohio Supreme Court granted a temporary injunction on June 3, restraining the Cleveland Railway from building tracks on Euclid Avenue between East Twenty-second and East Fortieth Streets. The company was placed under a bond of $500 for the faithful observance of the order until

June 30, when the Court will hear the case on its merits. Frank Billings and fifty-six other residents of this section of the street, known as Millionaires' Row, brought the suit and lost in both the Common Pleas and Appellate Courts.

LOS ANGELES TRANSIT PROBLEMS

Definite plans for solution of the transportation problems in Los Angeles, Cal., are outlined in a report which has been drafted by F. D. Howell, chief engineer for the transportation division of the Public Utilities Board of that city. The report will come before the Utilities Board at an early meeting, and then go to the City Council to be adopted formally and officially as the policy of the city. In general, the report presents three special features that are demanding attention. The first is the rerouting of cars to relieve congestion in the business districts. The second is further improvement of the city's subways, and the third is the entire elimination of grade crossings. All these three subjects, the report says, are interdependent. On the subject of interurban traffic, the report suggests that the electric interurban lines should be required either to elevate or depress their tracks from the city limits, the method being according to the topography and condition of the territory traversed. These tracks should lead to an elevated terminal or a subway loop without terminal. The street railway problem, the report says, is made serious because of the obstructions caused by surface interurban cars and grade crossings that must be flagged. In the business district the plan is to try rerouting, and if this does not relieve congestion the report favors subways in the shopping district.

THE KANSAS FLOODS

The Metropolitan Street Railway, Kansas City, Mo., and most of the interurbans operating into that city, were discommoded by the recent heavy rainfall. There was almost a cloudburst on May 26. Turkey Creek overflowed and the Southwest boulevard district was flooded. The water lacked fully 10 ft. of reaching last September's altitude, but it came within 50 ft. of the Metropolitan Street Railway's carhouse. The company moved its cars, and later moved its office equipment, desks and chairs in a mail car to a dead track on Eleventh Street, between Wyandotte and Broadway. From these temporary headquarters the division was conducted for three days. No damage was done to the carhouse or the equipment of the company. Cars were run on both sides of the flooded part of the street and passengers were transferred by wagon.

The flooding of the rivers caused little or no damage to the interurbans, other than washing mud and debris on the tracks. The Leavenworth line lost two trips through this cause. The Bonner Springs line lost a full half day on May 26, and service was irregular until Monday morning. The most serious damage in connection with this line was to the new work on the extension toward Lawrence. The completion of the extensions will not be seriously delayed, however, as no tracks had yet been laid.

Along the Kansas City, Clay County & St. Joseph Railroad there was one stretch of about a mile through a deep cut that had several bad washes, with mud from 2 ft. to 3 ft. deep on the tracks. A new ditch digger just equipped for service by the company plunged into the mess, and by Monday morning the track was comparatively clear.

On the Excelsior Springs division of this line, about 1200 ft., the tracks run between banks 20 ft. high. Mud covered the tracks nearly throughout the cut to a depth of 4 ft., being constantly replenished as shoveled away, from the high banks. Finally J. R. Harrigan, general manager, ordered two nose plows to be hooked onto the front ends of express cars and made to shove mud. They cleared the track.

The Kansas City, Lawrence & Topeka Railroad was held up in Rosedale, where the Southwest boulevard was flooded. The Missouri & Kansas Interurban Railway had little trouble.

Chicago Home Rule Defeated.—The measure to give Chicago home rule and grant to all cities in the State with a population of more than 2000 the option of regulating their own utilities was defeated in the Illinois Legislature.

Omaha Valuation Requested.—The State Railway Commission of Nebraska has received a request from Omaha for a physical valuation of the Omaha & Council Bluffs Street Railway for use in the Federal court in the suit to require the company to establish fares at the rate of seven for a quarter.

Pennsylvania Starting Postponed. — Owing to the fact that it was impossible to complete the electrification of the Pennsylvania Railroad's line between Philadelphia and Paoli in time, the inauguration of service by electricity, scheduled to take place on June 1, was postponed by the officials of the road for a few weeks.

Demands of Providence Employees.—The employees of the Rhode Island Company, Providence, R. I., who are organized as a division of the Amalgamated Association, have requested that the agreement with the company, which is about to expire, be modified so as to provide for an increase of approximately 20 per cent in wages, a closed shop and a minimum guaranteed day of seven hours.

Washington Valuations.—The State Tax Commission, of Washington as a basis for the levying of taxes this fall, to be collected next year, recently fixed the valuations of the street railway and interurban holdings in the State, as well as the steam lines, at $395,107,312, an increase of $3,738,705 over the valuations last year. The electric lines have a total actual valuation of $49,066,455 against $49,211,280 a year ago.

Demand Municipal Line Be Run for Profit.—An editorial on the municipal railway in San Francisco which appeared in the San Francisco *Chronicle* of May 30 was concluded as follows: "At any rate, now that we have a municipal system, it should be run on business principles, for a profit. The talk about running public services for the 'general welfare' is rot. It means compelling one set of people to pay part of the transportation expenses of another set of people."

Compromise of St. Louis Suit Suggested.—A resolution introduced by Alderman Wyrick authorizing the public utilities committee of the Council of St. Louis, Mo., to confer with officials of the United Railways in an effort to compromise the mill tax cases has been adopted by the Board of Aldermen by a vote of twenty-four to three. The mill tax cases have been pending in the courts about nine years, and the accumulated mill tax due to the city now amounts to about $2,500,000.

Dallas Investigation.—The annual city budget of Dallas, Tex., contains an appropriation of $10,000 to cover an investigation of public service corporations as pledged by the platform of the present administration. Commenting upon the order, Charles F. Wallace, directing head of the local Stone & Webster interests, said: "The plan which has been adopted by the commission is the only sound one. We welcome the investigation, feeling that it will have the effect of establishing closer and better relations between the community and ourselves."

The New Cleveland Subway Line.—O. C. Barber, head of the Cleveland, Akron & Canton Terminal Railway, addressed the City Council at Cleveland, Ohio, on June 1, and endeavored to have the members take a more liberal view of the plans that have been made for an electric freight subway under East Fifty-fifth Street than they have heretofore displayed. Councilman Bernstein endeavored to secure an estimate of the cost of the subway. Attorney W. W. White for the company replied that it would be impossible at this time to give him exact figures, but that the cost would be about $15,000,000.

Appointments to the West Virginia Commission.—Elliott Northcott, Huntington; William M. O. Dawson, Charleston, and Judge E. F. Morgan, Fairmont, were appointed members of the Public Service Commission of West Virginia by Governor Hatfield on June 6. Mr. Dawson is a former Governor of the State and has held many state offices during his career. Mr. Northcott is a close personal and political friend of Mr. Dawson and held the post of minister to Venezuela under President Taft. Judge Morgan is well known in his section of the State, but has not been engaged in state-wide politics to the extent the other two members have.

Detroit Purchase Negotiations. — James Couzens, chairman of the Detroit board of street railway commissioners, announced in the newspapers that negotiations with the Detroit (Mich.) United Railway for the purchase by the city of the company's property within the one-fare zone had reached the point where it was likely that submission of the proposition to the electors could take place in August or September. Mr. Couzens stated that there were a few matters to be ironed out by the attorneys, but that he expected the contract between the city and the company would be completed in time for submission to the stockholders of the company on June 16. The present plan of municipalization provides for the fixing of the purchase price by the circuit court of Wayne County.

Suggestions Regarding Municipal Ownership in Toronto.—Mayor Church of Toronto, Ont., on May 31 made public a letter of Corporation Counsel Geary in reference to the taking over by the city of the Mimico and the Scarboro radial lines of the Toronto & York Radial Railway within the city limits. It confirms the report that the company would apply for running rights over the lines purchased by the city. Mr. Geary said in part: "This application should be disposed of at once. There should be no discontinuance of the traffic on purchase by the city. I would suggest, therefore, that the city determine its policy with regard to the two sections of radial line as to through traffic and as to local traffic. As to the remuneration to be paid by the company for running rights, the commissioner of works should be asked to consider this question."

Pennsylvania Compensation and Other Measures Signed.—On June 7 Governor Brumbaugh of Pennsylvania signed the six bills, effective on Jan. 1, 1916, which provide a complete system of compensation and State insurance. Shortly before signing these bills the Governor approved the Senate bills bringing the 600,000 coal miners of the State under the compensation system. This disposes of all compensation legislation save the resolution for a constitutional amendment making acceptance of the compensation laws mandatory instead of elective on the part of employers. This resolution, which must pass the next Legislature before it can go to the people, is in the hands of the Secretary of the Commonwealth. On the same day the Governor also signed the bills changing the periods of reporting by corporations, and other bodies subject to State tax, except banks, savings institutions, title insurance, trust companies, building and loan associations and foreign insurance companies. Under the new laws these reports are to be made for the calendar year instead of a year ending early in November. Provision is also made for enforcement of reporting. The Governor also signed the act enabling the Public Service Commission to name examiners to take testimony anywhere in the State and thus save complainants the expense of coming to the State capital. It also allows appeals direct to the Superior Court, instead of first passing through the Dauphin County Court.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railway Association

The summer meeting of the Illinois Electric Railway Association will be held on June 25. Arrangements have been made for a trip from Chicago to Milwaukee on the *S. S. Christopher Columbus* of the Goodrich Lines, returning by way of the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad. The steamer is scheduled to leave Chicago at 9:30 a. m. and arrive at Milwaukee at 2:30 p. m. Dinner will be served on the boat. The expense of the trip is $1.75 for each person. This is to be a get-together meeting. Members are urged to bring their friends with them. The only formal business will be the presentation of the reports of the engineering committee on the questions submitted to the members at the March meeting.

New York Electric Railway Association

As previously announced in the ELECTRIC RAILWAY JOURNAL the thirty-third annual meeting of the New York Electric Railway Association will be held at the Oriental Hotel, Manhattan Beach, N. Y., on Tuesday and Wednesday, June 29 and 30. The annual banquet is scheduled for eight o'clock on Tuesday evening, June 29, at which time several distinguished speakers will deliver addresses.

There will be business sessions, morning and afternoon, Tuesday, June 29, and a morning session on Wednesday, June 30. The subjects of the papers to be presented for general discussion are as follows:

"The Proper Type of Car for City and Suburban Service."

"What Can We Give for a Nickel?"

"The Protection of Interurban Railway Highway Crossings."

"Jitney-Bus Competition."

In addition to the above-named subjects the following general questions will also be introduced for discussion:

1. What success have you had in arc-welding manganese and other special work repairs?
2. To what extent do you use hardened steel pins and bushings in brake rigging?
3. How often do you change your "Safety First" posters and other announcements to keep alive the interest of public and employees?
4. What is your experience as to the relative merits and fields of different classes of railway special work? Do you base your opinion on the number of wheels which pass over the work, the angularity of the crossing, the character of the foundation, etc.?
5. Is there any way of testing the contactor coils on type M control without tearing them down?
6. What is your experience with fittings for concrete poles?
7. What, in your experience, is the limiting car speed for which overhead contact signal systems are reliable?

Applications for hotel accommodations should be made to Joseph P. Greaves, manager, Oriental Hotel.

Pacific Claim Agents' Association

The seventh annual convention of the Pacific Claim Agents' Association will be held at San Francisco, Cal., on June 24, 25 and 26. Discussion of the following subjects will be presented in the form of papers, the name given in connection with each being that of the person to whom President A. M. Lee has assigned the same:

Collisions—
  "The Prevention of Automobile Accidents," by S. A. Bishop, general claim agent of the Pacific Electric Railway.
  "Investigating and Handling of Automobile Accidents," by J. S. Mills, assistant superintendent of the Key Route, Oakland, Cal., and H. H. Benton, district claim agent of the Northern Pacific, Seattle.
  "Investigating and Handling of Collisions with Pedestrians and with Vehicles Other Than Automobiles," by Thomas G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash., and W. H. Moore, claim agent of the San Diego (Cal.) Electric Railway.
Medical Department—How Organized and Managed to Be Most Effective:
  To the Employees, by H. K. Relf, general claim agent of the Spokane, Portland & Seattle Railway, Portland, Ore.
  To the Claim Department, by George Carson, general claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and J. H. Handlon, claim agent of the United Railroads, San Francisco, Cal.
  In Litigated Cases, by A. J. Falknor, trial attorney of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and F. J. Lonergan, trial attorney of the Portland Railway, Light & Power Company.
Employment Bureau—
  "How to Make It Most Effective," by H. G. Winsor, claim agent of the Tacoma Railway & Power Company.
  "To What Extent and How Should the Claim Department Be Consulted?" by Mrs. Ida P. Newell, assistant claim agent of the Portland Railway, Light & Power Company.
  "The Investigator and His Work," by C. F. Young, adjuster of the Puget Sound Traction, Light & Power Company.
  "The Adjuster and His Work," by W. F. Every, general claim agent of the Northern Pacific Railway, St. Paul, and Thomas A. Cole, of the Los Angeles (Cal.) Railway.
Safety Committee Program—
  "Mandatory Rules and Their Results in Accident Prevention," by F. M. Metcalfe, superintendent of efficiency of the Northern Pacific Railway, St. Paul, Minn.
  "Organization of Public Safety Committees and Their Co-operation with Transportation Companies," by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company.

Details of the entertainments remain to be arranged.

Financial and Corporate

ANNUAL REPORT

International Traction Company

The comparative statement of income, profit and loss of the International Traction Company System, Buffalo, N. Y., for the years ended Dec. 31, 1913 and 1914, may be shown as follows:

	1914	1913
Earnings:		
Gross passenger earnings	$6,492,212	$6,404,101
Receipts from other sources	268,368	290,341
Total	$6,760,580	$6,694,442
Expenses:		
Operating expenses	$3,601,800	$3,698,059
Taxes	423,632	392,613
Total	$4,025,432	$4,090,672
Net earnings from operation	$2,735,148	$2,603,770
Fixed charges:		
Interest	$1,645,401	$1,572,737
Rentals	45,379	32,185
Sinking fund and amortization of debt discount and expense	132,601	129,803
Total	$1,823,381	$1,734,725
Balance for renewals, replacements and dividends	$ 911,767	$ 869,045
Renewals and replacements reserve	359,244	204,000
Surplus	$ 552,523	$ 665,045

The gross earnings of the system for 1914 were $6,760,580, an increase of $66,137 over the previous year, or approximately 1 per cent. The small increase in gross earnings was due to the business depression during the year. The actual operating expenses and taxes for 1914 were $4,025,432, or $65,240 less than the previous year. The actual maintenance expenses were $103,347 less than the previous year, while the balance of the operating expenses increased $7,088, making a net saving in operating expenses of $96,259.

The taxes for 1914 exceeded 1913 by $31,019, which was due to an increase in tax rates of the various municipalities, the assessments being maintained about the same as for 1913. The fixed charges for 1914 were $1,823,380, or an increase of $88,656 over the previous year. This was caused by the interest accrued on additional bonds and mortgages issued for improvements and acquisition of additional property and also by an increase of rental and amortization charges.

The balance remaining for renewals, replacements and dividends was $42,722 more than in 1913. The renewals and replacements reserve shows an increase of $155,244, which was due to the above-mentioned reduction in the actual maintenance expenditures, plus an additional allowance in respect to maintenance and depreciation amounting to $51,897.

MR. HEULINGS ON TRADE CONDITIONS

W. H. Heulings, Jr., vice-president J. G. Brill Company, Philadelphia, testified before the Federal Trade Commission in New York on June 3, in regard to the desirability of legalizing combinations among American business men on foreign trade matters. Mr. Heulings said that the Brill company competes with all American builders and with those of France, England and Germany. The foreign business of the company has been increasing regularly and now comprises about one-third of its total. As a rule, when domestic business is poor, foreign business is better. The company feels the need of an adequate merchant marine so that it may have good shipping facilities to foreign ports for its products.

Mr. Heulings said he had a very keen desire to see something done that will promote a merchant marine and thinks that a subsidy or some other similar means should be adopted. He does not feel that his company needs cooperation in order to secure foreign business, but it would be a decided advantage. Being directly at the seaboard, it is situated more conveniently for shipping facilities than other concerns located in inland states. The company has a few agencies in foreign countries, but most of its business is done directly by its personal representatives. Mr. Heulings said that in most cases when the company sells cars to foreign buyers, it receives payment in New York. It is not difficult for a foreign corporation of good standing to get credit in New York. The company has not had to extend credit in order to get business. Where it had long standing business relations with buyers, as in the case of the companies directed by the late F. S. Pearson, it had given credit.

In answer to an inquiry from one of the commissioners, Mr. Heulings said that if export combinations should be made legal there would be no difficulty about keeping foreign business separate from domestic trade. It had been his experience that in new foreign enterprises where German capital was used German apparatus was almost always bought. It is not so likely to be the case, if British or French capital is employed, that British or French apparatus is used.

Mr. Heulings thought that many companies in various and diversified lines of business in this country would profit greatly by combinations which would enable them to meet foreign competition on equal ground. The establishment of branch banks in South America is a decided forward step in the interest of manufacturers of this country.

SAN FRANCISCO-OAKLAND STATUS

Board of Directors Issues Statement Showing Why Fundamental Readjustment Is Desirable

The board of directors of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has issued to security holders a general statement of financial conditions, setting forth various reasons why a fundamental readjustment of the present organization is essential. The outstanding obligations on which interest must be paid, sinking funds maintained and payment of principal provided for amount to $20,724,000, upon which the annual interest totals $1,133,646. The sinking fund requirements are becoming especially burdensome. In 1910 they amounted to only $30,150, but by 1917 they will reach $723,125. Other demands have been such that the company has been unable to meet the instalments of its various bond sinking funds maturing since Jan. 1, 1914. These payments are, therefore, now in default, and there is no prospect that this default can be made up out of earnings or that the heavy requirements of future years can be provided therefrom.

The road has suffered a decrease of approximately $125,000 in earnings from the middle of last December to the present time on account of jitney-bus competition. The present management has effected economies in practically all departments of operating expense, except labor and taxes. By reason, however, of the loss from jitney-bus competition and the general business depression during the last half of 1914, gross and net earnings for the current fiscal year show a considerable decline as compared with the three preceding years. The net income will not be sufficient to pay interest charges and sinking fund requirements, disregarding entirely requirements for necessary capital expenditures.

In spite of the fact that the assets of the company exceed its outstanding debt by a considerable margin, it is stated that the values existing in the company's securities can be protected only by the correction of all of the following conditions:

(1) It is impossible for the company to make the sinking fund payments required by the several deeds of trust. These deeds of trust provide no method for modifying the requirements and relief can therefore be obtained only by the unanimous consent of the bondholders of all issues, or the issuance of new bonds to take the place of those now outstanding.

(2) It is absolutely essential for this corporation, as it is for every public utility, to be able to raise capital for necessary betterments and extensions. This is impossible under the present financial structure of the company. Its bond issues are so numerous and so involved and its existing defaults so serious that it is not able to sell new bonds, nor is it able otherwise to borrow money, except by way of accommodation and under the most urgent circumstances.

(3) The company is obligated to pay $3,600,000 of notes,

which are now approximately two years overdue. Irrespective of any indulgence which may be offered by the noteholders it is imperative, from the company's standpoint, that these obligations be paid in order to save the securities which are pledged to secure the same, and re-establish the credit of the company.

(4) The $1,121,000 of bonds of the Oakland Transit first mortgage issue will mature on July 7, 1918, and their payment must therefore shortly be provided for.

(5) The present financial condition of the company greatly hampers the economical operation of its property.

For the above it is concluded that "such a fundamental readjustment of the financial structure of the company as will put it on a permanently sound basis would appear to be to the interest of all security holders."

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The Barcelona Traction, Light & Power Company is offering at 96 £900,000 of prior lien bonds, series A, of which one-half will be placed privately in the United Kingdom and the other half elsewhere. These bonds are part of an authorized issue of £2,000,000, to be used for completing the works and funding the interest on bonds as well as on various advances.

Camaguey (Cuba) Company, Ltd.—The stockholders of the Camaguey Company, Ltd., are to vote on June 22 in regard to an offer from the Electric Bond & Share Company to purchase the property for $500,000, subject to outstanding bonds. The Cuban company has $1,000,000 of capital stock and $570,173 of first mortgage 5 per cent bonds.

Charleston (W. Va.) Interurban Railroad.—Robert Garrett & Sons and the Fidelity Trust Company, Baltimore, are placing at 99½ and interest $450,000 of three-year 6 per cent collateral trust gold notes of the Charleston Interurban Railroad, dated May 1, 1915. The authorized issue is $750,000. The notes are being issued to retire the floating debt contracted in building the interurban line to St. Albans and to construct a 24-mile extension to Montgomery.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—The reorganization committee of the Chicago & Milwaukee Electric Railway is now said to be at work on plans to take the company out of the receivership which has existed since January, 1908. The plans are contingent on the raising of $5,000,000 in cash to clear up all obligations of the company. This sum would be used as follows: To clear up underlying first mortgage bonds, $1,080,000; to retire receivers' certificates, $1,200,000; for other liens, $500,000; for new construction and rehabilitation, $1,500,000, and for reorganization and miscellaneous, $720,000. It is reported that the committee is now negotiating with Chicago and New York bankers for the sale of first mortgage 5 per cent bonds of the new company to raise this cash.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—Representatives of the consolidated bondholders of the Columbus, Delaware & Marion Railway have objected to the application of the receiver of the company to issue $150,000 of receivers' certificates to pay $55,000 of back obligations of the receiver, $13,500 of back salary and $40,000 of bond interest, due Aug. 1. It is declared that the road should be permitted to default the August interest and thus clear the way for a foreclosure and reorganization. Other bondholders have asked the court to authorize the payment of the interest. Previous reference to this situation was made in the ELECTRIC RAILWAY JOURNAL of May 1.

Fresno (Cal.) Interurban Railway.—The California Railroad Commission has authorized the Fresno Interurban Railway to issue 250 shares of capital stock and $70,000 of first mortgage bonds. The order provides that the company may sell the stock at not less than 80 and its bonds at not less than 90. The company proposes to construct extensions and purchase new equipment with the proceeds. The application for these issues was noted in the ELECTRIC RAILWAY JOURNAL of May 15.

Interborough Consolidated Corporation, New York, N. Y.—The directors of the Interborough Consolidated Corporation, the company formed by the consolidation of the Interborough-Metropolitan Company and the Finance & Holding Corporation, as noted in the ELECTRIC RAILWAY JOURNAL of June 5, are the same as those of the Interborough-Metropolitan Company with the exception of George W. Young, who has been succeeded by F. P. Frazier. The new directors have organized by electing the same officers as those of the Interborough-Metropolitan Company. August Belmont is chairman of the board of the new company, T. P. Shonts, president, H. M. Fisher, secretary, and J. H. Campbell, treasurer. It is expected that the directors will meet shortly to complete organization details, and it is considered likely that an initial dividend will then be declared upon the preferred stock. The new stock certificates are now being engraved. As soon as they are ready, the company will announce the details of exchange to the old certificate holders.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—E. W. Clark & Company, Philadelphia, and Ludwell L. Howison, Portland, have sold at 97¼ and interest $614,000 of three-year 5 per cent second gold coupon notes, series C, of the Lewiston, Augusta & Waterville Street Railway. The authorized issue is $750,000, the remainder of the notes being reserved for future use. The present issue was used to refund $500,000 of 5 per cent two-year notes due on June 1 and for other purposes. The new notes are guaranteed by the Cumberland County Power & Light Company and are secured by a deposit of $853,000 of first and refunding mortgage 5 per cent bonds of the railway.

Manchester Traction, Light & Power Company, Manchester, N. Y.—The New Hampshire Public Service Commission has authorized the Manchester Traction, Light & Power Company to issue $1,000,000 of three-year 5 per cent notes at not less than 95. The proceeds of the notes will be used to retire floating indebtedness and to provide for new construction to plant. Tucker, Anthony & Company, Boston, have already sold the issue at 97½.

New York (N. Y.) Railways.—Frank L. Hall, Charles P. Howland and George B. Leighton have been asked by holders of New York Railways adjustment mortgage 5 per cent income bonds, owning and representing more than $6,000,000 thereof, to consider the advisability of continuing the litigation against the company for the unpaid interest on such bonds. In a circular to bondholders the committee says that it is of the opinion that the litigation should be vigorously pressed and a judicial decision obtained as to the manner of determining income applicable to bond interest which will insure future payment of the full 5 per cent. The amount of unpaid interest involved in the litigation to date is said to be upwards of $1,500,000. The committee states that its preliminary investigation of condition of the New York Railways should be reassuring to holders of adjustment bonds, for the company is in a strong financial condition with large cash reserves.

Northern Ohio Traction & Light Company, Akron, Ohio.—Hayden, Miller & Company, Cleveland, have purchased a new issue of $500,000 one to five-year 6 per cent collateral trust notes of the Northern Ohio Traction & Light Company, subject to the approval of the Ohio Public Utilities Commission. They will be offered shortly at par and interest according to plans generally understood now. The collateral underlying the issue includes that deposited under a former issue, which has been greatly reduced by maturity. This issue of notes will cover fairly well the floating debt of the company.

People's Railway, Wilmington, Del.—The price paid for the purchase of the People's Railway by the Wilmington & Philadelphia Traction Company, as announced in the ELECTRIC RAILWAY JOURNAL of June 5, has not been made public, but the consideration is said to have been a substantial block of the latter company's stock. T. W. Wilson, vice-president and general manager of the purchasing line, says: "As soon as the proper consents can be obtained from the public authorities for the necessary track connections between the two systems, important changes will be made in the routing and headway of the various lines, and transfers, under proper regulation, will be given between the lines of the People's Railway and the lines of the Wilmington City Railway to persons paying the full fare. The conductors and motormen of the People's Railway will also be materially benefited, for the Wilmington & Philadelphia Traction Company schedule of carmen's wages will be in force on both systems. This will mean an increase of about 3 or 4 cents per hour for the People's Railway carmen." The general offices of the People's Railway will be transferred from Wilmington to the offices of the Wilmington & Philadelphia Traction Company at 603 Market Street, Philadelphia.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has sold through a syndicate headed by Ladenburg, Thalman & Company $2,000,000 of one-year 5 per cent notes, due on May 15, 1916, the proceeds of which are to be used for general corporate purposes. S. D. Carson has been elected a director to succeed M. H. Furland, resigned.

Trenton, Lakewood & Seacoast Railroad, Trenton, N. J.—The Board of Public Utility Commissioners of New Jersey has authorized the Trenton, Lakewood & Seacoast Railroad to issue $190,000 of bonds to be sold at 80, upon condition that stock to the amount of $85,000 be subscribed and paid for at par. These amounts were deemed by the commission adequate to cover the acquisition of land not included in contracts for rights-of-way heretofore capitalized. The total application was for $200,000 of stock and $320,000 of bonds. Decision was reserved as to the balance.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has sent out notices to its second preferred stockholders advising them that they are entitled to exchange their present holdings of second preferred 3 per cent cumulative stock for either first preferred 6 per cent cumulative stock or common stock of the company, par for par. This privilege takes effect on June 15, and extends for sixty days.

Dividends Declared

Boston & Worcester Electric Companies, Boston, Mass., $1, preferred.

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, preferred.

Eastern Power & Light Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

Indianapolis (Ind.) Street Railway, 3 per cent.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-fourths of 1 per cent, second preferred.

Virginia Railway & Power Company, Richmond, Va., 3 per cent, preferred.

West End Street Railway, Boston, Mass., quarterly, $2, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$60,618	*$31,101	$29,517	$17,620	$11,987
1 " "	'14	56,594	*25,931	30,663	17,541	13,122
12 " "	'15	787,177	*378,258	408,919	209,792	199,127
12 " "	'14	775,456	*352,822	422,634	208,192	214,442

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$87,745	*$58,533	$29,212	$29,291	†$79
1 " "	'14	90,429	*57,600	32,829	27,597	5,232
12 " "	'15	1,049,582	*705,016	344,566	346,193	†1,627
12 " "	'14	1,200,748	*717,501	483,247	311,573	171,674

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$96,217	*$68,087	$28,130	$27,590	‡$780
1 " "	'14	99,627	*65,412	34,215	27,339	6,875
4 " "	'15	369,082	*258,101	110,981	109,821	‡1,400
4 " "	'14	373,925	*258,639	115,286	108,989	6,297

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$247,363	*$151,840	$95,523	$39,211	$56,312
1 " "	'14	248,748	*154,085	94,663	41,200	53,463
12 " "	'15	3,074,166	*1,861,754	1,212,412	473,827	738,585
12 " "	'14	3,040,893	*1,961,849	1,079,044	487,239	591,805

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr.,	'15	$1,093,746	*$585,894	$507,852	$359,203	$148,649
1 " "	'14	1,108,399	*588,555	519,844	343,170	176,674
12 " "	'15	14,016,905	*7,521,252	6,495,653	4,277,796	2,217,857
12 " "	'14	13,882,485	*7,712,405	6,170,080	3,966,730	2,203,350

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

Regulatory Ordinances Passed in Schenectady, Peoria, Des Moines and Portland, Ore. Action on Pennsylvania State Measures

Under the provisions of the amendment to the transportation corporation law the city of Schenectady has passed an ordinance to regulate the jitney. No person is to engage in the business of carrying passengers for hire in automobiles at a rate of fare of 15 cents or less for each passenger except as provided in the ordinance. Persons who desire to obtain licenses must deliver to the commissioner of public safety an application containing full information about their car or cars and file a map showing a route at least 3 miles in extent for the round trip, and a schedule which must be continuous for at least sixteen hours per day for at least six days a week. Together with such application there must be delivered to the commissioner a bond in the penal sum of as many times $1,000 as the number of passengers each car is designer to carry, exclusive of the driver. In no event is the sum to be less than $5,000. The commissioner of public safety is empowered to direct that the automobiles be presented at a place designated by him for inspection. If the commissioner is satisfied that the automobile is in safe condition, and that the route proposed is not supplied with adequate transportation facilities, and that the schedule and bond are satisfactory, the commissioner is authorized to issue a license authorizing the carrying of passengers for hire in the automobile designated in the application. In lieu of the bond the commissioner may accept a policy of insurance issued by a corporation satisfactory to the commissioner and binding such corporations in the same manner as prescribed for the direct bond from the owner. There must be paid to the commissioner of public safety for every public automobile license issued under the ordinance, a license fee equal to as many times $5 as the number of passengers, exclusive of the driver. In no case, however, is this fee to be less than $25. It is made unlawful for anyone to transport passengers for hire in Schenectady except over the routes set forth in the application pursuant to which the public automobile license was issued. The ordinance does not apply to or govern any automobile let for hire from a livery stable or garage. Any license under the ordinance may be revoked or suspended for failure to operate the automobile in accordance with the schedule set forth in the application. Conviction for violation of any of the provisions of the ordinance is punishable by a fine of not exceeding $150 or imprisonment for one day for each dollar of such fine as is not paid. The measure goes into effect immediately.

Assistant Corporation Counsel Benjamin B. Cunningham, of Rochester, N. Y., has drafted an opinion on the legality of the jitney in Rochester, in which he holds that the licenses which have been issued by the city give the jitneys the legal right to operate there until Jan. 1. He bases his opinion on the alleged failure of the Thompson bill to provide any retroactive clause. He says that there is nothing in the Thompson statute to indicate that it has a retroactive effect or is intended to invalidate acts done under laws in existence previous to its enactment. No doubt is expressed by Mr. Cunningham that the licenses granted by the city are revocable, but he holds that while they are in force they give the holder the right to operate in the streets.

Governor Brumbaugh of Pennsylvania has vetoed the bill to permit electric railways to operate motor buses in opposition to jitneys. He said: "This bill destroys competition. It makes for monopoly. The jitney service is too young and too uncertain to warrant such legislative treatment. Better allow each community to work out this new problem in its own way until experience shows the way to state-wide regulation." The Governor has, however, signed the so-called Patten jitney measure. The bill says: "Each city may regulate the transportation by motor vehicles (not operated on tracks) of passengers or property for pay within the limits of the city or from points in the city to points beyond the limits of the city. In such regulation the city may impose reasonable license fees, make regulations for the operation of vehicles, the rates to be charged for transportation, and may designate certain streets upon which such vehicles, if operated, must be operated."

The first real test of the legal standing of the jitney in Pennsylvania has begun before the Public Service Commission, which heard the application of the Jitney Service Company to carry passengers and freight in and about Wiliamsport. The company desires a charter, and it was opposed by the Williamsport Passenger Railway, the Vallamont Traction Company, the South Side Passenger Railway and the East Side Passenger Railway. N. M. Edwards, representing the jitney company, said about a thousand persons petitioned for the service. C. LaRue Munson, representing the traction companies, declared there is authority of law which provides for the incorporation of a company to operate motor-driven vehicles. A question to be determined, he pointed out, was whether the jitneys have the right to become rivals of long-established public service companies when they fail to set forth in their application every street and alley which they intend to traverse. He contended that the service furnished by the traction companies was adequate, and that the petitioners for the charter failed to disclose wherein the rights of the protestants were to be protected. Commissioner Pennypacker asked one witness whether, if the railway companies should be forced to surrender their charters because of lack of business brought about through competition, the people of Williamsport would be satisfied with a jitney service alone. The witness said he thought they would. The hearing is continued.

Announcement was made on June 2 that more than 100 jitneys had been registered with the Public Service Commission of Maryland. At the same time the plans for their regulations made by Chief Engineer Charles E. Phelps, were given out. These plans have not been acted upon, but will be considered later by the commission. Mr. Phelps' plan calls for the registration of all such public buses in the city and provides that the owner or operator of each be furnished with an identification card, which will contain comprehensive information about the machine, its owner, the number of passengers it may be permitted to carry, its route and schedule of operation. This card is to be presented for inspection on demand, and failure to produce it is to subject the owner of the bus to a penalty. If, in the opinion of the commission, any public bus fails to render satisfactory service or its service is inadequate, unsafe or improper its operation is to be prohibited. Provisions of the commission as to accidents that apply to electric railways are to apply to the buses.

Three sections of the Fort Worth, Tex., jitney ordinance have been amended. The most important change is in the insurance clause. This now requires jitney operators to furnish a bond of $2,500. The amendment decreases the amount of insurance but substitutes an insurance which is more expensive and highly effective. The jitney owners formerly paid $70 for insurance. It is estimated that the new bond will cost about $150. It will be made payable to the Mayor and will be conditioned so that in any action brought for damages the principal in the bond and the surety may be joined in the same action. The insurance amending clause also authorizes personal securities. The city commission will pass upon the bonds before a license is granted. Another amendment brings the "donation" jitney under the law. The police arrested about fifty operators of donation cars and the cases have been held in the police court awaiting the action of the city commission on the amendments. The third amendment makes it unlawful to operate a jitney without having first executed the bond as provided under the amended ordinance. The amendments become effective on June 16. Attorneys for the jitneymen have announced that they will apply to the Federal Court for an injunction to restrain the city officials from enforcing the new law. They will contend that the amended ordinance is unconstitutional; that the city has no right to revoke existing contracts entered into when licenses for one year were issued under the old ordinance, and that the city has no right to require individuals to insure against damages that are likely to arise.

The Dallas Transit Association was granted a temporary injunction by the Sixty-eighth District Court at Dallas, Tex., restraining the jitney ordinance which was to have become effective May 25, until a hearing could be had with a view to making the injunction permanent. Following the temporary injunction several conferences were held between the jitney men and the city officials in an effort to settle the matter out of court by compromise. No agreement was reached and the case proceeded in Judge Whitehurst's court after he had invited Judge Foree of the Fourteenth District Court and Judge Muse of the Forty-eighth District Court to sit en banc at the hearing. The jitney attorneys contended that the ordinance was unreasonable because it was class legislation and that the license fee was exorbitant. The judges ordered the injunction dissolved and the jitney attorneys immediately gave notice of an appeal. The city attorney then announced that if the attorneys for the jitney men would at once perfect their appeal so the case may be advanced on the docket of the Fifth Court of Civil Appeals to be tried during this term of court, he would ask the City Commission to withhold the enforcement of the ordinance until that time. The jitney men intimated that the case would be prepared within a few days, which means that it would go to trial within the next four weeks as the term of that court then ends. It is understood that the case will come up June 12 and a decision will be reached by July 15, but if no decision is reached by that time the ordinance will be enforced. About 25 per cent of the jitneys dropped out after the decision of the District Court, but a number reinstated service after it was established that the ordinance was not to be enforced immediately.

An ordinance regulating the jitney was carried in Portland, Ore., on June 7 by a big majority. The measure was passed by the City Council last month and was then referred to the people at regular city election. The new measure contains all of the essentials of the measure passed on April 2, and referred to in the ELECTRIC RAILWAY JOURNAL of April 17, page 774. According to an investigation completed on June 1 by Municipal Traffic Engineer Kirkpatrick of Portland, there were more jitneys in Portland then than at any previous time. On March 1 there were 350 jitneys in operation, while during the last week of May there were 445. The large buses had been reduced in number from twenty-one on March 1 to fifteen on May 31. The report states that in a twelve-hour day, 875 jitneys crossed the bridges spanning the Willamette River, and operated on the two principal west side routes. In summing up his report Mr. Kirkpatrick says that the jitneys operate on an average of 6.3 hours a day. Of the 445 in the city, only 115 are in service after 10 p. m. Eighty-five of the cars carry "For Hire" signs.

With a total of forty-six damage claims against jitneys during the last two weeks, the Pacific Coast Casualty Company has served notice on many bonded drivers in Seattle of the revocation of their bonds because of reckless driving and disregard of traffic regulations. The claims filed range from $30 to $600.

At the recent meeting of the sub-committee of the City Council of Richmond, Va., in charge of the proposed jitney ordinance, Attorney E. Randolph Williams, for the Virginia Railway & Power Company, said that the city is now confronted with the question of whether it is willing to sacrifice a universal service to all parts of the city and suburbs to foster a limited service, performed in a limited way, in a limited section of the city, from which comparatively few of the city's inhabitants derive benefit. Mr. Williams called attention to the failure of the ordinance to require an indemnity bond or some form of liability insurance to protect the jitney passengers or the pedestrian against injuries resulting from the negligence of the jitney driver or owner. Aside from the unjustifiable hazard which would be imposed upon the public, to relieve jitneys from this obligation would subject the street railway to unfair competition, since the jitney would be allowed to engage in the business of carrying passengers without being compelled to shoulder the risk inherent in the transaction of such business, a risk which the railway at all times assumes.

Judge Samuel B. Kirby, in joint session at Louisville, Ky., held recently that the city of Louisville is wholly within its rights in requiring a bond from operators of jitney buses "even, if necessary, to the extent of $5,000." Judge Kirby granted the plaintiffs a temporary injunction, overruled the city's demurrer to the petition, and held that the jitney operators may run their cars until the litigation is terminated, "the plaintiff to execute bond in the sum of $500." Judge Kirby said that while it may seem that a bond in a sum less than $5,000 "would accomplish the purpose, the court is not authorized to substitute its views for the wisdom and experience of the General Council acting within the scope of its authority."

Judge Charlton in the Superior Court at Savannah, Ga., has granted a temporary injunction restraining the Mayor and Alderman of Savannah from enforcing the jitney ordinance passed in that city. The injunction was granted on the ground that some provisions of the ordinance are "beyond reason and prohibitory."

It is reported that 100 jitneys ceased operating in New Orleans on June 1 when the ordinance passed recently by the Commission Council of that city to regulate the jitneys went into effect. The ordinance requires a $5,000 liability bond.

Reference has been made previously in the ELECTRIC RAILWAY JOURNAL to the ordinance passed in Little Rock, Ark., imposing a bond of $2,000 for each jitney operated in that city. When the city attempted to put the ordinance into effect, the operators of the jitneys applied to the Chancery Court for a temporary restraining order, which was granted. The case was tried on its merits on May 26 and the chancellor dissolved the injunction annd gave the jitney and the motor bus operators twenty days in which to file their bonds with the city and comply with all the terms of the ordinance, or appeal to the Supreme Court. The twenty days will expire on June 15. From present indications it seems likely that the jitney operators will not carry their case to the Supreme Court, but that they will abide by the terms of the ordinance.

On June 8 the Georgia Railroad Commission rendered a decision taking full supervision over jitney buses in Georgia. Tentative rules for the operation of the jitney have been prepared by the commission and copies of them will be mailed to jitney operators, who will have an opportunity on July 13 to be heard in regard to the rules. The number of jitneys in Atlanta has been decreasing of late, except for sporadic increases on Saturday afternoons and fair Sundays. The maximum number of 105 in operation at any one time was reached about May 4. Of that number only thirty-five remained among fifty-five found in operation about May 24. Of the original jitney bus operators of last February apparently not one remains. The Atlanta Jitney Bus Company, which sought to organize on a permanent basis and exclusively among jitney bus interests in Atlanta and gave promise of dependable service, has found free-lance competition in its own field too much for it and went out of business on June 1.

The jitney was considered by the Board of Police Commissioners of Toronto on May 27 and a draft of the regulations which will be embodied in the jitney by-laws were discussed and passed by the board. No jitney will be allowed to carry passengers in excess of its seating capacity. Each person taking out a jitney license will be required to give a bond of $1,000. In addition a monthly license fee of $1 will be imposed. These regulations will come into effect as soon as the by-law is passed by the Council. The board decided to ask the Council to establish jitney stands at the terminals of all routes. Early action by the Council is requested.

An ordinance has been introduced into the City Council of Peoria, Ill., requiring that the jitney drivers of that city file liability bonds in the amount of $5,000 each. The owners of the jitneys must also specify the exact terminals of their routes, a regular schedule must be maintained and the men must not work more than ten hours a day. The name, age, residence and State number of all jitney drivers must be filed with the city clerk. Stops for passengers must be made not less than 50 ft. nor more than 80 ft. from a "near" crossing. Each car must bear the name of the owner, the route traveled, the terminals, etc., and the interior must be illuminated at night. Penalties of from $25 to $200 for failure to comply with this ordinance are imposed.

The City Council of Des Moines, Ia., has passed an ordinance to regulate the jitney under the law passed by the State Legislature. Most important of the provisions of the measure are those requiring an indemnity bond of each driver and that jitneys shall follow designated routes. It will become effective within ten days upon publication. License fees higher than at present are required. Some important provisions of the ordinance are in brief as follows: A fine of not more than $100 or imprisonment for not to exceed thirty days is the penalty for violation. Applicants for jitney licenses must file schedule showing time of departure from stated and fixed terminals, the size of the car, its horsepower, etc. Applications are to be referred by the commissioner of public safety to the Council, which may deny an application providing it appears that the driver is inexperienced or that the territory in which he desires to operate is already supplied with ample facilities for transportation. For a car with a capacity of five or less the license per annum is $15; for more than five and less than eight, $20; more than seven and less than sixteen, $25; more than fifteen and less than thirty, $30; thirty and more, $35. Buses must be brought to full stop before crossing street railways, interurban, or steam railroad tracks. No more passengers may be carried than the actual seating capacity.

About 130 jitney licenses have been issued to date in Des Moines. Not all of these are now in use, however. The new ordinance provides that licenses now in force may be surrendered and a part of the license fee returned if application is made within fifteen days. The popularity of the jitney bus in Des Moines has been on the wane for several weeks, and the new ordinance may mean the end of all except the larger cars of which several already are operating as provided by the ordinance.

THE JITNEY IN ILLINOIS

Text of Order of Illinois Commission Restraining Jitney in Jacksonville

On June 3 the State Public Utilities Commission of Illinois issued a formal order in connection with the case of the Jacksonville Railway and W. B. Miser vs. L. F. O'Donnell, doing business as the Motor Transportation Company. The hearing before the commission on June 2 and the opinion expressed by Commissioner Owen P. Thompson were reported in the ELECTRIC RAILWAY JOURNAL of June 5, page 1093. The order entered by the commission follows:

"This cause came on to be heard upon the complaint filed by the Jacksonville Railway, in which W. B. Miser afterwards joined, and upon the answer of the defendant, L. F. O'Donnell, to said complaint, the complainants appearing upon the hearing by Messrs. Green and Palmer, their attorneys, and the defendant appearing by T. J. Condon, Esq., his attorney.

"It appears from the evidence that the defendant, L. F. O'Donnell, is the owner of a number of automobiles, which since about March 28, 1915, he has used for the transportation of persons for hire from and to points within the city of Jacksonville in this State, and that under the name of the Motor Transportation Company he has been furnishing what is commonly known as a jitney bus service.

"It further appears that the respondent has advertised in various newspapers and through printed circulars that he is engaged in the business of transporting passengers by motor buses over and along certain designated streets in Jacksonville and in such advertising has specified the routes to be taken by his motor buses, the rates of fare to be charged and a time schedule, and that the respondent has held himself out to the public as a common carrier for hire and offered to transport all persons desiring to ride along the routes taken by his said motor buses.

"From the evidence in this case, the commission finds that the respondent owns, controls, operates and manages within this State for public use, a number of automobiles which he is using for the transportation of persons for hire between points within this State, and that in the conduct of such business the respondent is a common carrier of persons and is a public utility within the meaning of the act entitled 'An Act to Provide for the Regulation of Public Utilities,' approved on June 30, 1913, and that as such public utility the respondent is subject to the provisions of said act.

"The commission further finds that said respondent was not engaged in such business, nor engaged in performing any public service of that character within this State prior to March 28, 1915, and that the said respondent has not obtained from this commission a certificate that public convenience and necessity require the transaction of such business.

"It is therefore ordered, that the said respondent, L. F. O'Donnell. cease and desist from carrying on the business which he is carrying on in the manner aforesaid, of transporting persons for hire between points within this State, until he shall have applied for and obtained from this commission a certificate that public convenience and necessity require the transaction of such business."

UNITED RAILROADS PROTESTS MUNICIPAL SCHEDULE

The United Railroads, San Francisco, Cal., has protested to the Board of Supervisors against the excessive use of the outer loop at the foot of Market Street by cars of the San Francisco Municipal Railway. The original agreement covering this matter provides that the United Railroads divide with the city the cost of maintaining the outer track on lower Market Street. It is stipulated further that the United Railroads shall furnish power to the city at cost, or, at least at a rate not to exceed 1 cent per kw-hr., which is the rate the city pays the Pacific Gas & Electric Company. It is also stipulated that the United Railroads shall not operate cars over the tracks faster than one every ninety seconds; no limit is placed on the number the city may operate. At the time this contract was drawn up both parties to the agreement operated the cars of two different routing over the tracks in question. The arrangement was satisfactory until a second bond issue was voted and the Municipal Railway put the cars of two additional routes on the lower Market Street tracks. This has placed the city in the position of operating 1050 cars a day over the outer tracks as against the United Railroads 504, while the company still is paying one-half of the maintenance charges.

The United Railroads on May 25 petitioned the superior court for a permanent injunction to prevent the Municipal Railway from operating its Van Ness Avenue cars over the outer tracks and loop on lower Market Street, and from issuing or accepting transfers on cars operating on that line.

MISSOURI FARE REDUCTION RESTRAINED

Three judges of the district court of the United States who collaborated in hearing a petition for a restraining order against the enforcement of commutation rate orders directed to the Kansas City, Clay County & St. Joseph Railway, have issued the injunction, and incidentally suggested that the Public Service Commission of Missouri had no authority to compel an interurban to experiment with commutation rates on the supposition that the lower rates would bring increased revenues. For the purpose of determining rates, the commission had ascertained the value of the railway's property to be $3,900,000, the net income from the first full year of operation $242,488.22, or a return of 6.2 per cent on the determined valuation.

The court declared that it need not now consider the question of valuation, and proceeded to consider the rate order as based on the valuation. The court suggested that the returns on rates established by the commission under the law must be remunerative or at least adequate, but said that "the commission comes dangerously near holding the contrary." The court quoted from the decisions in the North Dakota and the West Virginia cases by the Supreme Court, and suggested: "It seems clear that that right (power of the State to require commutation rates in general) cannot be created by local public demand or interest; that it cannot be justified by the commission's views of the probable beneficial effects of such rates upon the company's business; because that would constitute an invasion of the right of the company to conduct and manage its own affairs, subject to a proper exercise of the power of regulation."

In reference to the increase of business from suburban incomers, the court suggested that if the rate were allowed, it would be several years before many suburban homes could be built; and if the rate was later found unjust, hardship would be done to persons who built with the confidence that the rates would be permanent.

The court, in granting the temporary injunction, declared that the views expressed must not be taken as forecasting the judgment of the court on final hearing.

One-Man Cars in Jackson.—The Jackson Light & Traction Company, Jackson, Miss., is operating three one-man cars.

One-Man Cars in Tulsa.—The Tulsa (Okla.) Street Railway has served notice upon the public that in consequence of jitney competition conductors will be withdrawn from all lines except the Main Street line and that cars will be operated by one man.

Accident on Queensboro Bridge.—Several passengers were injured in a collision between cars of the Third Avenue Railway and the New York & Queens County Railway which occurred about 6 p. m., on June 6, at the underground loop at the Manhattan end of the Queensboro Bridge.

One-Man Cars in Salem.—Following a statement by T. L. Billingsley, superintendent of the Portland, Eugene & Eastern Railway, Portland, Ore., that the company is losing $700 a month in the operation of its lines in Salem the City Council passed an ordinance authorizing the use of one-man cars.

Plan to Eliminate Stops in St. Louis.—The United Railways, St. Louis, Mo., plans to eliminate 686 so-called "useless stops" on its system, thus enabling it to shorten its running schedules from four to five minutes on each line. Application to abandon the stops has been filed with the Public Utilities Commission of Missouri.

Fare Increases Suspended.—The Public Service Commission of Massachusetts has suspended until July 1 the proposed establishment of 6-cent fare units by the New Bedford & Onset Street Railway and the Norfolk & Bristol Street Railway. By a previous order the increase on the Norfolk & Bristol Street Railway had been suspended until June 1.

Trail Cars Ordered on Interurban.—Trail cars must be carried by the Denver & Interurban Railroad between Denver and Boulder whenever the number of passengers requires extra cars, according to an order by the State Public Utilities Commission. Trail cars will be attached at Broomfield when the seating capacity of the original car leaving Denver or Boulder is filled.

Workmen's Fare Reduction.—The Public Service Commission for the Second District of New York has granted to the Fonda, Johnstown & Gloversville Railroad the right to reduce the price of the workmen's commutation tickets good for a trip between Gloversville and Johnstown in the morning, noon and in the evening, from 6¼ to 5 cents. The new rate has gone into effect.

Advertising Municipal Band Concerts.—By arrangement between the city and the San Antonio (Tex.) Traction Company, San Antonio is giving concerts at San Pedro Springs in the suburbs, while the San Antonio Traction Company advertises the concerts in the local papers. The railway does not mention its own name or trolley service, but this is needless since those who go to the concerts will use the trolley. The fact that a carhouse is also near the Springs makes it easy to meet any demands for service.

Decision in New York Suburban Fare Case.—The Court of Appeals of New York has unanimously affirmed the Appellate Division's order annulling upon certiorari an order of the Public Service Commission, Second District, for a reduction from increases in commutation rates established by the New York Central Railroad within the electrified zone adjacent to New York City. The court said that "the naked fact that a railroad has established and continued a rate for a limited time does not justify the conclusion that it was profitable."

The Twin City Pamphlet.—"The Twin Cities, 1915," has been issued. The publication is bigger, brighter and better than ever. Each year it seems that the last of the possible changes has been rung in the making of this booklet, but the next year rolls around only to bring forth a more striking combination than was contained in any of its predecessors. Of the publication 50,000 copies are printed each year. For the most part the circular is distributed within a radius of 300 miles of the Twin Cities. The Twin City publication is the *ne plus ultra* of electric railway vacation bookets. In this respect the majestic palm seems to be borne by A. W. Warnock, general passenger agent of the company, and borne by him alone.

Deciding on a Type of Car for Toronto.—Some months ago the Ontario Railway Board ordered the Toronto (Ont.) Railway to construct fifty new cars and have them in operation by June 1. Following the order, the union of electric railway employees asked the board to order the abolition of the running board on the open cars, and the railway board, in view of the fact that a new type of car is being looked for, decided to leave the matter of the new cars in abeyance. The chairman of the board now says that it would be inconsistent to expect the street railway to build cars when the board has not decided what was the proper type of car to build. He also mentioned the fact that the engineers of the board, the city and the company had come to the United States to inspect a type of steel car which it was thought might prove satisfactory in service in Toronto.

Accidents in Greater New York.—According to a report by the Public Service Commission of the First District of New York, in January, February, March and April, 1914, there were thirty-seven fatal surface railway accidents in Greater New York. In the same period, for the current year, twenty-nine lost their lives through car collisions or accidents in which the trolley cars played the chief part. The record shows that in the first four months of 1914 there were 10,650 mishaps to persons and property on the surface car lines, and for the same period this year there were 8,597 accidents other than fatal. The total number of cars run at each period is not given in the report. During the current year the near-side stop has been in force.

I. C. C. Decision in Electric's Favor.—The Interstate Commerce Commission recently decided that the Crosby Transportation Company by selling through tickets over the line of the Grand Trunk Railway between Grand Rapids and Milwaukee and refusing to do so via the Grand Rapids, Grand Haven & Muskegon Railway (electric) unduly discriminates against the electric in favor of the steam road. The Crosby Transportation Company is an independent company, but is the exclusive carrier for the Grand Trunk Railway between Milwaukee and Grand Haven. The docks at Milwaukee used by that company are owned by the Chicago, Milwaukee & St. Paul Railway, but are leased by the Grand Trunk. The dock at Grand Haven is owned by the Grand Trunk. It was urged by the latter that its ownership of the dock at Grand Haven should give it the right to exclude its competitor from its use and enjoyment.

Accident in San Francisco.—A two-car train ran away down the Fillmore Street hill, San Francisco, Cal., on June 7, severely injuring several passengers. There were no fatalities, however. The accident was not caused by breakage, but by the train at the top starting before the train below connected with the cable. An investigation by the United Railroads places the blame on the starter and on the motorman of the upper train for starting before receiving the signal from below. About fifty passengers were on the runaway. Some were injured in jumping, while others were hurt in the collision with the train standing at the foot of the incline. The passengers on the loaded train below had time to leave before the crash. The company is installing a device necessitating the throwing of the lever after coupling below and before the train above can start down. Car operation on Fillmore Street was described in the ELECTRIC RAILWAY JOURNAL of May 22, page 977.

Recommendations for Street Traffic Regulation.—The street traffic committee of the Safety First Federation of America, at its meeting in Detroit on June 4 and 5, prepared twenty recommendations concerning street traffic regulation for submission to the national federation at the fall meeting. These recommendations are to be included in the traffic ordinance that is proposed by the committee for adoption everywhere. The recommendations include the following: Standard code of traffic signals, parallel and angular parking of automobiles with fifteen to sixty minute time limit, frosted or colored glass in front of every reflected light, designated safety zones and crosswalks, red lights on rear of horsedrawn vehicles, authorized police control of pedestrian traffic, standard accident reports by all cities, and standardization of size, color, design and means of attachment of all street traffic signs, including those for schools, hospitals, churches, safety zones, railroad and street railway crossings, etc. The meeting was attended by commissioners of public safety, police department heads and other safety-first workers. Joseph A. McGowan, auditor of the Indianapolis Traction & Terminal Company; F. W. Bacon, vice-president of the Kentucky Traction & Terminal Company, and W. E. Cann, of the Detroit United Railway, represented the street railways at the meeting.

Personal Mention

Mr. C. J. Chadwick has resigned as general freight and passenger agent of Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., and his office has been abolished.

Mr. L. G. Ireland has been appointed manager of the Brantford (Ont.) Street Railway in addition to the office which he has previously held as manager of the Hydro-Electric System of Brantford.

Sir Henry Lumley Drayton, K. C., who was knighted by King George on June 3, is chief commissioner of the Board of Railway Commissioners for Canada, and was formerly Corporation Counsel for the city of Toronto, Ont.

Mr. Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., returned from England on the *Philadelphia*, which docked in New York on June 3. Mr. Whitridge went abroad on the *Lusitania* on April 4.

Mr. R. V. Campbell has been appointed traveling freight and passenger agent of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn. Mr. Campbell formerly held a similar position at Des Moines, Ia., with the Minneapolis & St. Louis Railroad.

Sir John Strathhearn Hendrie, C. V. O., Lieutenant-governor of Ontario, was knighted by King George on June 3. He is one of the foremost figures in public life in Canada. From 1905 to 1912 he held the position of chairman of the railway committee of the Legislative Assembly and was also a member of the Hydro-Electric Power Commission of Ontario.

Mr. C. B. Fairchild, Jr., executive assistant, Philadelphia (Pa.) Rapid Transit Company, is the author of a paper entitled "The Opportunities of a Special Librarian," read this week at the annual meeting of the Special Librarians' Association at Berkeley, Cal. Mr. Fairchild refers to the demand from the administrative head of public service and private corporations and of city, state and national governments for specific information relative to special or specialized subjects. This is a growing need and is recognized in some of these corporations by the appointment of men working under such titles as executive assistants, special librarian, statistician, etc. Mr. Fairchild calls attention to the need for such work and to the increasing demand for it.

OBITUARY

John G. Mackintosh, a director in the Greenfield Gas & Electric Company, the Holyoke Street Railway, and the Springfield (Mass.) Street Railway, is dead. Mr. Mackintosh was born in Tariffville, Conn., in 1846. In 1876 he established the banking firm of J. G. Mackintosh & Company, Springfield, Mass., and in 1885 organized the Springfield Safe Deposit & Trust Company, of which he had since been president.

Charles F. Libby, formerly president of the Portland (Maine) Railroad, died at his home in Portland on June 4 at the age of seventy-one. He had engaged in law practice in his home city since 1866, was president of the American Bar Association in 1909-10, and had also been Mayor of Portland and president of the board of overseers of Bowdoin College. He headed the Portland Railroad Company for eight years, retiring about three years ago.

The report of the Hydro-Electric Power Commission of Ontario for the year 1914 on the electric railway department states that resolutions had been received from 138 townships, thirty-eight villages, forty-two towns, eleven cities, four police villages, and seven miscellaneous committees, such as boards of trade, etc., asking for surveys, reports and estimates on proposed lines. Two survey parties had been at work for almost the entire year making preliminary surveys of some 1200 miles of line. The information so obtained had been plotted and used for the purpose of preparing estimates on the cost of roadbed construction. In making the surveys topography was taken for approximately 400 ft. on each side of the traverse line. When this information was plotted the proposed lines were then projected and quantities figured along such lines.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Monterey, Cal.—The Monterey & Pacific Grove Railway has received from the Commission a certificate of public convenience and necessity to operate under franchises granted by the city of Monterey and the city of Pacific Grove.

Chicago, Ill.—The Chicago Surface Lines has asked the Council in Chicago for a franchise to extend its Chicago Avenue line to the lake.

Quincy, Ill.—The Quincy & Western Illinois Electric Railway has received from the Council a three years' extension of time on its franchise in which to build its proposed line between Quincy and Niota. [Jan. 23, '15.]

Newton, Mass.—The Middlesex & Boston Street Railway has asked the Public Service Commission of Massachusetts for its approval of the relocation of its tracks on Woodward Street between Boylston Street and Lincoln Street, Newton.

Springfield, Mo.—The Springfield & Western Railroad has received from the Council an extension of time on its franchise to construct a line between Springfield and Carthage.

Columbus, Ohio.—The East Linden Electric Railway has received a twenty-five year franchise from the Council for the construction of two lines through the northern section of Columbus. One line begins at the Leonard Avenue viaduct and extends northeast through Shepard to the bank of Alum Creek. The other line begins at the Leonard Avenue viaduct and extends through Joyce Avenue and Atcheson Avenue, Columbus, to East Linden. [June 5, '15.]

Urbana, Ohio.—The twenty-five-year franchise granted the Ohio Electric Railway in Urbana was approved in a referendum vote on June 1 by a majority of 258. At an election two months ago the franchise was defeated by five votes.

Toronto, Ont.—The franchise of the Metropolitan division of the Toronto & York Radial Railway on Yonge Street, north of the Canadian Pacific Railway tracks on Farnham Avenue, will expire on June 25. The franchise was granted to the company for a period of thirty-one years. The city has not yet laid down a policy in reference to the portion of the road which will fall into its hands. The Board of Control will take up the matter at once.

Providence, R. I.—The Rhode Island Company has received a franchise from the Council to lay a double track on North Main Street between Market Square and Waterman Street, Providence, to connect with the East Side tunnel.

Petersburg, Va.—The Council of Petersburg has adopted the ordinances introduced at a meeting recently, granting electric railway franchise rights on Bollingbrook Street and Wythe Street, asked for by the Petersburg & Appomattox Railway and the Petersburg & James River Corporation. These franchises will be sold to the highest bidder.

TRACK AND ROADWAY

Tucson (Ariz.) Rapid Transit Company.—Plans are being considered by this company to extend its University Avenue line on Park Avenue to and along the Speedway.

***Melbourne, Ark.**—Residents of Melbourne and vicinity have formed the Community Improvement Association with the object of promoting the construction of an electric line from some point on the Iron Mountain Railroad. It was voted to guarantee a right-of-way and a $10,000 bonus. A. P. Golden, secretary.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its line from San Bernardino to East Highland and Del Rosa.

Jacksonville (Fla.) Traction Company.—Work will be begun at once by this company rebuilding the track on its South Main Street line from Michigan Avenue to the terminal at Nichols Park.

Jacksonville & Florida Railway, Jacksonville, Fla.—Financial arrangements have been made to build the first section of 10 miles of this company's line between Jacksonville and Providence, and construction has been begun. A. W. MacKinlay, president. [May 8, '15.]

Milton, Fla.—H. S. Laird, Milton, advises that, owing to financial conditions, the project to build an electric railway from Milton to Bagdad has been entirely abandoned. [Jan. 31, '14.]

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—T. R. Osmond, general manager of this company, states that bonds have been taken and a definite proposition for the construction of this company's line between Jacksonville and St. Augustine and the building of a power plant has been submitted to an engineering concern in New York. An estimate will be made by the engineering company of the cost of building and equipping the plant and as soon as this work is completed the contract will be signed and work will be begun. [March 13, '15.]

Waycross Street & Suburban Railway, Waycross, Ga.—Plans are being made to begin work at once on the construction of this company's extension to Gilchrist Park.

Freeport Railway & Light Company, Freeport, Ill.—This company plans to begin at once the construction of its extension on Galena Street, Freeport.

Chicago & Joliet Electric Railway, Joliet, Ill.—Work will be begun at once by this company on the extension of its Hickory Street line to Theiler's Park. The line will extend from its present terminus at Smith Street, east to Broadway and north on Broadway to Theiler's Park. Township officials have promised a franchise and the consent of property owners is now being obtained.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—Plans are being made for the floating of $3,000,000 of bonds for the completion of this company's line. Plans are also under consideration for the location of the company's shops at Quincy. [May 1, '15.]

***Salina-Northern Railroad, Kansas City, Kans.**—It is reported that this line now under construction in Kansas will use motor cars instead of steam equipment. Track construction on the line between Salina and Osborne will begin July 1.

Salina (Kan.) Street Railway.—Ties are being distributed by this company for its line to the new union station at Salina. As planned, the line is to branch off from the Ninth Street line at Park Street, extend to Thirteenth Street and thence north to the union station. The company has applied for a permit to run street cars on Park Street.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being made by this company to build an extension of its lines to Salina and one to Winfield, which will have a branch from Mulvane to Wellington. Following these improvements an extension to El Dorado will be built.

Kentucky Traction & Terminal Company, Lexington, Ky.—The Board of City Commissioners has ordered this company to proceed at once relaying its tracks on South Limestone Street, Georgetown Street and Dewees Street, Lexington.

Gretna, La.—Edward L. Slattery, New Orleans, reports that surveys have been begun and application for a franchise will be made for the construction of an electric railway from the intersection of Copernicus Avenue and Front Street, Gretna, extending on Copernicus Avenue to Eleventh Street, out Eleventh Street by reverse curve to Nicholls Avenue to Twenty-third Street, at which point the road will extend northeast and connect with the New Orleans, Southern & Grand Isle Railway. [May 29, '15.]

Bay State Street Railway, Boston, Mass.—This company is relocating its tracks on lower Broadway, Chelsea.

Fort Scott & Nevada Light, Heat, Water & Power Company, Nevada, Mo.—This company is rebuilding its line on North Washington Street, Nevada. Ties for the entire line have been ordered and work is progressing rapidly.

Albuquerque (N. Mex.) Traction Company.—Among the improvements planned by this company is the repairing of curves and switches and overhauling its track in general.

United Traction Company, Albany, N. Y.—This company plans to spend $165,000 for new track this summer. Rails, ties and material have been ordered for a double track to be laid in Central Avenue from Lark Street west to Watervliet Avenue, Albany, a distance of 8500 ft. Work will be begun as soon as the material is received.

Interborough Rapid Transit Company, New York, N. Y.—Construction work on the Steinway tunnel, connecting Manhattan and Queens, is approaching completion, and the Public Service Commission for the First District of New York expects to order the beginning of temporary operation through the tunnel about June 15. For the last year this tunnel has been undergoing reconstruction to fit it for operation as a part of the new subway system. It will be operated by the Interborough Rapid Transit Company, with free transfers to and from the existing subway. During temporary operation trains will run back and forth between the temporary termini at Jackson Avenue and Van Alst Avenue, Long Island City, and at a point under Forty-second Street between Lexington Avenue and Third Avenue, Manhattan. The tunnel is a two-track line, and at the Manhattan end passengers will be brought to the surface by an escalator.

Brooklyn, N. Y.—The Public Service Commission for the First District of New York has directed its counsel to apply to the Appellate Division of the Supreme Court for the legalization of the Bushwick Station, East New York route. This is the eastern part of the so-called Eastern District subway line. This line begins at Sixth Avenue, Manhattan, and runs under Fourteenth Street and the East River to North Seventh Street, Brooklyn, through North Seventh Street to Metropolitan Avenue, through Metropolitan Avenue to Bushwick Avenue, and thence through Johnson Avenue and the Long Island Railroad right-of-way to East New York. The western end of the line, covering the underground portion, has already been legalized, but the commission found it impossible to get the consents of two property owners necessary to legalize the elevated railroad portion of the route. The application to the Appellate Division will be made at once, and it is not thought that there will be any delay in the completion of the road as the elevated portion, upon which work has not yet been begun, can be constructed in much less time than the underground parts.

Cincinnati (Ohio) Traction Company.—Plans are being prepared by City Engineer Krug for the construction of this company's extension to Bond Hill. It has not yet been decided whether the track will be laid through Avon Field or on Paddack Road. It will cost $70,000 to build a boulevard through the park property, and for that reason it is believed the Paddack Road route will be chosen. Work will be begun as soon as the Council determines on the route.

Toronto, Ont.—At a meeting of the Council on May 31 it was moved that the Board of Control report funds for the laying of a permanent street railway line on Bloor Street West, west of Dundas Street. The motion was referred to the Board of Control, as there is a legal difficulty in the way. The necessary legislation was not obtained and, as a result, the work has been tied up until a method of financing is devised.

Portland, Ore.—Steps are to be taken at once by the Council to confiscate a bond of $10,000 furnished by George F. Heusner to guarantee the construction of an electric line from Kenton to the West Side business district of Portland under the provisions of a franchise received by Mr. Heusner. The Council recently received a request for an extension of time in which to build the line but by unanimous vote refused any extension. The bond was given to guarantee completion of the line within eighteen months after the granting of the franchise. The eighteen months expired on June 3. [Jan. 9, '15.]

Eastern Pennsylvania Railways, Pottsville, Pa.—This company reports that it expects to build 2 miles of track between Pottsville and St. Claire.

***Gallatin, Tenn.**—In connection with the project to build an electric railway from Gallatin, Tenn., to Horse Cave, Ky., it is stated that if the sum of $100,000, which is needed to go ahead with the project, is raised, Nashville, Tenn., will supply a similar amount and the line will be built.

Dallas (Tex.) Southwestern Traction Company.—A subscription of $3,000 has been raised for the purpose of surveying this company's extension from Glen Rose to Stephenville. This is part of a plan to build an electric railway from Dallas to Brownwood. [May 22, '15.]

Houston, Richmond & Western Traction Company, Houston, Tex.—Arrangements are well under way for the construction of this company's line from Houston to Richmond. Residents of Richmond have assured the promotors of a cash bonus of $10,000, a right-of-way through the county and a terminus site of 3 acres. E. Kennedy, Houston, is interested. [May 29, '15.]

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Plans are being considered by this company to build an extension of its lines from Fourteenth South Street, Salt Lake City, through Hunter, Granger, Pleasant Green and other points into the heart of the agricultural district, 10 miles.

***Beckley, W. Va.**—H. G. Scott, Charleston, has submitted to the Raleigh County Business Men's Association plans to construct an electric railway from Fayette Station on the Chesapeake & Ohio Railway to Beckley, 35 miles. The route extends via Mount Hope, Oak Hill, Glen Jean, Fayetteville and other points. A committee consisting of C. L. Beckner, T. E. Bibb and Ernest Chilson, all of Beckley, has been appointed to consider the plan.

Charleston (W. Va.) Interurban Railroad.—This company has sold $750,000 of 6 per cent notes, the proceeds of which are to be used to build an extension of its lines from Charleston to Montgomery, 24 miles.

Princeton (W. Va.) Power Company.—Work has been begun by this company laying tracks on its line between Princeton and Bluefield, 12 miles.

***Superior, Wis.**—Plans are being considered to build an electric railway from Superior to Bayfield. It is said that more than half the money needed for the construction has been subscribed. L. E. Davis, Bayfield, is interested.

SHOPS AND BUILDINGS

Northern Massachusetts Street Railway, Athol. Mass.—Headquarters for the Gardner and Templeton divisions of this company will be established next week at East Templeton and the use of the carhouse at Westminster will be discontinued. A new switchboard has been installed in the carhouse at East Templeton and an addition built to care for the cars which have been kept at Westminster.

Twin City Rapid Transit Company, Minneapolis, Minn.—President C. G. Goodrich announces the purchase of a terminal site by this company in the heart of the Minneapolis business district for which a cash consideration of $1,100,000 was paid. The new terminal block is 330 ft. by 330 ft. and is bounded by Marquette Avenue, Second Avenue, Seventh Street and Eighth Street. The complete terminal plan contemplates not only suburban line operation but a modification of the downtown lines and rearrangement of the loops so as to relieve congestion.

Brooklyn (N. Y.) Rapid Transit System.—The Public Service Commission for the First District of New York has awarded the contract for the completion of construction and station finish in portions of the Fourth Avenue subway, Brooklyn, to D. O. Serber for $40,676.25. The work covered by this contract will be done in the next three months and will in no way interfere with the beginning of operation in the Fourth Avenue subway, which is scheduled for June 15. The work consists mainly in completing the station finish and other parts of the subway structure between Hanson Place and Butler Street.

Eastern Pennsylvania Railways, Pottsville, Pa.—This company reports that it expects to build a 208-ft. extension to its present carhouse in Pottsville.

Texas Traction Company, Dallas, Tex.—Officials of this company and the Southern Traction Company and Stone & Webster executive officers held a conference on June 2 at which plans were laid out for the construction of the new union terminal for interurban lines at Dallas. Under the terms of the franchise granted Stone & Webster by the city for the terminal, actual construction must be begun before Oct. 20.

Manufactures and Supplies

ROLLING STOCK

Boston (Mass.) Elevated Railway has ordered one flat car-body from the Laconia Car Company.

Ohio Electric Railway, Cincinnati, Ohio, has ordered one 63-ft. excursion type car from the Cincinnati Car Company.

Union Electric Company, Dubuque, Ia., is rebuilding eight single-truck cars into one-man cars in its own shops.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has ordered one all-steel car, 32 ft. 6 in. over corner posts, from the Cincinnati Car Company.

Detroit (Mich.) United Railway has ordered two of its standard type 60-ft. limited interurban cars from the Niles Car & Manufacturing Company. The cars will be duplicates of the previous order.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., has ordered two additional all-steel interurban cars from the Cincinnati Car Company. These cars are exact duplicates of those placed in service some months ago by the railway company.

Sioux City Service Company, Sioux City, Ia., will build this year four cars of its standard, single-end, pay-as-you-enter type. These cars are 31 ft. over corner posts and 8 ft. 6 in. wide with a 5 ft. 6 in. front vestibule and a 6 ft. 8 in. rear vestibule. The framing is of semi-steel and the body is of the monitor roof type.

TRADE NOTES

McKay Company, New York, N. Y., bankers, have removed their offices from 55 Wall Street to the twenty-second floor of the Bankers' Trust Company Building, 14 Wall Street.

Edwin G. Hatch, New York, N. Y., has recently supplied the Chicago, Milwaukee & St. Paul Railway with a number of seamless copper splicing sleedes to provide the splices in its transmission lines under construction in the West.

Graphite Lubricating Company, Bound Brook, N. J., has moved its factory in Bound Brook to a larger location two miles from the old plant covering a plot of about 500 ft. x 200 ft., where it will manufacture its "Bound Brook" and Nigrum graphite and bronze oil-less bearings and bushings.

Frank Ridlon Company, Boston, Mass., electrical engineer, manufacturer and repairer of electrical apparatus has removed its New York office to Suite No. 307 Engineering Building, 114 Liberty Street. George L. Smead is manager of the vacuum cleaner and fixture department, Harry De Steese of the export and supply department.

E. G. Long Company, Inc., New York, N. Y., has appointed John A. Warris, formerly assistant treasurer, as secretary to succeed F. Van Anden, resigned. Mr. Warris has been associated with this company for over fifteen years. Robert C. Riddick, works manager at the Kingston foundry, has been appointed a director of the company, succeeding Mr. Van Anden.

Ellcon Company, New York, N. Y., has received an order for porcelain enameled stanchions and Aero-metal fittings for the third lot of 100 cars ordered by the New York Municipal Railway, the same equipment as supplied for the previous 200 cars. This company has also received an order from the Interborough Rapid Transit Company for porcelain enameled barriers and Aero-metal fittings for its 478 new cars.

Alexander Milburn Company, Baltimore, Maryland, manufacturer of high power portable lights and oxy-acetylene welding apparatus, has acquired the business of the Wells Light Manufacturing Company, Jersey City, N. J. Repair parts for outstanding Wells lights will be manufactured and supplied in the future by Alexander Milburn Company, from its Baltimore factory, and complete Wells oil lights will also be furnished where desired, in conjunction with the standard Milburn acetylene lights.

ADVERTISING LITERATURE

Sangamo Electric Company, Springfield, Ill., has issued a catalog which describes its exhibit of electric meters in the Palace of Machinery at the Panama-Pacific Exposition.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 42552, on the subject of motor generator sets. The bulletin is attractively designed and includes numerous illustrations of various types of motor-generator sets, also a general description of this type of apparatus.

Altheimer & Rawlings Investment Company, St. Louis, Mo., has reprinted in pamphlet form the talk of Richard McCulloch, president and general manager of the United Railways, St. Louis, before the Bond Men's Club of St. Louis in which he discussed the problems of the company.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder on its fare register system. The folder contains a long list of electric railways which use this system. Enclosed with the folder is a form sheet for the convenience of making estimates of this system by stating the various fares collected on the line and also other necessary operating data.

Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., has issued bulletin Nos. 400 and 800 which show a variety of the latest designs in its electrical wiring. These connections are designed to do away with the surging in the line owing to bad contacts at the joints and to prevent loss of service traceable to high resistance or broken joints. These connecting devices secure low resistance joints owing to the fact that they are three times the area of wire or cable at the joint.

Esterline Company, Indianapolis, Ind., has issued catalog No. 364 describing its various types of "Golden Glow" incandescent headlights. The catalog contains an illustration made from an unretouched photograph of a street well illuminated for a distance of four blocks by one of these headlights on a car of the Indianapolis Traction & Terminal Company. In this type of reflector the light from the bulb passes through the glass, strikes the silvered surface and is reflected back through the glass and out in front of the lamp. In passing through the glass the violet and blue rays are absorbed in the glass and subtracted from the beam, leaving a shaft of golden yellow light. Even in a dense fog the light can be seen at a great distance. For electric railway service dash type headlights are burned in series with interior bulbs and will give a projection of light from 350 ft. with a 23-watt bulb to 750 ft. with a 56-watt bulb. The interurban headlight can be operated in series with resistance or interior bulbs. It will project an intense but non-blinding beam sufficient to distinguish objects at a distance of from 900 to 1200 ft. Use of these headlights in series with tungsten bulbs greatly reduces the effect of fluctuating voltage and is a material economy in current.

Cook Railway Signal Company, Denver, Col., has issued a catalog describing and illustrating its safety automatic gate for highway crossings. This gate operates practically the same as an upper quadrant signal. For electric lines the most common method of control is by means of either track instruments or trolley contactors. The functions performed by the gate and the results obtained by these methods are the same as in the "track circuit" installations. The journal where the gate arm is attached to the mast is 13 ft. above the foundation. When the gate arm is lowered it assumes a horizontal position with "tell-tales" hanging therefrom, which come down to about 5 ft. of the roadway. These tell-tales are made of crucible steel wire, wound in spring form, so as not to catch or hang to any object. Since the rigid arm is 13 ft. above the roadway, it is in the clear, and will not injure any one if it should come down, for a vehicle is directly under it. The bell starts ringing as soon as the arm moves to the danger position. The arm moves to the danger position very slowly, taking about six seconds, so it will not frighten horses as it might if it should descend rapidly. In the top of the mast is a red lens which throws a ray of light parallel to the public highway, so that at night time it can be plainly seen from a distance. In the head is also arranged a shaded white light which shines down upon the arm and "tell-tales" and lights up the crossing, making it visible during darkness. The gate is substantially and heavily made. The mechanism operates by direct current or alternating current, whichever is available, or by low voltage storage batteries.

Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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AWARD TO "ELECTRIC RAILWAY JOURNAL"

The International Jury of Awards, Panama-Pacific International Exposition, has voted to give a medal of honor to the publications of the McGraw Publishing Company, Inc., which include the ELECTRIC RAILWAY JOURNAL. This is the highest award granted a publishing company. The principal basis of the award is the general excellence and superiority of these publications.

JITNEY ACCIDENT COMPLAISANCE We have adverted several times not only to the danger that the directionless jitney imposes upon the streets but to the irresponsibility of the driver when an accident does occur. The traveler in the jitney belt finds aplenty such newspaper headlines as "Killed by a Jitney," "Searching for Reckless Jitney Driver" and "Jitney Beaten by Telegraph Pole"; and on an Oakland ferryboat three elderly females were heard recently to argue a fourth out of her favoritism for the jitney purely through stating accidents that had come to their knowledge. Yet, in the light of all this, every kind of political pressure is brought to secure the restoration of licenses to drivers whose recklessness had forfeited even that little protection to the public, giving another instance of the cowardly complaisance of the minor courts. Thus, on June 5, a California jitney driver ran down and severely injured a woman. He was arrested and asked to furnish just $20 bail. Within an hour the same driver ran down a little girl, the machine breaking both her legs. Verily, "The driving is like the driving of Jehu the son of Nimshi; for he driveth furiously."

TRAFFIC SURVEY ORGANIZATION Back of Mr. Doolittle's discussion, elsewhere in this issue, of the type of employee, organization and supervision best to be used for traffic survey work, there runs the premise that such work is of a sufficiently important character to warrant in certain cases the establishment of a special department with distinct personnel to provide for its thorough development. We heartily agree with this general statement, but also with the restriction placed upon it by Mr. Doolittle—that while such a method would insure the highest efficiency and the most complete and accurate results, many companies on account of their small size or peculiar organization and operating conditions cannot adopt it. It is difficult to draw the line at the proper point, for no strict classification can be made on the basis of revenue or operating statistics. Yet the point to be remembered is that even if a company is not so large as to allow it to use the special department method as a means of collecting the maximum amount of data at a minimum cost, entire neglect of traffic study is not warranted. Companies of medium size, with regular inspectors, conductors and transportation office clerks, can secure effective results along this line if the work is carried on regularly and systematically under the direction of the superintendent of transportation. In the case of the smallest companies, occasional studies by office employees and the older conductors under the manager's orders can well be made. The necessity and the value of traffic surveys form the vital point; the physical means of accomplishing such work is a minor problem of each management to be settled with business judgment in the light of local conditions.

CHICAGO RAILWAY TERMINAL REPORT The report of the Chicago Railway Terminal Commission, just rendered, is very careful to avoid any direct recommendation on the subject of electrification. On this point the commission is awaiting the report of the committee on smoke abatement and electrification of the Chicago Association of Commerce, and its particular duty was to report on the most practical rearrangement of the passenger and freight terminal facilities and service in Chicago. Nevertheless, in the analysis of this subject we can read into the report only the logical conclusion that electric motive power is the final answer to the problem in Chicago as well as in other large cities where similar problems are presented. In its discussion of the passenger terminal question the commission clearly points out the necessity for improving the facilities for distributing passengers, especially suburban passengers, after reaching the terminal, by the method of through routing, in other words of applying to the situation the same principles which would be used on a city transportation system. Such a plan would not only reduce greatly the expenses incident to the present competitive system with enormously expensive and inconvenient individual terminals, but would produce a greater intensive use of the property required and would be of much convenience to the traveling public. The principles outlined here for the handling of passenger traffic applies in equal measure to that of freight, and while no comparative figures are presented by the commission, it may be inferred that the economies obtained by the salvage of valuable real estate in the central district of the city from railroad purposes would go a long way toward defraying the cost of making the changes.

THE CHICAGO STRIKE

The real issue in the short-lived Chicago strike was the principle of arbitration. At first the men flatly refused to accept any arbitration at all, saying that they were the sole judges of what constituted fair wages; then, seeing public opinion and the press failed to support them in this attitude, they proposed to limit the choice of third arbitrator to one of five men in a list submitted by them. This claim, according to the Chicago *Evening Post*, was tantamount to the demand that they "should have the right of naming two of the three arbitrators" and "guarantees in advance that they would win their case." It is not strange that such an attitude was of direct benefit to the companies and, coupled with the unflinching position of Mayor Thompson in favor of fair arbitration, brought about the final decision.

We sincerely trust that the board now selected to decide the questions at issue will not merely seek a compromise, as too many boards in the past have done. On account of the size of the railway systems and the number of people dependent upon them for transportation, the question is a very important one. Three years ago the Chicago surface railways established a rate of wages higher than that paid in any other large city in the United States east of the Rocky Mountains, and by it 60 per cent of the trainmen have received more than $1,000 annually. Yet the men are demanding an increase in the minimum wage of more than 40 per cent and in the maximum wage of more than 12 per cent, as well as changes in the working conditions which will still further increase the operating expenses. Obviously there must be some limit. The companies cannot go on indefinitely increasing wages, especially when, as is the case at present, the companies have no difficulty in engaging all the men they need to work at the existing scale. It is said that the employees were opposed to arbitration because in an arbitration hearing on wages to which they were parties three years ago they did not secure all of their demands, but this is not surprising when it is realized that to grant their demand on the wages question alone now would cost the companies $1,500,000 a year. As opposed to the attitude of the men, the companies declared that they were perfectly willing to submit the entire matter to arbitration and even agreed that conditional on arbitration the present state of wages would not be lowered and that working conditions, if changed, should be not less favorable.

As the matter is now in the hands of the arbitrators we shall not attempt to anticipate their decision. Under the ordinance of 1907 the city is now a more than equal partner with the companies in the profits of the surface railways and so is directly interested in having them run on a business basis. This is entirely independent of the natural desire of any city to have such an important agency in its development as the local railway system at least fairly prosperous. Just how far this participation in the profits of the system by the city will affect the settlement of the present problem it is impossible now to state. There are no precedents in this country to show. It is not amiss, however, to say that the present seems an inopportune time in practically every business for employees to talk of increased wages. The country is passing through a period of business depression and unemployment in which almost every line of industry has suffered. This has been especially the case with the electric railway industry, and the spread of the jitney with its effect on the gross receipts has practically capped the climax. A solution for the present situation must come because there is no agency which can perform the necessary service of city and interurban transportation as cheaply as the electric railway, and the country cannot afford to have a stoppage of new electric railway construction. But just what this solution will be is still a question of the future. If the railways, during this period of business depression, should follow the practice of most industrial companies under similar conditions, they would reduce wages 10 per cent or more, or put the men on part time, or both. It is certainly not a favorable season in the electric railway business for either men or officials to talk about an increase of wages or other changes which will increase the operating expenses without adding to the gross receipts.

CONTINUOUS VS. NOMINAL RATING OF RAILWAY SUBSTATION MACHINERY

It is understood that at the Deer Park convention of the American Institute of Electrical Engineers which is to be held during the last week of this month the standards committee will propose for the consideration of the board of directors a revision of the standardization rules as they relate to the rating of railway substation machinery. These revisions will be in the direction of bringing the rating of this class of machinery more nearly into conformity with the rating of other classes of electrical machinery. The circumstances leading up to this recommendation are briefly as follows:

Several years ago rating of electrical machinery received very thorough consideration by engineers in every country where such machinery is made. The result was an international agreement upon the principles of rating, which principles were adopted by the American Institute of Electrical Engineers in the standardization rules issued Dec. 1, 1914. This continuous rating is based upon the load which can be carried indefinitely with specified observable temperature rises shown by experience to be safe for the type of insulation employed and allowing for an ambient temperature of 40 deg. Cent. While the rating of nearly all electrical machines follows these principles, a notable exception was made in the case of railway substation machinery at the request of certain engineers and these machines received a special rating called "nominal."

The system of continuous rating is so simple and rational that it is difficult to realize that it was evolved as the result of years of painstaking study and experimental work. In it the temperatures attained with rated load correspond to the maximum safe temperatures which the insulation will stand. It is therefore not permissible to "overload" machines which are running continuously at rated load. It should not be inferred from this that machines to be built in the future will be different from those built in the past. It will be possible to obtain any reasonable kind of machine by specifying its load requirements and leaving the manufacturer to supply the rating, as is now done with railway motors and locomotives.

On the other hand, in accordance with the nominal rating a machine, after running at nominal rated load continuously with an unspecified temperature rise, has its load increased 50 per cent for two hours, at the end of which period no part of the insulation shall exceed the standard temperature rises. The nominal rating of a given machine is, therefore, less than its continuous rating, and unlike the continuous rating its definition involves the assumption of certain characteristics, not only of the machine, but also of the load which the machine is expected to carry, a most extraordinary idea not at all in keeping with the clearly conceived system of rating used for other machines.

Before the present rules were adopted making specific provision for railway substation machinery, instead of one temperature rise limitation there were two, the lower applying to the continuous load and the higher to certain overloads superimposed upon the continuous load. It is now known that a given machine will have a nominal rating considerably less than its old A. I. E. E. rating, and that the manufacturers are embarrassed by this reduction. In fact, a movement has been started to revise the definition of nominal rating so as to make it more nearly equivalent to the old A. I. E. E. rating. Rather than make such a revision, why not relegate the nominal rating to a secondary place and rate railway substation machinery like other electrical machinery? The proposed revision is a step in this direction and should have the approval of the electric railway industry.

BASING DEPRECIATION ON PAR VALUE

The Nebraska State Railway Commission is pursuing a method of handling depreciation that should be of wide interest to utility operators on account of the peculiarly arbitrary yet facile way in which it has slid over the knotty sections of the problem. In these days when utilities and commissions are generally finding multitudinous points of difference in regard to the distinction between maintenance and depreciation and in regard to the proper life tables and depreciation rates for various classes of property, the Nebraska commission has tackled the problem from the other side in an apparent endeavor to find an easier solution.

Believing that maintenance and depreciation are so intermingled that it is impossible to establish an accounting system that will adequately and accurately separate the two, the commission simply handles these items together. Furthermore (while the commission has no established policy to the following effect), wherever practicable it forgets class rates and bases the allowance for the maintenance and depreciation reserve on the par value of securities issued. It is assumed that the amount issued covers the actual physical value of the property, plus a reasonable allowance for financing and promotion, so that this plan affords a fairly equitable basis for the maintenance and depreciation allowance. The percentage chosen varies with the character of the utility affected, the rate for a water company thus being lower than that for a telephone property. In a recent security authorization for the Omaha & Lincoln Railway & Light Company, the annual rate was 7 per cent, while a review of this commission's orders in 1914 shows that in some telephone cases it allowed 9 per cent and for such cases regards 8 per cent as the minimum allowance.

Concerning the practice of combining the maintenance and depreciation allowances, little need be said, for this is a means that has been recognized in various sources as the most expedient permissible solution of a most intricately technical problem. The basing of the combined allowance upon the par value of securities issued, however, is more of a novelty. It is true that such a close basic relation between investment and physical value was legally recognized as existent under the strict Massachusetts stock laws in the Middlesex fare decision, and various commissions now insist that the par value of newly authorized securities be covered by the actual value of the property. Yet few commissions have to our knowledge had sufficient faith in their own security-supervising ability to use such issues as a basis for operating calculations. The Nebraska commission does not itself seem to regard physical value and investment value as exactly interchangeable, as is shown by its practice in valuation cases, but it feels that these are sufficiently near to permit this somewhat rough-and-ready method of handling depreciation. With the yearly rate properly selected according to experience, this practice provides a reasonable protection for bondholders—provided local conditions in various sections of the State do not cause maintenance costs to vary so unduly as in some cases to leave no provision whatever for depreciation.

The chief point of value in this method, however, lies in the commission's recognition of the difference between the reserve for depreciation and actual accrued depreciation. We have at various times emphasized the fact that an arbitrary percentage chosen to facilitate the accounting treatment of depreciation over a certain period has no conclusive bearing upon the actual deterioration of property during the period. That the Nebraska commission agrees with this distinction is evident from the fact that in all rate cases it disregards its yearly accounting allowance for maintenance and depreciation and fixes an allowance on the basis of an actual appraisal.

Utility operators who have in the past been trying to make this difference clear to commissions can indeed see a glimmer of hope coming out of the State of Nebraska.

Michigan Railway's 2400-Volt, Third-Rail Line

This 94 Mile Road, the First of Its Kind to Be Built, Has Just Been Placed in Operation, Being Designed for Speeds Up to 90 M. P. H.—The Project, Which Was Conceived by the Late W. A. Foote, Includes a 44-Mile Section of Electrified Steam Line

Another link in the chain of interurban railways and electric light and power lines owned by the Commonwealth Power Railway & Light Company, Grand Rapids, Mich., has just been turned over to the Michigan Railway, the operating company. This new line marks a milestone in high-speed electric railroad development, since it is the first 2400-volt, third-rail line ever constructed. Moreover, it represents the culmination of another dream of the late W. A. Foote, who as vice-president of the Commonwealth Company had the courage to install the first 140,000-volt transmission line.

The 50-mile Kalamazoo-Grand Rapids section of the new line has been built for speeds up to 90 m.p.h. and is probably as fine an example of finished, modern electric railway construction as will be found in this country. The 44.5-mile steam road which forms the remaining part of the route was purchased from the Michigan Central Railroad and runs between Allegan and Battle Creek.

NECESSITY FOR NEW LINE AND ITS SERVICE

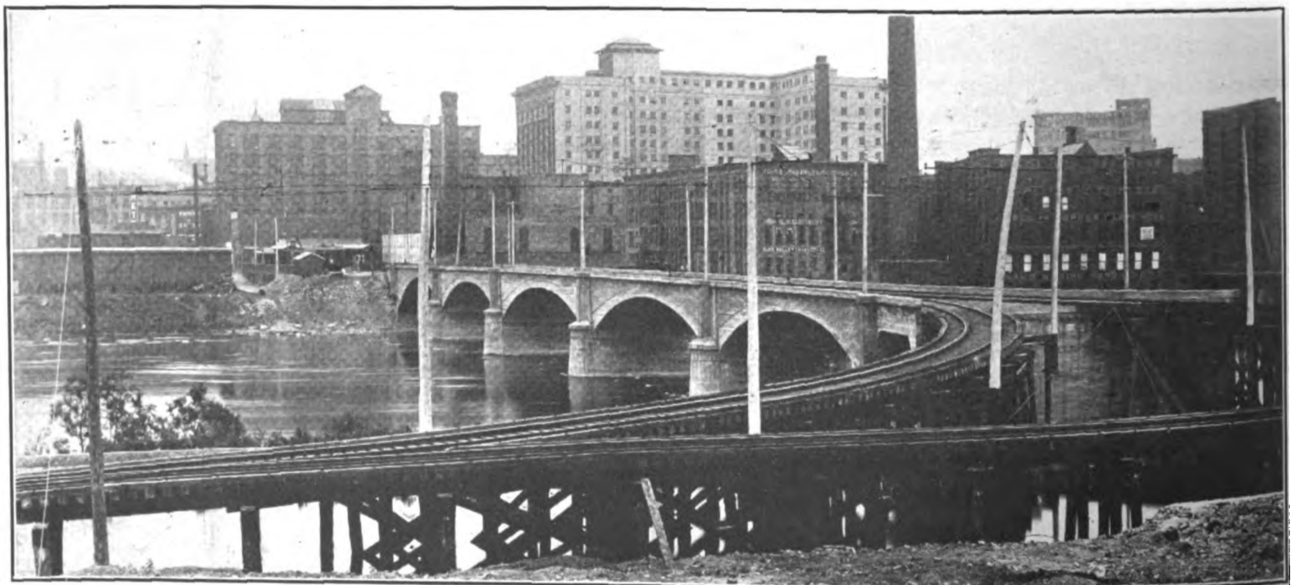
Infrequent steam-road service or none at all was the prime reason for connecting Grand Rapids with Kalamazoo by means of this high-speed electric line. In general, lower Michigan is peculiarly situated, being bounded on three sides by three great lakes, and as a result, only the extreme southern part of the peninsula is served by steam railroad trunk lines. During the entire year there is traffic east and west across the state, and during the summer months, the north and south traffic to the numerous summer resorts in this State reaches considerable proportions, so that steam railroads have been built only to cater to the transcontinental service and to furnish ingress and egress to the summer resorts. As a result but little provision was made for intercommunication between the different parts of the State.

In recent years, Grand Rapids, Kalamazoo and Battle Creek have grown rapidly, and there has arisen a demand for frequent high-speed service between them. Grand Rapids is a large furniture manufacturing center with a population of over 125,000, and a natural line of intercommunication existed between this point and Kalamazoo, another manufacturing city of 40,000 people, and Battle Creek, the home of prepared breakfast foods, a city of 30,000 inhabitants. Before the completion of this new line there was no direct railroad route between Battle Creek and Grand Rapids and only infrequent service between that point and Kalamazoo.

To develop the passenger, freight and express traffic between these points three classes of train service have been inaugurated. These include both local and limited trains, and a special service known as the "Flyer." Single cars from Kalamazoo and Battle Creek are coupled together at Monteith Junction, which is 18 and 30 miles distant respectively from the two terminals, and from this point they run as a two-car train into Grand Rapids, a distance of 32 miles.

Local trains make eleven round trips daily on the Grand Rapids-Kalamazoo line, and the run requires one hour and forty-five minutes. Two local trains make round trips between Grand Rapids and Battle Creek, which requires two hours and twenty-five minutes each way. Limited runs between Grand Rapids and Kalamazoo are made in one hour and twenty minutes and the run from Grand Rapids to Battle Creek takes two hours and ten minutes. The limited service comprises four trains to Kalamazoo and seven to Battle Creek. The third class of service, known as the "Flyer," is furnished only between Grand Rapids and Kalamazoo, and the 50-mile run is made in one hour and ten minutes. Both at Kalamazoo and Battle Creek, the Michigan Railway connects with the lines of the Michigan United Traction Company, a subsidiary of the same holding company. Passengers for points east of Battle Creek or between that point and Kalamazoo, are required to transfer. At Grand Rapids the new line intersects the Grand Rapids, Holland and Chicago Railroad, which is planning to abandon its entrance over city streets and will use the double track line and terminals built by the new road.

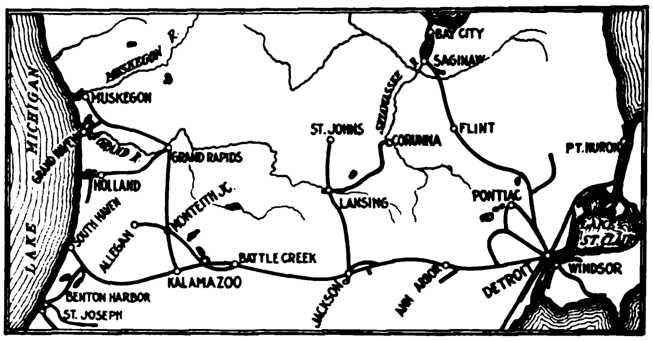
All the cars purchased for the new line are of steel



MICHIGAN 2400-VOLT LINE—CONCRETE BRIDGE OVER GRAND RIVER AT GRAND RAPIDS construction, particularly well equipped and finished. Those in the "Flyer" service are especially fine all-steel coaches with side doors and observation chair-car compartments. These were described on page 1087 of the May 16, 1914, issue of the ELECTRIC RAILWAY JOURNAL. The cars used in local and limited service are also of all-steel construction, but are of the standard arched-roof interurban type with the entrance and exit doors in a rear vestibule. These cars were described on page 106 of the ELECTRIC RAILWAY JOURNAL for July 18, 1914. All-steel express trail and motor cars were also purchased for the package freight service. On the electrified steam road division, the Michigan Railway took over a bulk-freight and express business, and the development of this class of traffic is also planned for the new line.

ROADWAY CONSTRUCTION

The territory traversed between Grand Rapids and Kalamazoo is slightly rolling, some rather heavy cuts and fills being necessary, both near Grand Rapids and near Kalamazoo. The electrified steam road was built through a country where a number of curves and grades were required. Except for the track in the city streets of Kalamazoo, and on a section of private right-of-way in Grand Rapids, a maximum curvature of 3 deg. and a maximum grade of 1 per cent were obtained. Roadway standards provide for an 18-ft. roadbed on fills with $1\frac{1}{2}$:1 slope and a 24-ft. roadbed in the cuts with the same slope. No unusually heavy grading was necessary on this line, although the total for the 50 miles was about 1,000,000 cu. yd. The heaviest cut, however, contained 85,000 cu. yd. and was 20 ft. deep and 2000 ft. long, while the maximum fill contained 60,000 cu. yd. and was 30 ft. deep. Reasonably cheap right-of way made it possible to standardize on a 100-ft. width except where grading requirements made more width necessary. A section of private right-of-way several miles long and sufficient for double track, was purchased through Grand Rapids.

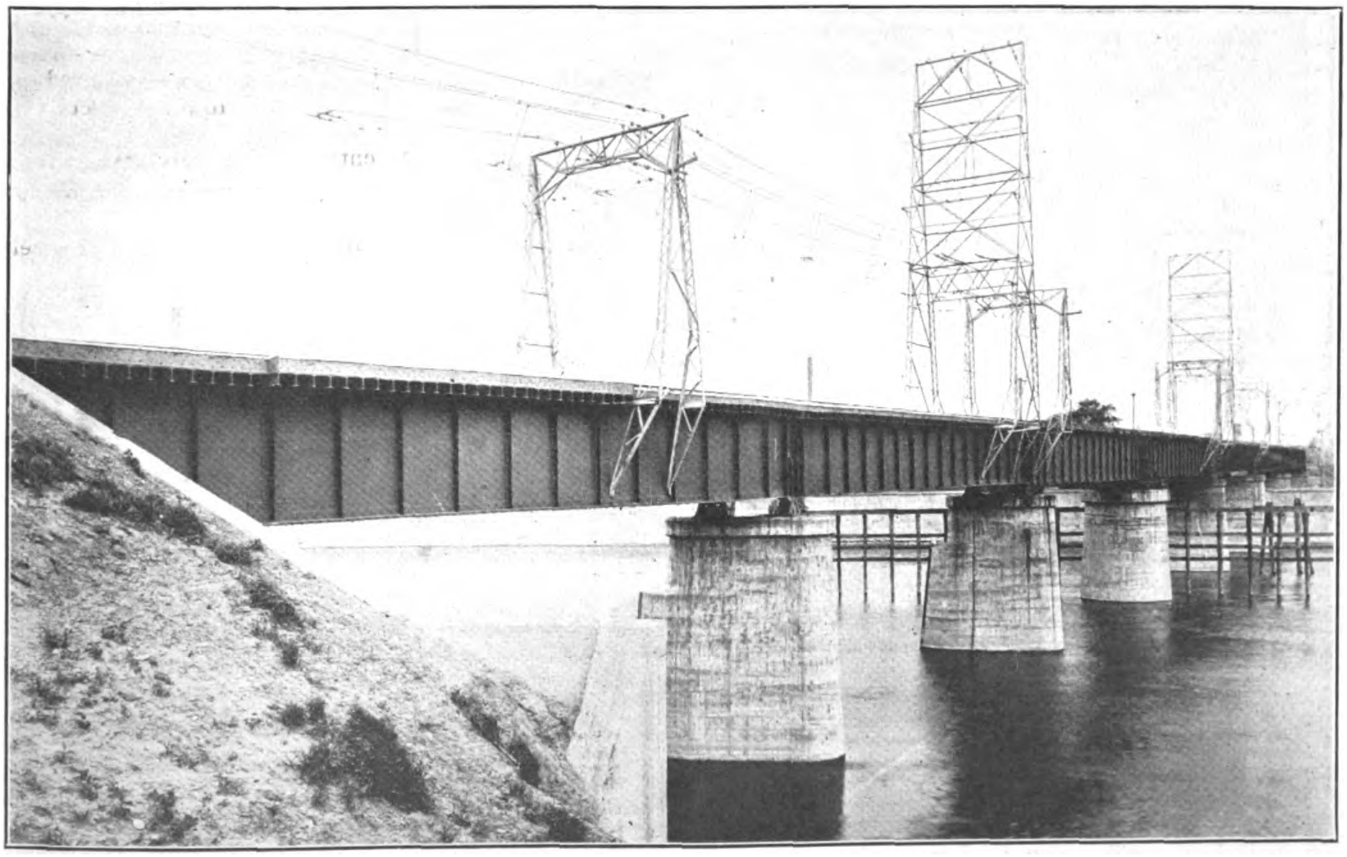


MICHIGAN 2400-VOLT LINE—MAP OF SOUTHERN MICHIGAN, SHOWING MICHIGAN RAILWAY AND ALLIED LINES

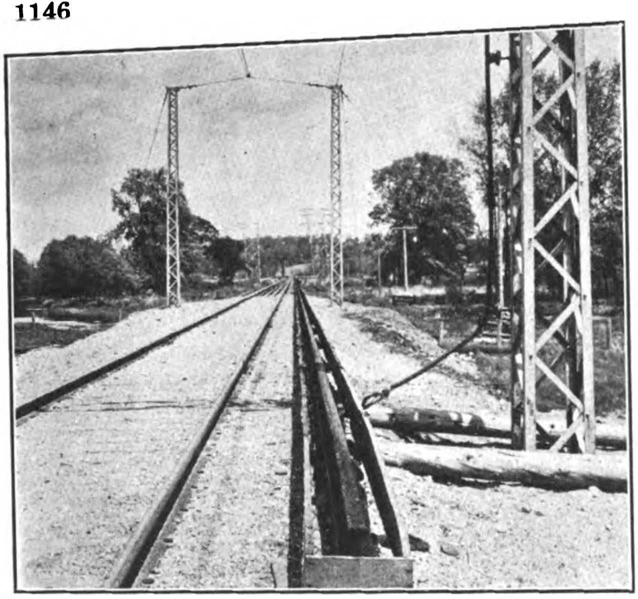
All right of way is fenced with a 48-in., No. 9 American Steel & Wire Company's woven fencing, fastened to 5-in. top, 8-ft. cedar posts, spaced $16\frac{1}{2}$ ft. apart. Wing fences and cattle guards are provided at all road crossings where the lower half of the fence is formed of 27-in. hog-tight woven wire. Above this are nailed two 1-in. x 6-in. boards, which are painted white so that the motorman can see a crossing well in advance of his train. A 14-ft. American Steel & Wire Company's tubular steel gate is used as standard at all private crossings, and the cattle guards are formed of ingot-iron metal strips with projecting angular spikes, laid side by side and spiked to the ties.

WATERWAYS

All waterways and under or over crossings are of concrete or combined concrete and steel. A rather unusual feature in connection with the smaller openings is that all reinforced concrete pipe, which was furnished under contract by the Chicago Reinforced Concrete Pipe Company, was made on the right-of-way with a portable concrete mixing plant which was moved along the line to minimize the haul of the completed pipe. All bridges and viaducts, except those to carry



MICHIGAN 2400-VOLT LINE—OVERHEAD CONSTRUCTION AT DRAWBRIDGE



MICHIGAN 2400-VOLT LINE — VIEW SHOWING CHANGE FROM THIRD RAIL TO OVERHEAD CONTACT WIRE

foreign roads, are designed for Cooper's E-40 loading which is approximately equivalent to a 100-ton car. At points where the electric line passes under a steam railroad or a highway, a clear vertical and horizontal opening 16 ft. square has been provided. The standard overhead highway crossing comprises three short deck spans with the bridge ends resting on abutments and the central span supported on structural steel bents which in turn rest on concrete foundations.

Two bridges of unusual size have been constructed over the Grand River in Grand Rapids. The lower Grand River bridge is made up of seven 88-ft. deck girders resting on concrete piers, the two central spans of which rest on a circular pier and are designed as a draw span. Double-track approaches to this bridge from each side close into gauntlet tracks over the bridge. This structure, with the two 59-ft. towers giving a 210-ft. feeder span, are shown in one of the accompanying illustrations. A double-track, reinforced concrete bridge has been constructed at the upper Grand River crossing. The Grand Rapids passenger terminal yards are at one end of this structure and a freight yard and tracks leading to a repair shop at the other end. The bridge provides a 25-ft. roadway and comprises four 96-ft. arch-spans and one 99-ft. 9½-in. central span. This structure was designed by D. B. Luten of the National Bridge Company of Indianapolis, Ind., and is shown with the business district of Grand Rapids in the background in one of the illustrations.

TRACK CONSTRUCTION

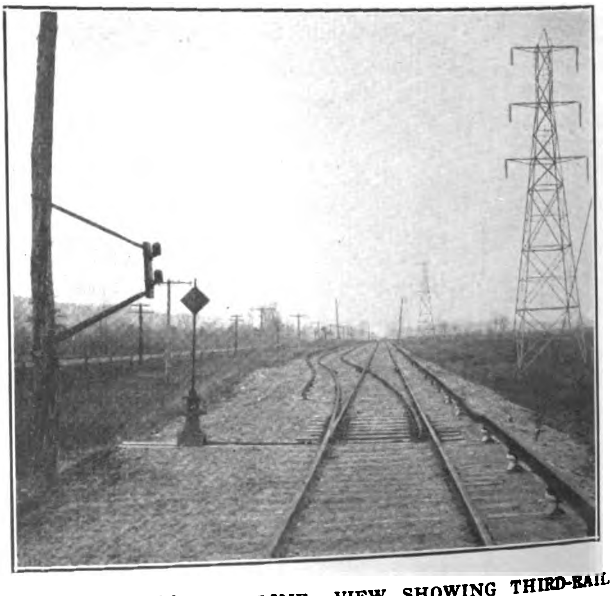
All track, including main line and sidings, is laid with 80-lb. A.S.C.E. rail on 6-in. x 8-in. x 8-ft. cedar ties spaced twenty to a 33-ft. rail. Every sixth tie is 10 ft. long and furnishes support for the third rail. Other track standards include No. 12 rigid frogs, 18-ft. switch points and 90½-ft. leads for all turnouts in the main track. All passing sidings are made approximately 1000 ft. in over-all length, and the standard of construction on passing sidings is equal to that on the main track. Special sawed-oak switch ties and high switch stands with fixed switch-targets are used in all main-track turnouts. All turnouts, including the switch stands, as well as the manganese-steel rail-bound crossings at all grade intersections with foreign roads were furnished by the Cleveland Frog & Crossing Company. It is interesting to note that all grade crossings with other railroads are interlocked, and the signal protection includes mechanically-operated home signals and electrically-operated distant signals for both lines.

THIRD-RAIL CONSTRUCTION

Special interest attaches to the third-rail construction because it is the first to be installed to conduct a 2400-volt propulsion current. Along the main line this is an 80-lb. A.S.C.E. section, low-carbon rail rolled especially for this road. The specifications provide for carbon to be not over 0.14, manganese to be not over 0.40, sulphur to be not over 0.08 and phosphorus to be not over 0.11. The rail is guaranteed to give a relative conductivity with copper of one to eight. The rail is mounted on a three-petticoat insulator furnished by the Ohio Brass Company, and this in turn rests on the 10-ft. track ties. The center of the third-rail is 32 in. from the nearest gage line of the track, and the top is 8-15/32 in. above the surface of the track rail. It is also interesting to note that, on continuous stretches of 1 mile or less in length, this third-rail is laid with expansion joints one and one-half times as wide as those allowed for standard track joints. Where the stretch of third-rail is more than 1 mile long, twice the standard track expansion is provided at joints.

Approaches to the third-rail level at all crossings are provided by bending the rail to form a 4-ft. incline with a total rise of 3 in. The third-rail is drilled with one hole at each end to serve for bolting the malleable-iron fish plates, these being so designed as to produce no strain or unusual friction and being slotted to allow for expansion. The third-rail rests on malleable-iron castings, which in turn dowel to the 8¼-in. two-petticoat, two-piece insulators. These insulators were tested at 5000 volts. They are held in place on the ties by a square, malleable lug, which is fastened with a lag screw and fits into a recess in the insulator base. The dimensions of the cap casting are such as to prevent free longitudinal movement of the third-rail. Lugs on this casting, 1 3/16 in. high, keep the rail from shifting out of line. Third-rail joints are bonded with 7-in. 500,000-circ. mil. bonds of the copper-ribbon compressed-terminal type furnished by the Electric Service Supplies Company.

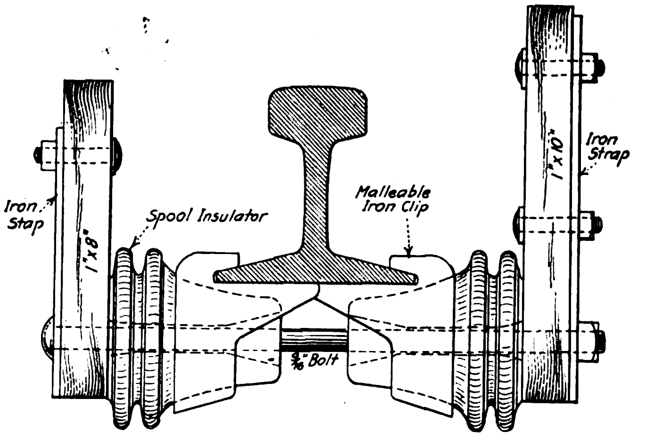
On industrial sidings and passing tracks the third-



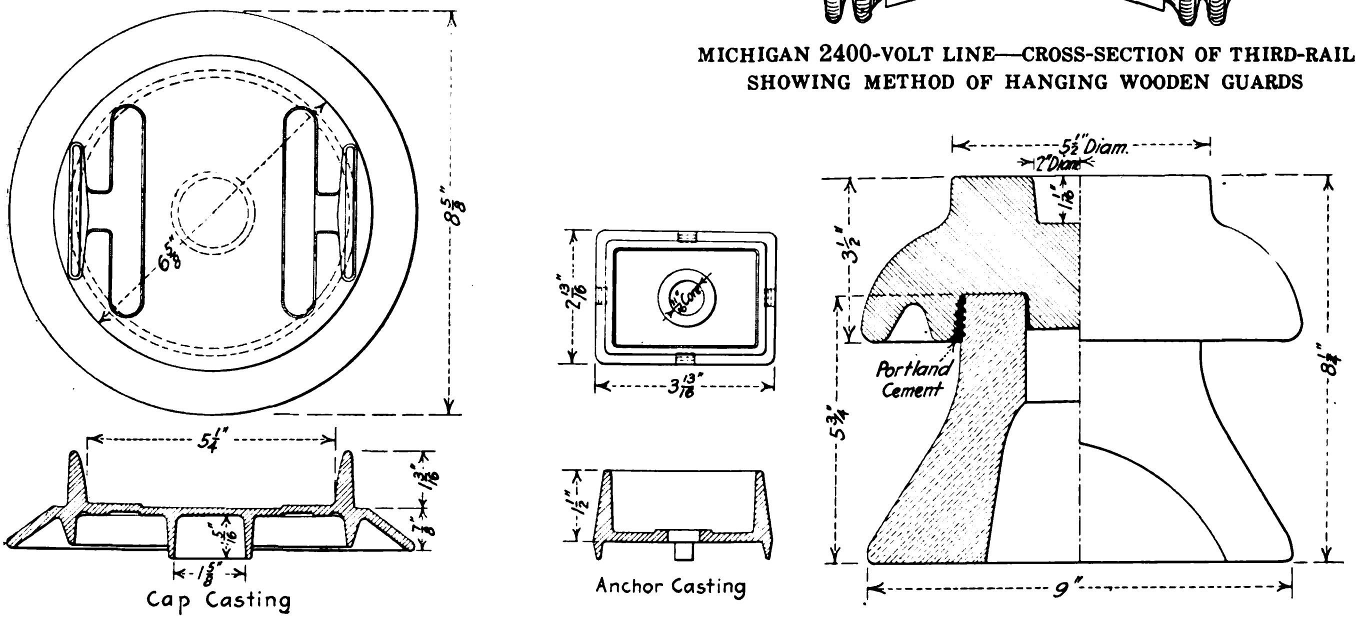
MICHIGAN 2400-VOLT LINE—VIEW SHOWING THIRD-RAIL BEFORE INSTALLATION OF GUARDS. TELEPHONE JACK BOX AT LEFT rail insulator is the same as that on the main line, but the third-rail is of 52-lb. weight. To obtain the same horizontal and vertical clearance as that for the main track third-rail, special malleable-iron cap castings were employed. The third-rail at these points is bonded with 250,000-circ. mil bonds of the same type as those used on the main track.

The third-rail is guarded on both sides to afford protection to men working on the track. The guard on the track side is a 1-in. x 8-in. fir board, the top of which is level with the third-rail. The guard on the outside is 1 in. x 10 in. in size, and the top is 2 in. higher. In this position these guards prevent a bar or any other piece of metal which may drop across the third-rail from coming in contact with it. The guard boards are 16-ft. long and are fastened together at the ends with malleable-iron plates containing holes punched oblong to permit expansion and contraction. They are fastened to the rail by two malleable-iron clip castings, which fit on the bottom of the rail and are insulated by two porcelain spool insulators. One end of this insulator sets into a recessed casting, and the other sets flush against the guard board.

At all highway crossings, as well as at points where the propulsion current conductor changes from third-rail to overhead, jumpers are provided. At the highway crossings these consist of 1,000,000-circ. mil bare-copper feeders suspended from a ½-in. steel messenger cable strung from two 30-ft. wooden poles over the crossing. The ends of the jumper are connected to the third-rail by special terminals. An overhead clearance of 21 ft. above the crossing is provided, and the poles are securely anchored to dead men. The same cable and special terminals are used in the jumpers where the third-rail joins with the overhead trolley. At these points, however, the jumpers pass from the third-rail to insulators on the latticed steel poles which are standard in all overhead construction.



MICHIGAN 2400-VOLT LINE—CROSS-SECTION OF THIRD-RAIL SHOWING METHOD OF HANGING WOODEN GUARDS



MICHIGAN 2400-VOLT LINE—THIRD-RAIL INSULATOR AND INSULATOR CASTINGS

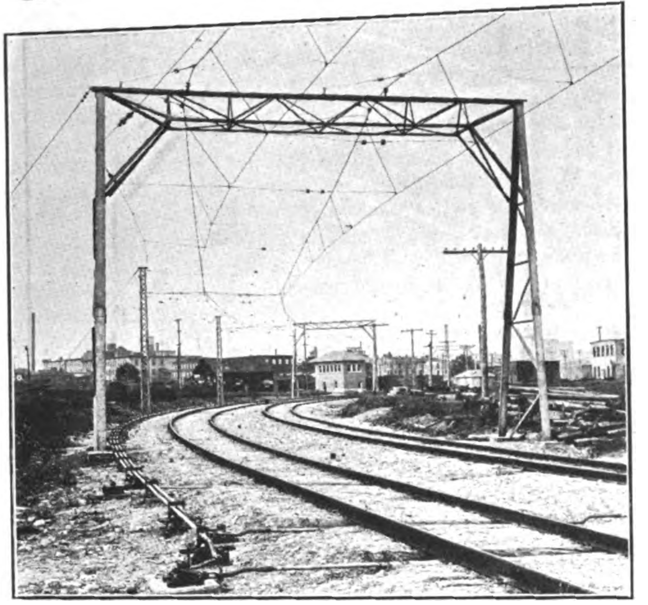
OVERHEAD CONSTRUCTION

Three types of catenary trolley suspension are used at different locations along this new line. Where there are two tracks, the line is spanned at 300-ft. intervals by double-track, special-galvanized steel bridges, built by the Aermotor Company, Chicago. The legs are 32 ft. 1 in. long and set 5 ft. in concrete, and this gives a trolley clearance of 19 ft. above the top of the rail. The clear width between the legs is 29 ft. 10 in. In connection with the design of these bridges it is interesting to note that each is required to withstand a vertical load of 1200 lb. with a factor of safety of two. The structure is also designed for horizontal load parallel to the line of 12,000 lb., distributed at four points on the upper channel. At right angles to the line and equally distributed on both sides, the bridge must carry a load of 4000 lb. with a factor of safety of two.

Trolley suspension on the 300-ft. spans is of the catenary type with a 500,000 circ. mil hard-drawn, copper-cable messenger having maximum sag of 6 ft. 6 in. This cable is designed to withstand 6324 lb. in tension, which will obtain when both the cable and the trolley are subjected to a coating of ½ in. of ice and a wind velocity of 65 m.p.h. The No. 0000 trolley is attached to the messenger by rigid hangers furnished by the Ohio Brass Company. These hangers are spaced at 15-ft. intervals, and hence give a twenty-point catenary suspension on the 300-ft. spans. On curves up to 4 deg., no pull-offs are necessary, the messenger being so attached to the bridge that it permits the trolley to take a natural curve. This pulls the plane of the messenger to a 45-deg. angle from the vertical, and in this position the hangers hold the trolley in its proper position.

SINGLE-TRACK OVERHEAD CONSTRUCTION

Single-track overhead construction is suspended from special galvanized, hot riveted, steel latticed poles set in concrete. These poles also were furnished by the



MICHIGAN 2400-VOLT LINE — CATENARY-BRIDGE CONSTRUCTION NEAR GRAND RAPIDS

Aermotor Company. They are designed with a factor of safety of two, for a load of 2000 lb. applied at the top and at right angles to the line. They will also support a vertical load of 1600 lb. at a point on the mast arm 10 ft. from the center of the pole.

These poles are set 165 ft. apart on tangent track, or thirty-two to the mile. The messenger on single track is also a 500,000-circ. mil hard-drawn, copper cable with a total tensile strength of 26,400 lb. In the 165-ft. pole spacing, the messenger sags 4 ft., giving a tension not to exceed 3200 lb. when both the messenger and trolley are coated with ½ in. of ice and the velocity of the wind is 65 m.p.h.

The No. 0000 trolley wire is attached to the messenger with rigid hangers 15 ft. apart. In the single-track overhead construction, no steady strains or pull-offs are used on curves up to 6 deg. since the messenger is so hung that it serves both as a messenger and a brail wire.

In order to give to the overhead circuit the same conductivity as the third-rail, a 500,000-circ. mil copper cable is provided. On single track this feeder is carried on a small arm on the inside of the pole, and on double-track bridge construction this feeder is suspended beside the messenger and has a sag of 6 ft. Sectionalizing switches are installed at each town so that any section of the third-rail and overhead may be de-energized.

Where siding tracks parallel the main track the latticed pole with a mast arm is used for the main track, and a wooden pole for the side track. The overhead construction for the side track usually comprises a No. 00 steel trolley wire attached to a cross-messenger suspended between the wooden pole and one end of the mast arm on the steel pole.

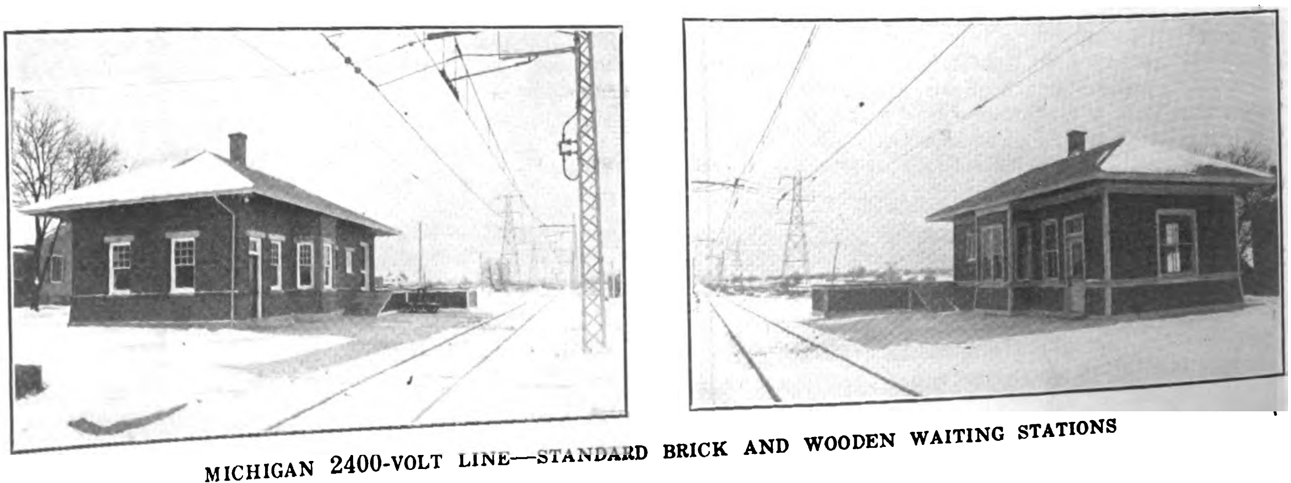
SURGE PROTECTION

With a conductor as large as the 80-lb. third-rail, it was necessary to provide surge protection. This consists of a series of aluminum cells with shunting resistances in each to balance the discharge. The series of cells is connected to the line through proper switches, fuses and self-clearing gaps. Each cell comprises a pair of concentric aluminum plates, positive and negative, properly separated and immersed in an electrolyte. Each plate is coated with a special electrolytic film. The air gap is set at a predetermined value and operates only when an excess energy impulse or surge is produced by an instantaneous release of the inductive energy of the rail due to a short circuit or other external cause.

The energy release manifests itself as an increase in voltage, the current approaching zero and the voltage increasing rapidly. The aluminum cells drain this excess energy from the rail to the ground through the large discharge surface of the aluminum plates. The effect of the plates is to produce a large current in the cell, due to the low resistance of the electrolyte. Accordingly the voltage peaks may be limited to any amount simply by increasing the number of cells, and caring for any known condition is simply a question of arriving at the right number of cells. The effect of these cells is similar to that of a safety valve on a steam boiler in that energy in excess of the normal value is permitted to escape by means of the air gap when abnormal conditions obtain.

SOURCES OF ENERGY

For the present the road, which is 94.5 miles long, is being fed from substations at Grand Rapids and Kalamazoo. A third source of energy will be furnished as soon as the transmission line can be completed into Battle Creek. At the Grand Rapids and Kalamazoo substations, energy is supplied at 2400 volts by connecting two 1200-volt rotary converters in series. The Battle Creek substation will feed the line at the same voltage, but from a motor-generator set. At Monteith Junction, where the Allegan-Battle Creek and the Kalamazoo-Grand Rapids lines cross, disconnecting switches have been installed so that either of the three branches of the road may be cut off. The feed from Monteith Junction to Grand Rapids is 28 miles, to Battle Creek 29 miles, and to Kalamazoo 18 miles. A short section of feeder line also extends from Monteith Junction to



MICHIGAN 2400-VOLT LINE—STANDARD BRICK AND WOODEN WAITING STATIONS

Allegan, a distance of 11 miles. The substation equipment and protecting devices were furnished by the General Electric Company.

WARNING SIGNS

An electric line that uses energy at this unusually high potential in a third-rail must necessarily be thoroughly fenced and supplied with warning signs. All the signs used are uniformly of blue enamel with white letters. At each side of every road crossing, there is suspended from a copper cable, a small danger sign. Also fastened to the wing fences on each side of the road, signs approximately 18 in. x 24 in. in size warn trespassers against the dangerous third-rail. Other types of signs displayed along the right-of-way include whistle, station, distant siding and bridge signs, and all are made of sheet metal with blue and white lettering. Where it was necessary to mount these signs on independent posts, they were attached to special galvanized angles set in concrete.

Unusual signs are also employed to indicate to the motorman the change from 2400-volt to 600-volt trolley, which is necessary when the cars leave the new line to enter the city streets of Kalamazoo, Grand Rapids and Battle Creek. These signs are illuminated by three 40-watt Mazda lamps, receiving their energy from the 600-volt trolley, and each one is 15 in. wide by 39 in. long, being suspended from four I-bolts beneath the mast arm about half-way between the trolley wire and the pole. An arched metal hood projects from the top of the sign over the lamps and serves both as a reflector and as a protection against the weather.

TELEPHONE LINES

Three copper metallic return telephone lines were strung on separate poles set along the edge of the right-of-way. Two of these lines are used by the railway company, one for commercial purposes and the other for train dispatching, and the third line is for the Commonwealth Power Company's dispatchers. Jack boxes on angle brackets are installed beside the head blocks at all passing sidings. If the telephone line is on the side of the track opposite the head block, the wires are carried down the line poles in conduits, thence underground to a special pole set beside the head block which supports the jack-box brackets. If the head block is on the same side of the track as the telephone pole line, the special pole is fitted with a cross-arm and merely serves to carry the telephone line to the conduit which extends from cross-arm to jack box.

STANDARD STATIONS AND SHELTERS

Two types of stations were constructed at the cities and villages along the new line—one a permanent brick and concrete building and the other a wooden building similarly arranged, but smaller in dimensions. At important crossroad points, wooden shelters, which cost approximately $200, are provided. These shelters are fully inclosed and rest on concrete foundations. Each one is provided with a small concrete platform.

GRAND RAPIDS AND KALAMAZOO TERMINALS

At Grand Rapids and Kalamazoo property was purchased in the heart of the business district and converted into commodious passenger stations with yard tracks for storing eight or ten passenger and express cars. At Grand Rapids the passenger and express terminal building is situated in the business district on the west side of the Grand River, and the freight house and team tracks are on the west bank of the river opposite the terminal. The freight facilities include a warehouse 50 ft. wide and 185 ft. long, built of brick, concrete and steel. Quite an extensive team-track yard, as well as a storage yard leading to a repair shop also situated at this point, have been installed.

At Kalamazoo, the terminal building combines a passenger station, baggage room and freight warehouse. Four storage tracks of sufficient length to hold two cars each, make up the terminal yards. Two of the tracks are used exclusively for passenger coaches and the other two for loading an unloading freight.

The work of building this high-grade, 2400-volt, third-rail line, and electrifying the steam road between Allegan and Battle Creek, was under the immediate supervision of George L. Erwin, president and general manager of the Michigan Engineering Company, and G. J. Wagner, superintendent of construction. During the construction period, the Michigan Railway Company was represented by the late W. A. Foote, vice-president, who promoted the line and who was responsible for many of its unique features.

Jitneys for Sale in Kansas City

The accompanying picture represents the third stage of the jitney transportation industry in Kansas City. A firm of three men which started three buses, each carrying twelve passengers, on April 1, 1915, is now offering the buses for sale. Three of the men had other lines of business and are said to have invested about $5,800 in the two Appersons and one Velie, making two of the bodies in the planing mill of two of the company members. Two of these men drove the buses for awhile, until they found that their own business needed their attention. The third bus was driven by an outsider, who finally obtained a small interest in the company. They claim that the business would be profitable if they could give their personal attention to it, which they cannot do.

FOR SALE
FOR SALE
27th & PROSPECT.
12th & GRAND.
5717

MONTH-OLD BUS FOR SALE IN KANSAS CITY

The Public Service Commission for the Second District of New York has completed moving from rooms in the Capitol and scattered offices in two buildings on Washington Avenue, Albany, to quarters provided by the trustees of public buildings on the three upper floors of the office building at 58 North Pearl Street, corner of Steuben Street. The offices of the commissioners, general offices, hearing room, filing divisions and the various engineering, legal and accounting bureaus gathered under one roof will greatly facilitate the business of the commission. The general offices are located on the fifth floor.

Report of Chicago Railway Terminal Commission

Co-operative and Distributed Terminals for Freight and Passengers Are Recommended

The Chicago Railway Terminal Commission, of which John F. Wallace is chairman, has submitted a preliminary report to the Chicago City Council committee on railway terminals, summarizing the result of its trip to Europe last summer and discussing the needs of passenger and freight terminals in the city of Chicago.

In its letter of transmittal the commission says that in addition to studying the Chicago situation it has made personal examination on the ground of terminals in Toronto, Montreal, Boston, New York, Liverpool, Manchester, London, Paris, Brussels and Antwerp. It has also had referred to it five ordinances and fourteen resolutions orders and communications in regard to electrification and smoke abatement, but it considers it unwise to formulate any views thereon until after the report of the Chicago Association of Commerce committee of investigation on smoke abatement and electrification of railway terminals. As this latter committee has spent four years and several hundred thousand dollars in the accumulation of facts and in the investigation of this subject and as the question of the electrification of the roads and the rearrangement and unification of track facilities are closely interlaced, the commission says that they should be carefully considered in conjunction with each other.

In its preliminary report the commission first described its organization and membership, which consists of Walter L. Fisher, Bion J. Arnold, E. H. Bennett, the Commissioner of Public Works, the corporation counsel, the chairman of the committee on railway terminals, and John F. Wallace to act as chairman. The solution of the railway terminal problem, according to the commission, requires elimination of the waste due to unnecessary and uneconomic duplication of freight and passenger facilities. It says that in the terminal district in Chicago the unnecessary complication of terminal facilities and operating costs is so extensive that it is appalling in its effect upon the railroads, the shippers and the public. The investments by railroads in unused or little used property to protect real or fancied competitive positions or interests is also a source of great expense to the railroads and ultimately to the public.

The report does not recommend a single terminal but a series of interconnected union terminals. Thus it says that a single union passenger station, even if principally devoted to through passenger service, should not be made so large or embrace so many roads that its very size reduces its advantages below those that would come from dividing the service among two or more union stations. The advantages to the railroad as well as to the public of co-operative passenger stations would be more generally recognized if it were not for the mistake which has hitherto been made in many union passenger stations of erecting monumental buildings, not only for their imposing architectural effects, but also to provide accommodations for through passengers and suburban passengers in the same building. The huge size of many union passenger stations, it says, could be materially reduced by recognizing the different necessities of the suburban and through service. The two classes of service do not desire or require the same accommodations. Each would be better served if given separate accommodations more directly adapted to its needs. The suburban service is, in many respects, more nearly related to the service performed by street and interurban railway lines than to the through service of the steam railroads, and these various services can be co-ordinated with great advantage, and in a manner to secure a more intensive utilization of existing rights-of-way.

The commission is also convinced that the co-operative principle recommended for passenger service should be applied also to the freight service. This means the establishment, for example, of a number of universal freight receiving stations for outbound l. c. l. freight, so that shippers may deliver to these stations for all the railroads or for properly classified groups of railroads. This would greatly reduce the amount of teaming and street congestion which results from unnecessary teaming. The commission also believes that serious consideration should be given to the advantages of the two or more level plans in the future development of freight facilities in congested terminals. This plan increases the capacity of a given area considerably more than 100 per cent, depending upon the nature of the plan used.

In referring to electrification the commission says in brief: "Both the railroads and the public are looking forward to the substitution of some less objectionable motive power for the present steam locomotive, especially in the operation of passenger terminals and terminal tracks. Without anticipating the findings of the report of the committee on smoke abatement and electrification, it seems safe to assume from the evidence generally available that electricity is the only motive power other than steam that has demonstrated its practicability for such extensive application as would be necessary in Chicago. It is also apparent that the cost of electrification would be greatly reduced by simplifying and unifying the passenger tracks entering the city, by removing the present tangle of cross lines, by establishment of direct instead of round-about routes within the city, and by the joint use of tracks available for and adequate for more railway companies than those which now use these particular tracks. The adoption of outlying co-operative freight stations will greatly simplify the electrification of the more trans-central freight terminals and tracks."

The commission also recommends the straightening of the Chicago River, by which a large additional area would be reclaimed in the central business district.

The report includes a stenographic report of an interesting interview between members of the commission and H. W. Thornton, general manager of the Great Eastern Railway of Great Britain, on the subject of electrification of steam lines and suburban traffic. Mr. Thornton, who was formerly connected with the Long Island Railroad, believes that suburban commuter business should be profitable. He said that profit in passenger business does not come from carrying a few passengers a long distance. It comes from carrying a great many passengers a short distance. On the long-distance trains the passenger may have a seat reserved in the sleeping car and yet occupy a seat in the cafe car, in the dining car or in the observation car. This means three or four seats for one passenger, and he can sit in only one seat at a time. But in the suburban business he has only one seat, and this is how the trains are filled. This makes the suburban business a profitable one. According to Mr. Thornton, if the Pennsylvania Railroad in New York, instead of building its lines underneath Manhattan Island had built a subway down Seventh Avenue and had connected with the Long Island Railroad at Flatbush Avenue with stations in New York en route as at Thirty-third Street and at Wall Street "there would have been untold millions in it."

Central Electric Railway Accountants

Report of Meeting Held in Indianapolis on June 11 and 12—Abstract of Paper on the Relation of the Accounting and Mechanical Departments

The twenty-seventh meeting of the Central Electric Railway Accountants' Association was held on June 11 and 12 in the Severin Hotel, Indianapolis, Ind. The opening session was called to order at 1:45 p. m. Friday by the president, H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway. Charles L. Henry, president Indianapolis & Cincinnati Traction Company and the Central Electric Railway Association, made the opening address. Mr. Henry spoke generally on the necessity of modern accounting, and cited several interesting personal experiences and anecdotes of early crude forms of keeping accounts. He thought that there was a possibility of too much refinement in account but believed that accounting had become an art and had been very much simplified by the standard classifications. Mr. Henry touched upon the relations between the commissions and the companies and the burdens that had been imposed upon the street railway business by city councils and other bodies, not with the intention of bettering the conditions for the public but for political effect. He thought that if the business interests were to receive proper treatment in the future, they would have to get into politics in the broadest sense and take part in the primaries or conventions, up to the final vote, and afterwards in the legislatures, so that every candidate would know that business in this country was looking after its interests.

Mr. Henry paid high compliments to the American Electric Railway Association, the Central Electric Railway Association and the Central Electric Railway Accountants' Association. What he particularly liked was the splendid team work of these organizations. No other class of business so new both in life and in character could show such results in so short a time. Mr. Henry mentioned the valuable assistance of the committee on accounts in straightening out things with the Interstate Commerce Commission, and also said that it was through the arguments and efforts of the accountants that the Public Service Commission of Indiana accepted the Interstate Commerce Commission form of report, thereby eliminating the necessity of two separate forms.

PAPER BY MR. HEMMING AND DISCUSSION

The next order of business was the presentation of a paper by R. N. Hemming, superintendent of motive power Union Traction Company of Indiana, on "The Accounting Department and Its Relation to the Mechanical Department." This paper is abstracted elsewhere in this issue. Mr. Hemming supplemented his paper by reading from the report of a steam railroad committee on reclamation, etc., printed in the *Railway Master Mechanic*. The contention of the report was that while "scrap" was usually taken to mean useless cast-off articles, the fact that articles were cast off did not imply that they were without value for other purposes. Yet, in the use of this second-hand material, care must be taken to avoid too much handling, or the cost of handling will exceed the value of the scrap. The report also contained recommendations in regard to handling of the serviceable second-hand material and the classification of the material returned to the storeroom.

In discussing Mr. Hemming's paper, L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, believed it impossible to have any fixed classification for departmental costs for the use of several companies but explained a system of departmental costs that might be used by various companies. He stated that his company had been using such a system for some time. If the mechanical department does work for the roadway department, for example, a departmental bill covering the cost of the material and labor is sent to the auditor's office. Mr. Hixson stated that as yet no charge was made for a certain percentage to cover depreciation, use of tools or superintendence. In his opinion no general classification could be arranged to take care of all departmental charges, unless each company amplified it to meet local requirements.

W. H. Forse, Jr., secretary and treasurer Union Traction Company of Indiana, said in regard to the classification of rolling stock criticised by Mr. Hemming that he did not think it possible to make a hard and fast line of demarcation. In dealing with the Interstate Commerce Commission it had been found necessary to compromise; and if concessions had not been obtained after a hard fight with the commission, the companies might have had a classification much more burdensome. In the distribution of departmental costs Mr. Forse did not think that enough charge was made for overhead expenses. He said that manufacturing companies sometimes charged from 50 per cent to 100 per cent for productive labor, and the charge of 10 per cent to 15 per cent made by some railways was not enough. The mechanical department likes to feel it can make articles cheaper than they can be purchased outside, but in most cases if a proper per cent were added for overhead the price would be found too high.

Mr. Hixson thought that a charge for overhead should be made which could be absorbed in the departmental accounts and not appear on the books. Each department could then show the proper costs, but this would not show on the general books because of the contra credit. He did not think a charge should be made for any profit on the company's own work.

Mr. Hemming stated that it was not his idea to show any profit, but he wished to show actual costs because he thought the mechanical department was operating at a loss. He felt that the roadway department, for example, had nothing to give back to the mechanical department to offset the loss in use of tools, etc.

Walter Shroyer, auditor Union Traction Company of Indiana, thought that if it was figured closely, the power, heat, etc., furnished to the shops would take care of any losses. He said that four or five years ago the Union Traction Company of Indiana figured out the matter and found there was not a great deal of difference. If a charge for supervision, use of tools, etc., was made for doing work for other departments, it was offset by the power and heat furnished by the power department.

T. P. Kilfoyle, auditor Cleveland (Ohio) Railway, in commenting on Mr. Hemming's statement that the storeroom was usually under the control of the purchasing agent, said that the purchasing department should not have anything to do with the storeroom. The latter is a separate department. After the goods are purchased, the purchasing agent is through, and the accounting department does all the checking and should have charge. As regards scrap, Mr. Kilfoyle said that this is reclaimed at Cleveland, and the material is used again for other purposes.

After considerable discussion, Mr. Hemming suggested that a committee be appointed to settle the various points. Mr. Kilfoyle moved that the paper be referred to the executive committee for decision as to the appointment of a committee to go into the matter further.

BALANCE SHEET DISCUSSION

Mr. Hixson then read a paper on "The Analysis of the Balance Sheet." An abstract of this paper was printed in the ELECTRIC RAILWAY JOURNAL of June 12. Mr. Forse asked Mr. Hixson what became of the reserve for the amount represented as set aside for injuries and damages, bonds purchased, etc. Mr. Hixson explained that if, for example, the annual payment to the sinking fund was $50,000, the entry would be to charge sinking fund $50,000 and credit sinking fund reserve for the same amount. When the bonds were purchased and cancelled, the sinking fund would be credited and bonds debited. There would be no change in the sinking fund reserve. Mr. Forse thought that the balance should be a free surplus or surplus unappropriated. Mr. Hixson agreed that this was correct, but said that if the sinking fund cash was used for bonds the sinking fund reserve would still be preserved, and should be kept until the retired bonds, again capitalized. Mr. Forse asked if the cash could not be used for investment in case it was not desired to issue more bonds. Mr. Hixson stated that the reserve was not cash and could not be used in the payment of dividends, even though it had been used in decreasing the indebtedness of the property.

The report of the compiling committee was next read by C. M. Witt, general storekeeper Union Traction Company of Indiana, chairman. After a short discussion, it was approved and accepted.

The report of the standing passenger and freight committee was read by Mr. Shroyer, chairman. After some discussion on the new form of interline and local way bill adapted in size and form for use on a standard typewriter, the report was approved and accepted. The meeting then adjourned until Saturday morning.

SATURDAY'S SESSION

The first order of business on Saturday morning was a short talk by P. C. Johnson, general auditor The Prest-o-lite Company, in lieu of the paper on "The General Principles of Accounting as between Common Carriers and Manufacturers" which he had been requested to prepare. Mr. Johnson related some experiences which he had as a steam railroad accountant to illustrate the trouble which may be caused by carelessness or failure to handle properly certain accounts. He thought that a great deal of attention was now being paid to the question of material and supplies on hand. These usually involve a large investment, and they should be safeguarded the same as cash. Not too much idle material should be allowed to remain in stock.

Mr. Johnson also discussed the matter of a proper inventory of such material. He thought that owing to certain practices the actual inventory usually showed above the book value. This was sometimes pointed to with pride, but it should be overcome if possible. Mr. Johnson explained that in manufacturing practice ledger accounts are kept for each class of material handled through the factory. They show what the maximum and minimum amount of material should be, to what department each kind of material is issued, value or cost, balance on hand, etc. Every day a certain number of items are inventoried and compared with the book figure. In this way, in the course of four or five months all items have been actually inventoried and adjusted to the book values, and it is not necessary to shut down the plant and take an inventory at any one date. Trial balances from the stock ledger are drawn off and show the value of material on hand.

In speaking of the balance sheet and the profit and loss statement of either railroad or manufacturing companies, Mr. Johnson stated that they must contain a certain amount of estimates. Such estimates should, therefore, be very carefully made in order to get as closely as possible to the financial condition of the company. In such cases the handling of material is as important as the handling of cash, and it should be followed up closely so that no more is carried on hand than absolutely necessary.

Mr. Hixson agreed with Mr. Johnson that the balance sheet should show everything possible, and that estimates when made should be very close in order not to prove deceptive.

The next paper was on "Electric Light and Power Accounting by a Combined Railway and Light Property," by Oren A. Small, auditor Benton Harbor, St. Joe Railway & Light Company. An abstract of this paper was printed in the ELECTRIC RAILWAY JOURNAL of June 12.

Mr. Hixson asked if in posting to the ledger from collection sheets a separate bill is used. Mr. Small explained that the bill is made in duplicate, a receipt for the customer and the stub for the collection agent. The collector writes the ledger account number (no names appear on the bills), and the posting is direct from the collection sheet.

In discussing the classification of accounts, A. C. Van Driesen, chief accountant Toledo Railways & Light Company, stated that Ohio had just put out a new electric classification which differs from the Michigan classification and also from that of the National Electric Light Association. They are, however, arranging a classification to meet the requirements of both states. Mr. Van Driesen explained the method used at Toledo in charging to other departments the power generated by the electric department. General expenses which apply to each one of four departments are divided on a percentage basis in proportion to gross earnings. The charge for power to the railway department is an arbitrary fixed charge, with an additional amount charged for each kilowatt furnished.

F. T. Loftus, auditor Indianapolis & Cincinnati Traction Company, described the method used by that line in making the drops to transformers for supplying lighting current to small towns along the system. There was considerable discussion as to the separation of the transmission and distribution systems in such cases.

The ensuing paper on "The Small Electric Line Handling Carload Freight," by James S. Clark, auditor Marion & Bluffton Traction Company, was abstracted in the last issue of this paper. Mr. Clark said that no tariff was filed except a switching tariff between cars on the Marion & Bluffton Traction Company and the Clover Leaf Railroad. In turning over cars to the steam road, the latter bills out the cars and the traction line does not know where they go. E. L. Kasemeier, auditor Ohio Electric Railway, brought up the matter of track scales. He said that the American Railway Association had made a ruling that no shipment that had not been weighed would be accepted under through rates. The road that weighs the car should charge the other road $3 per car. As the amount of business would not warrant small lines putting in track scales, he thought the proposed charge of $3 per car would be a serious matter to them. Mr. Hixson thought that the summary in Mr. Clark's paper, showing the volume of business handled with such a small amount of equipment, was one of the good points and should be brought to the attention of officials to help promote greater handling of carload business. Mr. Clark stated that the revenue derived by the Marion & Bluffton line from this carload freight amounted to 22 per cent of the total revenue.

The secretary then read to the meeting by-laws which were submitted as amendments to By-laws 1 and 2 of the Central Electric Railway Accountants' Association. Upon vote, the changes were adopted as presented. The meeting then adjourned.

ACCOUNTING AND MECHANICAL DEPARTMENTS

BY R. N. HEMMING, SUPERINTENDENT OF MOTIVE POWER
UNION TRACTION COMPANY OF INDIANA,
ANDERSON, IND.

The relation of the accounting and the mechanical departments to the purchasing department of electric railways is so interwoven that their jurisdictions frequently overlap. The accounting department, however, has no jurisdiction over the mechanical operation of a railway property or over the supplies. The supply or storeroom department is usually under the purchasing agent, who often has peculiar ideas as to the system which should be carried out between the mechanical department and the storeroom.

There are wide variations of opinion regarding the relation of the three departments previously mentioned. It seems almost impossible to adopt any set of uniform rules and regulations that can be used universally on all properties. Various managers are inclined to operate their properties to suit their own individual taste, irrespective, in a large number of cases, of what the association or the subsidiary departments have recommended or agreed to do. It also seems that what is good for one property is not always adaptable to the others—in other words, that not every recommendation which passes the associations is a "cure-all," and sometimes the remedy is worse than the disease.

Efficient management, no matter how well worked out its details may be, cannot be fully attained unless the human factor receives careful attention. The human element in any organization is half the problem—the most important half. Full recognition of the intimate relations between cost accounting, production, engineering and the field of industrial relations, each of which has so direct a bearing on both costs and output, is necessary to build a successful organization and to attain economic operation.

To attain this economic operation, it occurs to the writer from practical experience in reference to the railway scrap heap or second-hand material which has accumulated about the property—that all second-hand material should be received in the storeroom or substoreroom and credited to the department from which it is received. This material can be taken back at full or partial value as may be agreed upon. The writer was thus able to save thousands of dollars for a large property with which he was once connected.

It is human nature to want to draw or use new material in preference to old. It would not be economy, however, to operate a separate room for second-hand or used material. The general storeroom should have complete jurisdiction over all material, either new or old. Thus, other departments which use materials which are common to all could aid the company financially by drawing on the storeroom for such material as needed—the order might be filled in whole or in part with used material. This is a question which involves the accounting department and purchasing department, but mainly the operating head. Such a scheme might find objections from the accounting department and the purchasing agent, the former on account of the extra work required to credit such material and the general accounting resulting; the latter because he is responsible for the amount of capital invested in supplies and desires to keep the investment down to a minimum. There seems to be nothing in the Interstate Commerce Commission requirements to show that such a scheme would not be acceptable, nor would it be contrary to law. This is one of the things in which the accounting department can greatly aid the mechanical department and its company by lending a helping hand.

In regard to the Interstate Commerce Commission classification of 1914, relative to Accounts Nos. 66, 67, 70 and 71, the accounting department should present objections. There are many of these items that are chargeable to the mechanical department, yet they come under the heading of "Conducting Transportation." Items pertaining directly to the operation and maintenance of equipment should be included in the accounts provided under the head of "Equipment." Take for instance Account No. 70, "Carhouse Employees." All of the items set forth in this account are under the jurisdiction of the mechanical department, yet they are listed under the transportation department. This is also true of Account No. 71.

What is the definition of rolling stock? What constitutes a snow plow or scraper? Would one not imagine that the snow scraper referred to by the Interstate Commerce Commission means a piece of rolling stock mounted on wheels? Yet are not two planks built in a "V" shape with iron plates on the bottom and fastened to the rear end of a car by ropes, a piece of apparatus that should be charged to the roadway department—likewise, rail grinder, weed burner and bonding outfit to its respective department—equally as much so as the heating and lighting of the shops and the water supply for the same should be charged to the department which uses it? If a weed burner and bonding car are charged to the motive power department, why not hand cars, and if not hand cars, why weed burners and bonding car? One is a piece of rolling stock as much as the other. If the appliances of a crane or pile driver are chargeable to the motive power department, why are not the transformers and rotaries and appliances of a portable substation rightfully chargeable to this department? Cranes and pile-driver appliances are no more used for the motive power department than is the equipment and apparatus in a portable substation. The whole thing is inconsistent.

Is it not equitable and fair that the mechanical department should charge other departments a percentage for the use of shop tools and machinery, and for the supervision of such work as is performed by the mechanical department for the roadway department, power department, etc.? If it became necessary for the mechanical department to purchase new machinery, the roadway or the power department would not be willing to stand any part of the costs of replacement or renewal of such machinery. Yet the wear and tear of doing their work is bound to depreciate the usefulness of such machinery. Each department that does work for another department, even though both are in the same company, should charge a percentage, just as much as the committee on uniform charges of repairs on foreign equipment has recommended to charge, cost plus 15 per cent. There is nothing in the Interstate Commerce Commission system of accounts to prevent such a scheme. It is the duty of the Accountants' Association to see what it can do to carry this out.

Billing of inter-departments should be put into effect.

Each department should bill the other departments on a regular billhead for any work or material furnished, so that the chief of the department can observe the cost on such work. The policy of the auditing department simply charging up these items to the respective departments is misleading to the department chiefs, as each department must make out its yearly estimate and is expected to operate within such estimate. If in checking over his monthly or yearly expenditure he does not have at hand vouchers of work done by other departments, the chief may have to his discredit many items which may be difficult or impossible to explain.

The mechanical department should, where it is consistent with the size of the property, use a calculagraph to keep accurate account of all work done for it as well as for other departments, in order to insure that all charges for labor and material are placed against the proper account and the proper departments. With the human element, errors are bound to occur. One account will be overcharged and another one under. This is a good opportunity, however, for the accounting department to lend some assistance to the mechanical department and to the company in general. The Indianapolis Traction & Terminal Company has such a system in vogue at its shops, and it has proved very successful.

Cost accounting and time-keeping should be done by the storeroom as it is, or should be in close touch with the source of supplies and production. The storeroom is usually located adjacent to the main shop, and its close relation in this respect affords a more economic means of computing time consumed and costs.

Many small items in the way of improvements are frequently being placed on cars. It is strange that when such items only amount to a few dollars or as high as $25, a construction account number cannot be secured authorizing the installation, and such items have to be charged to maintenance. No ruling is found in the official system of accounts prohibiting the issuance of the desired order, regardless of the amount involved in dollars and cents.

Forms of stationery common to the auditing or accounting department and another department should receive the co-operation of both departments. One department should not proceed with getting out printed blanks without consulting the other department involved. The use of legal-size paper should be avoided entirely, and as much as conditions permit stationery of a standard letterhead size should be used.

In the last year the Central Electric Railway Association appointed a special committee on uniform charges of repairs of foreign equipment. This greatly concerns the accounting department and its relation to the mechanical department. The writer was not in favor of a blanket proposition of cost plus 15 per cent. The items of brakeshoes, brake heads, journal bearings, journal wedges, trolley wheels, poles, harps, axle bearings, coupling hose and accessories, carbon brushes, signal lamps, etc., should be billed at a fixed price, for the reason that cost plus 15 per cent means the exposure of many contract prices. The whole subject deserves serious consideration.

There is vast room for improvement which can be obtained by closer co-operation, not only between the accounting and the mechanical departments, but all other departments. The accounting department can aid very materially by making a strenuous effort at least in the direction of securing accurate mileage data on the operation of revenue and non-revenue cars over its own lines, as well as the individual car mileage operated over foreign lines. As the purchase of supplies is regulated largely upon the mileage obtained in service, accurate mileage records should be kept pertaining to everything, especially regarding rolling stock.

The Boston Center-Entrance Trailer

Being a Description of the Construction and Equipment of the New Rolling Stock of the Boston Elevated Railway

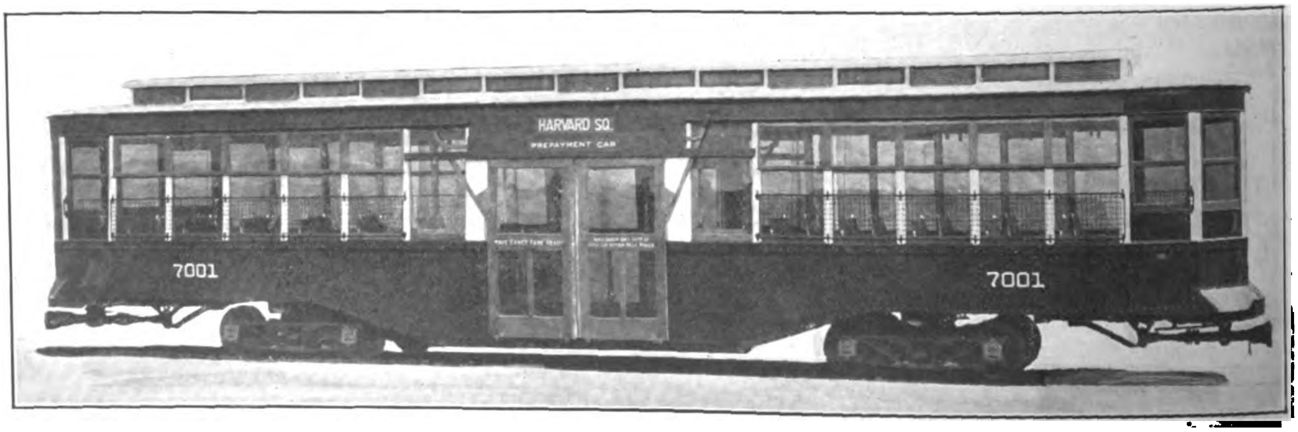
A description of the general plan and dimensions of the Boston (Mass.) Elevated Railway's new center-entrance surface trailer was published in the ELECTRIC RAILWAY JOURNAL of Jan. 9, 1915, page 99. An order for seventy-five of these trailers was placed about that time with The J. G. Brill Company and for twenty-five trailer car bodies with the Laconia Car Company. The following article describes additional features and details of this car, and accompanying illustrations show interior and exterior views of the completed car.

GENERAL CONSTRUCTION

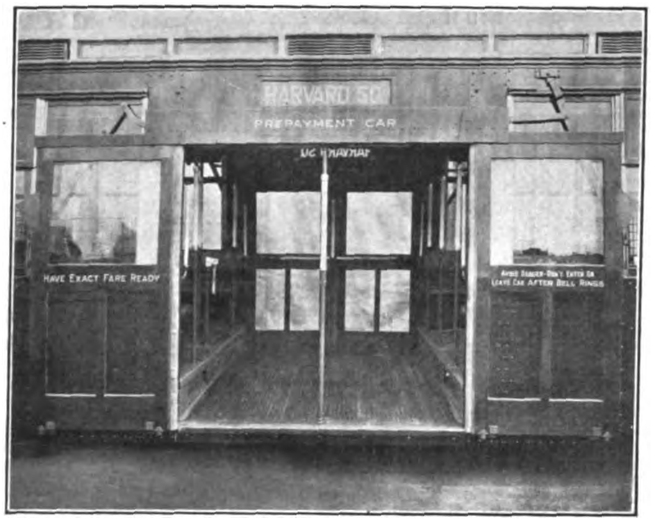
The weight of the new trailer car body is 15,900 lb. and its length is 48 ft. 2½ in. over anti-climbers. The all-steel underframe is composed of ⅛-in. pressed-steel crossings, side sills of 5-in. x 3-in. x ⅜-in. angles reinforced with 2-ft. 1¾-in. x 3/32-in. sheets, and end sills of 3-in. x 3-in. x ⅜-in. angles. The side posts are of 1½-in. x 2-in. x 3/16-in. x ¼-in. "T" construction. The side of the car is slightly tapered from window rail to eaves. The roof is of the wooden monitor-deck type and is equipped with seven Perry ventilators on each side.

CENTER-ENTRANCE ARRANGEMENT

A feature of the new trailer is the arrangement of the center-entrance section shown in an accompanying illustration. This section consits of a well extending across the car. The width of the well is the same as that of the door openings, 6 ft. 6 in., and its floor is 15 in. above the rail. A 10-in. step on each side of the well leads to a ramp, which has a rise of 4 in. in a length of



BOSTON CENTER-ENTRANCE TRAILER—EXTERIOR VIEW



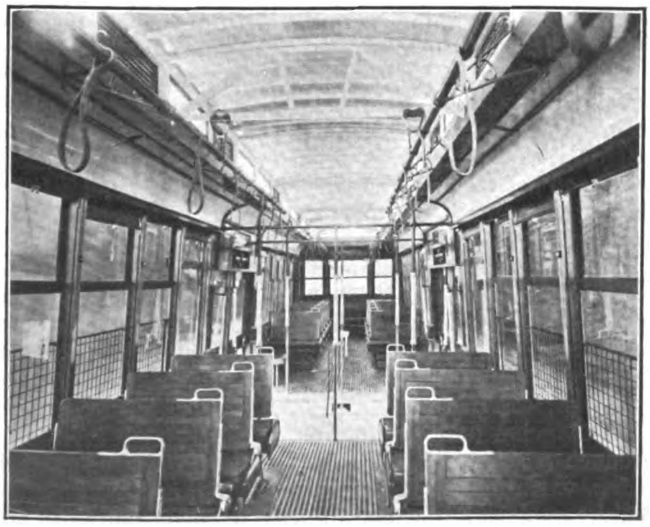
BOSTON CENTER-ENTRANCE TRAILER—VIEW OF SLIDING DOORS AND CENTER-ENTRANCE WELL

4 ft. The well floor is equipped with Universal safety treads. The entrance to the well is guarded by two doors which slide open on runways located outside the car siding. The upper halves of the doors are slightly bent inward in conformity with the tapering car siding. The doors are controlled by an operating mechanism of the Consolidated Car Heating Company.

Both doors are operated by levers actuated by an air valve over the door entrance. The air valve will be mechanically controlled by the throwing of a handle on the conductor's stand which will be located in the center of the well. The closing of the doors will be automatically announced to the motorman by means of a signal light. A white-enameled stanchion is located at the center of the door opening for the assistance of boarding passengers, and a row of three vertical stanchions, joined together overhead by a transverse pipe, border each side of the well, as shown in the accompanying interior view. White-enameled grab handles are bracketed on each side of the door entrance. The entrance well will be arranged for prepayment operation.

INTERIOR EQUIPMENT

The seating capacity of the car provides for sixty-two persons. The end space used ordinarily for door entrances and exits or for the motorman's compartment is in this case utilized entirely for seating accommodations at both ends by means of a semicircular seven-passenger seat. In addition there are ten transverse and two longitudinal Brill "Winner" cherry slat seats on each side of the car. The cross-seats are 35⅛ in. long and are separated by an ample aisle space of 28½ in. Under the seats will be installed Consolidated heaters equipped with tilting heat deflectors for preventing the overheating of seats by deflecting the heated air to the rear of the seat. The upper deck has no headlining but the lower deck is lined with Agasote. The interior has a mahogany finish. Trimmings are of Aero metal. The curtains are of double-faced Pantasote material with Curtain Supply Company's curtain fixtures. The hand brakes are operated by a Pittsburgh drop handle installed close to one of the middle stanchions. The car is equipped with the Consolidated buzzer system.



BOSTON CENTER-ENTRANCE TRAILER—INTERIOR VIEW

EXTERIOR EQUIPMENT

The double-truck equipment is known as the Brill 53-F, which has a wheelbase of 5 ft. and 24-in. wheels. The size of the journal boxes is 3½ in. x 6½ in. Other exterior equipment includes Tomlinson Type A, form 8 couplers, Westinghouse air brakes and Keystone destination signs, installed on the letterboard over the center-entrance door.

The "Journal" at the Fair

Headquarters of This Paper at the Panama-Pacific Exposition in San Francisco

The headquarters of the ELECTRIC RAILWAY JOURNAL at the Panama-Pacific Exposition at San Francisco are in the Palace of Electricity, at the corner of Avenue C and Second Street. The accompanying illustration shows the attractive booth which is occupied by this paper, in conjunction with the other papers published by the McGraw Publishing Company. The signs are illuminated by means of lino-lites, and the exhibit consists of bound copies of the papers for several years, with current copies and issues of the directories. There is also an exhibit of interesting views of important installations in the electric railway field and other fields covered by the McGraw papers, the views being thrown on a screen by means of a stereomotograph. These views have attracted a great deal of attention.

ELECTRICAL WORLD
ENGINEERING RECORD
ELECTRIC RAILWAY JOURNAL
McGRAW PUBLISHING CO

HEADQUARTERS OF "ELECTRIC RAILWAY JOURNAL" AT EXPOSITION

Readers of this paper are cordially invited to visit these headquarters when in San Francisco.

C. E. R. A. Meeting

Abstracts of Papers on Track Joining and Bonding, the Human Element in Electric Railway Operation, and Engineers and Public Service

The summer meeting of the Central Electric Railway Association was held on board the *S.S. City of Erie* on June 17 and 18 between Cleveland and Buffalo. Abstracts of three of the papers presented at the meeting follow. Owing to the fact that the meeting was held on the boat it was not possible to secure a report of the proceedings for this week. This, with an abstract of Mr. Allen's paper, will appear in a later issue.

TRACK JOINING AND BONDING

In a paper with this title E. C. Price, vice-president Indianapolis Switch & Frog Company, Springfield, Ohio, gave a review of the history of joint construction on interurban and city track as well as the methods of bonding the joint, pointing out the importance of a permanent joint, both electrically and mechanically. This, he said, is specially important in paved streets where any repairs or renewals of joints or bonds necessarily entail a heavy expense.

The speaker then reviewed the four types of welded joints put on the market: (1) The Lorain or spot welded joint, (2) the cast or molded joint, (3) the thermit joint, and (4) the Indianapolis arc welded joint which is made by welding a fillet of steel electrode around the periphery or edge of a pair of plates. According to the speaker, this process of applying is similar to joining one piece of fabric to another by sewing around the edge, which in arc welding of plates is accomplished without heating up the rail to the point of impairment, as heat is only generated under the point of the ¼-in. diameter electrode as it travels the edge of the plates, and the latter are so shaped and placed that no lines of welding are opposite, and thus tend to heat the rail through the opposite sides. This joint is applied with a small inexpensive outfit, known as the portable electric welder, requiring but one man to operate it. Any number of joints may be applied as economically as a quantity and under traffic conditions where necessary.

Efficiency tests of this joint show the conductivity and strength of the joint is from 100 per cent to 125 per cent compared with the unbroken rail. In a test for strength, two pieces of 7-in. T-rail, joined together with these welding plates, were subjected to a pressure of 30,000 lb. when supported on 2 ft. centers. This test resulted in curving the head of the rail and in stretching the base of the two plates, representing an area of 1½-in. thickness of metal, without impairing the welding fillet excepting for a distance of 2 in. or 3 in. at the point of elongation of the plates. Other tests have been made by removing the ties for a distance of 3 to 4 ft. each way from the joint, but, under traffic, less deflection was shown at the joint than within the rail proper.

The speaker, after then referring to some conductivity tests described in the paper read before the Iowa Street & Interurban Railway Association by F. V. Skelly, assistant superintendent Tri-City Railway & Light Company, and reported in the ELECTRIC RAILWAY JOURNAL for April 24, 1915, described the results of a test made by the Bureau of Standards in Washington. In this case the rail joint tested consisted of two sections of 7-in., 70-lb. T-rail, 2 ft. and 5 ft. in length respectively, joined together by two arc welded plates similar to plates 3391 and having approximately the following dimensions: Mean length 22½ in., width 4½ in., thickness ¾ in. The resistance of 3 ft. of joint and 3 ft. of adjacent rail was determined by measuring the drop across the respective sections with a Weston millivoltmeter while the rail carried approximately 300 amp. The results follow:

RESULT OF TEST

Resistance of 3 ft. of joint	0.0000272 ohm
Resistance of 3 ft. of adjacent rail	0.0000376 ohm
Conductance of 3 ft. of joint in per cent of conductance of continuous rail equals 138 per cent.	
Resistance of rail per foot	0.0000125 ohm

In conclusion the author said in part:

"Many roads heretofore deprived of welded joints on account of quantity or cost are now installing this combined joint and bonding plate largely in the reclamation of old track and welding broken rails. For this purpose the manufacturers have designed what is known as the Apex type, reinforcing and supporting the head or tread side of girder or side bearing rails that have become weakened or split along the web. The Simplex type is similar but without the head support. This joint being of more recent origin than any other of the welded type is not as widely known. The plates, which are nominally ¾ in. thick, 30 in. in length at the base and 20 in. at the top with ends beveled, are fitted to the contour of the base of the rail and are temporarily bolted or clamped in position during the welding.

"The metal electrodes used are of special steel of the requisite resistance, melting point and content, which in combination, with contributed elements in the flux coating, insure a perfect, homogeneous weld, of maximum strength and free from blow-holes and impurities necessary to resist electrolytic and corrosive action. The arc is drawn between the electrode as the positive and both the edge of the plate and the rail as the negative, producing a cavity in the negative members which is filled in and built up by the molten electrode. The time required for welding a joint is from twenty to forty minutes, depending upon size of rail and traffic.

"The cost of welding a 9-in. girder rail, including the plates, welding steel, current and labor is given as from $3.50 to $5 per joint, varying with the type of plate used and conditions which applied. In new construction the rail ends should be either milled or slightly under cut to allow the heads to join closely together. In old track with open joints, a dutchman cut from a rail of the same section is inserted, completely filling the space between rail ends. These joints, as all others, should be ground to a perfect surface alignment after welding.

"The practice of welding the joint is no longer confined to the high sections but is now extensively used for all weights of rail, if bound in by paving or a surrounding roadbed and particularly if anchored to steel ties, and even without this provision in localities of even temperature.

"Expansion and contraction, if restrained, is said to produce a stress of 1000 lb. per square inch for each 7 deg. variation in temperature. This, under extremes, will be sufficient to cause failures at weak points in the continuous track either at or between the welds. Failures of this nature may be due to the quality of the rail or an impairment through welding, both of which may be prevented.

"From the foregoing it would appear that if the jointless track of perfect conductivity, the value of which is recognized, is of a permanent nature, eliminating joint and bond maintenance and materially reduce other items of upkeep, through maintaining high physical condition of the track, it will lead to the utmost universal adoption for city tracks, excepting at special work, where it is not practical.

"In the final analysis we find that the manufacturers have specialized and developed joint and bond materials, with the aid and co-operation of railway engineers, and that the progress has more than kept pace with increased requirements. Furthermore, it may be said that there is now a prevention as well as a cure for joint and bond disease."

HUMAN ELEMENT IN ELECTRIC RAILWAY OPERATION

BY H. C. DECAMP, REPRESENTATIVE OF THE WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, CINCINNATI, OHIO

Lack of education and training is the root of all evil represented by improper operation of cars, and explains the high cost of power per ton mile and excessive maintenance of equipment, overhead and track expenses. Since the first electric car was operated in Richmond, Va., it seems to have been the opinion of operating men that the position of motorman called for unskilled labor. This is probably caused by the fact that in the early days horse-car drivers or cable grip-men were used for that position, in an endeavor to keep the organization intact. It is true that it did not require much skill to operate cars in those days, as schedules were slow, cars light in weight and lacking in complicated equipments. The principle of operating a controller or hand brake is practically the same to-day as it was then—that is, in the motions taken to utilize these. Yet the art of operating electric cars has made as rapid advancements as any other feature in electric transportation, although this fact seems to have been overlooked by many operating officials in their haste to keep pace with improvements along other lines.

Betterment of the condition of the motorman in recent years has been forced, while other improvements have been for the most part made voluntarily, or as a matter of course in order to keep pace with events. The working conditions of traction employees to-day are ideal compared to what they were twenty-five years ago, but the responsibilities have increased in like proportion. The compensation paid is far greater than in the old days, but the companies are getting very little more for what they give. The fault must lie at the door of the management, for overlooking an opportunity to benefit by an educational course for the employees.

There are more opportunities for the education and training of men for any other position or trade than that of motorman. The American Association has made arrangements for a course of training for railway employees through a correspondence school, but nothing is said about the motorman. One cannot learn to be a motorman by correspondence, for it takes practical experience as well as practical demonstrations to train one properly for this position.

Owing to the fact that there never has been a general school of instruction for motormen, such as can be found for every other trade, it becomes necessary for each company to train its own employees before putting them in service. This is usually accomplished by placing the prospect under the guidance of a tutor, usually one of the oldest men in the service. If the applicant has had some experience in railroading he becomes familiar with the road in a short time and is instructed as to operation of controller and brakes. But who has instructed the instructor? Instead of improving conditions he may be teaching the new man in the old out-of-date way.

Some companies have the applicant, after he has been turned in by his instructor, placed in the shop for a stated time and thoroughly instructed in the equipments he will come in contact with. Please note the word "thoroughly," for there are men who have spent the regular time in the shop but did not gain much valuable information, owing to the fact that there were no regular shop instructors or predetermined course for them to follow, and they were left to shift for themselves. In such cases the applicant begins his work with a feeling that all he has to do is to get by the best he can. There are some electric railways which have educational courses, but they are in the minority.

Some time ago an article on instructions to motormen was drafted, and some of the member companies had it printed in pamphlet form and placed in the hands of their men. It was both surprising and gratifying to learn that the men as a whole took a deep interest in the subjects mentioned. When they found that some of the suggestions for the operation of their cars conflicted with their individual methods they willingly changed to the proper course. The majority had been following out their own way because they had not been instructed differently.

Most motormen are sadly lacking in the art of coasting with a corresponding saving in power, and this can be accounted for by their lack of knowledge of the expense to which the company is put to produce it. Coasting clocks and meters are being used in an endeavor to increase the amount of coasting, with marked success, but the men should be educated in the use of these instruments, as well as the method and the expense of producing power. Instructions to men in a body, with lantern slides or other illustrations, do very well in their way, but practical demonstrations on a car by a competent authority are of greater value. There are not many motormen in service to-day gifted with the art of judging weight, speed and distance. The practical demonstrations, therefore, can be used advantageously to convince them of the saving in power which can be accomplished by obtaining the maximum amount of coasting in any given run and under all conditions. By using a car for demonstrations, the proper method of accelerating, running and braking can also be shown to advantage.

Another very important point to consider is being prepared for emergency stops. A motorman, as a rule, runs his car every day in the same manner and all goes well. When something unexpectedly happens he has to decide instantly what to do, in his excitement he loses his head and invariably does the wrong thing. It is well to instruct the men what to do in each case so that they will always be prepared for emergencies. Preparedness on the part of the motorman may be the means of saving thousands of dollars in claims.

Some managers may say that it is not advisable to educate motormen, as it is unnecessary to make electrical engineers of them. Quite true, in some respects. The efficiency of a motorman may be classed as 80 per cent good judgment and common sense and 20 per cent knowledge of his equipment. Many may say that too much knowledge may lead to trouble on account of the men meddling with the equipment, but there are not many men who are looking to do another's work. They do want to have sufficient knowledge of the apparatus to bring their cars into the shop if anything happens.

In all of the educational efforts expended to-day on the part of accident preventions, such subjects as the saving of power, reduction of maintenance and service to the public could be covered at the same time if a method of instruction had been mapped out which would show the men that their interests were being considered as well as the prevention of accident claims. In any organization, whether railroading or otherwise, it is essential to have every man in the organization satisfied with his position and a loyal booster. When the human element is in this condition of mind it is easy to bring about other reforms than accident prevention.

There is another unfortunate condition which exists in many railways—that is, a lack of co-operation between the operating and the mechanical departments. Of all departments these two above all others should work in harmony. The mechanical department working at a high state of efficiency and with modern appliances overhauls a car and sends it out for service as good as new. The operating department may place it in charge of an inexperienced man, and it is shortly turned in for control or motor trouble, or possibly for brakes, which is of course objectionable to the mechanical department. It is true that cars are turned in for imaginary troubles, but on the whole, the mechanical department should welcome information from the operating men. A motorman operating a car all day under service conditions, if he is a competent man, is usually in a better position to discover faults with the equipment than is the man in the shop.

In taking up the education of employees, companies should not lose sight of the fact that conditions surrounding the daily life of the men will have a great deal to do with winning the human side of the men to the methods of increasing their efficiency. Pleasant surroundings and various classes of concrete welfare work will be bound to have their effect upon the human element in the men.

The question of education for employees is of such importance it should be considered by the association as a whole for the influence such action would have on other companies. There are standardization committees on almost every subject in electric railway transportation, but little has been done in educational or welfare work, which without doubt presents the greatest opportunities for reforms in transportation problems.

ENGINEERS AND PUBLIC SERVICE

BY PROF. M. E. COOLEY, DEAN ENGINEERING DEPARTMENT UNIVERSITY OF MICHIGAN, ANN ARBOR

To-day lies in an engineering age. Modern civilization is an engineering product. Were the engineer's work to be stopped, civilization would stop. The engineer, having produced the structure of modern civilization, cannot now shirk the task of perpetuating it. The real work of the engineer is but now begun. Upon him devolves the task of making the country support the growth of population. This means increasing the food-bearing land, co-workers in other fields increasing its productiveness. It means bringing the food from remote districts to the point of consumption. It means many other things of a constructive character. But more than all, it means conserving the things now possessed.

The work which is now and in the future must be the engineer's, if the public is to be served most effectively, cannot be done at all without the support of his neighbor in other walks of life. To win this support, he must make his neighbor understand. Thus the engineer must become a teacher, an apostle, to preach the gospel of understanding to those who do not now realize the condition of things.

The conditions of the times are well represented by the quarrels between capital and labor, between the public service corporation and the public. The men in control of each and all of these great forces must be made to understand the facts and principles upon which their respective demands are based, and how far they can reasonably expect to have them satisfied. For example, railroad employees must be made to realize that omitting taxes and depreciation, one-half or more of the total operating expenses goes to them in wages. Thus, if there is a 10 per cent increase in wages, there is a 5 per cent increase in operating expenses. That much less is available for taxes, depreciation and support of the investment.

The state and federal commissions should be made to understand that there is a limit below which operative earnings cannot go if the demands of labor are to be met with increasing frequency and the property is to be maintained always in condition to render the service required. Where the two lines, decrease of earnings on the one hand and increase of expenses on the other, cross, or soon after, there must be a crash. To use a hydraulic term, there will no longer be any difference of head to turn the wheels.

The public service commission stands for the public. It is a splendid controlling force. Its motives are not to be impugned. Yet it needs the kind of information which engineers can furnish. Congress has recently made the acquirement of some of this information possible on the grandest scale ever undertaken. The valuation of railroads by a federal board has already begun. It is a stupendous task in its details, and still more stupendous in its possibilities of application. The engineering profession has a direct interest in the conduct of the work and its welfare. It should not stand aloof but interest itself now and until the last figure is made. Then will come the application of the results by the Interstate Commerce Commission to the problems of capital and rates to be allowed. Here again the engineer will have a teaching work to do. What elements of cost shall be considered proper for capital, and what factor shall make up the allowance out of earnings for operating expenses and maintenance of the property in a condition to render safely at all times the service demanded. These are new fields for most engineers, and before they can become teachers they must become students.

Engineers have so closely confined their attention to the details of their work as not to see very far beyond. It may be, and probably is, a result in large measure of the engineer's ability to center himself on specific things that the world has advanced so far in a multitude of directions. There must still be inventors, men content to devote a lifetime to the accomplishment of a single thing, specialists in the various fields. But engineering has widened its scope beyond the capacity of individuals. With this expansion there has grown the necessity of men trained in a broader way, not alone in engineering, but in all other walks of life.

The question must frequently arise in the future—whether it will or will not be wise to go to public ownership. Somebody should be able to give the true answer. The engineer is the natural man. His training fits him particularly for the necessary analysis of the problem, and upon his judgment the public must, or should, rely.

The conditions as between the public and the public service corporation have now become so serious as to involve more than individuals. There is a widespread belief that the public service corporation has not been dealing fairly. This may have been true in the past and probably was in some cases; indeed, it may still be true, but nowhere nearly to the same extent. The mistake is now recognized, and the attitude of the utilities is for peace on favorable terms. The public, however, wants peace on its own terms. Right here the danger lies. The pendulum is likely to swing back too far, and in revenging itself the public is liable to cripple itself. That must be guarded against.

The importance of utilities to present civilization has been pointed out. Nearly $37,000,000,000 of private capital is invested in them. More will be needed as the country grows. Where will it come from? Certainly not from individuals when they understand the attitude of the public towards utilities. Capital will seek safer and more remunerative fields. The statistics of 1911 show that the net income of all utility corporations was $843,855,442. This is an average rate of return on all the capital of but 2.3 per cent. If the stocks, amounting to $19,329,023,135 be eliminated, there is but 4.85 per cent return on the $17,383,237,766 of bonds. No one will contend that the bonds alone represent the entire value of the property. Bonds are protected by a mortgage, and the mortgages are not given on full values. If it is assumed that the total value is represented by the bonds plus one-half the stock, the rate of return becomes 3.12 per cent on $27,047,749,333. Thus the average rate of return on utility investments is less than can be had in the savings banks. Why, then, does money flow into public utilities? Largely for the same reason that it flows into gold mines—namely, ignorance of the true conditions, particularly on the part of the small investor. The large investor is not usually found in the non-paying companies, except as he invested when the conditions were different and cannot now readily withdraw.

There are many things to be made clear to the general public before public service corporations can feel that cordial relations have been re-established. None is more important than an understanding of the real cost and value of utility property. One would expect this to be an engineering matter, but the courts have had a hand in laying down the rules for valuing property, and these must of course govern. Unfortunately the courts and the engineers have not always approached the problems in the same way or had the same point of view. Thus the engineer has often been obliged to sail a rather tortuous course in an effort to bring about what he believes is the right result of an appraisal of property. A problem already complex enough is thereby rendered more complex.

Another deplorable matter is the practice in this country of discounting the testimony of witnesses in hearings before commissions and courts. That is, the apparent necessity of having several engineers testify to the same set of facts. In England and in Canada, one engineer who has shown by his qualifications that he is competent to testify, is considered enough. But here, notwithstanding the array of engineering talent brought into court, the issues seem still to remain in doubt. This is particularly true in hearings before commissions relating to public service properties. The reasons appear to be that as far as the public is concerned the case has been prejudged, and no amount of controverting testimony can effect a change. Then, too, there is the feeling that engineers whose testimony is favorable to the corporation have been bought.

It behooves engineers, therefore, so to regulate their conduct that the people will have confidence in them. The engineer's capital is his reputation. He must not depreciate or destroy it. He must stand ready to serve the people with a loyalty commanding the respect and confidence of everyone. To do this most effectively he must, in addition to whatever specialty he may have in mind, rise above it and view his profession of engineering in a broader aspect. He must recognize that his duty as a citizen is even more important than as a specialist, and stand ready at all times to aid in the solution of public questions for which his training has so well fitted him.

As an illustration a recent action of an engineering society might be cited. In Detroit, where for years there has been a fight between the city and the street railway, the society sent the following communication to the Street Railway Commission: "In view of the fact that many of the problems that you have under consideration are largely engineering problems, especially those pertaining to valuation of existing railway property and to the study and planning of radical improvements of Detroit's transit facilities—we, of the Detroit Engineering Society, respectfully offer you our most cordial co-operation both as engineers and as citizens of Detroit." It is pleasing to add that this offer was accepted. Another instance of recent date is the action of the Western Society of Engineers in outlining the proper relations to be followed with engineering advisers.[1]

Harold Albert in a recent paper read before the Western Society of Engineers discussed in cogent language the engineer as a student of public relations. He said that upon the engineer rests the responsibility, and with him lies the capacity, to render the largest public service possible in setting the lawmakers' and the consumers' fears of excessive profits at rest, and also aiding in securing the right for the public utility to earn a fair return, all hazards considered.

These are a few out of many examples to illustrate what is meant by the engineer in the service of the public, or engineering in a broader aspect. Every true American must do his part in the work of general betterment, but to the engineer falls the task of explaining many things of an engineering nature which the citizen uses and does not understand. The one great obstacle to present welfare is ignorance—ignorance of things based on engineering and economics. Engineering in its broadest sense may include the latter. The engineer in the service of the public must as speedily as possible be made to understand that there are other things than mere material things to plan and execute. He should enlarge his horizon, look out upon the world, and try to comprehend the problems waiting to be solved. He should as a first requisite acquire a broad knowledge of the complex man of to-day.

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[1] WHEREAS, The president of the Sanitary District of Chicago appointed a commission early in 1912 to investigate and report, among other matters, on the water power development of the Sanitary District, which report, after careful investigation, has recently been made public; and

WHEREAS, Certain members of the Sanitary District, the City Council of Chicago, and the daily free press have poured out a torrent of fretful rebuke and personal insinuation against the individual members of the commission, all apparently because the facts and conclusions of said report were not what had been expected;

Therefore be it resolved—that this society views with regret this public attempt to abuse men who were apparently trying to do their duty to the public in setting forth facts as they found them and testifying to the truth as they saw it, and the society would point out for the benefit of the public officials, who have been conspicuous in this controversy, the following proper relations with engineering advisers, which it wishes to emphasize at this time, as a matter which vitally affects the public welfare:

(1) That an engineer's first duty to his client is to tell him the truth, no matter where it may lead, or how unpalatable it may be.

(2) That engineering and engineering economics are subject to natural law, which cannot be altered to suit the whims of human nature.

(3) That the most serious disgrace that comes to an engineer is to conceal, prevent, or distort natural and economic law, either to please a client or temporarily advance his own interests, and so ultimately lead his client into difficulties.

(4) That an experienced engineer of standing ranks as a confidential professional adviser, feeling keenly his responsibilities, and whose integrity and conscientiousness, when properly established, should be appreciated and upheld by his client.

(5) That engineers, while not infallible, or superhuman, are more apt than laymen to be right in their findings on engineering facts and economic truth connected with engineering matters.

Organizing the Traffic Survey

General Discussion of Type of Man, Organization and Supervision to Be Employed in Traffic Surveys—Work Mapped Out for Large, Medium and Small Companies

BY F. W. DOOLITTLE, DIRECTOR BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

Although the development of extensive traffic studies has been relatively recent, various companies in order to judge of operating efficiency have for many years prepared certain traffic statistics. At first such data were usually taken from conductors' trip reports and confined to the determination of the number of passengers carried throughout the day and to the number of cars provided for their accommodation, with particular reference to the occurrence of heavy loads and the profitable use of trippers. The figures so obtained were variously plotted and analyzed.

A description of a method used in 1901 on the New Orleans & Carrollton Railroad, where it was introduced by George H. Davis, former manager of the road, now of the firm of Ford, Bacon & Davis, was published in the STREET RAILWAY REVIEW of Sept. 15, 1901, in an article by A. H. Ford, now general manager of the Cumberland County Power & Light Company. Since that time, however, necessity for greater and greater detail has arisen, and to meet this more extensive traffic studies have been made.

No attempt will be made here to pass on the value of these traffic studies, but it will be worth while to examine later the details of some of them as showing what practice has been and is. In this article the topic will be the organization of a traffic survey. It is well agreed that the type of man and organization to be employed in such a survey is of vital importance to its success. In the following paragraphs especial attention will be paid to the details of organization.

FUNCTION OF THE TRAFFIC SURVEY ORGANIZATION

The function of the traffic survey organization is the collection and the compilation of information concerning traffic characteristics which it is necessary for the officers in charge of operation to have in order that the maximum operating efficiency may be reached. That organization is best which permits the collection of the maximum amount of pertinent and reliable data at a minimum cost.

There are three distinct classes of work in making traffic surveys:

(a) The collection of data by observation in the field.

(b) The compilation and tabulation of field data in the office.

(c) The supervision of this work (a and b) and the study of results.

Based on these studies is the construction of time-tables, and it would be of advantage in many cases to place the working out of schedules under the man who directs and supervises the making of traffic studies, and who analyzes their results. When this is done, there should be added a fourth division of the work:

(d) Construction of time-tables.

Before discussing further the general features of the organization and the supervision of the work, it will be well to examine both the purpose and the nature of the work to be done in the field and in the office.

FIELD AND OFFICE WORK

The extent of the data required and the frequency of their collection present problems which will receive more extended attention later. Here it is pertinent to note that the field data to be recorded will consist of such items as the number of passengers boarding or leaving a car at certain points, the number of seated passengers on the car, the number standing, the time at which the car passes certain points, the condition of street traffic, the types of passengers, classified as to occupation, and other similar information. All items must be neatly and accurately recorded and turned in to the office in such shape as to facilitate their combination with similar records taken by other observers.

Although there is substantial agreement as to the duties of observers, there is some disagreement among traffic experts as to who these field men should be—conductors on regular duty, conductors especially assigned to the work, or inspectors and special agents drawn from other departments or not previously connected with the company. The 1910 report of the committee on construction of schedules and time-tables of the Street and Interurban Railway Association shows[1] that out of thirty-eight companies reporting on the matter, twenty-four used inspectors, twelve used conductors, and two used special agents. In the discussion that followed this report it was brought out (three to one) that conductors' reports were uniformly unreliable and that inspectors were far more efficient.

If it could be done without sacrificing efficiency, it would be economical to have observations made and data recorded by the conductor on duty with each car. Experience with this method of procedure, however, has been generally unsatisfactory in city operation. Bion J. Arnold, in his San Francisco survey made in 1912, reached the conclusion that a traffic study based on conductors' reports is unreliable[2]. Yet it might be noted that conditions of interurban operation permit conductors to devote more time to recording traffic statistics than those prevailing on city lines, and that results under these conditions are reliable[3].

A. M. Taylor, director of the Department of City Transit, Philadelphia, in reporting the Philadelphia traffic survey of November, 1912[4], speaks of the great accuracy of the results as being caused by the employment as checkers of experienced conductors borrowed for the purpose from the Philadelphia Rapid Transit Company. These conductors did not have charge of the cars but confined their attention to the collection of traffic data. In 1909, Stone & Webster[5] in making a traffic count on the Metropolitan Street Railway lines in New York City resorted to the same expedient, namely, borrowed a number of experienced conductors from the company and used them as checkers. It must be borne in mind, however, that the purposes of both these studies and the extent of the data recorded were such that sufficient accuracy could be obtained only by men extremely familiar with local conditions.

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[1] 1910 Proceedings of the Transportation and Traffic Association of the American Electric Railway Association.—p. 256 a.

[2] San Francisco Transportation Problem, December, 1912. Report on Traffic and Service.

"To make results, as many as five observers were stationed on the non-prepayment cars. . . . These counts showed the following missed fares or passengers missed by the conductor on a single trip:

"One line was ninety passengers short.

"Four lines were fifty passengers short.

"Eight lines were twenty-five passengers short.

"Thirteen lines were ten passengers short.

"In one case . . . during a typical rush-hour period, 38 per cent of the total registration was missed on a single car trip. In comparison therewith, only two prepayment lines showed ten passengers or over missed by the conductor, the average being four or five. In these two cases, the excessive crowding on the rear platform (against the company rules) prevented the conductor from reaching the passengers clinging to the rear step."

[3] Howard F. Fritch, in ELECTRIC RAILWAY JOURNAL, Sept. 21, 1912, comments as follows:

"Passenger counts are taken both by inspectors on the street and by conductors. The conductors take the counts most frequently. Not only have very good results been obtained from counts taken in this manner but it is much more economical, as a large force of inspectors would have to be employed to take counts over so large a territory as is covered by the Bay State Street Railway, while a large number of counts can be taken by the conductors at one time with practically no additional expense."

[4] "The Solution of a City's Transit Problem."—*Electric Journal*, October, 1914, page 518.

Efficiency is developed by instructions as well as by experience and practice[6], and whether conductors undertake the work in addition to their regular duties or devote their whole time to recording traffic data, or whoever the field men may be, it is considered good practice to give the men taking the data thorough instructions in methods best calculated to insure accurate results. Bound pocket books ruled into columns with proper headings or printed cards should be provided for the recording of all data, and frequent checks should be made of the accuracy[7] of the record.

The office force has as its duties the assembling and the analysis of the data collected by the observers and the preparation of information for use in constructing time-tables. It may also be called upon to prepare special information of various sorts for various other departments. Questions of routing, transfers, extensions, time of loading under different conditions, effect of changing social and business conditions, etc., are subjects on which the traffic survey department may make reports. The office force should be recruited from those in other departments which have shown an aptitude in grasping the significance of figures. There will be drafting to be done, but this will be largely the construction of curves and for that reason will not require great technical proficiency.

SUPERVISION

Whether the traffic survey is carried on under the superintendent of transportation, with the work done by regular conductors and clerks from his office, or is placed in a separate department whose director reports to the manager or superintendent of transportation, will of necessity depend many times on the size of the company and on the distribution of other duties among the officers and departments. It is of interest that the chief engineers of two state railroad commissions have recommended very strongly the establishment of separate and distinct organizations wherever possible for the collection and analysis of traffic data[8].

In this connection the ELECTRIC RAILWAY JOURNAL of April 25, 1914, reports the Pittsburgh Railways as having maintained for some years past a department of traffic statistics composed of divisions dealing with:

(a) Routing and time-table.
(b) Traffic counts.
(c) Dispatching.
(d) Publicity.

In outlining the transportation department of the Metropolitan Street Railway, New York, the ELECTRIC RAILWAY JOURNAL of June 25, 1910, states that a distinct time-table and statistical bureau is maintained in the department under the supervision of the superintendent of transportation. This bureau is under the immediate control of a chief who is aided in the work by a force of clerks and stenographers, tallymen and time-table makers.

Another article in the ELECTRIC RAILWAY JOURNAL of Sept. 21, 1912, by Howard F. Fritch of the Bay State Street Railway time-table department, describes that organization and its work. The department was originated in June, 1910, under Prof. A. S. Richey as superintendent of transportation. Its duties are as follows:

(a) To make investigations of traffic.
(b) To keep graphical records.
(c) To make time-tables for the entire system of 938 miles of track.

The preceding discussion of the organization of a department of traffic studies brings out certain general principles which have been deemed of value in the past and which it may be worth while to emphasize further and summarize at the same time.

As regards the type of man and organization to be employed on the work, it may be said that a separate, distinct, permanent traffic study department, under the sole and responsible direction of a first-class trained man with initiative and executive ability, may well be established by many companies. The subordinates of this organization should be intelligent, accurate, well-instructed, and properly aided and supervised men, and the personnel of the department should be kept separate and distinct from all others. Yet while this would insure the maximum of efficiency and results which would be of the best in accuracy and completeness, it is manifestly not practicable in all cases, and for the smaller companies would be out of the question. A simplified organization for these companies is to be desired and the following is recommended:

For present purposes, companies will be classified as large, medium and small, but no attempt can be made to define any more closely the limits of these classes by reference to annual revenue, car-miles or other operating statistics. It may very well be that, because of peculiar conditions surrounding the operation of a property, this classification will place it in a group where it would not naturally fall under a classification based on operating data.

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[5] Stone & Webster's *Public Service*, March, 1913.

[6] Speaking in general of the efficiency of inspectors, R. W. Harris, electrical engineer and traffic expert, says in "A Method for Determining the Adequacy of an Electric Railway System"—American Institute of Electrical Engineers, Proceedings for 1910:—

"At first glance it might seem that the amount of data to be taken of each car going in one direction is more than could be expected without sacrificing accuracy, and especially when the time spacing of cars is often as short as ten seconds; this feature, however, is overcome by practice in making observations. As a matter of fact, the inspectors became so efficient that the data were found to be 95 per cent accurate by test, which is sufficiently close for this class of work."

[7] R. M. Feustel, chief engineer State Public Utilities Commission of Illinois, who made the recent Winnipeg (Canada) traffic survey, says in the Public Utilities Commission of Manitoba 1913 Report:—

"Inspectors chosen were intelligent, accurate workers. The notes taken were entered into books in a form previously prepared and each man was provided with a watch, so that all records were accurately taken and uniformly listed. The inspectors were checked two or three times each day, both by chief inspector and myself, to see that the notes were accurate, and each man was carefully instructed in the work."

[8] C. M. Larson, chief engineer Wisconsin Railroad Commission, in an article in *Municipal Engineering*, February, 1914, says:

"If the system is of considerable size a traffic study department should be established, under the direction of either the manager or the operating officer. If the system is small this officer may himself have direct charge of the details of the work, provided he is thoroughly familiar with the nature and scope of the investigation to be made. This department should not be a spasmodic affair dependent for its existence upon a shortage of work in some other department. It should be permanent and should be prepared to supply to the manager or operating department reliable information on traffic conditions for any season, day or hour, and upon any point of every line. In whatever way this is done (data collected), the collection should be under the direction of the head of the traffic study department in order that the results may be consistent and trustworthy."

E. Swenson, chief engineer, Pennsylvania Railroad Commission in Case No. 87, 1910, Report on Pittsburgh Railways, says:

"Establish a central organization . . . which shall be in full control of securing all the data of the movement of population from and to the many centers of population, and all other traffic data in this territory . . . The personnel of this department shall be kept separate and distinct from that which takes care of the operatives and their interests. It should be composed of the following bureaus: Traffic; routing and scheduling; dispatching and checking, and publicity. The first two and the fourth bureaus, the duties of which do not in any way pertain to the operatives, their time, etc., shall have a personnel composed solely of first-class, technically trained men and that of the very best talent, as the efficient and profitable service depends largely upon their data and deduction."

It is recommended that large companies establish permanent departments for the purpose of traffic study under the superintendent of transportation, but directly in charge of a chief of a bureau of traffic statistics, who will devote his entire time to this work. Under him there should be two general classes of employees, inspectors or field men, and clerks and draftsmen, who will compile and analyze the data furnished by the inspectors and prepare them for use in the construction of time-tables.

For companies of medium size, it is desirable that there be made regular and continuous studies under the direction of the superintendent of transportation, and that there be used for the work, as inspectors, in addition to the employees regularly engaged in the supervision of loading, headways, schedules, etc., conductors and clerks from the office of the superintendent of transportation. These men will naturally be in closer touch with such types of information as it is desired to compile than men in other branches of the service. The information secured should be worked up by the regular office force of the superintendent of transportation.

In the small companies, only occasional studies will be made, and these should be made under the direction of the manager by men from various offices. In so far as the collection of data is concerned, the older and more experienced conductors should be used.

Regardless of the size of the company and the detail in which the information is desired, the purpose of the traffic studies will be to enable the company to reach two results: (1) That the maximum service which it is possible to render for the fare paid shall be offered, and (2) that as great a saving as possible in car-miles shall be made. The problem becomes that of making car-miles coincide both as to time and place with passenger-miles.

In a later article the extent and the frequency of the collection of data necessary under different conditions will be discussed.

The C. E. R. A. Boat Trip

A telegraphic dispatch sent from Buffalo Friday morning reported that the Steamship *City of Erie*, carrying the members of the Central Electric Railway Association, their families and guests reached Buffalo safely on Friday morning. About 225 persons participated in the trip.

The meeting of the executive committee of the association was held Thursday morning and the technical session in the afternoon. President Henry presided and S. W. Greenland, Fort Wayne, presented the report of the committee on uniform charges for repairs to foreign equipment. Four new members were elected, and amendments to the constitution and by-laws, making steam and water transportation lines eligible for membership and making the office of secretary and treasurer an appointive one were passed. The four technical papers on the program were presented, but there was no discussion. President C. Loomis Allen of the American Electric Railway Association addressed the members and spoke of the importance of the company section movement. He also expressed the hope that the association would so amend its constitution as to admit all railway employees to membership at lower rates.

Two special cars from Indianapolis, one by way of Columbus, and the other by the way of Fort Wayne brought a number of members to Cleveland on their way to the boat. Those who traveled by way of Columbus stopped at the Mansfield Country Club where the Ohio Brass Company tendered a banquet to them.

Conference on the National Electrical Safety Code

As has been announced in the ELECTRIC RAILWAY JOURNAL from time to time, the national bureau of standards had scheduled a general conference on the proposed national electrical safety code to be held in Washington on July 1 and 2. At this conference the railway association was to have been represented by W. J. Harvie, Syracuse, N. Y.; A. S. Richey, Worcester, Mass., and C. L. Cadle, Rochester, N. Y. In order to allow more time for the study of the proposed code, which is now available in pamphlet form, the conference has been postponed to Oct. 27.

The code circulars can be obtained from the superintendent of documents, Government Printing Office, Washington, D. C. The prices are: No. 49, operating rules, 10 cents; No. 54, construction rules, 25 cents.

N. E. L. A. Convention

List of Officers Elected and Brief Abstract of Secretary's Report Are Given

Supplementing the extended abstract of the proceedings of the annual convention of the National Electric Light Association held in San Francisco, June 8 to 11, printed in last week's issue, the following items covering occurrences too late for that issue are given.

The elections to offices and the executive committee resulted thus: E. W. Lloyd, Chicago, Ill., president; H. A. Wagner, Baltimore, Md., first vice-president; W. F. Wells, Brooklyn, N. Y., second vice-president; R. H. Ballard, Los Angeles, Cal., third vice-president; R. S. Orr, Pittsburgh, Pa., fourth vice-president; W. H. Atkins, Boston, Mass., treasurer; W. H. Blood, Jr., Boston, Mass., insurance expert; T. C. Martin, New York, N. Y., secretary; Harriet Billings, New York, N. Y., assistant secretary and assistant treasurer; J. E. Davidson, Portland, Ore.; H. C. Abell, New York, N. Y.; H. C. Bradlee, Boston, Mass., and R. F. Pack, Minneapolis, Minn., executive committee members.

In his annual report T. C. Martin described the large volume of business conducted in the headquarters office. During the year 150,000 copies of the association *Bulletin* were issued, an average of more than 13,000 for the eleven months of publication. The effort has been maintained to build this up into a publication of magazine character without encroaching upon the legitimate field of the technical magazines. The activities of the vigorous and aggressive commercial section have been expanded greatly, and it has now taken over the publication of *Rate Research*, and has also taken a further most important step in the creation and organization of its educational course. The organization of the accounting section marks the apparent increasing tendency in the association to differentiate into group work, which may lead in time to the reconstruction of the old hydroelectric section or its merger into a broad technical section. The lecture bureau has a working list of thirty-five lectures, most of which are illustrated. During 1914 the lectures were delivered before 40,000 persons. The association, also, has on file rate information from practically all member companies, and has sought to develop and maintain friendly interchange relations with all the public service commissions.

Master Car Builders' Convention

At the Annual Meeting at Atlantic City, June 14-16, Car Construction, Draft Equipment, Brakeshoes, Impacts between Moving Cars, and Couplers Were Among the Subjects Discussed

At the forty-ninth annual convention of the Master Car Builders' Association, which was held at Atlantic City June 14-16, a large part of the discussion centered on the general subject of the increased buffing and pulling strains to which modern freight cars were subjected. This was evidenced by the extended reports made by the committees on car construction, couplers, and draft equipment.

With regard to passenger equipment, however, an important recommendation was made to the effect that a dimension of 51 in. be established as the standard height above rail for the top of the platform buffer. The committee on car construction also took up an important subject in submitting, tentatively, complete designs for a standard M. C. B. box car, the idea being that the members of the association should study the drawings and submit suggestions for modifications by Dec. 1, 1915. The proposed design, it may be said, is of the steel-sheathed type, the inside length being 40 ft. 6 in.

In its report also this committee stated that a large number of failures can be attributed to improper center-sill construction and that it had therefore formulated some rules based on fundamental principles and comparable with the strength of other parts of the car. Many roads are at present modifying wooden cars, making it desirable to have a guide for minimum strength requirements for reinforcement of existing wooden cars to fit them for some years' further service. For such cars the following rules are submitted:

The draft attachments, including draft arms, if used, must be of metal and may be of either integral or riveted construction. The strength value of the draft attachments and center-sill construction must be equivalent to at least 10 sq. in. of steel in tension and compression, 6¼ sq. in. of rivet-bearing area, and 12½ sq. in. in shear. The ratio of unit stress to end load must not exceed 0.15. Metal draft arms applied to wooden center sills must extend at least 30 in. beyond center line of bolster, toward center of car, must be securely fastened to bolster and center sills, and where possible should butt against compression members placed between draft arms and needle beams and also between the needle beams.

Hardwood or yellow pine center sills may be considered equivalent to steel in center-sill construction between bolsters, if they have four times the specified unit values, namely, 40 sq. in. tension and compression area, and a ratio of unit stress to end load not exceeding 0.0375. Where wooden members are reinforced with metal (composite construction) either the steel or the wood alone must meet the strength requirements.

DRAFT EQUIPMENT

The committee on draft equipment submitted a tabulation made up from replies received to twenty questions sent out in a circular of inquiry for the purpose of finding out general practice and the weaknesses of the present draft gear appliances. The great majority of replies stated that the wooden cars were being equipped with higher-capacity draft rigging, the general practice being the application of metal draft arms and steel sills. Sixty per cent of the total number of cars were of steel center sill construction, and 65 per cent of these were equipped with friction draft gear ranging in capacity from a minimum of 100,000 lb. to a maximum of 260,000 lb. The capacity of these cars varies from 80,000 lb. to 120,000 lb. It is evident that a draft gear of low capacity necessitates a better construction of car in order to take care of the shocks, which are meant to be absorbed by the gear.

Eighty per cent of the total replies show preference for a friction draft gear on new equipment. Thirty-six per cent express a preference for more coupler travel than the present standard of 2¾ in. between coupler horn and striking plate. The matter of keeping up nuts on drawbar carry-iron bolts is a great source of trouble. Almost all who advise no trouble in that respect are using nut locks, while some of the largest roads are overcoming this trouble by placing these bolts in shear instead of in tension, as has been the general practice. Keys are preferred to rivets in the coupler yokes by an overwhelming majority.

BRAKESHOES

In its report the committee on brakeshoe and brake-beam equipment submitted a résumé of the tests so far made on brakeshoes for the years 1906 to 1914, inclusive. During this time, a considerable number of brakeshoes of differing materials and construction have been tested on the Master Car Builders' machine at Purdue University, and it has become apparent that the coefficient of friction diminishes as the pressure on the shoe is increased, but between the pressures of 12,000 lb. and 18,000 lb. the change in coefficient is slight. It is furthermore apparent that pressures in excess of 18,000 lb. are not economical.

The coefficient of friction at high speeds is very much less than at moderate speeds, the average coefficient at 80 m.p.h. being less than 10 per cent or less than one-half the corresponding average at 40 m.p.h. The coefficient of friction of filled or composition shoes is, in all cases, considerably greater than the average, being from 50 per cent to 100 per cent in excess of that for cast-iron shoes.

General conclusions cannot safely be drawn as to the effect of speed and pressure on the loss of weight, except that pressures in excess of 18,000 lb. cause an abnormal loss. The tendency, however, is for the loss in weight to increase as the pressure and the speed increase.

CLASP BRAKES FOR PASSENGER CARS

The committee on train-brake and signal equipment stated that, to date, there are in service about 2500 sets of clasp brakees in use for modern passenger car equipment on about a dozen leading railroads of the country. So far as the committee has been able to learn, this type of rigging is maintaining its claims for reduced brakeshoe wear per given number of foot-pounds of brake work done, for reduced number of hot journals in so far as the brake may be responsible for them, for smoother riding of car during time of brake action and for a remarkably low cost of maintenance both with respect to the parts of the rigging itself and to the cost of brakeshoe renewal. The stopping efficiency is about 20 per cent greater than the single shoe arrangement. It appears that where the wheel load is approximately 12,000 lb., clasp brakes should be used. The committee recommends, therefore, that clasp brakes be applied to all four-wheel truck passenger cars weighing 96,000 lb. or more, and to all six-wheel passenger cars weighing 136,000 lb. or more.

IMPACT BETWEEN MOVING CARS

An individual paper on impact between freight cars in switching service, presented by Louis E. Endsley, included the results of tests made with a chronograph having a cylinder revolving at a speed of 45 r.p.m. and a marking needle that was attached to the car whose movement was to be registered. As the cylinder was 20 in. in circumference, this gave a speed for the paper on the cylinder of approximately 15 in. per second. In the test, eight or ten cars in a string were placed on a track that had just sufficient grade to keep a car in motion after it had been started but not enough to accelerate the car. The brakes on the last two cars on the down-grade end were set, and a locomotive was coupled on to the up-grade end and the slack was pushed in until only the draft-gear movement was left between each pair of cars. The end car was then disconnected and pulled up the track some distance, the chronograph having been connected to the end car of those standing. The motor was then started and the drum allowed to revolve. The car that the engine had pulled up the track was allowed to drift into the string of stationary cars, the speed being determined by stop watches, and the velocity and acceleration of the first standing car were obtained from the record made on the cylinder of the chronograph.

The tests were made on the Norfolk & Western 90-ton cars and the Pennsylvania 55-ton cars, both kind of cars being tested light and loaded. For the purpose of distinguishing the different cars, the moving car was called "A," the first car of those standing "B," the second standing car "C," the third standing car "D," etc. The instrument was connected to Car "B," which was the first car in the cut of standing cars. In each case the weight of the car and load was known, and the acceleration was determined from the curve drawn on the drum. The weight of the trucks included in the weight of the car, as the maximum force occurred after the car had moved approximately ¾ in., and the trucks must have been in motion by that time.

The following table gives the results obtained:

Weight of Car in Pounds	Velocity of Car "A" in Ft. per Sec.	Speed of Car "A" in m.p.h. at Impact	Maximum Velocity of Car "B" in Ft. per Sec.	Maximum Pressure in Pounds
48,000	1.35	0.92	0.67	12,600
48,000	3.57	2.43	1.64	41,500
48,000	5.00	3.41	2.48	90,600
48,000	8.12	5.54	3.30	158,500
60,000	3.26	2.22	1.25	101,000
60,000	5.00	3.41	2.37	128,800
60,000	8.83	6.02	4.94	468,000
143,300	2.75	1.87	1.75	119,100
143,300	3.45	2.35	2.04	167,000
143,500	5.36	3.65	3.26	453,000
143,300	6.98	4.76	3.82	640,000
248,000	2.46	1.68	0.59	110,000
248,000	3.49	2.38	1.69	263,000
248,000	4.76	3.25	1.80	530,000
248,000	5.65	3.85	2.65	655,000

The loss of kinetic energy in some cases amounted to as much as 70,000 ft.-lb. This can only be accounted for by the destruction of some part of the car. During the testing on the 90-ton cars a few impacts were made with bumper blocks installed. A larger percentage of the kinetic energy was transmitted to Car "B" when the bumper blocks were used. Also the force of impact between the cars was usually somewhat greater. This, no doubt, is accounted for by the fact that the load is distributed over three points and thus a greater force was produced with less destruction than when the couplers and draft-gear connection received all the load. The maximum force of impact for any given speed is almost directly proportional to the weight of the two cars in impact.

An interesting thing, plainly shown from the curves made on the chronograph, was the fact that the maximum force on Car "B" occurred always before it had moved 1 in. although Car "B" usually moved a total distance of from 4 in. to 12 in. Therefore, the maximum force on Car "B" occurred before any appreciable force was exerted between Cars "B" and "C," and the speed of Car "B" was very slow before Cars "C" and "D" had any pressure between them. Car "B" was always stopped before the impact between Cars "D" and "E" occurred. The largest percentage of kinetic energy is taken out of the moving car in the impact between Cars "A" and "B," and the greatest damage would be done at this point. As the greatest force occurred before Car "B" had moved 1 in., the damage to the end of the car would be just as great if only one car was standing as if a dozen were backing it up, provided there was at least 1 in. slack between the first and second cars of those standing. Of course, as regards damage to the center sills at the center of the car, no doubt this damage would be greater if the cars were backed up by other cars. But the results given in this paper seem to indicate that there would be just as great an impact between the cars if one car struck a single car or struck a string of cars.

COUPLERS

The standing committee on couplers, which has had under consideration the development of a single standard design, presented in detail the result of the extended tests made during the past year. A number of the experimental couplers of both "A" and "B" type were tried out in service, others being submitted to static strength and endurance tests, and the results showed the experimental types to be satisfactory.

The opinion has been voiced, although no specific objection has been made, that the weight of the experimental type is too great. However, the objections that have been raised are apparently commercial and are based on the increased cost due to the increased weight rather than to any definite mechanical features. The experimental standard couplers were planned originally to withstand a static pull of 200,000 lb. without exceeding the elastic limit, and the coupler head and other parts were designed to conform to this load, making the knuckle the weakest part of the coupler, as it should be. After developing the design it was found that the 200,000-lb. requirement could not be obtained with a height of head that would go under passenger-car buffer. Limiting dimensions were placed upon the height of the head and these reduced the strength to 175,000 lb. without permanent set, establishing a coupler weighing approximately 400 lb. This gave a 33 per cent increase in weight with a 100 per cent increase in strength over existing designs.

Attention was called to the desirability of designing any new equipment to accommodate the proposed new design of coupler. It has been found that a 6-in. x 8-in. shank is essential, and therefor provision should be made for this so that the new standard couplers can be applied when the design is finally adopted.

As a result of the investigation and tests during the year the manufacturers of the "A" and "B" experimental couplers are to make final changes in the designs, and they have submitted models of these changes, which, however, do not alter the general principles of the coupler in any way. Therefore it has been decided to designate the modified "A" coupler as "C," and the modified "B" coupler as "D" in order to avoid any confusion in the tests and records. It is expected that the committee will be in position to make final recommendations as to the selection of either the "C" or the "D" type as a standard at the 1916 convention.

Chicago's Two-Day Strike

Mayor Thompson's Efforts for Arbitration Succeed, Despite the Stolid Refusal of the Men at First to Accept Arbitration as a Means of Adjusting Wage-Scale Differences

A two-day strike, involving the acceptance of the principle of arbitration as a means of settling the new working agreement between the Chicago Surface Lines, the Elevated Railroads of Chicago and their employees, has been won by the railway companies. The managements of the two companies felt that they owed it not only to Chicago but to the whole country to stand by the principle of arbitration, particularly when the employees refused to consider offers which were clearly so just. Preliminary negotiations leading up to this strike included at first a number of conferences between the representatives of the employees and President Britton I. Budd, of the Elevated Railways, and President Leonard A. Busby, of the Surface Lines. From these resulted a satisfactory adjustment of working conditions, but when the employees refused to consider any offer of increased wages short of their demand for a 33-cent minimum and a 36-cent maximum, negotiations ended.

In former wage controversies one of the principal points at issue has been a graduated scale. This question was raised by the employees in their demands this year, and accordingly both the elevated and the surface lines offered to raise the wages of the lower-grade men but not to increase the maximum wage of 32 cents an hour. In taking this stand the Chicago Surface Lines held that 60 per cent of the trainmen were receiving the maximum wage which gave them average yearly earnings of approximately $1,000. That this was deemed sufficient to make train service highly desirable employment was shown by the number of applications received. In making this offer on June 9, the company agreed, if the proposition was not satisfactory, to arbitrate the entire question.

On the same day the men declined the company's offer, refused to arbitrate and issued an ultimatum to the effect that unless the company made what they considered a fair proposition within forty-eight hours the men would be called out. In regard to the usual form of arbitration the representatives of the employees stated:

"From the experience we have had with your usual way of settling questions of this kind, either in the State Legislature or in the City Council, we can assure you that we want no repetition and the usual way you proposed will not be accepted. In refusing your proposition we wish you to bear in mind that the refusal is not the act of any man or individual, or a committee of officials, but is the act of the whole organization. We, therefore, wish to inform you that acting in full concert and with authority vested in us by our membership, every proposition in your communication has been rejected."

In response the company again offered arbitration and pointed out that the men and the company were apparently unable to agree upon what was a fair proposition. Accordingly this question was put to the employees: "Who is to determine what is a fair proposition after the parties, in the course of their negotiations, have failed to agree?" On June 10, in replying to this question, the employees declined to consider arbitration. They said: "We must remain the judges of what constitutes a fair proposition concerning wages." At this point both the surface and elevated railways dropped further negotiations and Mayor Thompson endeavored to bring about a settlement. Through his efforts the time of beginning the strike was delayed until President W. D. Mahon, of the Amalgamated Association, could be summoned from Detroit. Mr. Mahon arrived on the morning of June 11 and conferred with representatives of the union and the Mayor, but the men declined to consider arbitration as a basis of settlement. Conferences continued all through Friday and part of Saturday, and at 7:30 p.m. Saturday evening the so-called form of arbitration was submitted to the Mayor. The basis of this proposition, as stated in the letter accompanying it, was to safeguard the arbitration in such a way as to secure an impartial result. In the employees' plan, under the heading of points conditional to arbitration, were included demands which meant an increase in wages of approximately $1,500,000. These conditions were set forth as follows:

EMPLOYEES' DEMANDS ON JUNE 12

"First—Conditional to arbitration, mutual agreement that:

"(*a*) Runs arranged so that 50 per cent be straight runs and 50 per cent be completed within fourteen consecutive hours.

"(*b*) Graded wage scale limited so as not to exceed two years, maximum wage paid at the expiration of that time.

"(*c*) Night platform service completed within eight consecutive hours.

"(*d*) Period of contract two years, ending May 31, 1917, and findings effective as of June 1, 1915.

"(*e*) No run shall be less than nine hours or over eleven hours, and no run shall pay less than nine hours' pay, except Sunday.

"Second—Questions to be arbitrated:

"(*a*) How much, if any, raise above the present wage shall be paid all employees members of the association?

"(*b*) All other points in dispute raised in the proposed contract that cannot be settled before arbitration takes place.

"Third—Subject matter to be covered upon question of ability of the company to pay, and justice of the demands of the men:

"(*a*) Actual money investment of the properties of the surface lines and returns on such actual investment.

"(*b*) Salaries and considerations paid general officers of the company and comparison with like salaries paid like officers in like corporations; also comparison between increase in such officers' salaries since the 1907 ordinance and increase in wages paid employees.

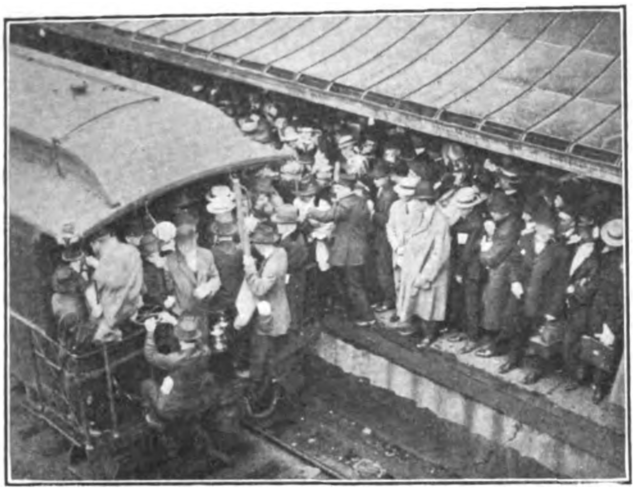
"(*c*) Nature and effect of contracts by surface lines and constituent companies, in regard to operation and charges thereon, and comparison of such contracts with like contracts in other cities.

"(*d*) Use of all books, documents and vouchers, whether private or otherwise, of the company, to determine its ability to meet the demands of the men, and profits actually earned and dividends to stockholders.

"(*e*) Relationship and extent of salaries and expenses of board of supervising engineers.

"Fourth—Plan of arbitration:

"Each party, within twenty-four hours, select a member of the arbitration board. The two thus chosen, within forty-eight hours, select a third one, who will serve, from the following five named representative citizens: Governor Edward F. Dunne, Judge Marcus Kavanagh, Carter H. Harrison, Judge William E. Dever, Judge John P. M'Goorty.



CHICAGO STRIKE—MONDAY EVENING RUSH AT ILLINOIS CENTRAL SUBURBAN STATION

"Board to be convened without delay; hearings daily except Sunday; award within ten days after close of hearing and arguments; award binding upon both parties when signed by majority of the arbitrators; rulings binding upon both parties if made by majority of the arbitrators.

"Fifth—The same arbitration board above selected and chosen shall serve in the same manner with respect to the dispute between the elevated company and the association, the arbitration to be as to wages and conditions upward of the present rate.

"The period of contract shall be the same as between the surface lines and the association, and findings to date back in the same way.

"The subject matter to be covered upon questions of ability to pay and justice of the demands to be the same as sections *b*, *c* and *d* of the surface lines' proposition under such sections, and the following:

"'The arbitrators shall consider as to the actual investment in the property of the elevated railroads an amount not to exceed the amount determined by the valuation commission of the City Council, in their report submitted to the City Council.

"The conditions preceding the arbitration shall be along the same general lines as those prescribed with reference to the surface lines, and the period for maximum pay shall be as specified in the proposed contract and conditioned further upon the provision that, if either the surface lines or the elevated railroads shall not accept the arbitration, as herein outlined, the association withdraws the offer as to the other."

REPLY OF COMPANIES

In response to this plan of arbitration submitted to Mayor Thompson, President Busby, of the surface lines, and President Budd, of the elevated lines, to show that they were seeking nothing but the prompt settlement of all these questions on a basis of fair arbitration, submitted the following proposition:

1. We offer to arbitrate all questions pertaining to working conditions.

2. We offer to arbitrate the question of wages, including wage scale for employees who are members of the association. We further state that we shall not in that arbitration ask for any decrease in the rate of wages of any employees.

3. We offer to arbitrate any other question upon which we are unable to agree.

4. We will accept a board of arbitration selected as follows: The association will select one man, the company will select one man. If these two men are unable to agree upon a third arbitrator within forty-eight hours the Mayor of Chicago will tender five names, the arbitrator chosen by the association to have the right to strike out two names, and the arbitrator chosen by the company to have the right to strike out two names, and the remaining name to be the third arbitrator.

In response to the request that the railways be given time to call their directors together on June 14, to place the whole proposition before them, the representatives of the employees declared that a strike would be called at midnight Sunday, June 13. Since some of the members of the board of operation of the Chicago Surface Lines were out of the city, it was impossible for them to take any action on this ultimatum. At the time set all the men turned in their runs. During the strike the surface railways did not attempt to operate while the elevated railroads were able to operate trains at a fifteen-minute headway between Sixty-first Street, the terminal of the South Side Elevated Railroad lines, and Wilson Avenue, the terminal of the Northwestern Elevated Railroad lines. For this service old employees were used who had refused to accede to the union order.

THE EFFECT ON CHICAGO TRANSPORTATION

The combined surface and elevated railways in Chicago transport 3,750,000 passengers daily. All the steam roads with suburban service and a number with lines through districts not served by any other means of transportation put into operation all the passenger equipment they could muster, but even with this equipment the steam roads were taxed to the limit during the morning and evening rush hours. In fact, the congestion was so great that conductors found it practically impossible to collect tickets en route. Passenger-carrying vehicles of every description were put in service on the streets. Every available motor truck was equipped with seats and charges for the haul from the Chicago loop district to points 5 and 6 miles out varied from 10 cents to $10 per passenger. On Monday morning most everybody was delayed in reaching his place of business, and some were unable to get downtown. By Tuesday the improvised modes of transportation had been so perfected that most persons were able to reach their places of business at the regular time. Vehicular traffic on the principal streets in the "loop" district and the arteries leading to the various steam-road stations became greatly congested.

Only one attempt at violence was reported on Monday. A wooden block was hurled through a window of an elevated train from a building beside the South Side Elevated structure and a police detective was slightly injured by flying glass.

CANAL STREET

CHICAGO STRIKE—EVENING RUSH IN THE NORTHWESTERN RAILROAD STATION

Approximately 14,000 men and women were engaged in the strike. Of this number 300 were ticket agents, 2900 were trainmen and other employees in the elevated railroad service. The number of surface line trainmen, car cleaners and repairmen called out was about 10,800.

EVENTS ON JUNE 14 AND 15

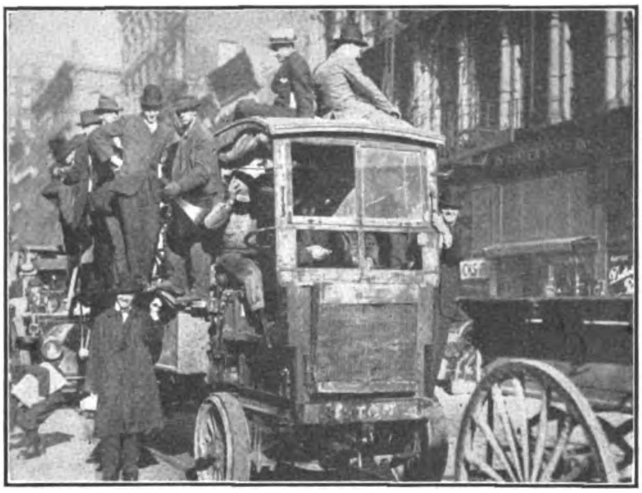
At the regular meeting of the Chicago City Council on Monday night Mayor Thompson was empowered to name a special committee of Aldermen to take charge of the strike situation in so far as the city government was concerned and to make an effort to effect an immediate settlement. The Council indorsed the Mayor's efforts to bring about peace between the companies and their employees, and passed an ordinance to prohibit the use of strike breakers. This ordinance provided that no motorman or conductor could be employed by the surface or elevated lines until he had from fourteen to twenty-one days' instruction. As the Council passed this ordinance under a suspension of rules it could not go into effect until it was signed by the Mayor, who had until the next Council meeting to approve or veto it. In other words, more than two weeks were required before the ordinance could become operative.

On Tuesday, June 15, important developments in the strike situation occurred in close succession. The inconvenience experienced by the public Monday and the full-page advertisements in all the local morning and evening papers, placed by the Chicago Surface Lines under the heading "Who Is Responsible for This Strike?", created strong public sentiment against the employees. In this advertisement all the steps leading up to the strike were outlined and the final paragraph read, "The management believes that a duty devolves upon it at this time to uphold the principle of arbitration. If this principle is surrendered there will no longer exist any peaceful and lawful method of adjusting differences of this character in this city. In deciding to adhere to and uphold the principle of arbitration at this time, the management has also undertaken to show what its position with reference to fair arbitration is by leaving the selection of the third arbitrator to be determined, in effect, by the Mayor of the city of Chicago."

ARBITRATION WINS

Early Tuesday morning Mayor Thompson called together the aldermanic conciliation committee. A series of conferences followed between this committee and representatives of the railways and employees, which at 5 o'clock Wednesday morning ended in an agreement to submit all questions to arbitration. The principal point contested by the employees after they had acceded to the principle of arbitration, was that of selecting the third arbitrator. A number of names were suggested and finally President Busby offered Mayor Thompson as the third arbitrator, and he was accepted. The absolute fairness of the Mayor in these conferences and the firm stand he took for the principles of arbitration on a fair basis, are credited by all as being the largest factor in bringing an end to the strike. On the other hand, adverse public opinion coupled with the fact that both the surface and elevated railway companies had employed a large number of trainmen and fully intended to resume operation on all lines, caused the men to look upon arbitration as the best course.

CHICAGO STRIKE—A 10-CENT BUS WITH DESTINATION SIGN



CHICAGO STRIKE—TYPICAL LOADING ON AN IMPROVISED AUTOBUS

Although the arbitrators for the employees and the companies have not been selected, all the issues they must settle have been accepted. Concessions by employees which made arbitration possible included all the items set forth in their proposed basis of arbitration, except the term of contract and the existing tripper system. President Busby for surface lines, and President Budd for the elevated railways, agreed to the two-year term of contract and to eliminate the existing tripper system of computing wages.

Points to be arbitrated upon which agreement was reached are as follows:

Percentage of straight runs and consecutive hours in which single runs shall be completed.

Maximum time covered by straight runs on Sundays.

Allowance for fall-backs for meals and reliefs if any, on the street for meals.

Hours of service including week-days, Sundays and holidays for employees other than trainmen provided for in the agreement.

Length of wage scale and wages for all trainmen, including trainmen on cinder, sprinkler, supply and other cars.

Hours of service and wages paid car repairers, motor repairers, inspectors, dopers, car placers, car cleaners, janitors, terminal men and other men around the barns.

Allowance for turning in time.

Seniority and efficiency with reference to men outside the train service.

Officially the strike was called off at 5:30 Wednesday morning, but some time was required before complete service could be resumed. The elevated railways began full schedule operation shortly after 7 a. m. and by 9:30 the service was normal. The surface lines, a more complicated task to handle, was unable to effect full operation before about the noon hour. The announcement of the strike's end was enthusiastically received by the public and the first cars in the downtown districts were greeted with cheers. It is planned to begin arbitration as soon as the arbitrators for the companies and the employees can be selected.

VARIOUS INTERVIEWS

Regarding his efforts at conciliation which resulted in the ending of the biggest street-railway strike in history and his appointment as referee, Mayor Thompson had the following to say:

"We fought it out behind locked doors. This tells the whole story of the settlement of the strike. Both sides acted splendidly. It is a victory for the great principle of arbitration. Both sides fought desperately for their cause, but the great underlying principle at stake was whether we should have real arbitration or arbitration with a specific agreement beforehand. The car men were suspicious. They told of their previous experiences. But arbitration won.

(From left to right: Mr. Budd, Mayor Thompson, Mr. Blair, Mr. Busby)

CHICAGO STRIKE—PRINCIPALS WHO BROUGHT ABOUT THE SETTLEMENT

"I cannot say all I would like to say about the splendid spirit of sacrifice for the common good shown by both sides to the controversy. That spirit makes for the building of a greater Chicago. The city was in a desperate plight and on the threshold of grave developments. Bloodshed might have resulted, business would have been stagnated and the public enraged. This cloud has passed and the city can settle down to business again. The situation has been tense since trouble began. Beneath the surface was a feeling of bitterness that nerved the disputants. This feeling finally gave way to sober reason.

"I accept this responsibility with a full realization of what it means. The routine duties of the city hall are hard enough, and this means extra work. But I am glad to take on the additional burden. There is too much at stake. I will do my duty as I see it. I devoutly thank God that I can be of service. I will see that a square deal is given to all concerned."

In an interview Mr. Budd said: "When the strike was declared, the entire controversy resolved itself into more than the question of wages and working conditions. It involved the principle of whether arbitration as a means of bringing about the settlement of disputes could be cast aside and force used. The railways feel that they were not only obligated to the people of Chicago, but to the country at large to maintain the principle of arbitration. They endeavored in every way possible to accommodate the public by restoring service, and the elevated railroads succeeded to the extent of operating a fifteen-minute service between Wilson Avenue on the Northwestern line and Sixty-first Street on the South Side line. This service was made possible by a number of the old employees who refused to accept the strike order. We feel that the principle of arbitration has been upheld by the railways' attitude and action. While the people of Chicago have suffered great inconvenience and discomfort uncomplainingly, and the financial loss to the community has been enormous, the compensating fact is established that reason and not force shall govern in the settlement of these differences in this community."

Henry A. Blair, Mr. Busby and Mr. Budd issued the following statement to the press:

"We settled the strike this morning at 5 o'clock, the men finally agreeing to submit all questions to arbitration. We offered the Mayor as the third arbitrator and he was accepted by the men.

"The surface lines will be in operation before noon and we hope to have a normal schedule for the evening rush.

"The people have been remarkably cheerful and patient under very trying circumstances. Mayor Thompson is entitled to the gratitude of the people of Chicago for the way in which he upheld and stood by the principle of arbitration upon a fair basis. He handled the situation throughout not only with tact, but with a remarkable degree of firmness. He never hesitated for a moment from the time he stepped into the situation to insist first and last that the matter must be arbitrated if the parties were unable to agree. In accepting the place as third arbitrator he did so knowing that this would impose a very heavy and additional burden upon him.

"Chief of Police Healey is also entitled to the gratitude of the people for the prompt and efficient way in which he organized his force for the protection of life and property. He gave every one to understand from the start that there would be no rioting in the city and none occurred.

"We feel grateful for the good will which has been manifested toward the company by the people and for the co-operation we have received from the city officials."

SIDELIGHTS ON THE STRIKE

Sidelights on the effect of the strike include a well-organized move to bring about a compulsory arbitration statute for public utilities. Former Secretary of the Interior, Walter L. Fisher, made this prediction, and such a movement is supported by a number of prominent citizens. The Federal Government also took a hand in the strike situation in connection with the Oak Park Elevated Railroad. Judge C. C. Kohlsaat, of the United States District Court, issued peremptory orders to the company to resume service at once. President Budd announced that operation on this line would begin Wednesday morning in compliance with the order of the court. The Aurora, Elgin & Chicago Railroad was permitted to continue operation over the Metropolitan West Side Elevated Railroad structure to the Fifth Avenue terminal, but only upon the understanding that local passengers would not be transported. Likewise the Chicago & West Towns Railway, operating in the suburbs west and northwest of Chicago, the Evanston Railway and the Chicago & Interurban Traction continued operation without interruption. General Manager F. L. Butler of the Chicago & West Towns Railway announced that his company would accept the result of the Chicago controversy and accordingly his employees remained at work.

Equipment and Its Maintenance

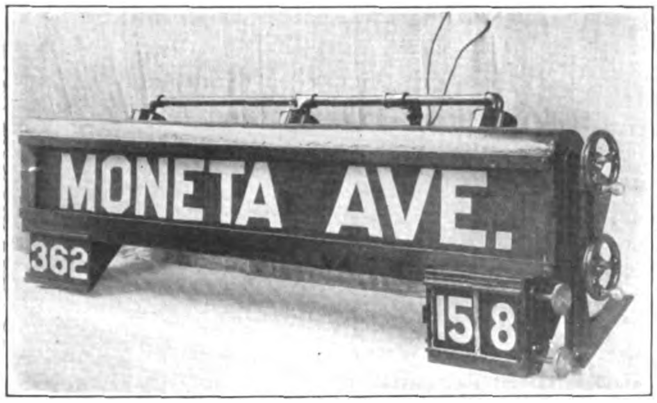
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Los Angeles Illuminated End Destination Sign with Car and Run Numbers

BY E. L. STEPHENS, MASTER MECHANIC LOS ANGELES (CAL.) RAILWAY

The cases of our illuminated end destination signs are of No. 24 gage galvanized iron, stiffened with two 3/8-in. x 1-in. irons, and supported by cast-end brackets, as shown in the accompanying illustration. The "Hunter" sign cloth is used with soft copper edges, to keep the curtain absolutely straight and free from raveling on the edges. The size of cloth is 55½ in. wide by 40 ft. long, with block letters 5 in. high, so that the sign may be read distinctly one block away during the day or night. The present number of names used is fifty-four with sufficient spare cloth for seventeen more. At the lower left hand corner of the sign is the car number in figures 2⅝ in. high, made directly on the glass.



LOS ANGELES CAR SIGN WITH CAR NUMBER PAINTED DIRECTLY ON THE GLASS AND WITH SEPARATE MECHANISM FOR DISPLAYING RUN NUMBER

Another unusual feature of these signs is the inclusion of the run number instead of the general use of separate tags or signs. These run numbers are at the lower right-hand corner of the sign. The figures are 3 in. high, and are made on two separate strips of cloth, one 3½ in. wide by 7 ft. long, with numbers from 0 to 9 inclusive, the other 3½ in. wide by 9 ft. long, with numbers from 1 to 20 inclusive, giving a total from 1 to 200 inclusive.

Operating wheels or handles for the large curtains are provided with a friction band for holding the rolls in position. As illustrated, the run numbers are changed by means of hand wheels, fastened on 3/8-in. shafts which, by means of an interlocking device consisting of a pin in the shaft and a slot in the curtain-roll flange-hub, allow motion in either direction. The rolls are of wood, 1¼-in. diameter, and are finished with metal flanges on the ends to guide the curtains.

This sign is illuminated by three 16-cp lamps, which are connected by wires running through ½-in. gas pipe supports, as shown above the case. The extreme height, depth and length of the sign are 16 in., 11 in. and 5 ft. 3½ in. respectively.

Track Tools—Supplies and Appliances

BY R. C. CRAM, ASSISTANT ENGINEER WAY AND STRUCTURE DEPARTMENT BROOKLYN RAPID TRANSIT SYSTEM

The tools and appliances which make up the working equipment of the way department are very important items in connection with track maintenance work. This becomes more evident when available statistics are consulted wherein it will be found that under "maintenance of way and structures," the materials and labor expenditure for strictly track accounts for the average road will range between 60 per cent and 70 per cent of the total. The item of track and roadway labor will range from about 40 per cent to 60 per cent of the track maintenance costs, depending upon the character of the property. Probably the actual tool-using men will comprise between 70 per cent and 80 per cent of the gang and the greater part of their time is spent in work requiring the constant use of tools.

The design of even the simple, every-day tools such as picks and shovels, will be found to have a direct bearing upon the character of the work done when their predominance in use on the average job is considered. The cost of tools and tool maintenance may run from $225 to $250 per mile of single track on heavy reconstruction work in city streets. It therefore becomes quite apparent that first-class tools should always be used, since they cost little more than inferior grades while better work and greater durability are obtained. Good tools also furnish an incentive to good workmanship and afford no shield behind which the lazy man may hide his laziness. Good tools will also tend to lessen accidents. However, it is poor practice to purchase good tools and then neglect to ascertain that they are put their proper uses and are properly cared for until real breakage or actual wear requires their replacement.

The desirability of having standard plans of all tools seems to be evident, and such plans will be found to assist in correct purchase and inspection. If the making of these plans appears burdensome and unnecessary, it certainly is possible as well as worth while to select tools from the catalogs of reliable supply houses and always order the same makes and styles by the catalog numbers.

Each regular gang should be supplied with a full outfit of such tools and supplies as may be required by the average number of men and the character of the work done. The importance of having all gangs equipped with one style of tools is worth noting. The advantages come from the familiarity with one style of each particular tool and the avoidance of jealousies between gangs through real or fancied superiority of the same tool (jacks, for instance) over another. Also, if the gangs come together on rush work there will be less tendency to borrow the other fellow's good tools and return poorer ones in their places.

In addition to a full outfit of tools, each gang should also be allowed an appropriate number of extra tools, and parts to replace such tools as regularly require sending to the shop for repairs or redressing or are subject to a certain amount of breakage, as is the case with such items as hammer and maul handles. Even here care should be taken to limit the extra supply because an excess tends to lessen the care necessary to conserve the supply and secure full usage up to the allowable wear limits.

Many of the larger roads find it advisable to employ a man whose sole duty is to keep track of the tool supply and maintenance. On small properties the roadmaster or general foreman should assume such duties, and some form of monthly report of tools showing stock on hand, stock away for repairs and new stock received should be rendered by all foremen who have tools in charge.

In connection with tool repair and maintenance full advantage should be taken of portable tool sharpening devices for use on the job. On large jobs it will often be found advantageous to maintain a blacksmith with his portable forge who will be available for sharpening picks, chisels and many other tools as well as for fitting up joint plates.

The repair of tools in general can best be done at some central point under the supervision of the master mechanic and upon proper orders from the way department to facilitate accounting.

On roads of the larger class, regular tool and supply cars and emergency automobile service are maintained, which make routine and special trips to the several gangs to pick up worn, broken and surplus tools and leave new or repaired tools as required. On the other hand, the smaller systems arrange to have the tools sent in for repairs on the regular work cars generally on their return after leaving materials. In some cases a man is detailed from the gang to take a bunch of tools to the repair shop, stowing them upon the front platform of the first passenger car available. This method of transporting tools is somewhat annoying to passengers, causes some delays to the car and is apt to hinder the motorman in the safe performance of his duties. It is justified only in emergencies.

One man in each gang should be directly responsible to the gang foreman for the tools. It should be his duty to see that tools are properly distributed among the men, that they are all returned to the tool box at night and that they are in good condition for use. However, this arrangement should not relieve the foreman of his responsibility for the tools and their fitness for service at any moment.

Increasing the Output of Hydraulic Presses

BY "VULCAN," A. M. I. C. E., A. M. I. E. E., ENGLAND

In forcing axles into or out of car wheels, the ram of the hydraulic wheel press often has a considerable amount of idle travel before reaching the object to be forced. On many jobs this idle travel almost equals, and on certain work considerably exceeds, the load travel, or distance moved under appreciable pressure. To give the very heavy pressure required, the ram must of necessity move very slowly. With the ordinary type of machine having only one belt-driven, constant-speed pump plunger, the traveling speed of the ram is practically the same whether the latter is exerting a light or a heavy pressure. The time wasted on idle movement is proportionately very high and various arrangements have therefore been devised with the object of increasing the ram speed at this period.

Some makers provide the hydraulic press with two plungers of different diameters, power-driven from the same crankshaft. The larger plunger, or both together, is for use during the idle movement of the ram, and the smaller one for providing the greater ram pressures required when the work is reached. Others have used a single plunger and have driven this from a two-speed countershaft. In this case the high speed is employed for small ram pressures and the low speed when the loading is great. This method has been more or less successful, but the following device, which has been adopted by the writer on presses having only one pump plunger, meets all requirements in the simplest possible manner and obviates the mechanical disadvantages of the other plans.

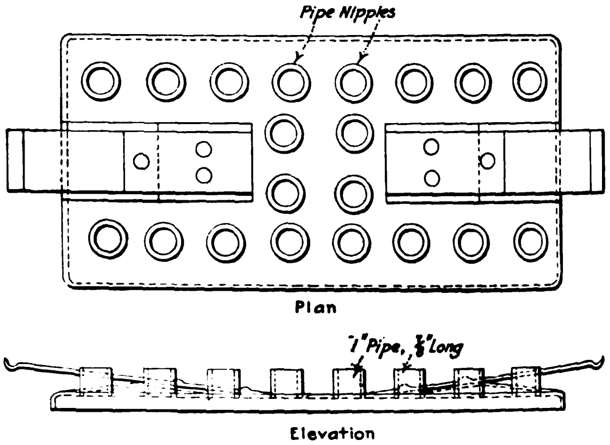
A tank is fitted on the wall of the building as high as possible above the press cylinder and it is connected to the latter through a 1-in. pipe and through a $\frac{5}{8}$-in. hydraulic valve on the press. The tank is connected to the local water main through a ball-float valve. By supplying water from the tank to the press during the idle forward travel, a ram speed many times greater than that produced from the pump may be obtained, the tank supply being shut off when the normal forcing pressure is required.

With a tank located 20 ft. above the press it is possible to obtain by this means a total force of 680 lb. on a 10-in. ram, which is more than sufficient to move the ram forward. This addition to an ordinary hydraulic press increases the output very considerably and costs very little to install.

A Simple Ventilating Scheme for Increasing Motor Output

BY R. H. PARSONS, ELECTRICAL FOREMAN

The following scheme for ventilating a motor not originally designed as a ventilated motor will be found preferable to the method, sometimes employed, of throwing away the top covers and allowing the motor to run entirely open. A few pipe nipples and a little drilling are all that are necessary in the making of perforated, and at the same time protected, covers.



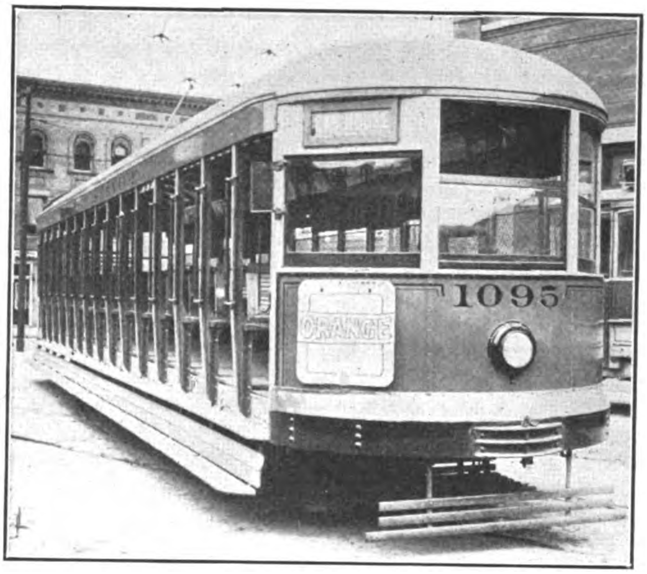
PLAN AND ELEVATION OF VENTILATED MOTOR COVER

As the accompanying drawing shows, the motor cover is drilled with a number of holes to accommodate nipples made of 1-in. pipe, $\frac{7}{8}$ in. long. The number of holes necessary is determined by judgment to give the desired degree of ventilation. The holes should be drilled for a driving fit of the nipples, which should be well cleaned where they come in contact with the cover.

This construction allows about $\frac{3}{4}$ in. of pipe to project above the level of the cover, making it impossible for water to enter the case excepting under very unusual conditions. The size of the hole in the pipe is such as to keep out large objects, while the currents of warm air rising from the motor tend to exclude dust.

The nipples should be fastened in place with the aid of an acetylene welding outfit or an electric arc, or by brazing or soldering if welding is not practicable.

A Steel Underframe, Open-Bench Car



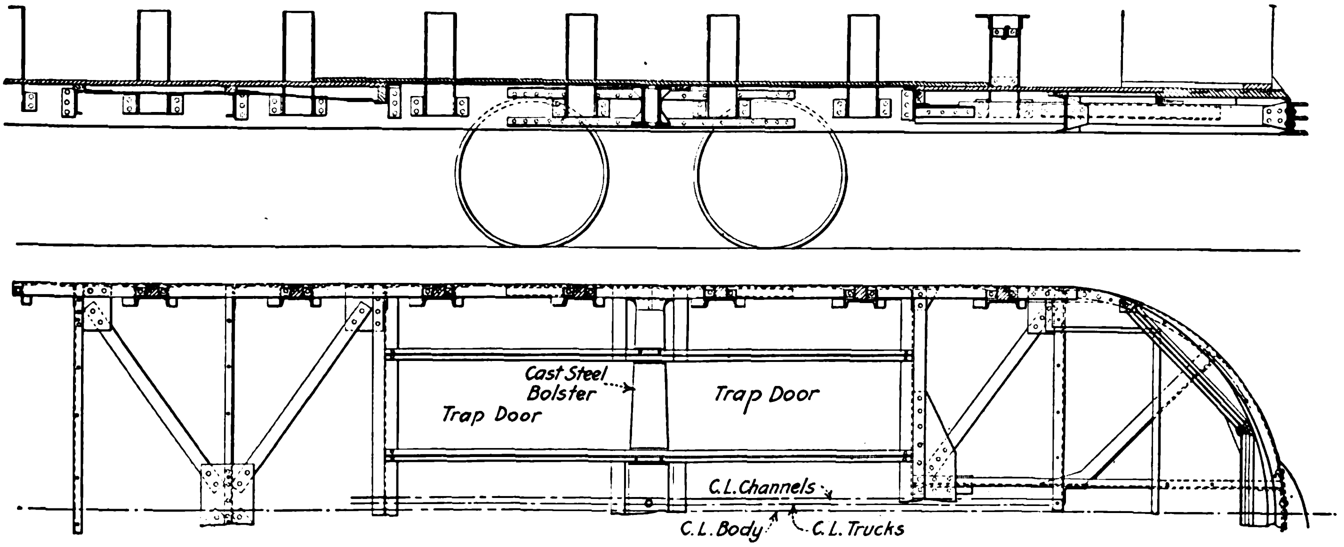
PUBLIC SERVICE OPEN-BENCH CAR—FRONT VIEW

The Public Service Railway of New Jersey recently completed at its Plank Road Shops in Newark, N. J., twenty large open-bench cars. These were built to provide a large seating capacity for the summer season at a reasonable cost, this type of car being very popular on certain lines of the company. The company does not find that the proper use of open-bench cars is conducive to accidents, and such accidents as do occur are of a trivial nature. By providing ample seating capacity and keeping passengers off the running board as much as possible the results are very satisfactory.

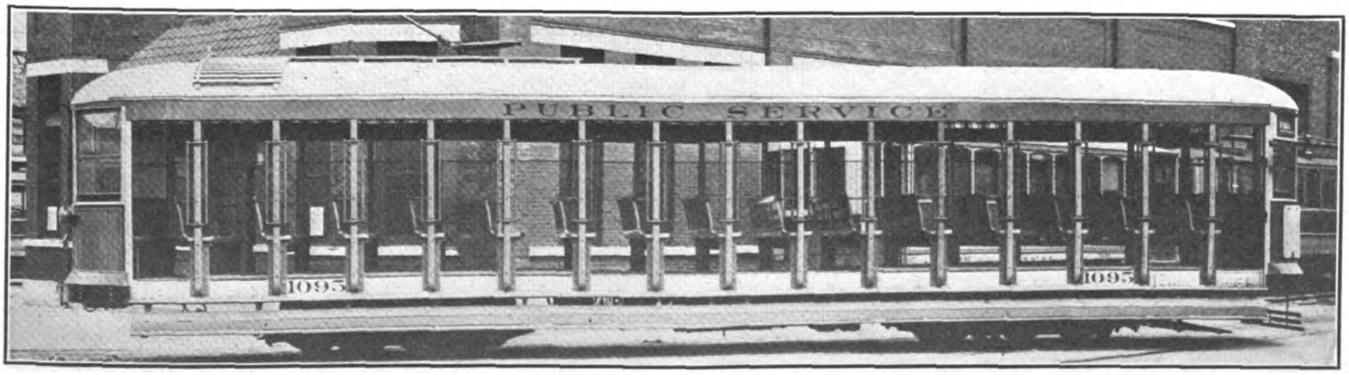
In designing the car for minimum cost and reasonable lightness standard structural shapes were used throughout and the underframe was laid out as a truss to give the necessary resistance to horizontal twisting and end shocks, while vertical stresses were provided against through the use of deep channels as side sills.

There are no bulkheads in the car, which is therefore open from end to end. A double step, of which the lower step can be folded up inside the line of the upper one to give necessary clearance, provides easy access from the street. The first step is 15 in. from the top of the rail, the next 13⅛ in., while the final step to the car floor is 8⅜ in. The floor is thus slightly over 3 ft. above the rail. Wheel guards without fenders are used on the cars.

The side sills are of 10-in. 20-lb. channels, stiffened over the bolsters with 2-in. x 2-in. x ⅜-in. angles 5 ft. 5 in. long above and 3 in. x 3 in. x ½ in. at the bottom where the channel is cut away to clear the truck frame. The end sills are of 8-in. 11¼-lb. channel. Each end sill forms one side of a truss designed to take the shock of collisions and to stiffen the frame generally. The other side of the truss is a Z-bar, 3 1/16 in. x 4 in. x 3 1/6 in. x ¼ in., so placed as to give the maximum truck clearance. That is, the high flange of the Z-bar is toward the bolster. Diagonal braces of 3-in. x ⅜-in. strap, riveted to 3/16-in. gusset plates, are used to stiffen the trusses. Near the center of the car are two other stiffening panels in the underframe. At a distance of 12 ft. 10 in. from each end sill is another Z-bar of the same size as that already mentioned, and longitudinal



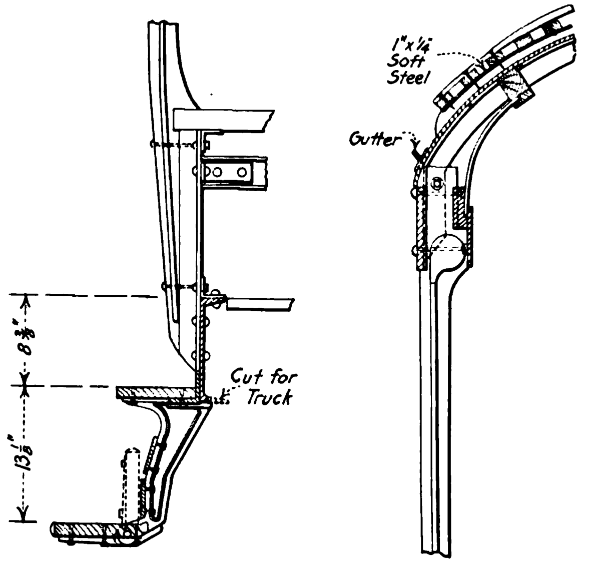
PUBLIC SERVICE OPEN-BENCH CAR—PARTIAL VERTICAL SECTION AND PLAN OF UNDERFRAME



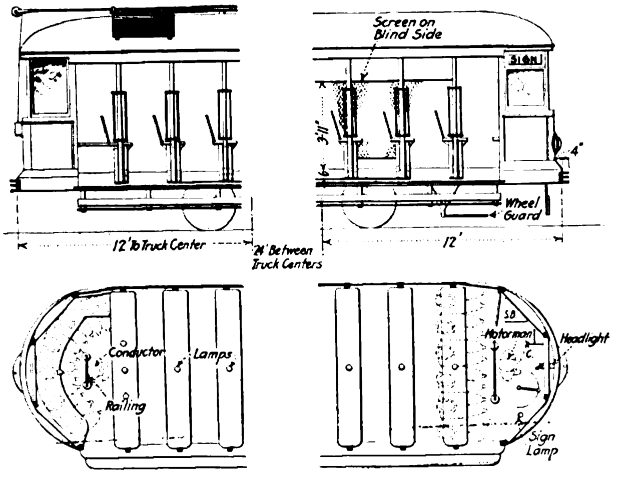
PUBLIC SERVICE OPEN-BENCH CAR—SIDE VIEW OF CAR

T-bars rest upon the flange of this and the end Z-bar, forming supports for the trap doors over the motors. These light T-bars also rest upon the bolster which is midway between, and which is the standard cast-steel bolster of the company modified somewhat to fit the deep side sills.

The bumper iron is an 8-in. channel weighing 11¼ lb. per foot, and its ends are riveted to extensions of the side sills. Fitted into the top of the bumper is a wooden crown piece 2 in. thick. The bumper is stiffened by means of two 3-in. x 3-in. x ¼-in. diagonal braces and 5-in. 6½-lb. channel knees. Nailing strips for the floor, which is of ⅞-in. pine, are mounted on the lower flanges of the Z-bars and upon light cross channel irons supplied for the purpose.



PUBLIC SERVICE OPEN-BENCH CAR—DETAILS OF STEP AND SIDE POST POCKET, AND POST AND CARLINE JUNCTION



PUBLIC SERVICE OPEN-BENCH CAR—PARTIAL SIDE ELEVATION AND HORIZONTAL SECTION, LATTER SHOWING ALSO POSITION OF LAMPS

The side posts are anchored between two 2½-in. x 2-in. x 3/16-in. angles each, which form pockets for the posts and at the same time furnish end supports for the seats. On the step side the pocket angles are riveted on the outside of the channel, but on the blind side, in order to give a smoother exterior, they are mounted above the channel and braced securely by means of angle brackets. The seats rest upon the tops of the angles which are cross connected by 3-in. 4-lb. channels to furnish center supports for the seats.

The seats are non-reversible and are 8 ft. long between side posts. The seat proper is of 1 5/16-in. maple strips with ⅛-in. air space between. It is 15 in. deep, and 17-in. spaces are provided between adjacent seats. The back is curved to give greater comfort in riding than is possible with the straight back.

The side posts are of ash and of the standard form except that at the top they are fashioned for attachment to T-iron carlines. These carlines are 2-in. x 2-in. x ¼-in. T-irons, set into the tops of the posts in the manner shown in one of the illustrations. They are bent to form an arch roof and are covered, on the straight part, with 5/16-in. Agasote and with ⅜-in. Agasote on the curved ends.

On both ends of the car the side sash are stationary and inside lining of the end is thus rendered unnecessary. In the center of each end are two sashes, the upper of which drops outside of the lower. On each end is a Hedley combination drawhead and anti-climber.

The cars are equipped with four Westinghouse 101-B2 motors and Westinghouse HL control. The purpose in using the latter was to get the contactors out of the sight of the passengers who are apt to be frightened by the arcs in the ordinary form of controller. It is felt that the danger of accident will be thus greatly reduced.

The car is called a fifteen-bench car which rating, however, does not include the seat in the rear. As each seat accommodates six passengers the total seating capacity of the car is ninety-six passengers. Exclusive of the carlines there are about 5300 lb. of steel in the car. The weights of the different parts and of the complete car equipped but without load are as follows:

Body	13,200 lb.
Control	1,800 lb.
Air brakes	1,220 lb.
Hand brakes	200 lb.
Wheel guard	200 lb.
Motors	10,580 lb.
Trucks	13,000 lb.
Total	40,200 lb.

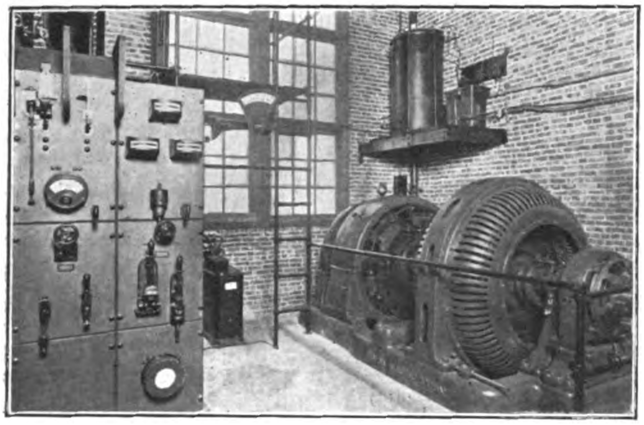
This total is about 420 lb. per seated passenger.

The new cars have just been put into operation on the company's Orange line which connects the Pennsylvania Railroad station in Newark with the Harrison Avenue terminal in West Orange. It passes through East Orange, Orange and West Orange. On this line there is considerable short-haul business. The cars are proving very popular, particularly with women.

Electrification of the Great Falls Terminal of the C., M. & St. P. Railway

The electrification of an important section of the main line of the Chicago, Milwaukee & St. Paul Railway for 3000-volt d.c. operation gives interest to an auxiliary electrification in the city of Great Falls, Mont. This city is at present the terminal of the new 138-mile feeder line from Lewiston, Mont., connecting with the main line transcontinental division at Harlowton, the eastern terminus of the main line electrification now under construction. The relation of this feeder to the main line is shown on the map published in the issue of the Electric Railway Journal for Nov. 14, 1914, page 1157. The Great Falls terminal yards are located in the center of the city and are connected by a crosstown line about four miles in length, known as the Valeria Way line. The total trackage in the terminal is about seven miles. The terminal buildings include a large freight house, a roundhouse, a power plant for heating purposes and a passenger station.

The Great Falls electrification is at 1500 volts, 750-volt motors in series being used on the one locomotive employed at present. Provision has been made to handle



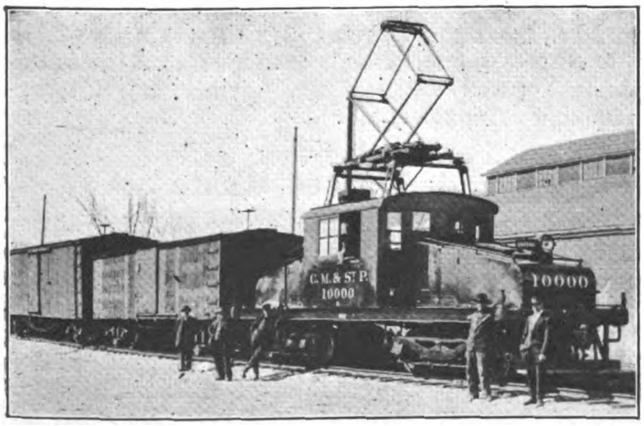
GREAT FALLS TERMINAL ELECTRIFICATION—SUBSTATION EQUIPMENT

freight trains up to 580 tons in weight at a speed of about 9½ m.p.h. on the maximum grade of 0.65 per cent. Three-phase electric power at 6600 volts, 60 cycles, is furnished by the Great Falls Power Company from the hydroelectric plant at Rainbow Falls, 6 miles from the substation.

The substation is housed in the heating-plant building. It comprises a synchronous motor-generator set together with auxiliary apparatus. The set comprises a 6600-volt motor, rated at 435 kva at 80 per cent power factor, with compensator starter. The generator is of the commutating-pole type, rated at 300 kw. The set can carry 900 kw momentarily. Excitation for the motor field and for the shunt winding of the d.c. generator is supplied by a 10-kw, 125-volt, d.c. exciter. The appearance of the substation equipment is shown herewith.

The locomotive is of the standard 50-ton type shown in the second illustration. It is equipped with four GE-207, 750-volt, box-frame, commutating-pole motors insulated for 1500 volts. The motors have a one-hour rating of 79 hp. They are ventilated from a blower direct connected to the dynamotor in the cab used for supplying low-voltage current for operating the auxiliaries. The gear reduction is 64 to 17. Sprague, General Electric type M control is used, and provision is made for ten series and seven series-parallel steps.

The current collector is of the type being installed on the main line locomotives, the slider being lifted into position by air pressure and held against the wire by steel coil springs. Compressed air for all purposes is supplied from two CP-29, 1500-volt motor-driven compressors located in the cab, each having a displacement of 27 cu. ft. of air per minute at 90 lb. pressure.



GREAT FALLS TERMINAL ELECTRIFICATION—1500-VOLT ELECTRIC LOCOMOTIVE

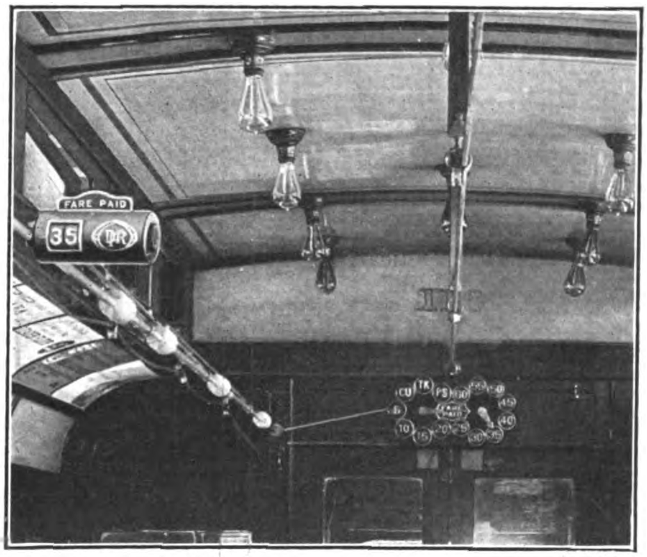
On each end of the locomotive is a headlight containing a 100-cp, concentrated filament Mazda lamp.

The overhead line construction is of the catenary type, similar in a general way to that installed on the Butte, Anaconda & Pacific 2400-volt railroad. Both span and bracket constructions are used, depending upon local conditions. Poles are spaced approximately 150 ft. apart on tangent track, supporting No. 0000 grooved trolley wires from three-point suspension. No feeder copper is installed.

The work was done by the electrification department of the Chicago, Milwaukee & St. Paul Railroad, R. Beeuwkes, engineer in charge, under the direction of C. A. Goodnow, assistant to the president. All of the electrical apparatus, including locomotive, substation equipment and line material, was furnished by the General Electric Company.

New Forms of Fare Indicators and Recorders

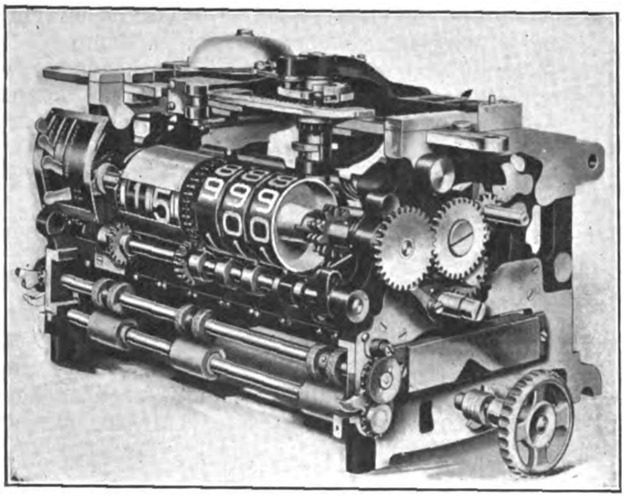
The accompanying illustrations show some of the interesting features of the new line of computing fare recorders and indicators developed by the Dayton Fare Recorder Company of Dayton, Ohio. Two illustrations show the register mechanism with the case removed. It has been designed with a view to avoiding intricate or delicate parts and the use of springs as far as possible, and to securing simplicity, compactness and durability. Two sets of printing counters are used in each machine, one to register and print the results of the fare collections on each trip and the other to register and print the total of all fares collected during the entire period of work by each conductor. The classification of the fares is made by means of a setting rod, and a system of fare indicators which guide the conductor in registering the fares and also serve as visual receipts. The registering operation is performed in the usual manner by means of a cord.



INDICATORS USED WITH DAYTON FARE RECORDERS

In connection with the register a double-dial indicator, located on the bulkhead at the end of the car opposite the recorder, and two-way indicators located in the center of the car and in each compartment are used to indicate the amount of fare paid.

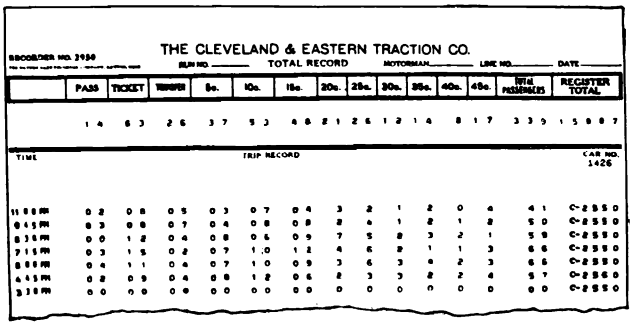
The double-dial indicator, comprising two dials and two hands or pointers, each indicating a different range of fares, is shown in one of the illustrations. The two-way indicators are small cylindrical devices having openings on both sides through which the fare indi-



MECHANISM OF DAYTON FARE RECORDER, FRONT VIEW

cations can be seen. One of these is also illustrated. All of the indicators work in unison, permitting the checking of the classification of registration from every part of the car.

An improved type of indicator is also used on the recorder to verify the registration. To show positively when the mechanism has been changed to cancel the indications, a "Fare Paid" sign and a "Not Registered" sign are used. When a fare is registered the "Fare Paid" sign appears prominently above the indicator, and when the position of the indicator is changed to indicate a fare different in denomination or kind from that last registered the "Fare Paid" sign disappears and the "Not Registered" sign is exposed to view. The latter remains prominently above the fare indicator until a fare is registered, when the "Not Registered" sign disappears and the "Fare Paid" sign is again brought into the indicating position. This method of distinguishing the fares actually registered from those only indicated and keeping the indicators distributed throughout the car in unison with the indicator on the recorder overcomes the serious objection to having the indicator covered up during the registering operation. When the indicator is so covered it is impossible to check registration when the fares are "bunched" or rung up in rapid succession.



RECORDER NO. 2930

THE CLEVELAND & EASTERN TRACTION CO.

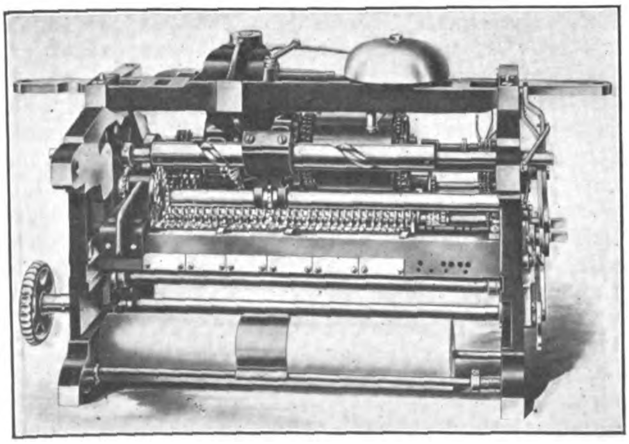
RUN NO. ______ TOTAL RECORD MOTORMAN ______ LINE NO. ______ DATE ______

	PASS	TICKET	TRANSFER	5c.	10c.	15c.	20c.	25c.	30c.	35c.	40c.	45c.	TOTAL PASSENGERS	REGISTER TOTAL
	14	63	26	37	53	48	21	26	12	14	8	17	339	15807

TIME TRIP RECORD CAR NO. 1426

11 00 PM	02	08	05	03	07	04	3	2	1	2	0	4	41	C-2550
9 45 PM	03	08	07	04	08	08	2	4	1	2	1	2	50	C-2550
8 30 PM	00	12	04	08	06	09	7	5	2	3	2	1	59	C-2550
7 15 PM	03	15	02	07	10	12	4	6	2	1	1	3	66	C-2550
6 00 PM	04	11	04	07	10	09	3	6	3	4	2	3	66	C-2550
4 45 PM	02	09	04	08	12	06	2	3	3	2	2	4	57	C-2560
3 30 PM	00	00	00	00	00	00	0	0	0	0	0	0	00	C-2550

SAMPLE RECORD SHEET FROM DAYTON FARE RECORDER



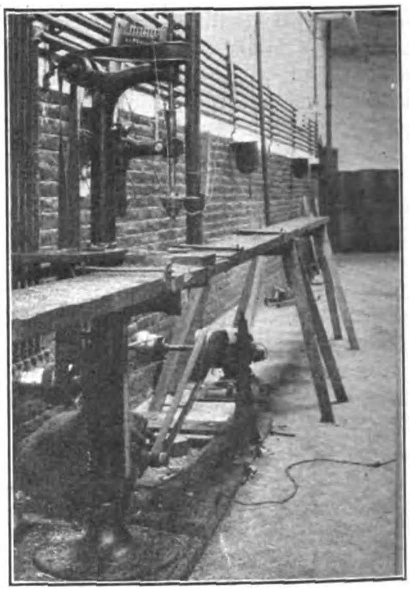
MECHANISM OF DAYTON FARE RECORDER, REAR VIEW

All of the connections from the operating mechanism to the recorder are made by means of intersecting shafts and bevel gears, no sprocket chains being used. The mechanism is, therefore, smooth and nearly noiseless in operation.

This type of register makes complete computations of the fares registered, the detail and total registrations being printed in the form of a balance sheet, like that shown herewith, ready for the receiving office. The printed record is a double check upon the fare collections.

Temporary Drilling Outfit for Toe Plates

A second running board on open cars has been recently ordered by the Massachusetts Public Service Commission, and in response to this the Holyoke Street Railway has set up a temporary drilling outfit in the carhouse as shown in the accompanying photograph to save handling the heavy toe plates to and from the machine shop. These plates are 4½ in. wide and ⅛ in. thick, and are frequently 25 ft. long. A vertical drill was installed in an aisle of the shop. This drill is belt-driven by a 2-hp, 550-volt d.c. motor which is used in the summer to run an ice-cream freezer at a park controlled by the company. A temporary cable and starting box for this were rigged up in the shop. The stock is laid on a plank about 35 ft. long, that is supported on wooden horses. A minimum of handling is required as the car undergoing alterations stands within 5 ft. or 6 ft. of the machine, and in operation the equipment has proved to be a time-saving and a labor-economizing arrangement.



TEMPORARY DRILLING OUTFIT

Trade-Marked Waste

A novelty that will interest every electric railway official who may have to do with the work of the repair shop or carhouse has recently been brought out in the form of trade-marked waste. The material, which is manufactured by the Royal Manufacturing Company, Rahway, N. J., is selected waste of high-grade cotton and wool, refined by the removal of all impurities and cleared of the small pieces of wood, wire, etc., that are a far too frequent annoyance at present. The waste is made extra soft, absorbent and spongy. It is reported to absorb even the stickiest kinds of grease, and it is manufactured in twelve special grades, six white and six colored, all of which are absolutely standardized.

The most interesting feature of the product, however, aside from its standardization of quality, lies in the fact that the weight of each bale is guaranteed and that the tare weight is also warranted to be within 6 per cent of the net weight, refunds being made in case a greater difference is found to exist. This standardization of the bale weight naturally puts a stop to the custom of furnishing and billing for bales weighing 125 lb. or even 150 lb. when 100-lb. bales were ordered. In filling orders for Royal waste the makers give the exact poundage that is ordered.

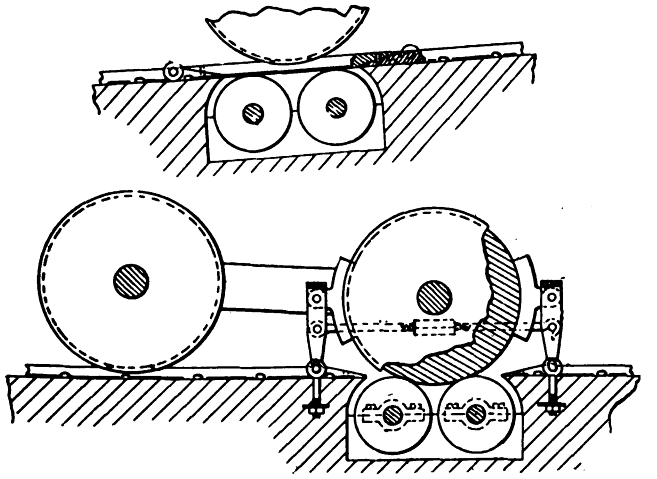
Corrosion Test of Sheet Steel

At a recent meeting of the American Iron and Steel Institute Dr. A. S. Cushman reported results of a corrosion test made by bending up the edges of flat non-corrugated sheets so as to make of them shallow pans. These pans were filled wih coal slack cinders and exposed in a horizontal position so that the rains could descend upon them. The results are given in the accompanying table.

Material	Sul.	P.	C.	Mn.	Cu.	Ni.	Condition after nine months
Bessemer steel........	.038	.094	.012	.36	.016	—	15 holes
Basic coppered steel..	.028	.008	.10	.19	.26	—	6 holes
Pure basic O. H. iron..	.020	.004	.012	.008	.032	—	sound
Pure basic O. H. iron..	.029	.006	.012	.023	.024	—	1 hole
O. H. nickel alloy....	.020	.007	.010	.037	.036	.16	5 holes
O. H. copper nickel alloy	.019	.009	.010	.015	.23	.26	6 holes
O. H. copper nickel alloy	.027	.006	.010	trace	.17	.20	sound
O. H. high nickel alloy	.024	.004	.010	.015	.028	1.00	sound

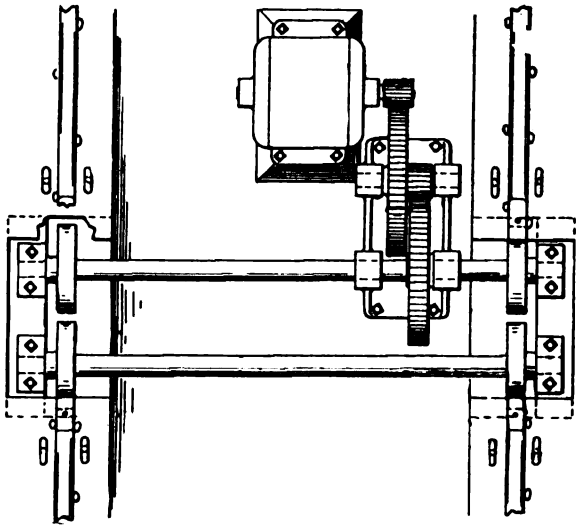
An Inexpensive Wheel Grinder

A cheap and practical wheel grinder to be used in connection with the well-known wheel-truing brakeshoe has recently been patented by the Wheel-Truing Brakeshoe Company, Detroit, Mich. It is not the company's intention, however, to manufacture this apparatus but to allow such of its patrons as wish to grind their wheels in the shop rather than on the road to make use of it in accordance with their needs. The material necessary in the construction of the grinder is to be found in or about almost every carshop and the device can be cheaply and easily assembled by the shop force.



CROSS-SECTIONAL ELEVATION OF DEVICE WITH TRUCK IN PLACE, AND SECTION SHOWING REMOVABLE SECTION OF RAIL REPLACED

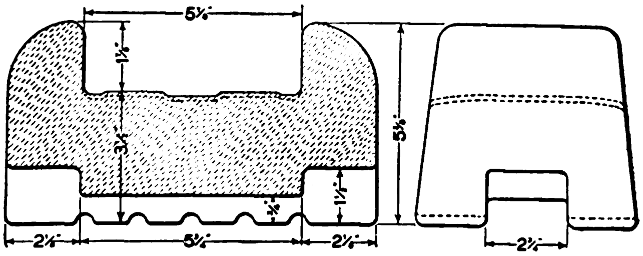
The advantages of the machine are self-evident from the accompanying cuts. It is not necessary to remove wheels for grinding nor is it necessary to jack up the car. Idle wheels or trailers can be ground as well as driver wheels, because in all cases the wheel is rotated by an under-running roller to which is geared a motor set in a shallow pit between the rails. Normally, these rollers are covered by a removable section of rail, but when it is desired to grind a wheel the rail section is removed and the car is run forward until the wheel in question rolls down the beveled joint that is provided for the removable rail section and rests upon the rollers. Wheel-truing brakeshoes are then attached to a pair of uprights on either side of the wheels, and pressure is applied between these shoes and the wheel tread by means of a turnbuckle on a rod connecting the two uprights. Any degree of pressure within the capacity of the motor may be applied in this way. Both wheels on an axle may, of course, be ground at the same time, as rollers and uprights for brakeshoes are installed on either side of the track.



PLAN OF WHEEL GRINDER, SHOWING DRIVING GEAR AND MOTOR

A New Third-Rail Insulator

A new third-rail insulator, known as the Type K, has been placed on the market by the Ohio Brass Company. The insulator is held in position by means of a bar-iron forging that is lagged to the tie. Across the bottom of the insulator are slots, recessed at each end, to provide clearance for lag-screw heads. The forging may be extended to provide a support for a protection board, if so desired. The device is covered by the Roger patent No. 1,090,234, issued March 17, 1914, half interest of which has been assigned to Nathan Shute, and the Ohio Brass Company has entered into a contract that gives it exclusive manufacturing and sales rights for the general market under that patent. A large number of these insulators have already been placed in service on an important Eastern road, where they have proved highly satisfactory.



THIRD-RAIL INSULATOR

News of Electric Railways

SIR EDGAR SPEYER'S RETIREMENT

The Part He Played in Connection with the London Underground System

The retirement of Sir Edgar Speyer from all his public positions in England was referred to briefly in the ELECTRIC RAILWAY JOURNAL of May 22. The part played by Sir Edgar in the work put under way in connection with the London underground roads by the late Charles T. Yerkes is not fully appreciated in this country, except perhaps in banking circles. Commenting on the retirement of Sir Edgar and on the work the London *Financial News* said in part in a recent issue:

"From the city's point of view one of the most striking results of the recent campaign against everyone of German origin living in this country has been the announcement from Sir Edgar Speyer that he has determined to resign his membership of the Privy Council, as well as his other honorary distinctions, and to ask for the revocation of the baronetcy conferred upon him in 1906. He also retires from the chairmanship of the Underground Electric Railways, which he has held since 1906, following the death of C. T. Yerkes.

"His succession to Mr. Yerkes was, in itself, natural enough. Though the latter was the actual organizer of the scheme for the acquisition and conversion of the District Railway to an electrically-worked line, the financial power behind the throne was James Speyer, head of the New York house of Speyer & Company. Mr. Edgar Speyer, as he then was, had assumed control of the London house of Speyer Brothers in 1887, and at the time of this American invasion in 1902 he had already established his reputation as one of the ablest financiers in the city.

"As it happened his accession to the control of the Underground Electric Railways occurred at a time when his services were of the utmost importance. The position in 1906 was exceedingly critical. The hopes of those who had embarked upon the scheme for providing London with a rapid transit service by means of tubes and the electrification of existing underground railways were threatened with disaster on account of the growing competition of the municipal tramways and the threat of the motor omnibus. The financial crisis in America in 1907 brought matters to a head, and it was then that Speyer Brothers stepped into the breach, and by arranging, in conjunction with the American and Frankfurt houses, for the payment of the December coupon on the 5 per cent profit-sharing notes saved the situation, and gave time for a reorganization of the concern under more favorable conditions. The operation involved the payment of a sum of about £175,000, and the courageous action of the firm did much to rehabilitate the company's fortunes. Since then the Underground Electric Railways has floated into smoother waters, but much yet remained to be done, and in the subsequent negotiations which have resulted in the consolidation of all the principal tube railways with the District, the London United Tramways and the London General Omnibus Company, Sir Edgar Speyer has played the leading part, and may almost be said to have been the controlling genius."

MAYOR CHURCH'S ATTITUDE

Discussing the work of the Ontario Legislature with respect to the railway measures affecting Toronto, Mayor Church of that city said recently:

"When the city's bill was before the private bill's committee of the Ontario Legislature last session, one clause related to the taking over of the Toronto & Suburban Railway in ward seven and the cancellation of the franchise of the company on the streets not built on. The bill was considered by the committee under the chairmanship of I. B. Lucas, attorney-general, but it was laid over, and the attorney-general advised the city to prepare a brief of the whole matter and take it up with the government in the recess, so that, if necessary, the government might deal with the matter in a general way. I am having the brief prepared.

"The report of C. R. Barnes on traffic in Toronto was another matter before the private bill's committee. The city asked for an order to compel the company to carry out the recommendations in the report and build 150 new cars and a further 13 miles of new track at once. The bill would have passed the committee only for the promise of R. J. Fleming, manager of the Toronto Railway, that fifty new cars would be ready next fall, and the tracks built. This it has not done, the Railway Board having allowed the company an extension owing to the war and the financial situation. The company has since been allowed to take a large number of cars off the existing routes and to dismiss more than 100 men, and further to restore the old time-table of 1911, although the railway act says that the company is not to use this without first having the Railway Board approve the new time-table. Another matter is the running-board on the open cars. The whole matter should be taken past the Railway Board to the government, and a new form of summer car ordered, and a private bill laid at the next session to give effect to it. The Board of Control has decided to confer with the government. I am going to take all these matters up with the attorney-general. The city has appealed to the Governor-in-Council from the decision of the Railway Board and I propose to bring these matters before the Board of Control."

CLEVELAND & YOUNGSTOWN RAILWAY

After making a trip over the proposed freight terminal to be built by the Cleveland & Youngstown Railway, the transportation and trolley freight committees of the Cleveland Chamber of Commerce on June 10 informally agreed to support the company's plans before the City Council.

At a meeting of the City Council as a committee of the whole on the following day Attorney J. L. Cannon, representing the company, stated that the company is perfectly willing to revise its plan as far as possible, in order that the inconvenience resulting from the change in streets may be minimized.

Members of Council made a tour of the property on June 8. They were accompanied by Attorney J. L. Cannon and W. E. Pease, chief engineer of the company. Both members of Council and the committees of the Chamber of Commerce visited the congested freight depots of the steam roads and were shown the advantages that would accrue from proper terminals practically on a level with the business section of the city. It is estimated that the cost of transportation from the stations at present is 20 cents a ton.

Councilman Bernstein insisted at the various meetings that a clause be included in any franchise to the effect that electric power be used for the freight terminal.

MERIT SYSTEM SUGGESTED FOR DETROIT

In reply to the request of officers of the street car men's union for modifications in the agreement existing between the union and the Detroit (Mich.) United Railway, particularly as related to disciplinary matters, F. W. Brooks, general manager of the company, has suggested the re-establishment of the merit and demerit system to replace the suspension plan now in effect. Mr. Brooks points out that the suspension plan, which has been favored by the union, frequently works a hardship on the wives and families of offenders without benefiting the service. He suggests the appointment by the company of a disciplinary officer who shall hear all cases that arise, whether for acts resulting in merit or demerit marks, with provision for quick appeal from the decision of this officer. Mr. Brooks offers the plan of immediate appointment of a board of five, three by the company and two by the union, to establish a standard of marks to be given under the merit and demerit system. It is also suggested that in future all arbitration boards have five members instead of three. In reply to the suggestion that the speed of cars be reduced, Mr. Brooks points out that frequent complaint is made by the public that the present average schedule speed of 9.25 m.p.h. is too slow.

NEW JERSEY GAS CASE

State Court of Errors and Appeals Reverses Own Decision, but Case Will Be Carried to Supreme Court

By vote of six to four the Court of Errors and Appeals of the State of New Jersey has reversed its decision of Dec. 9, 1914, which in turn reversed a Supreme Court decision affirming a 90-cent rate order of the Board of Utility Commissioners applying specifically to the so-called Passaic District, but upon recommendation of the commission extended by the company to all communities in which it operates. The case is of interest to all other public utility corporations because of the contention, now disallowed, that a special franchise is property and has value which must be considered in establishing a basis for the regulation of rates. On June 17 the company decided to take a writ of error to carry the case to the Supreme Court of the United States.

The case originated in a complaint filed with the Board of Public Utility Commissioners in June, 1911, by the Mayor of Paterson, which is in the Passaic district, relating to all public utility rates charged in that community. On Dec. 26, 1912, the commission fixed a 90-cent rate for gas to be effective on Feb. 1, 1913. The case was then taken before the Supreme Court, which in July confirmed the order of the commission. Carried to the Court of Errors and Appeals, the Supreme Court decision was reversed and the 90-cent rate order was set aside. Immediately following the decision a petition for a rehearing was filed and allowed and the reargument was heard early in March. As a result the original order is again enforced. The decision of the Board of Utility Commissions was published on page 35 of the issue of this paper for Jan. 4, 1913; that of the Court of Errors and Appeals on page 1331 of the issue for Dec. 19, 1914.

In order to explain the course followed by the case in the courts the following facts regarding the conditions may be of interest. The Supreme Court of the State of New Jersey consists of nine members, who usually deputize the hearing of causes to branches of three justices each. The Court of Errors and Appeals, to which appeals are made from Supreme Court decisions, consists of all the members of the Supreme Court and in addition six lay judges who are theoretically laymen. As a matter of fact, all but one of the lay judges are now lawyers. The chancellor of the State presides over the Court of Errors. In this court the three Supreme Court justices who formed the branch court hearing the original action are debarred from serving on the Court of Errors and Appeals, so that thirteen of sixteen members only are available. In this particular case after the arguments had all been made before the Court of Errors and Appeals two members died and a third failed to vote in the decision, leaving only ten to make the decision which reversed by six to four the Supreme Court decision. When the case came up for rehearing the two vacancies caused by death had been filled, the three members of the original branch court were still debarred, one of the new members declined to sit on account of his having been a member of the commission which made the original ruling, another judge withdrew from the case so as to remove any possible suspicion of prejudice due to his business connections, and the term of another, who was ill when the reargument was started, expired before the case was concluded. As a result the same number of judges heard the reappeal and they reversed their own decision by the same vote, six to four. Those who voted on both appeals voted the same way, but the new members reversed the votes of the judges whom they replaced.

COMMERCIAL EDUCATION FOR FOREIGN TRADE

The National Foreign Trade Council of New York has sent letters to the heads of 1000 corporations and firms engaged in foreign trade asking responses to five questions bearing on the adaptability of the American system of commercial education to the needs of foreign trade and what changes should be made to render the system more helpful. The inquiry is made through the committee on commercial education for foreign trade, which is composed of business men and educators. The data obtained will be communicated to a large number of educators and made the basis for a consultation of educational opinion, with the idea that this will lead to changes in curricula.

Commission Bills in Alabama.—Several bills have been introduced into the Legislature of Alabama with the object in view of creating a public utilities commission for the State.

Fire at an Amusement Park.—On June 5 fire broke out at Rock Springs Park, Chester, W. Va., owned by the East Liverpool Traction & Light Company, East Liverpool, Ohio, and leased to an amusement company. Several persons were badly burned.

Small Property for Sale.—The Hendersonville (N. C.) Traction Company, it is understood, would entertain an offer to purchase its property. The line is 2 miles long and extends from the railroad depot to Columbia Park. Two Carlson gasoline cars are operated. The president of the company is David L. Fuller.

Decision in Superior Fare Case.—The Supreme Court of Wisconsin has confirmed the ruling of the Circuit Court of Dane County sustaining the order of the Railroad Commission of Wisconsin requiring the Duluth (Minn.) Street Railway, operating in Duluth, Minn., and Superior, Wis., to sell tickets in Superior at the rate of six for 25 cents.

Steinway Tunnel Ready.—The Interborough Rapid Transit Company has notified the Public Service Commission for the First District of New York that the Steinway tunnel, connecting Manhattan and Queens, will be opened for traffic at noon on June 22. Three trains composed of four cars each on a headway of four to five minutes will be operated under the opening schedule.

Rapid Transit Bill Disapproved. — Governor Brumbaugh of Pennsylvania has vetoed the bill to give cities of the second class in that State the right to build or to acquire by lease or purchase underground or elevated railways. The Governor characterized the move as "a proposed adventure by municipalities into a range of service that were far better left to competition and to the action of the local authorities."

"Advertising Week."—The eleventh annual convention of the Associated Advertising Clubs of the World will be held in Chicago, Ill., June 20-24. This organization includes all branches of periodical publishing, daily, weekly, monthly, popular, religious, technical trade, etc. President Wilson has accepted an invitation to present an address. Cabinet members will attend and the Mayor of Chicago has officially recognized this gathering by proclaiming "Advertising Week."

Changes in Power Arrangement.—The Texas Traction Company's lines, beginning July 1, will be furnished with power by the Texas Power & Light Company. In the past the railway has operated its own power plants, but a company was organized recently to take over the light and power plants. The transmission lines between Dallas and Denison are being changed from 19,000 volts, twenty-five cycles to 30,000 volts, sixty cycles. A survey is being made at the present time for a transmission line from Waco to Taylor.

Decision on Delayed Deliveries.—The Supreme Court of Appeals of Virginia has set aside a verdict obtained by the Westinghouse Electric & Manufacturing Company against the Washington & Old Dominion Railway for $81,652 for apparatus supplied. The railway company claimed that the material had not been delivered on time, and in consequence it had been obliged to operate its Bluemont branch for six months by steam power at larger expense than it could have been operated by electric power.

Source of Trouble Removed.—Motorman Peter J. Whaling, because of whose discharge for reckless operation the motormen and conductors of the Detroit (Mich.) United Railway went on a one-day strike, is no longer in the employ of the company. Whaling was returned to the service by a majority of the arbitration board in his case, but charges outside of his activities as a company employee were filed against him last week by a fellow employee and before any further action looking to his discharge by the company was taken Whaling left the service.

Sale Offer in Alexandria.—The Southern Traction & Power Company, Alexandria, La., has offered to sell the street railway property to the city for $50,000, less the price of rail already sold, taking payment in certificates of indebtedness issued by the city maturing within ten years and bearing interest at 5 per cent a year. As an alternative the company has suggested the fixing of the sale price by two disinterested engineers. The appointment of receivers for and the suspension of service by the company were referred to in the ELECTRIC RAILWAY JOURNAL of June 5, page 1088. If the offer made by the company to the city is not accepted the property will probably be offered for public sale by the receivers about Aug. 1.

Freight Subway Ordinance at Cleveland.—The ordinance giving the Cleveland, Akron & Canton Terminal Railroad the right to build a subway under East Fifty-fifth Street, Cleveland, passed to its second reading in the City Council on the evening of June 14. Disputed points between the city and the company are to be taken up by special committees. It was announced by representatives of the company that the proposed clause requiring a valuation of the land to be filled in at the foot of East Fifty-fifth Street at the end of seventeen years would be equivalent to killing the entire proposition. It is also proposed to reduce the period of the franchise from ninety-nine to seventy-five years.

Sale or Lease of Seattle Municipal Line Suggested.—The sale or lease of Division "A" of the Seattle Municipal Railway to the Puget Sound Traction, Light & Power Company is proposed in a resolution introduced in the City Council by Councilman Allen Dale. The resolution recites the difficulties encountered by the city in acquiring the Rainier Valley line, the Seattle, Renton & Southern Railway and in extending Division "A," and provides that the city utilities committee, when it takes up for consideration the use of canal bridges by the Puget Sound Traction, Light & Power Company, shall also consider the sale or lease of Division "A" to the company, with the understanding that it be connected with the present system and extended to meet new requirements. It is understood that Mayor Gill favors leasing the property.

The Cleveland 1-Cent Fare Line.—Statements which have appeared in the daily press elsewhere than in Cleveland have misrepresented the 1-cent fare line in Cleveland. The fare on all the lines in the city except the one in question is at present 3 cents with 1 cent for a transfer. The line on which the 1-cent fare is in force extends from the Public Square to the new passenger piers on the lake front, a very short distance. Three cars are operated on it. Nearly all the patrons of the line use the regular city cars, and it was decided that the simplest method of operation would be to charge a 1-cent fare on the line to the piers, patrons who change to or from the regular city cars at the Public Square paying the usual fare on those cars. This relieves the conductors on the pier line from handling transfers and facilitates rapid loading at the terminals. The establishment of this line and this rate of fare is entirely separate from all other lines and the rate of fare on those lines. It is an experiment being made to meet operating conditions for the purpose previously noted.

Franchise Without Consents Valid.—In the case of residents of Reading Road, Cincinnati, Ohio, against the city and the Cincinnati Traction Company, to prevent the construction of a street railway on that thoroughfare to furnish service to the village of Bond Hill, the Hamilton County Court of Appeals on June 1 held that the legislation relating to the procuring of consents under Sections 3770 to 3777, and Section 9105 of the general code is unconstitutional, and that the ordinance passed by the Cincinnati Council, giving the company a franchise on Reading Road, without securing the consents of a majority of the owners of abutting property, is a valid legislative enactment. The case has been taken to the Supreme Court in an action known as David L. Carpenter et al. against the City of Cincinnati et al. Mr. Carpenter represents the residents of Reading and Paddock Roads, and he asks that the Cincinnati Traction Company and the city of Cincinnti be restrained from building a track through these streets for the extension of the Avondale line to Bond Hill. The Superior Court granted a permanent injunction to the property owners some time ago, but it was recently reversed by the Appellate Court. The case hinges on the necessity of obtaining consents of property owners along the proposed line.

PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The annual ladies' outing of the New England Street Railway Club will be held on June 25 at the Point Shirley Club. It is planned to have the members leave Park Square, Boston, at 10 a. m. for an auto ride through some of the beautiful sections of the North Shore and Point Shirley Club. Those who do not care to take the auto ride can go by ferry from Rowe's wharf on Atlantic Avenue to East Boston, connecting with the narrow-gage line for Winthrop Beach station, there taking the Point Shirley Street Railway for the club. Dinner will be served at the club at 1 p. m. The entertainment program will be begun at 3 p. m. It will include baseball and athletic sports, dancing, whist, etc. The return to Boston may be made at any time desired. Tickets, including the auto ride and everything except transportation between Boston and the club, are $2.50 each. The outing will be held rain or shine.

American Institute of Electrical Engineers

At the annual convention of the American Institute of Electrical Engineers, to be held at Deer Park, Md., from June 29 to July 2, the following papers dealing with electric railway matters will be read and discussed:

"Construction and Maintenance Costs of Overhead-Contact Systems," by E. J. Amberg and Ferdinand Zogbaum.

"Contact System of the Butte, Anaconda & Pacific Railway," by J. B. Cox.

"Third-Rail and Trolley System of the West Jersey & Seashore Railroad," by J. V. B. Duer.

"Unprotected Top-Contact Rail for 600-Volt Traction System," by Charles H. Jones.

"Contact Conductors and Collectors for Electric Railways," by C. J. Hixson.

"Contact System of the Southern Pacific Company, Portland Division," by Paul Lebenbaum.

The headquarters will be at Deer Park Hotel.

New York Electric Railway Association

The complete program has been announced for the thirty-third annual meeting of the New York Electric Railway Association to be held at the Oriental Hotel, Manhattan Beach, New York, Tuesday and Wednesday, June 29 and 30.

Following the regular business meeting of the association at 10 a. m. on June 29 the reports of committees will be presented by John J. Dempsey, chairman, on safety rules, and by James P. Barnes, chairman, on workmen's compensation insurance. The subject for discussion at this session is "The Proper Type of Car for City and Suburban Service," introduced by W. G. Gove, superintendent of equipment of the Transit Development Company, Brooklyn, N. Y. At the session on the afternoon of June 29 the subject for discussion is "What Can We Give for a Nickel?", introduced by E. G. Connette, president of the International Railway, Buffalo, N. Y. Three-minute written discussions by members will follow both papers.

At the session on June 30, at 10 a. m., the subjects for discussion are "Jitney Bus Competition," introduced by James E. Hewes, general manager of the Albany Southern Railroad, Rensselaer, N. Y., and "The Protection of Interurban Railway Highway Crossings," introduced by William H. Hyland, claim agent of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y. The question box will also be opened at this session. The questions for discussion under this head have been published in this paper.

The annual banquet will be held at 8:30 o'clock on Tuesday evening. The speakers will be William Temple Emmet, of the Public Service Commission for the Second District; Charles C. Peirce, vice-president of the American Electric Railway Manufacturers' Association; Nathan C. Kingsbury, vice-president of the American Telephone & Telegraph Company, and E. E. McCall, of the Public Service Commission for the First District. An excellent entertainment program will be provided, with special features for the ladies. Arrangements for space for light exhibits can be made directly with Joseph B. Greaves, manager of the hotel. Hotel accommodations may be secured direct through Mr. Greaves.

Financial and Corporate

ANNUAL REPORTS

Terre Haute, Indianapolis & Eastern Traction Company

The statement of income, profit and loss of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., for the year ended Dec. 31, 1914, is as follows:

Gross earnings from operation	$3,168,532
Operating expenses	1,866,002
Net earnings	$1,302,530
Taxes	142,945
Earnings from operation, less operating expenses and taxes	$1,159,585
Other income —	
Dividends on stocks owned, etc	$129,146
Sale of power	116,161
Total	$245,307
Earnings from all sources, less operating expenses and taxes	$1,404,892
Deductions and rentals:	
Bond interest	$803,106
Dividends	218,813
Interest on notes	26,665
Maintenance of organization—leased lines	3,000
Total	$1,051,584
Surplus	$353,308
Sinking fund	116,301
Balance	$237,007

The total operating expenses during 1914 were 58.89 per cent of the gross earnings. There was an increase of $123,573 in the railway department, of which additional expenditure $66,000 was for maintenance of track and roadway, reballasting, etc. The increase in wages granted to motormen and conductors on April 1, 1914, made an increase of $35,910 in operating expenses. The light and power department showed an increase of $22,521 in operating expenses. There was an increase of $14,895 in taxes paid in 1914. During the year there was expended and charged to capital account for added property the sum of $217,659. Of this amount, $169,598 was expended on leased lines and $48,061 on owned lines. Further installations of block signals were made on the Northwestern, Martinsville, Eastern and Brazil Divisions.

In 1914 the company paid $141,102 to the trustees on account of sinking funds. Up to Dec. 31, 1914, the total amount, par value, of bonds held for sinking funds, including cash in hands of trustees to purchase additional bonds, was $435,519. No dividends for the company proper were paid during 1914. The surplus of $237,007 was expended for construction purposes, for which no securities have been issued, and in the reduction of the company's liabilities.

Owing to the very serious business depression, the increase in gross earnings for 1914 over 1913 was only 1.8 per cent, the greater part of this coming from the light and power department. There was also a decrease of $162,354 in the dividends received from the Indianapolis Traction & Terminal Company, all of the stock of which company is owned by the Terre Haute, Indianapolis & Eastern Traction Company. This was also caused by the depression in business and the increased operating cost of the Indianapolis Traction & Terminal Company, the increase in wages of trainmen and other employees resulting from the award of the arbitration commission in March, 1914, adding more than $100,000 to operating costs.

Miscellaneous statistics for the year follow:

Passengers carried—interurban lines	9,378,866
Passengers carried—city lines	14,233,118
Total passengers carried	23,611,984
Freight handled (tons)	77,742
Express handled, exclusive of United States and Wells-Fargo express (tons)	7,781
Car miles operated—interurban lines	6,278,575
Car miles operated—city lines	2,156,798

Honolulu Rapid Transit & Land Company

The gross operating revenue of the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, for the year ended Dec. 31, 1914, amounted to $615,583, of which $602,842 consisted of revenue from transportation. This transportation revenue showed a decrease of $10,296 as compared to the results in 1913. The total operating expenses decreased by $3,448 to $367,794, giving a net revenue from operation of $247,788, a decrease of $6,692. The total deductions amounted to $103,215, a decrease of $13,594, so that the net revenue carried to surplus was $144,573, an increase of $6,902.

In comparison with 1913 the passenger traffic showed an increase of 145,918 fare passengers and 3833 free passengers, the total for 1914 being 12,241,032. In 1914 there were 2,878,719 transfers issued as compared to 3,466,750 in 1913. The freight traffic of 1913 fell off 10,376 lbs. The operating revenue in 1914 per car-mile was $0.313 and per car-hour $2.879, while the operating expenses per car-mile were $0.187 and per car-hour $1.720. In 1914 the company expended $12,582 for betterments and additions.

The falling off in revenue in 1914 was almost wholly attributed to the large increase in the number of automobiles of both a public and a private character put into service during the year.

CANADIAN ELECTRIC RAILWAY EARNINGS

The report of the Comptroller of Statistics on electric railway operation in Canada for the year ended June 30, 1914, shows that gross earnings from operation of all companies amounted to $29,691,007, while miscellaneous earnings totaled $3,503,104. Operating expenses amounted to $19,107,807, and taxes, funded debt, etc., to $4,756,055, leaving net income of $6,566,853. Other statistics were as follows: First main track mileage, 1560.82; total car-mileage, 98,517,808, and fare passengers carried, 614,709,819.

According to the Comptroller four operating lines, the Montreal Tramways, the St. John Railway, the Yarmouth Street Railway and the Pictou County Electric Company, submitted no reports for the year. These companies operate under provincial charters and believe that they are not required to report to any dominion department. In these cases it was necessary to insert figures for the preceding year. The other reports in general disclosed a year of financial progress by the electric railway interests in Canada.

The total operating expenses and miscellaneous charges, $23,863,862, deducted from the gross earnings from operation and the miscellaneous earnings, $33,194,111, gives an amount of $9,330,249. The discrepancy between this figure and the net income figure of $6,566,853 is caused by the fact that no items are included in miscellaneous charges for the Montreal Tramways and the St. John Railway.

FAVORABLE TAX DECISION

By a decision of the United States Circuit Court of Appeals at Cincinnati the government will be obliged to return to the Cincinnati Street Railway, the Dayton & Western Traction Company, the Columbus, Newark & Zanesville Electric Railway, the Fort Wayne, Van Wert & Lima Traction Company, and the Indiana, Columbus & Eastern Traction Company, about $100,000 collected from these companies under the old federal corporation tax law. The question in dispute was whether these companies carried on business within the meaning of the law. All the companies had leased their properties to other corporations, and the only business done by them was to collect and pay out the rentals under the leases. The Court of Appeals held that they transacted business only incidentally to that of their lessor companies, thus reversing the findings of the lower court.

Albuquerque (N. Mex.) Traction Company.—The District Court on June 4 ordered the foreclosure sale of the Albuquerque Traction Company, unless bonds with accrued interest and costs are paid within ninety days. The property will be offered by L. F. Lee, special master. The receivership of this company was noted in the ELECTRIC RAILWAY JOURNAL of May 22.

American Cities Company, New York, N. Y.—The directors of the American Cities Company have declared a semi-annual dividend of 1½ per cent on the company's cumulative preferred stock, payable on July 1 to holders of record on June 20. This compares with the full rate of 3 per cent paid from January, 1912, to January, 1915. President Hugh McCloskey has submitted a statement explaining the dividend reduction and attributing the decreased earnings for the subsidiary companies to the conditions resulting from the European war and to the inroads made by the jitneys. Inasmuch as the stock is cumulative, payment of the 1½ per cent now in arrears will be made as soon as such is justified by earnings.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has awarded $1,000,000 of 5 per cent bonds, dated 1912 and maturing in 1942, to a banking syndicate composed of R. L. Day & Company, N. W. Harris & Company, Estabrook & Company, Blodgett & Company, Merrill, Oldham & Company and Curtis & Sanger. These bonds are part of a general issue of 5 per cent debentures, of which $4,000,000 are now outstanding. The proceeds will be used to cover a floating debt incurred for extensions and additions.

Camaguey (Cuba) Company, Ltd.—It is reported in Montreal that the offer to purchase $1,000,000 of capital stock of the Camaguey Company, Ltd., for $500,000, as noted in the ELECTRIC RAILWAY JOURNAL of June 12, is part of a plan to amalgamate a number of electric light and traction companies in the West Indies.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—Judge Kinkead has taken under advisement the question as to whether the receiver of the Columbus, Delaware & Marion Railway should be authorized to issue $150,000 of receiver's certificates to meet obligations falling due on Aug. 1, or the company through a default in bond interest should be sold and reorganized. References were made to this company in the ELECTRIC RAILWAY JOURNAL of May 1 and June 12.

Fort Wayne & Springfield Railway, Decatur, Ind.—Edward M. McKinney, general freight agent of the Cincinnati, Bluffton & Chicago Railroad and a representative of F. A. Dolph, Chicago, states that a deal for the purchase of the Fort Wayne & Springfield Railway by Mr. Dolph and others who recently purchased the Cincinnati, Bluffton & Chicago Railroad, would in all probability be completed by July 4. Mr. McKinney said that the interurban line would become part of a system of a 420-mile electric system reaching into Ohio and northwestern Indiana, but details cannot be given out at this time. The receiver's sale of the traction company was noted in the ELECTRIC RAILWAY JOURNAL of May 22.

Interborough Rapid Transit Company, New York, N. Y.—The Appellate Division of the Supreme Court on June 11 confirmed the decision of the lower court in dismissing in December, 1913, the suit of Clarence H. Venner and his corporation, the Continental Securities Company, against the original directors of the Interborough Rapid Transit Company. The complaint charged fraud and extortion by August Belmont and other directors in connection with the organization of the Interborough company. The court, however, found no evidences of fraud, bad faith or the exaction of an exorbitant bonus by Belmont & Company. J. P. Morgan & Company have taken $5,000,000 of additional first and refunding 5 per cent bonds of the company, which makes a total of $103,356,000 issued to the bankers since the underwriting agreement was made. Of the amount thus far taken $52,600,000 has gone for refunding and the remainder for financing the construction of the new subways and extending the elevated lines.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—The stockholders of the Kanawha Traction & Electric Company and the Parkersburg, Marietta and Interurban Railway have approved a proposition to merge the two companies under the name of the former with a capitalization of $3,000,000. The new company will operate the city lines in Parkersburg, W. Va., and in Marietta, Ohio, as well as the interurban line operating between these cities and to Lowell and Beverly, Ohio. The Kanawha Traction & Electric Company was originally incorporated in West Virginia to build an electric railway in Parkersburg from a point on the west bank of the Ohio River to extend by the most practicable route to a point at or near Murdock Avenue, as noted in the ELECTRIC RAILWAY JOURNAL of May 8. The consolidated company has sold $1,000,000 of notes to a syndicate formed by the Fidelity Trust Company, Baltimore.

National Securities Corporation, Boise, Ida.—The Idaho Public Service Commission has authorized the amalgamation of the Idaho-Oregon Light & Power Company, the Idaho Railway, Light & Power Company, the Idaho Power & Light Company, the Great Shoshone & Twin Falls Water Power Company, the Southern Idaho Water Power Company and other electric generating and distributing companies in southern Idaho into the National Securities Corporation, organized by Electric Bond & Share Company interests. The commission states that the plans of the National Securities Corporation are lawful and their consumation will prove beneficial to holders of the securities of the old companies as well as to the consumers of their service and will improve the state of their credit. The National Securities Corporation was formed early in the current year with $21,000,000 of stock. Previous details were published in the ELECTRIC RAILWAY JOURNAL of April 17.

New York, Westchester & Boston Railway, New York, N. Y.—The New York, Westchester & Boston Railway has been incorporated in New York State with $6,000,000 of authorized capital stock, to complete the corporate union of the present company of the same name and the Westchester Northern Railroad. The details of this amalgamation were published in the ELECTRIC RAILWAY JOURNAL of June 5.

New York (N. Y.) Railways.—Clark, Dodge & Company, New York, are offering at 95 and interest, to yield about 5.3 per cent, part of the $1,500,000 of improvement and refunding mortgage (closed) 5 per cent gold bonds of the Twenty-third Street Railway. These bonds are due on Jan. 1, 1962, and are redeemable, all or in part, at 107 and interest on any interest date on four weeks' notice.

Pacific Electric Railway, Los Angeles, Cal.—The California Railroad Commission has extended to Jan. 1, 1916, the time within which the Pacific Electric Railway may issue $1,554,000 of refunding mortgage fifty-year bonds, this being the unsold portion of $2,942,000 authorized on Nov. 23, 1914. The commission has also given the company until Jan. 1, 1916, to issue $1,866,000 of these bonds, the unsold portion of $6,839,000 authorized in the latter part of 1914.

Pacific Gas & Electric Company, San Francisco, Cal.—It is announced that the board of directors of the Pacific Gas & Electric Company will meet on June 30 and declare a common stock dividend of 6 per cent to be issued in two installments, one-half on July 15 and one-half on Dec. 15, to holders of record on June 30, in certificates for whole shares of fully paid new common stock and warrants for fractional parts of such shares, exchangeable at par for stock certificates for integral numbers of shares but not bearing interest or entitling the holder to participate in dividends prior to exchange for stock certificates. The total amount of common stock to be distributed amounts to $1,926,600, and represents an equivalent amount of bonds retired with earnings, through the operation of sinking funds, since Jan. 1, 1914. The company's total outstanding capitalization will not be increased as a result of this distribution. It is said to be the expectation of the board of directors to continue similar distributions of common stock from year to year in addition to such cash dividends as the earnings of the company and general financial conditions may warrant. As the obligatory bond retirements are running at the rate of about 2½ per cent per year of the total amount of common stock outstanding, it is anticipated that the portion of such dividends which may be paid in common stock in future will be approximately at this rate. It has been the practice of the company for a number of years to set aside each year a portion of earnings as a reserve for depreciation. The amount to be so set aside this year will be $100,000 per month, or $1,200,000 for the year. The company makes this statement to remove any possible apprehension that the policy above outlined will disturb the present relation between assets and issued capital.

Public Service Newark Terminal Railway, Newark, N. J.—The Fidelity Trust Company, Newark; Drexel & Company, Philadelphia, and Clark, Dodge & Company, New York, are offering at 95½ and interest $5,000,000 of first mortgage (closed) sinking fund forty-year 5 per cent gold bonds of the Public Service Newark Terminal Railway. These bonds are dated June 1, 1915, and are due on June 1, 1955. They are unconditionally guaranteed jointly and severally as to principal, interest and sinking fund by the Public Service Railway and the Public Service Corporation of New Jersey. They are redeemable as a whole at 105 and interest on June 1, 1920, or on any interest date thereafter on six weeks' notice, and are also callable for the purposes of the sinking fund on June 1 of each year, beginning with June 1, 1920, at 102½. This company was incorporated under the laws of New Jersey to construct and operate the new electric railway terminal in Newark.

St. Joseph Valley Railway, Elkhart, Ind.—The St. Joseph Valley Railway has been authorized by the Ohio Public Utilities Commission to issue $10,000 of common capital stock to be sold for the highest price obtainable but for not less than par. The proceeds are to be applied to the payment of applicant's indebtedness incurred in the construction of its line of railway from the Indiana and Ohio State line eastward into Ohio.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—It is reported that a committee of twelve, representing various persons and corporations interested in the San Francisco-Oakland Terminal Railways and its subsidiary corporations, has been formed to consider the present financial condition of the company and its problems. If three-fourths of the members of the committee approve a general financial plan for the reorganization of the corporation, it will then be made public and a reorganization committee will be selected to take steps to put such a plan into effect. The committee of twelve hopes to have a reorganization and refinancing plan ready to submit to the security holders within a comparatively short time. A statement from the board of directors showing why a readjustment is essential was abstracted in the ELECTRIC RAILWAY JOURNAL of June 5.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—It is reported that the properties of the Syracuse & South Bay Electric Railroad and of the Syracuse, Watertown & St. Lawrence River Railroad will be sold at foreclosure in about sixty days in order to make way for a reorganization proceeding. The appointment of Ernest Gonzenbach as receiver of these companies and details concerning the reorganization plan were noted in the ELECTRIC RAILWAY JOURNAL of May 29.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—The Waterloo, Cedar Falls & Northern Railway has filed an amendment to its articles of incorporation to cover an increase in its capital stock from $2,250,000 to $5,000,000. The capital stock is to be divided into 16,650 shares of preferred stock and 33,350 shares of common stock, par value $100. The amendment also provides for an increase in the number of executive officers. Heretofore the company has had a president, one vice-president, a secretary, a treasurer, an auditor and a general counsel. By the amendment the company is authorized also to elect "one or more vice-presidents," and an assistant secretary.

West Virginia Traction & Electric Company, Wheeling, W. Va.—William Morris Imbrie & Company and William P. Bonbright & Company, New York, are offering at 98 and accrued interest, to yield about 7.1 per cent. $1,500,000 of two-year 6 per cent collateral trust notes of the West Virginia Traction & Electric Company, dated June 1, 1915, and due on June 1, 1917. These notes are callable at 100½ and accrued interest on forty days' notice. They are a direct obligation of the company and are secured by the pledge and deposit of the entire outstanding $1,875,000 of its first refunding and improvement mortgage thirty-year 6 per cent gold bonds. The bonds thus deposited are a general lien upon all the property of the company and its subsidiaries, subject to the prior lien of $3,123,000 of divisional bonds, for the retirement of which bonds of this issue are reserved.

Worcester & Warren Street Railway, Brookfield, Mass.—It is announced that the Warren, Brookfield & Spencer Street Railway has changed its name to the Worcester & Warren Street Railway. No changes have been made in officials or employees. The foreclosure sale of this company was noted in the ELECTRIC RAILWAY JOURNAL of April 17.

DIVIDENDS DECLARED

American Cities Company, New York, N. Y., 1½ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

Eastern Texas Electric Company, Beaumont, Tex., 3 per cent, preferred.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Manila Electric Railway & Lighting Corporation, Manila, P. I., quarterly, 1½ per cent.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Springfield Railway & Light Company, Springfield, Mo., quarterly, 1¾ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Union Passenger Railway, Philadelphia, Pa., $4.75.

Union Traction Company, Philadelphia, Pa., $1.50.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

West Philadelphia (Pa.) Passenger Railway, $5.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May,	'15	$448,672	....	....	....	....
1 " "	'14	487,461	....	....	....	....
5 " "	'15	2,130,304	....	....	....	....
5 " "	'14	2,195,560	....	....	....	....

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Apr.,	'15	$7,407	*$8,431	†$1,024	$1,111	†$2,135
1 " "	'14	8,338	*8,545	†207	1,081	†1,288
12 " "	'15	121,522	*101,198	20,324	13,374	6,950
12 " "	'14	121,655	*100,919	20,735	12,922	7,813

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Apr.,	'15	$186,786	*$111,821	$74,965	$70,403	$4,562
1 " "	'14	186,634	*115,608	71,026	63,745	7,281
12 " "	'15	2,543,812	*1,437,484	1,106,328	762,960	343,368
12 " "	'14	2,407,857	*1,384,718	1,023,139	741,474	281,665

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Apr.,	'15	$50,669	*$29,484	$21,185	$8,728	$12,457
1 " "	'14	52,519	*32,365	20,154	8,212	11,941
12 " "	'15	669,127	*389,105	280,022	103,868	176,154
12 " "	'14	542,580	*344,953	197,627	88,639	‡136,190

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Apr.,	'15	$193,827	*$119,538	$74,289	$60,996	$13,293
1 " "	'14	213,998	*143,327	70,671	55,708	14,963
12 " "	'15	2,531,939	*1,519,661	1,012,278	737,802	274,476
12 " "	'14	2,745,570	*1,701,837	1,043,733	607,090	436,643

GRAND RAPIDS (MICH.) RAILWAY

1m., Apr.,	'15	$83,353	*$67,025	$16,328	$13,702	$2,626
1 " "	'14	101,454	*67,016	34,438	13,538	20,900
12 " "	'15	1,258,480	*835,100	423,380	162,162	261,218
12 " "	'14	1,300,544	*825,407	475,137	161,446	313,691

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m., Apr.,	'15	$53,817	*$35,755	$18,062	$15,681	$2,381
1 " "	'14	49,773	*37,748	12,025	15,567	†3,542
12 " "	'15	696,011	*459,466	236,545	187,161	49,384
12 " "	'14	674,730	*451,953	222,777	183,115	39,662

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Apr.,	'15	$176,040	*$103,949	$72,091	$41,992	$30,099
1 " "	'14	186,150	*116,394	69,756	41,338	28,418
12 " "	'15	2,216,599	*1,294,976	921,623	491,119	430,504
12 " "	'14	2,228,645	*1,404,493	824,152	480,219	343,933

PORTLAND (MAINE) RAILROAD

1m., Apr.,	'15	$75,238	*$50,816	$24,422	$24,309	$113
1 " "	'14	77,306	*50,147	27,159	21,435	5,724
12 " "	'15	1,048,915	*643,385	405,530	258,014	147,516
12 " "	'14	1,039,980	*658,453	381,527	229,184	152,343

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Mar.,	'15	$445,544	*$266,308	$179,236	$183,854	†$4,618
1 " "	'14	547,393	*280,263	267,130	117,185	89,945
12 " "	'15	5,978,042	*3,221,351	2,756,691	2,196,100	560,591
12 " "	'14	6,763,416	*3,322,134	3,441,282	2,067,420	1,373,862

TAMPA (FLA.) ELECTRIC COMPANY

1m., Apr.,	'15	$81,176	*$42,739	$38,437	$4,376	$34,061
1 " "	'14	79,258	*44,590	34,668	4,454	30,214
12 " "	'15	993,778	*510,893	482,885	52,988	429,897
12 " "	'14	907,485	*505,862	401,623	55,851	345,772

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

Terms of New Springfield and Portland Regulatory Ordinances Are Summarized

Springfield, Mo., has amended its jitney ordinance to accord with the decision of the courts in the case brought to have the municipal law declared unconstitutional. The amended ordinance provides that jitneys shall display the name of the party operating it and the route and destination, shall be lighted after dark and shall not exceed in speed 4 m.p.h. when approaching a crossing, 6 m.p.h when turning a corner of any intersecting streets, 8 m.p.h. when passing intersecting streets, 8 m.p.h. on streets within the business district and 15 m.p.h. otherwise. The penalty for the violation of the ordinance is a fine of from $10 to $100, or imprisonment from five to sixty days or both. The amended ordinance also provides that conviction for drunkenness or for a violation of the provisions of traffic ordinances shall act as a forfeiture of a motor-vehicle license, which will not thereafter be reissued for six months. The main feature of the ordinance is a provision for a $2,000 indemnity bond, which provision was indorsed by the courts.

The Portland, Ore., jitney measure, the approval of which by the voters was noted in the ELECTRIC RAILWAY JOURNAL of June 12, was carried by a vote of 22,115 yeas against 14,284 noes. No indemnity bond of any kind or in any amount is required, and the jitneys need operate only from 6 to 10 a. m. and 3 to 11 p. m. Railway cars, autos used exclusively for sightseeing, hotel buses and taxicabs are not considered motor-buses within the meaning of the grant. Licenses must be secured with the approval of the Commissioner of the Department of Public Utilities of the city. The route set forth in the license is not to be transferred or assigned without the consent of the commissioner. The rate of fare is not to be more than 5 cents. Stops are to be made on the near side. The number of passengers to be carried is limited to the registered seating capacity of the car. Cars must be submitted to the city for inspection every thirty days. Interiors must be lighted at night. Small license fees are fixed. The fine is $100 for conviction for the violation of any provisions of the measure.

In Kansas City, Mo., there has been a renewal of the effort to get a jitney ordinance passed. The Council committee having the matter in hand met a few days ago to consider anew the form the ordinance should take. Interest in the subject has been renewed mainly by the recently-formed transportation companies which are operating buses on the boulevards and feel that their business would be improved by weeding out the irresponsible small-car jitney operator, who does not operate at all during the quiet hours and has no fixed route when he does operate. A representative of one of the leading jitney companies is quoted as having said to the Council committee that his company and others were voluntarily taking out bonds for the protection of their drivers and property and for the safety of their patrons and the public. He declared himself in favor of bonding those in the business, of establishing routes for the various lines and of compelling strict adherence to them. The committee, however, did nothing and it is considered unlikely that there will be an agreement soon on anything that will serve any important purpose.

C. W. Ferguson, state manager of the Pacific Coast Casualty Company, Seattle, which is bonding jitney operators in the sum of $2,500 each, recently announced that bonding rates would be increased 25 per cent to 50 per cent after June 10. The company has bonded about 600 machines in Washington. The increase in the number of accidents has caused the advance in the insurance rates.

Charges of violating the city speed ordinance regulating street cars were preferred recently against ten motormen in the employ of the Puget Sound Traction, Light & Power Company in Seattle by R. J. Miller, president of the Auto Drivers' Association. On the same day E. H. Worthen, investigator for the Puget Sound Traction Company, applied for warrants against nineteen drivers of jitneys on the charge of violating the bonding law.

GEORGIA JITNEY RULING

Opinion of Commission Regarding Regulation—Rules Prescribed for Operation

In its ruling assuming jurisdiction over the jitney the Railroad Commission of Georgia said in part:

"We repeat that in order for this commission fairly, justly and intelligently to regulate the street railroad company's business and intelligently to decide whether such service is adequate it is essential that the commission have the same power of regulation over other public service operators in competition with street railways over the same routes. This is in the interest of the public and not of the street railroad company.

"Passenger transportation service, to be of value to the public, must be regular and dependable. No common carrier in this State now under the regulatory supervision of this commission is allowed to discontinue temporarily or abandon permanently any established service without the consent of this commission. No one questions the wisdom of this regulation.

"The same regulation ought to apply to the jitney, if it holds itself out as a common carrier and expects to establish itself in the confidence of the public as a dependable transportation agency.

"We have attempted to demonstrate that respondents in this complaint not only come within the letter of the law prescribing the jurisdiction of this commission, but also clearly within its spirit and general scope, and that there is plain need of some governmental supervision and regulation of their business. . . . Motor car transportation, in our opinion, has come to stay, and hence all the more the necessity for regulation. Proper and reasonable regulation does not mean, nor should it be exercised, for prohibitory or strangulation purposes.

"These public servants, like their competitors, the steam and street railroad companies, are entitled to fair treatment, to reasonable fares and sane regulation. Observation by members of the commission of the operation of jitneys in Atlanta, and of their practices, has convinced us that supervision and regulation are essential to the public safety and welfare, and, believing under the act of 1907 that it is made our duty to exercise supervision over the conduct of their business, we shall do so, and from time to time prescribe such just and reasonable regulations as seem to us demanded. In doing this, it is neither our desire nor purpose to interfere with or supersede the police powers of local authorities or their powers or duties in reference to license or other forms of taxation."

Tentative rules have been prepared by the commission and will form the basis of discussion at a hearing to be held on July 13. These rules follow:

"(a) Each and every person, firm, company or corporation owning or operating any automobile, auto-bus, auto-truck or other motor vehicle for the transporting for hire of passengers over any definite route, highway, street or streets, or between definite points, places or terminals, in any town or city within this State, or between any towns or cities within this State, shall observe and obey in the conduct of their public business the following rules and regulations hereby prescribed by the Railroad Commission of Georgia for the government of the business of each and all such common carriers of passengers:

"(b) Provided that these rules and regulations shall not be construed to apply to the owners or operators of automobiles, auto-buses, auto-trucks or other motor vehicles operating and using the same in the service of hotels for transporting their patrons, nor to the owners or operators of automobiles or other motor vehicles or cars operated or used for hire to one or more individuals for individual, special or exclusive transportation service.

"Each and every person, firm, company or corporation owning or operating any public motor vehicle, as defined and described in Section A, Rule 1, prior to or simultaneously with the beginning of operation as mentioned in said Rule 1, shall file with the Railroad Commission of Georgia a typewritten declaration or statement showing:

"(a) The name and business address of the carrier filing.

"(b) If a corporation, the names and addresses of its executive officers, with a certified copy of its charter.

"(c) If a firm, the names and addresses of the members or partners thereof.

"(d) The number of vehicles to be operated, the makers thereof, the State license numbers for each, and the manufacturer's rated seating capacity of each.

"(e) The name or names of the driver or drivers of each car and the age of each driver.

"No person under eighteen years of age shall be allowed to operate or drive, while in public use, any public motor vehicle as defined or described in Section A of Rule 1.

"(f) The route or routes, highway or highways, street or streets over which, and the terminals or points between which, the owner or operator proposes to conduct the business of a common carrier of passengers, and whether such service is to be daily or otherwise.

"(g) A certified copy of the city license for each vehicle, owner, operator or driver as the case may be, in any city or cities where licenses are required.

"(h) The fare or rate desired to be charged.

"No passenger shall be allowed to ride on the running boards or elsewhere on any public motor vehicle as defined and described in Section A, Rule 1, while in the public service, except within the tonneau, or seated by the side of the driver.

"Not more than two persons in excess of the manufacturer's rated seating capacity shall be allowed on any public motor vehicle as defined and described in Section A, Rule 1, at one and the same time; provided that children under five years of age, in arms, need not be counted.

"No fare or fares shall be collected by the driver while a vehicle is in motion, but all fares shall be collected, when taken by a driver, prior to the starting of the vehicle or after it has been brought to a full stop.

"Public motor vehicles as defined and described in Section A, Rule 1, shall be regularly and continuously operated over the route or routes designated and filed with this commission by the owners or operators, or as included and designated in municipal licenses where required, unless prevented by causes beyond the control of such owners or operators, between the hours of 6 a. m. and 11 p. m. within incorporated cities; and where operated between designated cities or towns, as near as practicable upon regular schedules, information as to which shall be given to the public by printed card or circular, one copy of which shall be posted and kept posted at a conspicuous place at each terminal of the route. One copy of each schedule or time table required in this rule shall be mailed to the office of the commission.

"No person, firm, company or corporation, after having filed with the Railroad Commission the declaration or statement required in Rule 2, unless from causes beyond his or their control, shall discontinue such public service or withdraw his or its facilities from any designated route or service, except after the expiration of twenty-four hours after written notice of intention so to do shall have been filed with the Railroad Commission of the contemplated discontinuance of service or withdrawal of facilities.

"Each motor vehicle as defined and described in Section A, Rule 1, when in operation in public service, shall plainly indicate in suitable print on an attached sign the terminals between which and the route over which it is being operated.

"Nothing in these rules shall be construed so as to interfere with the lawful police regulations of any municipality of this State in reference to the uses of the public highways of such municipalities, or with any lawful requirement as to business licenses, or taxation, nor to authorize any person, firm, company or corporation to carry on the business of a common carrier of passengers upon, over or through the streets or upon the public places or highways of any municipality in this State, without first complying with the lawful ordinances of such municipality concerning the same."

PARTICIPATION PLAN PROPOSED IN LEXINGTON

Employees, union or non-union, of the Kentucky Traction & Terminal Company, Lexington, Ky., will be placed on a co-operative, profit-sharing basis beginning on July 1, if the contract read to more than forty of the company's conductors and motormen at the company's office recently is approved by the men. The present contract between the company and the men expires on July 15, and it is proposed by F. W. Bacon, vice-president of the company, to substitute the profit-sharing plan. The proposed contract would increase the wages of the conductors and motormen 1 cent an hour immediately and would set aside 18.5 per cent of the gross earnings derived from freight and passenger traffic for the payment of the wages of the trainmen and the costs of the claim department, except as to fees paid to attorneys, adjusters and surgeons.

If during the fiscal year ending June 30, 1916, the amount paid for wages and legal expenses do not exceed 18.5 per cent of the gross revenues of the company, derived from the transportation of passengers and freight, the amount paid to conductors and motormen is to be increased 1 cent an hour for the fiscal year beginning July 1, 1916. If during succeeding years the amount paid out for claims and wages does not exceed 18.5 per cent of the gross receipts, the saving is to be apportioned among the trainmen as increases in wages, while in case the amounts paid out exceed 18.5 per cent, the trainmen are to submit to a reduction in wages, though at no time are they to be paid less than the rate for the year beginning July 1, 1915, which is an increase of 1 cent an hour.

The contract, if accepted by the men, will take the place of the present contract and will continue in force for three years from July 1, 1915.

Ninety-two of the 125 motormen and conductors have signed the agreement submitted to them by Mr. Bacon.

TORONTO SERVICE PROBLEM

Transportation matters occupied the attention of the Board of Control of Toronto, Ont., for several hours on June 8. The most perplexing problem which confronted the members was the policy to be adopted in regard to the operation of the Metropolitan radial line of the Toronto & York Radial Railway south of Farnham Avenue after the expiration of the franchise at midnight on June 16. The company is anxious to arrange with the board for some form of compromise which will enable it to continue the operation of its Yonge Street service to the terminal at the Canadian Pacific Railway crossing. It is possible the company may be permitted to run its passenger cars over the tracks on sufferance from day to day, until the Council finally decides on its policy for dealing with the traffic problem in the suburban districts.

It has been decided by the city to take over the line from Farnham Avenue, but it cannot be utilized for the Toronto Civic Railway, unless an arrangement is entered into with the radial company. The comptrollers will not recommend the Council to sanction anything but a temporary arrangement until after the report on the rapid transit and hydro-radial systems, now in the course of preparation, has been presented and considered. What action the management of the Toronto & York Radial Railway will take cannot yet be ascertained, but it is thought the company will refuse to allow the city to run its cars over the tracks unless the company is permitted to run freight cars to the present terminals. Consequently residents of North Toronto and the suburban districts may have to walk to reach the Toronto Railway cars at the Canadian Pacific Railway crossing. The situation is complicated by the fact that the Toronto Railway is entitled to operate its cars up Yonge Street to Farnham Avenue. So far it has refused to operate beyond the Canadian Pacific Railway tracks. Mayor Church is inclined to recommend the Council to order the company to extend its service up to Farnham Avenue. If it refuses to do so after reasonable notice, the city can operate cars over the line.

PENSION SYSTEM AT HAMPTON, VA.

The Newport News & Hampton Railway, Gas & Electric Company put into force on June 1 a pension system for superannuated employees. Any employee is eligible who has reached the age of seventy years, or is between seventy and sixty years and has been continuously in the service of the company for more than twenty-five years and has become physically disqualified for such service, or has been continuously for twenty-five years or more with the company and has become physically disqualified by reason of injury received while in the discharge of his duties. The system is limited, however, to those whose maximum wages have not exceeded $1,800 per annum for a period of more than ten years, prior to retirement. The pension is based on an allowance of 1 per cent of the average yearly pay received during the last ten years of service preceding retirement for each year of service with the company, the minimum pension being $240 per annum. Thus an employee would receive 25 per cent of his annual wages as a pension if he had been with the company twenty-five years. The company, through its welfare board, reserves the right to discontinue the plan or to revoke any pension as it may desire.

At the same time that it announced its pension plan the company made public a statement in regard to an insurance plan under which all employees now under sixty years of age who have been in the employ of the company continuously for three years and all employees, on completing three years of continuous service with the company, will be entitled to life insurance to the amount of $1,000 for white employees and $500 for colored employees.

Near-Side Stops in Springfield.—Mayor T. K. Bowman of Springfield, Mo., has signed the ordinance, passed by the City Council, which provides for the stopping of all street cars on the near side of the intersections of all paved streets in the city.

Charging for Packages.—The State Public Service Commission of Washington has ordered the Seattle, Renton & Southern Railway, operating in Seattle, not to charge passengers for packages which they carry with them on the cars. The road has been making a fixed charge of 10 cents for each package taken on the car by a passenger. The patrons protested against the charge, and the city, through the office of the Corporation Counsel, asked that an order be made prohibiting the charge.

Through Service Between Gary and Chicago.—The Gary & Interurban Railroad, Gary, Ind., operating 85 miles of road in northern Indiana, has made a contract with the Hammond, Whiting & East Chicago Railway whereby through cars will be run from Gary to Chicago. The Hammond, Whiting & East Chicago Railway is owned by the same interests as the Chicago Surface Lines, and through cars from Gary will run into a Chicago terminal at Sixty-third Street and Madison Avenue.

Ferry-Car Transfers Continued.—The Board of Estimate and Apportionment of New York City has approved the report of the transit committee to continue the system of transfers between the Staten Island municipal ferry and the lines of the New York Railways for the coming six months. The division of the fare is on the basis of 3 cents to the company and 2 cents to the city. The arrangement is in the nature of a concession to the residents of Staten Island under the new rapid transit arrangement.

Hearing on Stops in St. Louis.—The hearing before the Public Service Commission of Missouri on the application of the United Railways, St. Louis, to that body for permission to eliminate more than 700 stops was begun at the Planters' Hotel on June 11. Bruce Cameron, superintendent of transportation, was the principal witness for the company. He outlined the advantages of the plan proposed and exhibited samples of "car stop" and "no stop" signs which the company proposes to install if its application is granted.

Car Capacity Ordinance Upheld.—The order of Dr. S. S. Goldwater, commissioner of health of New York, to the Brooklyn Rapid Transit Company limiting the number of street-car passengers to one and one-half times the seating capacity of cars, has been upheld in the Court of Special Sessions in Brooklyn. Jacob Horowitz was adjudged guilty of violating the sanitary code for persisting in boarding a Third Avenue car which already contained forty-eight passengers, the maximum permitted under the ordinance. Sentence was suspended.

Increase in Wages on Suburban Line.—The employees of the Hartford & Springfield Street Railway, Wharehouse Point, Conn., have been granted an increase in wages. In future all men in the employ of the company five years or more will receive 28½ cents an hour, and all under five years will be paid accordingly, rating from 23 cents an hour for those employed one year or less, with a gradual increase each year until the maximum of 28½ cents an hour is reached. The new scale of wages will go into effect on July 1 for one year.

Re-routing in Baltimore.—Mayor Preston of Baltimore, Md., has suggested the appointment of a commission to consider the question of rerouting cars of the United Railways & Electric Company. He would have the commission consist of a member of the board of estimate, representing the Mayor and the City Council; a member of the Maryland Public Service Commission; an official of the railway, and a representative of the public. Thomas A. Cross, manager of the company, has stated that the company would gladly co-operate with such a body.

John Barleycorn and Traffic.—There has been a noticeable increase in passenger traffic on the Louisville & Interurban line, which connects Shelbyville, Ky., and Louisville, since the saloons in Shelbyville were closed. Ticket sales on Saturday, June 5, totaled $157, compared with total sales of $38.40 for the last Saturday during which the saloons were open in Shelbyville. On the Saturday night in question fifty tickets were sold to Eight Mile House, the first "wet" spot between Shelbyville and Louisville. On the latter Saturday, when Shelbyville was still wet, no tickets were sold to the roadhouse in question.

Refrigerator Service.—The Illinois Traction System, Peoria, Ill., has inaugurated a refrigerator service between St. Louis and points on its line in Illinois. At present two iced refrigerator cars depart from the Twelfth Street and Lucas Avenue depot in St. Louis each Monday and Wednesday, destined for Springfield and stations south. One car carries shipments to Mount Olive, Litchfield and Hillsboro, and the other to Benld, Gillespie, Carlinville, Nilwood, Girard, Virden, Thayer, Auburn, Chatham and Springfield. Tonnage so far consists almost entirely of meat, most of which was heretofore shipped by express.

New Hampshire Crossing Law.—New Hampshire has just passed a law requiring every city and town to maintain a warning sign on every highway approaching a crossing at a reasonable distance on each side of the crossing. Under the act grade crossing protection is put in the hands of the Public Service Commission. That commission has ordered that enamel metal signs 24 in. x 12 in., white letters on a blue ground, shall be placed at varying distances from grade crossings. If any town for sixty days neglects to comply with the commission's order, it forfeits $1 for each day. Anyone injuring these signs is liable to a fine of $10.

Indiana Safety-First Banquet.—Ninety men connected with the Union Traction Company of Indiana enjoyed the hospitality of the company at the June safety-first banquet at the Doxey Hotel, Anderson, on the evening of June 4. Interesting and instructive talks along the lines of extending the safety-first movement were made by A. W. Brady, president of the company; H. A. Nicholl, general manager; C. A. Baldwin, superintendent of transportation; S. R. Dunbar, purchasing agent; E. E. Slick, claim adjuster, and several others. The winning safety-first essays were read by E. H. Mitchell, George E. F. Kincaid and A. C. Bounsall. Essays written by these employees were selected as prize winners from among thirty-two papers.

Improved Service to Boston Beach Resorts.—Rapid transit to Revere Beach from Boston, Mass., will be inaugurated next month as the result of an operating agreement between the Boston Elevated Railway and the Bay State Street Railway, associated with the opening for service of the West End extension of the East Boston tunnel. Through service to and from this resort, which is sometimes visited by 100,000 persons on warm Sundays and holidays, will be afforded by the construction of the tunnel extension, supplemented by the building of a new line on a private right-of-way east of Belle Isle inlet, with a trestle bridge capable of carrying 50-ton cars. Crews will be changed in East Boston, and service on the Boston Elevated system to and from the beach will be established on an 8-cent check basis.

Helping the Commerce Club.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., working in close harmony with the Commerce Club, has for the last three months, while the Commerce Club was exploiting various campaigns, joined in the movements by displaying appropriate posters in its street cars. The posters are printed in colors on sheets 21 in. by 28 in. In the clean-up campaign particularly did the company render excellent service. The posters were attached in pairs to the windows of the cars, one pair on each side of the car. One sheet of the pair was exposed to the passengers, and the outside sheet of the pair was exposed to the passers-by on the street—or those passed by. Another poster recently used backed up the local campaign to "Trade with Your Merchants in St. Joseph." H. C. Porter, commercial manager of the company, is third vice-president of the Commerce Club, and on its active committees.

The Safety-First Traffic Rules.—Brief reference was made in the ELECTRIC RAILWAY JOURNAL of June 12, page 1137, to the twenty recommendations concerning street traffic regulation prepared by the street traffic committee of the Safety First Federation of America at its meeting in Detroit on June 4 and 5. It was decided at the Detroit meeting to communicate with C. Loomis Allen, chairman of the Federation's transportation committee, also president of the American Electric Railway Association, with the request that a sub-committee be appointed to confer with the street traffic committee with the view to the adoption of some of the suggestions, which it is believed would make for the greater convenience and safety of the patrons of the street railway lines. Among the members of the street traffic committee of the federation are Joseph A. McGowan, auditor of the Indianapolis Traction & Terminal Company, and F. W. Bacon, vice-president of the Kentucky Traction & Terminal Company.

Bridge Material by Electric Railway.—In sharp competition with two steam roads, good pike roads and motor trucks, the Louisville & Interurban Railroad, Louisville, Ky., has won the contract for transporting the materials to be used in a big concrete bridge being constructed by the county east of Louisville. The site of the bridge is 6 miles from the end of the Fern Creek line of the railway, and the sand and gravel, cement and steel, will be hauled from that place by the trucks of the contractor, the Hoke Company. The sand and gravel will be taken from the bins of the Ohio River Sand Company, which are located on the tracks of the Louisville Railway at Thirty-first Street and Broadway, and it is probable that the cement will be delivered to the railway at the end of its Orell line, which will mean a haul of about 30 miles by car. There will be about 1,500 barrels of cement. The sand and gravel will be delivered by trains of four cars each, each car holding thirty-five cubic yards. These are side dump cars and will dump at the end of the line, the contractor having thus to handle his materials only once.

Safety First Discussed in Louisville.—What the safety-first work of the Louisville (Ky.) Railway has accomplished is illuminatingly indicated in a recent statement made by Dr. Ellis Duncan, coroner of Jefferson County. Speaking before the members of the Louisville Rotary Club at that club's last meeting, when consideration was concentrated on the electric railway interests, Dr. Duncan said that the records of his office show that in former years the fatal accidents to be charged to street railway operation in that county ranged between twelve and fourteen each year. Last year, 1914, when the Louisville Railway began its safety-first work in earnest, the record was reduced to only four deaths, while for what is practically half of 1915 there has not been a fatal accident. Samuel Riddle, superintendent of transportation of the company, went further than Dr. Duncan when he stated that there had not been a fatal accident chargeable to the company since last August. Mr. Riddle is the electric railway representative of the Louisville Rotary Club and, in accordance with the plan by which all the members take their turns in "boosting" their special interest, Mr. Riddle discussed the work of the company in the direction of accident prevention and asked for co-operation of his fellow Rotarians in getting results. Three speakers supported him, Dr. Edward Grant, city health officer; Dr. Joseph W. Fowler, superintendent of the City Hospital, and Dr. Duncan, the coroner. The principal address of interest was that of Dr. Duncan, who suggested that the civic and commercial organizations of the city further a movement looking toward the appointment of a safety commissioner by the city, after the plan followed in Chicago, to investigate accidents and determine causes, as well as outline plans by which they might be prevented. Mr. Riddle expressed his approval of the proposal and it is expected that definite will be obtained.

Personal Mention

Mr. Frank Sullivan Smith has been elected a member of the executive committee of the American Light & Traction Company, New York, N. Y., to succeed the late Gen. Thomas Hubbard.

Mr. J. H. Merrill, Youngstown, Ohio, has been appointed purchasing agent of the Rockford & Interurban Railway and the Rockford (Ill.) City Traction Company, to succeed Mr. Charles A. Ingle, who resigned some time ago.

Mr. Emerson McMillin, chairman of the board of the American Light & Traction Company, New York, N. Y., has also been elected chairman of the executive committee of the company to succeed the late Gen. Thomas Hubbard.

Mr. Charles F. Wallace was elected president of the Stone & Webster properties at Dallas, Tex., known as the Rapid Transit Railway and the Dallas Electric Light & Power Company, at the annual meeting of these companies on June 10.

Mr. John W. Brown has been appointed by the Kansas City Court of Appeals to succeed himself as the representative of Kansas City on the board of directors of the Kansas City Railways, the company which will have control of the street railways of Kansas City if the new franchise is accepted. Mr. Wagner's term had expired. Mayor Jost nominated him and two others as a list from which the Court of Appeals might name a representative.

Mr. R. W. Berliner, who for the last two years has been general maanger of the Colonial Power & Light Company, the Claremont Railway & Lighting Company and the Claremont Power Company, all of Claremont, N. H., has been appointed engineer in charge of general construction work in the South and East for the Eastern Power & Light Corporation, which controls the Claremont companies. Mr. Berliner's headquarters after July 1 will be in New York Citiy.

Mr. Byron T. Burt, who resigned as general manager of the Chattanooga & Tennessee River Power Company early this year, has been appointed vice-president of the Rutland Railway, Light & Power Company, and will have charge of the operation of the company with headquarters at Rutland, Vt. The Rutland Railway, Light & Power Company is controlled by W. S. Barstow & Company, New York, N. Y. Mr. Burt was manager of the Chattanooga Electric Company until its consolidation with the Chattanooga Railway & Light Company. When the Chattanooga & Tennessee River Power Company was organized to construct the hydroelectric plant at Hale's Bar on the Tennessee River he was made general manager of the company.

OBITUARY

Joshua Hale, for some years a partner of John Balch Blood in the engineering firm of Blood & Hale, Boston, Mass., was instantly killed by an automobile at Newburyport, Mass., on June 15. Mr. Hale was born in Boston in 1869 and was educated at the Massachusetts Institute of Technology and at Harvard University. At the time of his death he maintained an office in Boston, and was in close touch with engineering and financial interests.

A blackberry grower's organization at LaGrange, Ky., about 25 miles from Louisville, in Oldham County, will this year, for the first time ship its produce to Louisville, where R. H. Wyatt, general freight agent of the Louisville & Interurban Railway, has found purchasers among several preserving concerns. Heretofore the berry growers have shipped their entire product to the Eastern markets by steam roads. The crop this year will come to Louisville in the express cars of the Louisville & Interurban. This business has resulted in part from the efforts of Mr. Wyatt to show the potential shippers on the company's lines that often their best market is to be found close at home. In this instance the net returns figure out as well in spite of the fact that a lower price is paid, for the whole crop is contracted for, and, with the short haul, there is no need of iced-cars, and consequently the freight rate is lower. The berry traffic around Louisville, where the electric roads figure, will run to about 3,000 crates daily in the next week or so, all being hauled to Louisville.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Cumberland & Manchester Railroad, Manchester, Ky.**—Incorporated in Kentucky to build a railway from Manchester to Barbourville, 24 miles. Capital stock, $50,000. Incorporators: F. M. Heidrick, Brooksville, Pa.; R. E. Heidrick, Clarion, Pa.; W. D. Clark, Franklin, Tenn., and C. B. Lytle, Manchester, Ky.

***Nashville, Springfield & Northern Railroad, Nashville, Tenn.**—Incorporated in Tennessee to build an electric railway between Nashville, Springfield, Clarksville, Tenn., and Franklin, Ky., 80 miles. Capital stock, $10,000. Officers: E. G. Stribbling, Nashville, president; W. B. Myers, Goodlettsville, vice-president, and Robert C. Leonard, Nashville, secretary and treasurer.

FRANCHISES

Globe, Ariz.—The Globe & Miami Traction Company has received from the Council a six months' extension of time on its franchise to build a line between Globe and Miami. L. L. Lichtfield, president. [May 9, '14.]

Adams, Mass.—The Berkshire Street Railway has received from the Council in Adams a franchise to relocate its track on Columbia Street near the corner of Friend Street and Columbia Street.

Ayer, Mass.—The Lowell & Fitchburg Street Railway has received a franchise from the Council for the extension of its tracks on Main Street, Ayer, across the railroad tracks to connect with the Ayer terminus of the Shirley-Ayer line of the Fitchburg & Leominster Street Railway.

Haverhill, Mass.—The Bay State Street Railway has asked the Council for a franchise to alter and relocate some of its track in Haverhill.

Haverhill, Mass.—The Massachusetts Northeastern Street Railway has asked the Council for a franchise to relocate and change the grade on some of its track in Haverhill.

Pontiac, Mich.—The Detroit, Pontiac & Owosso Railway has asked the Council for a franchise to build a railway in Pontiac. This is part of a plan to construct a railway from Owosso to Detroit. George H. Lau, Detroit, is interested. [Aug. 1, '14.]

Kenmore, N. Y.—The International Railway has received a five-year franchise from the Council to extend its line on Military Road to the Velodrome, Kenmore.

Pittsburgh, Pa.—The Pittsburgh Railways has asked the Council for a franchise to construct additional track in Pittsburgh. The franchise asked is for a single track on Diamond Street from Grant Street to Wood Street, a double track from Try Street to Grant Street and for connections to be made with existing tracks on Forbes Street, Grant Street, Smithfield Street and Wood Street.

Portland, Ore.—O. M. Clark and associates have asked the Board of County Commissioners for a franchise to build a railway from Portland to Linnton. [May 15, '15.]

Portland, Ore.—The United Railways has asked the Board of County Commissioners for a franchise to build an extension from Portland to Oilton.

Belpre, W. Va.—The Marietta-Parkersburg Interurban Railway has asked the Council for a franchise to construct a railway in Belpre. This is part of a plan to construct a railway from Parkersburg to Marietta.

TRACK AND ROADWAY

Los Angeles & San Joaquin Valley Railroad, Los Angeles, Cal.—This company reports that on account of financial conditions no work has been undertaken on the project to build an electric railway between Los Angeles, Olig and Tejon Pass. Efforts will be made to revive the project when conditions improve. T. E. Gibbon, president. [Sept. 6, '13.]

Pacific Gas & Electric Company, Sacramento, Cal.—The following improvements in Sacramento are being planned by this company: Reconstructing P Street from Third Street to Tenth Street with single track, replacing 40-lb. T-rail; reconstructing J Street from Second Street to Twelfth Street with 87-lb. groove rail to replace 51-lb. rail; reconstructing 60-lb. T-rail with 87-lb. groove rail and building a new track on Second Avenue from Stockton Avenue to East Avenue, thence on Park Avenue to Thirty-fifth Street.

Bay Shore Railroad, San Diego, Cal.—Material for the construction of this company's lines from San Diego to Mission Beach has been received and work will be begun at once laying tracks on the bridge across the Mission Bay inlet. The railway will extend the length of Mission Boulevard and will cross the bridge over Mission Bay inlet, connecting with the Ocean Beach line for transportation to and from San Diego. [Aug. 1, '14.]

Municipal Railways of San Francisco, San Francisco, Cal.—Engineer O'Shaughnessy is preparing to let the contract for the building of the Church Street line from Market Street over the Church Street hill as far into the Noe Valley as the available funds will take it. The Board of Supervisors has authorized the building of the line, opposition having been withdrawn by the interested property owners.

Norwich, Colchester & Hartford Traction Company, Hartford, Conn.—The stockholders of this company have accepted the charter amendment which extends the rights of the company to complete its line between Norwich and Hartford for two years, and have practically planned to finish it within that time. The line is completed from Silver Lane to Glastonbury, 7 miles, and about 25 miles remain to be constructed. New York financiers have become interested in the proposition. At a recent meeting the following directors of the company were elected: Walter S. Garde, Hartford; Elmer Robinson and W. A. Strickland, Glastonbury; Stanley R. Ketcham, New York; Dr. C. E. Stark, Mayor T. C. Murphy, Frank Kromer and C. S. Holbrook, Norwich. [Jan. 19, '15.]

Jacksonville, Fla.—S. J. Pegram, Jacksonville, has offered to give $10,000 toward the construction of the proposed railway from Ortega to the Florida State camp ground at Black Point and a committee is canvassing among other realty owners to see what financial assistance they will be willing to render. Committees were appointed at a recent meeting of the military body of the Jacksonville Chamber of Commerce and it is expected that definite information will soon be ready with reference to the construction of the line. [May 8, '15.]

Jacksonville (Fla.) Traction Company.—The Council of Jacksonville has authorized this company to build an extension of its line along Kings Road, Jacksonville.

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—Amended articles of incorporation have been prepared by this company to increase its capital stock from $400,000 to $1,000,000. An extension of its line from the Jungle to Pinellas Park and Clearwater is contemplated.

***Evansville, Ind.**—In connection with the proposed Dixie Bee Line Highway from Chicago to Nashville, to pass through Terre Haute, Evansville, Henderson, Ind., and on south to Tennessee, it has developed that there is a movement on foot to build an electric railway between Evansville and Terre Haute. The Terre Haute, Indianapolis & Eastern Railway reaches Sullivan and the Evansville Railway reaches Patoka, leaving a gap of 60 or 70 miles. Business men of Vincennes, Princeton and Terre Haute are interested in the proposition to build the line.

Iowa Railway & Light Company, Cedar Rapids, Ia.—Plans are being made by this company to extend its lines to Jefferson this summer. The company is now purchasing the right-of-way and material has been received for the construction of the line.

Ottumwa Railway & Light Company, Ottumwa, Ia.—This company reports that it is relaying about 1 mile of track in Ottumwa. All material for the construction has been purchased.

Iola (Kan.) Electric Railroad.—New rails are being laid by this company on its line on East Madison Avenue, Iola.

Bay State Street Railway, Boston, Mass.—The Public Service Commission of Massachusetts has authorized this company to operate its cars over a new location of tracks on Martin Street near Prospect Street, Essex.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—This company has asked the Public Service Commission of Massachusetts for its approval of the relocation of its tracks on Hampshire Street at Arlington Street, Lawrence, established under an order from the Council Nov. 9, 1914.

Muskegon-Saginaw Electric Company, Muskegon, Mich.—Plans are being considered to extend this company's proposed line to St. Johns via Crystal, Carson City and Maple Rapids. The amount asked for the preliminary survey has been secured. [May 29, '15.]

Minneapolis & Northern Railway, Minneapolis, Minn.—This company, operating an 18-mile line between Minneapolis and Anoka, has contracted with the Minneapolis Street Railway whereby the lines of that company will be used for an entrance into Minneapolis.

St. Paul Southern Electric Railway, St. Paul, Minn.—Officers of this company recently voted to accept practially in full the terms offered by the St. Paul City Railway for the use of its tracks inside the city limits. A conference will be held within a few days to arrange further details and to sign the contract. Immediate steps will then be taken to make operating arrangements and it is expected that regular service from Hastings to St. Paul will be inaugurated within two weeks.

Metropolitan Street Railway, Kansas City, Mo.—This company has begun construction on its new track from the Pacific Bridge to the city limits on Electric Street, Jefferson. New and heavy rails have been laid.

***Mexico, Mo.**—Plans are being made by the Mexico Investment & Construction Company to build a railway from Mexico southwest, 14 miles, if a bonus of $30,000 can be obtained.

Trenton & Mercer County Traction Company, Trenton, N. J.—This company is rebuilding and repairing some of its lines in Trenton and the suburbs. The company has purchased 18,000 ties for this work and the overhead construction is being practically rebuilt in many cases.

Brooklyn Rapid Transit Company, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has received bids for the supply of certain track materials to be used in equipping the New Utrecht Avenue elevated railroad and possibly on other lines of the dual system of rapid transit. The New Utrecht Avenue line is to be an elevated railroad connecting the Fourth Avenue subway through Thirty-eighth Street, New Utrecht Avenue, Eighty-sixth Street and Stillwell Avenue with Coney Island. It will be operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit) under the contract between the city of New York and the New York Municipal Railway Corporation. The bids covered open-hearth rails, manganese rails, splice bars, anti-creepers, cast-iron separators, cut track spikes, screw spikes and lag screws, ties and timber, bolts and nuts, nut locks, malleable-iron rail braces, washers and end inclines, tie plates, hand rails, frogs and switches. Contracts will be awarded this week.

***Olean, N. Y.**—O. P. Brown, Olean, and associates are considering plans to build an electric railway between Olean and Cuba, via the Haskell Road. Rights-of-way have been secured and a report has been presented to the Western New York & Pennsylvania Traction Company, which has signified approval of the route.

Cleveland (Ohio) Railway.—Peter Witt, street railway commissioner of Cleveland, stated on June 4 that the 123d Street crosstown line will be built just as soon as the city accepts the streets on which it will operate. They are new streets and are still owned by real estate operators.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Work has been begun by this company on the extension of its Arlington Avenue line from Arlington Avenue and Fifth Avenue to Arlington Avenue and Cambridge Boulevard, Upper Arlington.

Lancaster Traction & Power Company, Lancaster, Ohio.—This company reports that plans are being made to build a 2-mile extension of its lines. All material for the construction has been received.

Toronto (Ont.) Railway.—Owing to the amount of track work ordered by the Ontario Railway Board and the financial stringency, this company has informed the city that it will not lay new track on McCaul Street from a point 400 ft. north of St. Patrick Street to College Street, Toronto. The city asked the concession in order that a proper roadbed might be put down as the southern portion of the street has already been done.

***Southern Counties Railway, St. Cesaire, Que.**—Construction has been begun and track is being laid on this company's proposed railway between St. Cesaire and Granby, 16 miles.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—The construction on this company's new Chickamauga Park line is progressing rapidly. Grading has been completed to a point below Rossville and poles and wire are in place. Before the end of the summer the line will be extended to Fort Oglethorpe.

Nashville Railway & Light Company, Nashville, Tenn.—Work will soon be begun on the new $45,000 viaduct which is to span the Nashville, Chattanooga & St. Louis Railway tracks at Cedar Street, the city and the Nashville Railway & Light Company by agreement to divide the expense of construction. The street railway has two tracks over the present wooden bridge at this point.

***Beeville, Tex.**—Plans are being considered for the construction of a railway to connect Beeville, Cadiz, Oakville and Three Rivers, 25 miles. C. O. Williams, Corpus Christi, is interested.

Texas Traction Company, Dallas, Tex.—Construction on the extension of this company's line from Waco to Austin which was recently surveyed has been abandoned for the present. Officials of the company say that the construction will not be undertaken until conditions improve. While the line from Austin to San Antonio is assured, the time of its actual construction is still vague.

Tacoma Railway & Power Company, Tacoma, Wash.—Work will be begun at once by this company on the reconstruction of its tracks and foundations on Pacific Avenue between South Thirteenth Street and South Seventh Street, Tacoma.

Charleston, Parkersburg & Northern Railroad, Parkersburg, W. Va.—Financial backing from Eastern capitalists has been secured by this company and construction will be begun at once on the proposed line between Charleston and Parkersburg, 74 miles. The road will be standard gage, and self-propelled cars will be operated on it. K. B. Stephenson, Parkersburg, secretary. [Dec. 26, '14.]

Chicago & Wisconsin Valley Railroad, Madison, Wis.—Preliminary arrangements are being made to begin construction this summer on this company's line between Madison and Janesville. It is planned to start in Madison and Janesville simultaneously and work from each city. Arrangements have been made with eastern capitalists to furnish the necessary finances and equipment. J. E. Jones, president. [Sept. 26, '14.]

SHOPS AND BUILDINGS

Kankakee & Urbana Traction Company, Urbana, Ill.—The contract has been let for this company's new passenger and freight station at Rantoul. The building is to be modern in every way.

International Railway Company, Buffalo, N. Y.—This company plans to build a new station at Lockport to be a terminal for all interurban lines entering Lockport. The plans provide for a waiting room, ticket office, parcel room, dispatcher's office and news stand on the first floor, and for the superintendent's office, trainmen's rooms, lockers, etc., on the second floor.

POWER HOUSES AND SUBSTATIONS

Savannah (Ga.) Electric Company.—A report from this company states that it has purchased one 1000-kw, 650-volt railway motor generator, one 1250-kva, 13,000-volt transformer and two 200-kw, 2300-volt voltage regulators for use in its power station.

Toledo Railways & Light Company, Toledo, Ohio.—This company reports that its Detroit Avenue substation is about completed and machinery will be installed during July. A new 20,000-kw Westinghouse turbine and condenser will also be erected next month at the main plant.

Manufactures and Supplies

ROLLING STOCK

Lincoln (Neb.) Traction Company expects to purchase one snow-plow.

Salina (Kans.) Street Railway has purchased two single-truck cars which will be put into operation when the new union depot is completed about Sept. 1.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., expects to purchase within the next two weeks two single-truck pay-as-you-enter cars.

TRADE NOTES

G. Drouvé Company, Bridgeport, Conn., supplied the sash operating device for the shops of the Norfolk & Western Railway, which were described in an illustrated article in the ELECTRIC RAILWAY JOURNAL of June 5.

Corliss Carbon Company, Bradford, Pa., manufacturer of motor and generator brushes exclusively, has opened its office at 1052 Peoples Gas Building, Chicago, Ill. The Western district is now in charge of Frank D. Frawley.

Ford, Bacon & Davis, New York, N. Y., engineers, are rebuilding a pier at Galveston, Tex. A new building is being erected on the pier, and arrangements are being made for the loading and unloading of material from steamships and for shipment by rail.

Union Switch & Signal Company, Swissvale, Pa, has just completed the installation of one block of the T. D. B. system of automatic signals controlled by continuous a. c. track circuits, on the line of the Michigan United Traction Company, between Grand Rapids and Kalamazoo.

Templeton, Kenly & Company, Ltd., Chicago, Ill., manufacturers of Simplex jacks, report that they have received orders for complete equipment of Simplex jacks from fully 50 per cent of the electric railway companies in Pennsylvania which have equipped their cars with emergency jacks in accordance with the State law effective June 1. Among these roads are the following: York Railways Company, Scranton & Binghamton Traction Company, Philadelphia Railways Company, Hershey Transit Company, Lehigh Valley Transit Company, North Branch Transit Company, Easton Transit Company, Wilmington & Philadelphia Traction Company, Buffalo & Lake Erie Traction Company, Frankford, Tacony & Holmesburg Street Railway and Schuylkill Railway Company.

S. K. F. Ball Bearing Company, New York, N. Y., has greatly increased its office space and now occupies a full wing on the sixth floor of the Hudson Terminal Building, 50 Church Street. This company says that it is the only company importing ball bearings from Europe that has not been interfered with by the war. Sweden, being a neutral country, is enabled to send large and regular shipments via Norway and Denmark without entering the war zone. These Swedish imported ball bearings are now very much in demand on account of the high grade of the material and superiority of workmanship. The bearings are made in Gothenburg in a model factory employing 3000 hands, engaged exclusively in the manufacture of S. K. F. ball bearings.

Graphite Lubricating Company, Bound Brook, N. J., announces that, due to expansion of the two departments of its business—the "Bound Brook" and "Nigrum" departments—it has purchased additional property which will be devoted exclusively to the manufacture of "Nigrum" graphite impregnated oil-less bearings. The manufacture of "Bound Brook" graphite and bronze oil-less bearings will be conducted as in the past in the original plant. The new plant is 2 miles from the original property and covers a plot of more than 500 ft. x 200 ft. It is situated on the tracks of the Central Railroad of New Jersey, Philadelphia & Reading Railroad and Baltimore & Ohio Railroad. A side track is available from each of these roads. This item corrects a note published in the ELECTRIC RAILWAY JOURNAL of June 12, in which it was stated that the company had transferred the manufacture of both products to the new plant.

Esterline Company, Indianapolis, Ind., has received the following orders from electric railways for "Golden Glow" headlights during the month of May: Mahoning Valley Railway, Los Angeles (Cal.) Railway, Charles City & Western Railway, Western Railways & Power Company, Atchison Railway, Light & Power Company, East St. Louis & Suburban Railway, Metropolitan Street Railway, Lawrence Railway & Light Company, Sioux City Service Company, Noord-Zuid-Hollandsche Tramweg Matschappij, Haarlem, Holland; Cleveland & Eastern Traction Company, United Railways of St. Louis, Salina Street Railway, Menominee & Marinette Street Railway, Granite City Railway, Long Island Railroad, Virginia Railway & Power Company, Wausau Street Railway, Titusville Traction Company, Chambersburg, Greencastle & Waynesboro Street Railway, Union Street Railway, Cedar Rapids & Marion City Railway, Harrisburg Railway, Chicago & Joliet Electric Railway, Hocking-Sunday Creek Traction Company, Lincoln Traction Company, Chambersburg & Shippensburg Railway, Iowa Railway & Light Company, Bristol & Plainville Tramway, St. Joseph Railway, Light & Power Company, Peoples Gas & Electric Company, Union Electric Company, Regina Municipal Railway.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued folder No. 171 listing its stock of dump and flat cars.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34-X describing and illustrating its A-G "Giant" gas and gasoline engines.

Roller-Smith Company, New York, N. Y., has issued a number of bulletin sheets which illustrate and contain price lists of its various types of switchboard apparatus and portable instruments, including circuit breakers, reverse-current relays, frequency meters, volt-ammeters for d.c. and a.c. railway signal operation and watt-hour meters.

John C. Dolph Company, Newark, N. J., has issued a folder on its lacquer, an alcohol black finishing varnish for protecting armatures, field coils, dynamos or motors from the action of lubricating oils or moisture. Among the users of this varnish are the Hudson & Manhattan Railroad, Long Island Railroad, New York, New Haven & Hartford Railroad, Pittsburgh Railways and Texas Traction Company.

Barnes & Kobert Manufacturing Company, Milldale, Conn., has issued a catalog describing its trussed steel pole line bracket hardware. In the manufacture of this equipment the locust or oak bracket cobs are thoroughly kiln dried and impregnated with kerosene under pressure. Cold drawn steel shells are forced on and the cobs screwed on to the brackets. The shells are then swedged into position. A locking feature prevents thimbles from backing off or becoming loose owing to shrinkage. No metal portion of the brackets touches the insulator.

Electrical Testing Laboratories, Inc., New York, N. Y., has issued a bulletin which contains a general description, accompanied with illustrations, of the equipment, organization and work of its testing service. The electrical testing laboratories of this organization offers to manufacturers and operating companies a testing service which is complementary to that furnished by their own laboratories. Its comprehensive equipment includes some instruments and apparatus which often even the best equipped private laboratories do not possess. The company commands an experienced staff and an extensive organization which keeps in close touch with the electrical engineering field. The work of the laboratories is confined to testing and inspecting. It undertakes practically every work within its field of activity, which involves the ascertaining of facts and performance. Its testing service consists of tests and investigations at the laboratories upon apparatus and materials submitted by clients, acceptance tests at the factories or at the laboratories upon apparatus and materials to determine compliance with clients' specifications, and operating or service tests made after installation. In addition to the above the company offers facilities with which clients may conduct their own tests and investigations. Well equipped rooms are available if privacy is required.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLV NEW YORK, SATURDAY JUNE 26, 1915 No. 26

MORE TIME FOR STUDY OF SAFETY CODE The United States Bureau of Standards has very wisely postponed the conference on the proposed National Electrical Safety Code, which had been scheduled for July 1 and 2, to Oct. 27. This gives practically four months of extra time for study, very much more than the original time available. It was a practical impossibility for railway men interested in this matter even to read, much less to digest the recommendations of the proposed code which are contained in two circulars aggregating 187 pages of standard Bureau of Standards form. While the heat of summer is not conducive to study, railway men are accustomed to working under conditions not always delightful. They will no doubt plan to include these circulars in their programs of summer reading. They might well be made the basis of conferences. It is safe to say that never has a proposed set of rules been inaugurated with more care than that being exercised in the present instance. If rules objectionable to the electric railways get by the October conference, especially after this extra study period has been allowed, the railways will be to blame.

ARBITRATION IN CHICAGO After the conclusion of the negotiations in Chicago which lead up to arbitration, the Surface Lines published a statement in the daily papers under the heading, "Arbitration Has Won." This statement appears in abstract elsewhere in this issue. It defines the issue at point as the acceptance of arbitration, and the companies, the men, the citizens of Chicago and the mayor of that city should all be congratulated upon the adoption of this policy. Industrial conflicts may not be so serious as those between nations, but in principle there is little which distinguishes them because both are based upon the idea of breaking or wearing the other side down. Surely the time has gone by when people really believe that the best way of convincing a man that his opinions were wrong is by knocking him on the head, especially when one has to do business with him later. Violence never proved anything in regard to the real merits of the affair at issue. The statement mentioned above, issued by the Chicago Surface Lines, is particularly happy in bringing out not only the real point at difference in the dispute but also the present viewpoint of corporation managers as regards the proper functions of utility companies. They are no longer considered by their owners as purely private corporations but as public agencies with definite duties to perform. The companies can properly be held by the public strictly accountable for the performance of these duties and, in return, are entitled to protection by the public against excessive demands of labor and strikes. This protection was given in the Chicago case, both by a pronounced public sentiment and by the action of Mayor Thompson in insisting upon real arbitration.

THE COLOR LINE AND THE JITNEY Many people seem to think that the only thing which the jitney owner has to worry about is how he is going to get enough money to pay for all his repairs and to buy a new machine when the one which he is using at present wears out. But this is not all. One of the questions which the jitney owner has yet to solve is the color question, and it may prove an embarrassing one. So long as the jitney remained an unregulated private vehicle operating at the will of the driver, he could take such passengers as he chose, and he could refuse to carry others. Just as soon, however, as he began to operate on regular routes and charged a definite fare, he became a common carrier, and as such is obliged to carry anyone who presents himself or herself. The question has already come up in several Southern cities and is likely to arise in quite a number of others. Will it mean that certain seats in every jitney will be reserved for colored people? Or will separate cars have to be run? If the latter, what redress would colored citizens have if the service of jim-crow jitneys on any particular route is inadequate? There is still a good deal to be learned about the jitney before it can be considered an established transportation agent.

THE SCIENTIFIC SPIRIT IN THE SHOP One does not have to look very far to see that the spirit of investigation is at work in the electric railway shop as well as in the college laboratory. The same principle underlies the careful analysis of the mileage obtained from different kinds of gears and pinions and the counting of the numbers of millions of bacteria in a cubic centimeter of liquid. The purpose in each case is to obtain some knowledge which will improve conditions in shop maintenance and hygiene or medical practice respectively. Rule-of-thumb methods in all lines of activity enjoy a waning popularity, and analytical methods are supplanting them. Devices for testing one quantity or another are seen more and more in the shop, on the car or in the power house. This is illustrated in the statements made by W. L. Allen in his paper delivered before the Central Electric Railway Association and abstracted elsewhere in this issue. Mr. Allen endeavors to outline the ways in which purchasers of gearing can determine what they are getting. As gears and pinions and other supplies come to be purchased more and more to specifications such tests will be increasingly necessary. While it is impracticable for most companies to own all of the machines described by Mr. Allen and the corresponding testing equipment needed in other lines, yet some of these devices can be owned, while neighboring or even distant laboratories can be depended upon for tests beyond the capacity of local equipment. The manufacturers, of course, have well-equipped laboratories, and much more extensive use could be made of college laboratories by the railways than is the present practice. If the desire for test data on materials and structures exists the information can be secured in one way or another.

THE BAY STATE ARBITRATION DECISION

The decision of the arbitration board in the Bay State Street Railway wages case, abstracted in another column, is of interest from several angles. Like many other findings in industrial disputes, it sets a compromise between the contentions of the two parties, giving the men a smaller increase in pay than was demanded by them and yet awarding new rates imposing a serious additional burden upon the company itself. This burden cannot be met by present revenue, according to officials of the company who know, as few outsiders do, the struggle to make ends meet which has been going on within the system during the past decade, and if a good and adequate service is to be rendered and if the investor is to receive anything like a fair return upon his capital, just one course remains. Application must be made to the Public Service Commission of Massachusetts for authority to increase the price of transportation. Commenting for the press upon the finding, President Sullivan states that the company has postponed as long as possible an increase in rates, but that it will now get ready to act in this direction. With the Middlesex & Boston decision as a precedent, the outcome ought to be favorable to the road. This phase of the problem can be left for future comment, with the single remark that what, according to the last census report, was the world's largest electric railway system in point of mileage stands in front of an economic problem whose solution is sure to be as enlightening in method and as interesting in detail as have been the proceedings in the arbitration just closed.

The decision itself contains a revolutionary fiat in establishing a minimum wage for miscellaneous employees, such as shopmen, power plant workers, line and track maintainers, etc., after one year's service. More than half of the labor outside the blue uniformed men will be affected by the $2.25 minimum named. How such a sweeping basic compensation rate will work out remains to be seen, but there is clearly a pretty small margin of profit in modern street railroading on which to build a structure resembling even the remotest degree the economic mansion of the famous automobile manufacturer whose products are the jitney and its uncommercialized relations, who toil not even if they spin. The practice of dealing with a score or two of trades with all their individual complications on anything less than an extended consideration must of necessity lead to results more or less experimental.

The blue uniformed men receive by the award less than their maximum demands by 5 cents per hour, but the graduated scale was shortened from eight to six years and the former maximum increased from 28 to 30 cents. A considerable part of the increase granted these employees conforms closely to the rates offered them in conference prior to the arbitration. The latter has been costly, but if the estimated addition of $300,000 in two years to the company's expenses is correct as a result of the decision, it would seem that the men came off fairly well and ought to accept the finding with good grace. The chairman and deciding member held to the opinion that the company should pay a standard of wages not defined by the financial condition of the road nor apparently influenced by its ability to fill the ranks of its employees at the existing scale. Whether one concedes this or not, the company's agreement to the arbitration means that it will stand by the finding. The suggestions of the board with respect to the standardization of classifications among miscellaneous employees open up another field for study, but the great interest in the decision lies in its relation to the future policy of the company with respect to the charges to be made for its service.

PRECAUTIONS FOR THE FOURTH

Fortunately there has been marked progress in all cities during the last ten years toward the establishment of a "sane fourth." It was not many years ago that railway companies had to make many special provisions for the day in the way of fire and accident precautions. Not only was the hose unreeled in carhouses and provisions made to direct streams of water promptly on the roof or elsewhere where a fire might start, but motormen had to be particularly careful not to run over children who were setting off crackers in the street and oblivious of everything else.

There are still cities where the day is celebrated in the old way and there these precautions will still be maintained. Even where individual displays of fire works have given place to displays by the municipality or by clubs, the danger is still present, although it may be less, and care about guarding against fire is desirable. It would be a good plan on all properties during the coming week to have an inspection to see whether the fire pails are filled, the hose in condition, the extinguishers and other apparatus ready for putting out an incipient fire promptly.

Preparations should also be made to handle the extra traffic which is always an accompaniment of our principal summer holiday. In the spread of the "sane fourth" idea, the railways as well as the public have been gainers. Nevertheless, we feel confident that most managers will breathe a sigh of relief when the fourth has passed without material casualties for which the company is responsible.

CONTINUOUS VS. NOMINAL RATING OF RAILWAY SUBSTATION MACHINERY

In last week's issue of the ELECTRIC RAILWAY JOURNAL the situation regarding the rating of substation machinery was briefly outlined. As the subject is coming up next week at the A. I. E. E. convention at Deer Park, Md., some further facts may be of interest.

Some of the arguments which are advanced against the continuous rating for substation machines are as follows: 1. Machines will be rated higher than hitherto and prices will be raised to correspond with the rating. 2. The continuous rating corresponds with neither the average nor the peak load of the substation, whereas the nominal rating corresponds roughly with the average load, and the overload capacity with the peak load, thereby enabling the railway engineer to determine by rule-of-thumb the size of machine required to perform a given duty-cycle. 3. Owing to the fluctuating character of the load on most railway substations, it is safer to obtain a machine which is too large for the service, than to run the risk of obtaining one which is too small. The manufacturer should therefore be given an opportunity to supply a machine of generous design, and in order to make competitive bidding fair, the requisite margin should be standardized and incorporated in the rating. 4. Substation operators have become accustomed to the nominal rating which resembles the old A. I. E. E. rating and a change is likely to lead to misuse of machines.

The first of these arguments is based upon three assumptions: (*a*) that machines are habitually given the maximum rating which their performance warrants; (*b*) that the new system of rating permits higher temperatures than the old, and (*c*) that manufacturers base their prices upon nameplate markings rather than upon production costs. On the other hand the following can be said: Regarding (*a*), it is probable that no synchronous converter ever sold attained the three temperature limits set by the old standardization rules. Regarding (*b*), the maximum observable temperature rise for continuous operation at rated load is the same in the old and new systems of rating for the type of insulation used in railway substation machinery. The temperature rises allowed for overloads under the old rules were recognized by the manufacturers as excessive and were seldom attained.

The second argument is based upon the further assumption that the capacity of a machine for continuous and short-period loads is completely specified by its nominal rating. The fact is, however, that the capacity of a machine cannot be fully stated by one rating, as it requires for its complete specification the enumeration of two independent physical quantities, the thermal absorption and the thermal dissipation. Any attempt to combine these quantities is absolutely futile for, while the specification of both of them separately calls for a machine of definite thermal characteristics, the specification of any rating which combines them may correspond to an infinite number of different kinds of machines. A given fluctuating load can obviously be most economically carried by a machine of certain definite characteristics. Hence the nominal rating of a machine cannot indicate its suitability for carrying a given fluctuating load. The only practical way to ascertain what machine is best suited for a given duty-cycle is to give a full statement of the duty-cycle to the manufacturers, making all necessary allowances for contingencies. The manufacturers will apply their knowledge of the thermal characteristics of their machines to the solution of the problem. This substitutes scientific engineering for rule-of-thumb processes, which, although easy to apply, are likely to lead the user into trouble. Thus the under-rating of machines, as by the use of a nominal rating, results in substation operators being given a false impression of the capabilities of their machines, tending to underloading, with resultant necessity for excessive substation equipment. Furthermore comparative bids obtained on machines to meet a given duty-cycle are much more fair than those based upon a given rating because, as stated above, equal ratings do not necessarily mean equal machines, whereas equal ability to meet a given duty-cycle reaches the real essence of the problem.

The third argument is a plea for the institute to provide a margin to allow for deficiencies in engineering estimates. It is hard to see why each engineer should not make his own contingency allowance in stating the load conditions upon which bids are to be based. Indeed, the futility of trying to do otherwise has been proved in the answer to the second argument already given.

The fourth argument neglects to take into account the fact that many railways are operated from d. c. power stations, the generators in which are rated in accordance with the A. I. E. E. continuous rating. Hence the retention of the nominal rating for substation machinery will result in operators having to change their perspective when they go from a d. c. power station to a substation or vice versa. Furthermore this argument does not apply to railway substations with any greater force than to lighting substations, and no difficulty has been anticipated or experienced by the lighting men, due to the change in rating. It should also be remembered that whatever inconvenience may attend the change from nominal to continuous rating will be of a temporary character, while the retention of the nominal rating will lead to permanent inconvenience, due to the difference which would always exist between the rating of substation and power-station machines.

It is understood that the standards committee of the institute will recommend the continuous rating, allowing the nominal rating to be used, however, where it is not convenient to use the former. This will give an option and the resulting custom will determine whether or not the nominal rating can be dropped later. This action is conservative, and if purchasers will buy on the standard basis the nominal rating will disappear from lack of use.

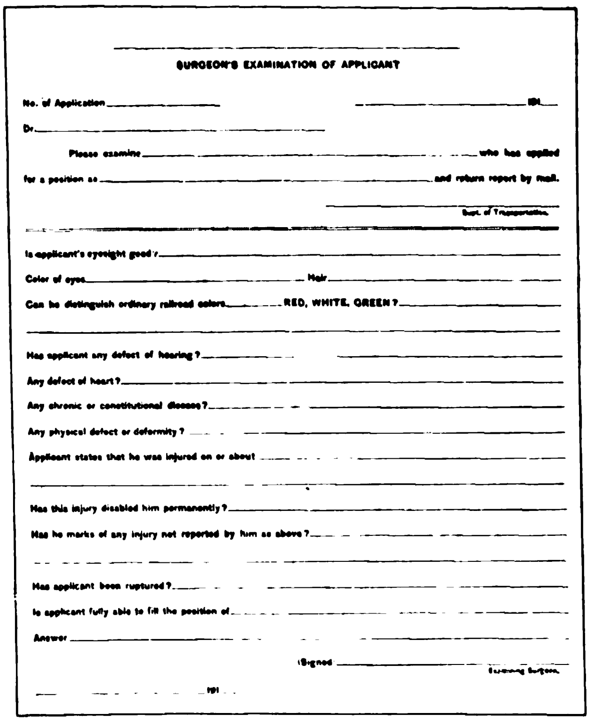
Chicago Elevated Medical Methods

An Account of the Methods of Examining the Sight, Hearing, Color Sense and Mentality of Applicants on the Chicago Elevated Railroads

BY DR. H. E. FISHER, SURGEON ELEVATED RAILROADS OF CHICAGO, ILL.

About two years ago the Elevated Railroads of Chicago employed a surgeon to take charge of its medical department and required all employees except those in the general offices and at stations, to pass a medical examination. The surgeon's office was located centrally and was completely equipped with modern devices for making examinations, as well as for ministering to injuries and physical ailments of employees. Recent editorial comments in the ELECTRIC RAILWAY JOURNAL on this department's work have produced numerous inquiries. While some of these have been answered by letter, it has been considered advisable to publish an account of the work done by departments.

The applicant for employment, after being accepted by the transportation department, is sent to the surgeon's office, where he presents his original application and an order for his medical examination. This order is reproduced in the first form shown. The upper portion of this form is filled in by the superintendent of transportation and the lower portion is for the record of the examining surgeon. Upon receipt of this order the applicant is required to fill out a second form, also shown. This form is self-explanatory, and its main object is to secure a record of the applicant's past medical history over his signature, which may be used for future reference in case of injury. It is always desirable to know whether the previous medical condition had any bearing on the results of an injury received at a later date. At the time of examination this medical history is also used to determine whether the applicant is a safe risk for handling the work he is seeking, or whether he has any incurable or serious constitutional disease. If the medical examiner is satisfied with the applicant's previous medical history, he begins a practical examination of the special senses, namely, sight, hearing, color perception and mentality.

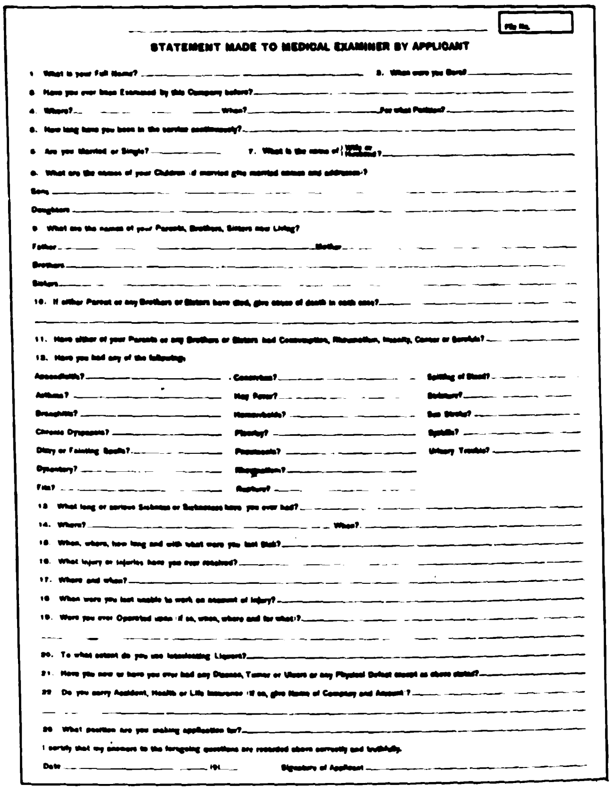


SURGEON'S EXAMINATION OF APPLICANT

No. of Application
191
Dr.
Please examine who has applied
for a position as and return report by mail.
Supt. of Transportation.

Is applicant's eyesight good?
Color of eyes Hair
Can he distinguish ordinary railroad colors RED, WHITE, GREEN?
Has applicant any defect of hearing?
Any defect of heart?
Any chronic or constitutional disease?
Any physical defect or deformity?
Applicant states that he was injured on or about
Has this injury disabled him permanently?
Has he marks of any injury not reported by him as above?
Has applicant been ruptured?
Is applicant fully able to fill the position of
Answer
(Signed)
Examining Surgeon.
191

CHICAGO ELEVATED MEDICAL EXAMINATIONS—SURGEON'S EXAMINATION RECORD BLANK



File No.

STATEMENT MADE TO MEDICAL EXAMINER BY APPLICANT

1. What is your Full Name? 2. When were you Born?
3. Have you ever been Examined by this Company before?
4. Where? When? For what Position?
5. How long have you been in the service continuously?
6. Are you Married or Single? 7. What is the name of Wife or Husband?
8. What are the names of your Children (if married give married names and addresses)?
Sons
Daughters
9. What are the names of your Parents, Brothers, Sisters now Living?
Father Mother
Brothers
Sisters
10. If either Parent or any Brothers or Sisters have died, give cause of death in each case?
11. Have either of your Parents or any Brothers or Sisters had Consumption, Rheumatism, Insanity, Cancer or Scrofula?
12. Have you had any of the following:

Appendicitis?	Convulsions?	Spitting of Blood?
Asthma?	Hay Fever?	[illegible]
Bronchitis?	Hemorrhoids?	Sun Stroke?
Chronic Dyspepsia?	Pleurisy?	Syphilis?
Dizzy or Fainting Spells?	Pneumonia?	Urinary Trouble?
Dysentery?	Rheumatism?	
Fits?	Rupture?	

13. What long or serious Sickness or Sicknesses have you ever had?
14. Where? When?
15. When, where, how long and with what were you last Sick?
16. What injury or injuries have you ever received?
17. Where and when?
18. When were you last unable to work on account of injury?
19. Were you ever Operated upon (if so, when, where and for what)?
20. To what extent do you use Intoxicating Liquors?
21. Have you now or have you ever had any Disease, Tumor or Ulcers or any Physical Defect except as above stated?
22. Do you carry Accident, Health or Life Insurance (if so, give Name of Company and Amount)?
23. What position are you making application for?
I certify that my answers to the foregoing questions are recorded above correctly and truthfully.
Date 191 Signature of Applicant

CHICAGO ELEVATED MEDICAL EXAMINATIONS—EMPLOYEES' MEDICAL HISTORY BLANK

SIGHT

In testing the sight the standard Snellen's test letters are used. One line of letters is displayed at a time in order not to confuse the applicant, as is frequently the case when charts have more than one line. These charts, illustrations of which are shown, are placed in a test-card rack with a black background, the letters being illuminated from both sides by incandescent lamps. The applicant is seated 20 ft. away from the rack, which is placed on a level with his eyes. A trial frame is then placed on his face and one eye is covered with an opaque disk. After this has been done the room is darkened and the applicant requested to read the letters displayed. Normal 20/20 test letters are used first, and then the increased sizes are shown until one line is read correctly. A record is made of the line so read, and then the other eye is tested in the same manner. Finally, both eyes are uncovered and the applicant is asked to read the letters in order to obtain a record of the combined vision.

Requirements

The classification used is as follows:

Class 1. All those handling trains and train signals, that is, motormen, extra motormen, yard motormen, towermen, switchtenders, interlocking men, switchmen and signalmen.

Class 2. Conductors, regular guards, extra guards and student guards.

Class 3. Station platform guards, crossing flagmen, crossing gatemen and all other employees.

The requirements are as follows:

Class 1. Vision—Normal (20/20 required in each eye without glasses).

Hearing—Normal (whisper at 20 ft., acoumeter or rewind of watch at 4 ft. for each ear).

Color perception—Normal (by Holmgren's worsted color skeins and Williams' test lantern).

Employees under Class 2 seeking promotion to Class 1 must have a combined vision of 20/20 provided vision in one eye is not less than 20/30 without glasses.

Physical defects—All physical defects tending to impair the efficiency of individual disqualify.

Re-examination—Re-examination of employees in this class must be made once every two years.

Vision—Only those whose vision does not fall below normal in one eye, and 20/40 in the other, may be allowed to hold their regular or preferred runs.

Hearing—Same as requirements for entrance to service.

Physical defects—Same as requirements for entrance to service.

Class 2. Vision—Normal (20/20 required in one eye and not less than 20/30 in the other).

Hearing—Normal (whisper at 20 ft. acoumeter or rewind of watch at 4 ft.).

Color perception—Normal (by worsted and lantern the same as for Class 1).

Physical defects—All physical defects tending to impair the efficiency of the individual disqualify.

Re-examination—Re-examination of employees in this class must be made once every two years.

Vision—Combined vision must be 20/30 and not less than 20/40 in one eye, with or without glasses.

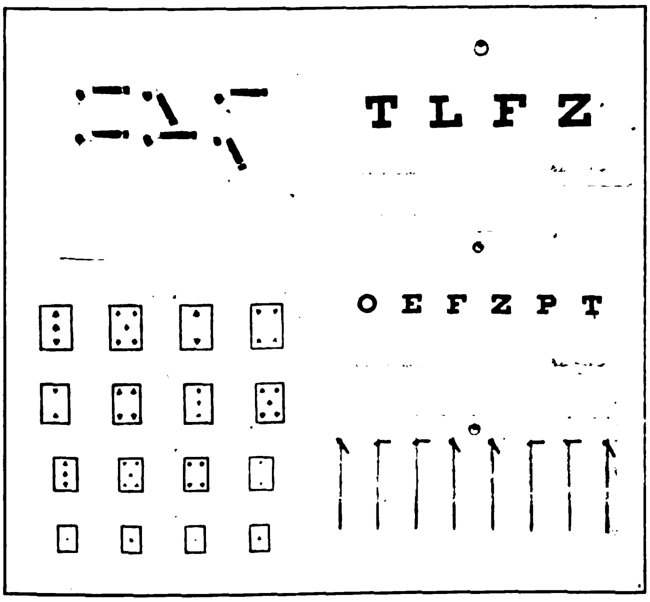
Hearing—Same as for entrance to service.

Class 3. Vision—Combined 20/40, not less than 20/50 in one eye, without glasses.

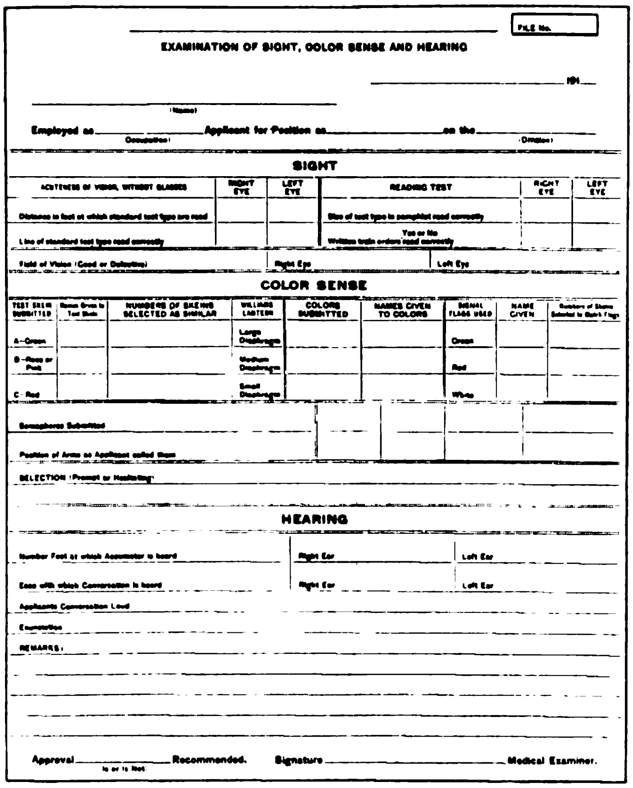
Hearing—Normal in one ear and not less than 2 ft. in the other (rewind of watch).

Color percention—Normal (worsted and lantern).

Physical defects—All physical defects tending to impair the efficiency of the individual disqualify.


T L F Z
O E F Z P T

CHICAGO ELEVATED MEDICAL EXAMINATIONS—VIEW OF TYPES OF CHARTS USED


FILE No.

EXAMINATION OF SIGHT, COLOR SENSE AND HEARING

______________ 191__

____
(Name)

Employed as ______________ (Occupation) Applicant for Position as ______________ on the ______________ (Division)

SIGHT

ACUTENESS OF VISION, WITHOUT GLASSES	RIGHT EYE	LEFT EYE	READING TEST	RIGHT EYE	LEFT EYE
Distance in feet at which standard test type are read			Size of test type in pamphlet read correctly		
Line of standard test type read correctly			Yes or No Written train orders read correctly		

Field of Vision (Good or Defective) Right Eye Left Eye

COLOR SENSE

TEST SKEIN SUBMITTED	Names Given to Test Skein	NUMBERS OF SKEINS SELECTED AS SIMILAR	WILLIAMS LANTERN	COLORS SUBMITTED	NAMES GIVEN TO COLORS	SIGNAL FLAGS USED	NAME GIVEN	Numbers of Skeins Selected to Match Flags
A—Green			Large Diaphragm			Green		
B—Rose or Pink			Medium Diaphragm			Red		
C—Red			Small Diaphragm			White		

Semaphores Submitted

Position of Arms as Applicant called them

SELECTION (Prompt or Hesitating)

HEARING

Number Feet at which Acoumeter is heard ______ Right Ear ______ Left Ear ______

Ease with which Conversation is heard ______ Right Ear ______ Left Ear ______

Applicants Conversation Loud

Enunciation

REMARKS:

Approval ______________ (Is or Is Not) Recommended. Signature ______________ Medical Examiner.

CHICAGO ELEVATED MEDICAL EXAMINATIONS—SPECIAL SENSE RECORD BLANK

Employees over fifty years of age, or employees who require glasses to bring their vision to standard, must be examined every year. Employees who have suffered severe injury or illness must be examined before they re-enter the service.

KNOWLEDGE OF ENGLISH

Frequently the examiner has to deal with a flagman or some other employee who is unable to read or write the English language or to speak it fluently, and it is necessary to provide a test to determine just what can be seen. For this purpose charts containing various sizes of playing cards corresponding to the various lines of Snellen's test letters are employed. Samples of these cards are shown in one of the accompanying illustrations. The applicant is required to indicate or call out the name of the card he can see, in order to prepare his record. Another test chart employed is one containing various sizes of figures which most applicants are able to read.

For transportation work, only those men who can read, write and speak English are employed. Men with these qualifications are of a higher grade intellectually, and they are more easily instructed and more readily understand orders. As witnesses in court they are also more valuable, and their testimony does not necessitate an interpreter, with the usual misunderstandings. Moreover, experience has shown that men who do not understand English are more liable to accident. Injuries that appear to be the result of carelessness will upon investigation often be found to be due to ignorance of English.

IMPAIRED VISION

Applicants whose sight requires glasses to bring it up to normal or standard are refused employment for train service. The reason for this rule is that the public does not feel as safe with trainmen who require glasses as they do with those who do not wear glasses. Moreover, such men must be examined more frequently, owing to the fact that glasses change the refraction of their eyes. Again, a man obliged to wear glasses may break a lens or leave his glasses at home and while on duty without them may cause an accident either to himself or to the public. Glasses are also a menace to the wearer in times of accident, as they may be broken and the pieces injure the eyes.

Near vision is tested by the ease with which the applicant reads and fills out his medical-history blank. The printing on these blanks conforms to the letters on the Jaeger test card for near vision. Old employees in service, who are re-examined and found to have defective vision, are sent to an eye specialist to have the error of refraction corrected. If the defect is such that it cannot be corrected safely with glasses, the employee is assigned to other work where good vision is not so important.

All employees, including shopmen, yardmen, electrical and road department men, should have their sight examined at the time of entering the service so that in case of an accident a record of their condition is available. All employees whose eyes have been injured, or who have had eye trouble, should be examined for range of vision before being allowed to resume their former duties. Neglect of this sometimes results in claims being made on the ground of impaired vision as due to an accident occurring after the return of the employee, when, in fact, the defect already existed.

HEARING

Range of hearing is tested by the ordinary backwind of a watch. One ear is closed by placing a finger over it and the watch held near the ear to be tested. The distance between the watch and the ear is gradually increased until the applicant fails to hear the rewind. Various acoumeters have been tried and discarded owing to the change in the intensity of sound after prolonged use. The ease with which the applicant hears ordinary conversation both in a whispered and normal voice, without seeing the examiner's lips, is also sufficient to determine whether any defect is present. A record is made of each ear's range of hearing, and any degree of impairment is sufficient reason for refusing an applicant, even though he is otherwise perfect.

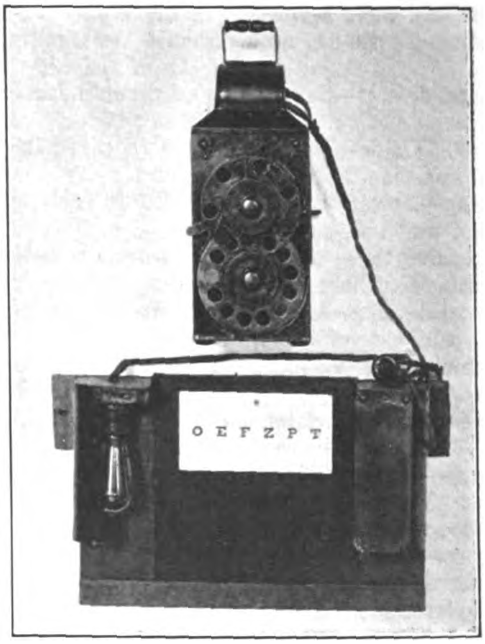
A man in the transportation service with defective hearing is a grave menace both to himself and to those associated with him. The tests in this respect are often slighted by examiners, and slightly deaf men are assigned to hazardous occupations. Even slight deafness often leads to an accident because the approach of trains is not heard. Carelessness in the examination of flagmen and gatemen for defective hearing probably causes more accidents than neglect of any other part of the examination.

Perfect hearing is essential to trainmen so that they may understand quickly and accurately train orders and other instructions, and so that passengers need not shout their inquiries. The use of bell signals is another reason for perfect hearing. A man with defective hearing may confuse the number of bell signals and so cause an accident.

COLOR PERCEPTION

Color perception ranks a close second to sight in railroad work. Correct interpretation of colors is a safety-first rule for trainmen at night, because they must depend largely on signals for the safety of their trains. In testing the color sense, Holmgren's worsted color-test skeins are used. The applicant is required to pick out the regulation railroad colors, red and green, quickly and with precision. Calling the various names and shades of colors is often difficult for some people because they do not know the names and colors. This condition is known as color ignorance. The railroad transportation business holds no place for a man who is color blind, color ignorant, or confused when he sees two colors at the same time.

The second color test is made with the Williams' railroad test lantern, which is shown in one of the accompanying illustrations. Every railroad company, regardless of its size, should use one of these lanterns in making examinations. As railroad signal colors, red and green, are those usually confused by color-blind persons, tests for color sense are particularly important. People may be color blind for green or for red, or for both. The lantern used by the elevated railroads is fitted with a revolving disk containing thirteen small lenses. These lenses are of various shades of red, green, blue, white and amber, and may be revolved before two apertures. On another revolving disk are small London glasses smoked to various degrees. When these smoked glasses are placed over the clear colors, they make the light appear like that of a dirty or smoky signal lamp. Two levers operating small disks of frosted glass are used to make the light resemble that of signal lamps in a fog or a rain. An indication like that of a smoky signal lamp on a foggy night may also be obtained.



CHICAGO ELEVATED MEDICAL EXAMINATIONS—WILLIAMS' LANTERN AND CHART RACK

The Williams' lamp also has three sizes of diaphragms or openings—large, medium and small. When these are placed over the colors and the size of the apertures is changed, the appearance of a regulation switch lamp on a dark night at distance of ½, 1 and 2 miles may be obtained. During the examination the lantern is placed in front of a dark background and all other light excluded. The applicant is seated 20 ft. from the lantern and each eye is tested separately. He is requested to call the colors quickly and correctly, and any confusion merits rejection.

Another test often used is to place two red signal lanterns, two green ones and a white one in a dark room and request the applicant to pick out the colors called by the examiner. Signal flags of various colors may also be employed in a similar test. Another simple method sometimes resorted to is to ask an applicant to name the various colors on the billboards within view of the office windows. To have more than one method of testing for color blindness is essential to good practice.

MENTALITY

The degree of alertness and quickness of perception is tested by requiring an applicant to call out the positions of signal arms. Samples of these signal charts are shown in one of the illustrations. The small line of signals is used in testing motormen and gives them the appearance of a standard semaphore as seen in daylight one mile away and against a clear sky. The three larger two-arm signals, shown on another chart, are employed in testing quickness of perception. The chart is placed in the test rack, and the light is flashed for two seconds on one mast at a time. The applicant, after this two-second interval of observation, must describe the position of the two arms.

It is difficult to test for and grade degrees of mentality. The time during which an applicant is under observation is short, consequently when he is slow in comprehending directions or answering questions, he must be subjected to more rigid tests. Men who are inclined to be fresh, forward and talkative are rejected. Applicants who act peculiarly or are nervous or excitable are also examined carefully. Any applicant with an impediment of speech is rejected, as distinct enunciation, when the names of streets or stations are being called, is considered important.

PERSONAL APPEARANCE

Another point which should be considered in the examination of applicants is the personal appearance of the prospective employees. This applies particularly to the condition of the skin on the face and hands. No applicant with a contagious skin disease or disfigurement of the face should be appointed to a position where he comes into contact with the public. The carriage and poise of the applicant should also be noted. An upright, straight-backed man who avoids a slouching attitude is preferable to one who is not particular about his personal appearance.

Every transportation company should have a regularly appointed medical examiner who is a licensed physician. This work is too important to be left to some employee who gives a few insignificant tests. Complete equipment for conducting examinations is invaluable and soon pays for itself. It is always good practice to require a complete written report of every examination, as well as to employ only physicians who will give painstaking attention to their work.

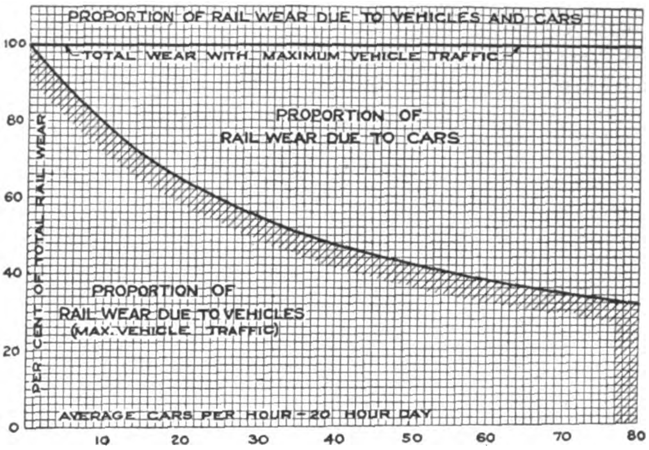
The standard of employees on the Elevated Railroads of Chicago is not exceeded anywhere in transportation circles. Strict requirements are not resented by any man. When an applicant finds that he must submit to a rigid examination which he passes successfully, he knows that he is in a superior class on account of his good physical condition. A fact that attests to the fine physical condition of the elevated railroad employees is that 70 per cent of them carry life insurance. Summed up, the essential qualifications of employees in transportation work are normal sight, normal hearing, perfect color perception, normal mentality and pleasing personal appearance.

In compliance with the request of the Austrian Minister of the Interior, the Vienna Tramway has had printed on the backs of all tramway tickets culinary advice as to how to cook economically in view of possible famine. The recipes are meant for the middle and poorer classes, who are unable to obtain flour, butter and eggs, and have to content themselves with dried fish, potatoes and rice.

Rail Wear in Chicago

Amounts Due to Vehicles and Cars—Notes on Paving, Ties and Electric Welding

Some interesting technical data on rail wear in Chicago are presented in the sixth annual report of the Board of Supervising Engineers Chicago Traction. The report says that it is the general impression that vehicle traffic causes but very slight wear on a railway track when it is properly built, but recent observation made on a section of unused track laid with a standard concrete base seems to contradict this conclusion. This section of track had never been used by cars since it was laid owing to the objections of abutting property owners, so that all of the wear upon it had come from vehicles. Careful measurements made with Vernier instruments after this track had been in the street for forty months showed that approximately 1/32 in. reduction had occurred in the rail head, measured on the center line of the tread. This represents 5 per cent of the wearing life of the original section of the rail. As the tread was perceptibly coned, the maximum wear was greater than that shown by these measurements.



RELATIVE PROPORTIONS OF RAIL WEAR DUE TO VEHICLES AND TO CARS ON STREETS OF MAXIMUM VEHICLE TRAFFIC IN CHICAGO

These results are corroborated by the fact that the lip of old girder rail had been worn down and bent over elsewhere in the city by team traffic, and in some cases the flangeway of standard 129-lb. rail has been considerably enlarged by the wear of wagon wheels, thus materially reducing the wearing width of the rail tread.

To determine the extent to which vehicle traffic is responsible for the wear of rails, a large number of observations were made at different points of the system. The results are thoroughly consistent and are shown in the accompanying diagram, in which the relative portions of wear from cars and vehicles are shown for varying average headway of cars along the street. This diagram shows that even on a line with a great deal of railway traffic, such as forty cars per hour for a twenty-four-hour day, vehicle wear may amount to as much as half of the total wear on the rail head, thus reducing the life of the rail by a corresponding amount. Other measurements, taken on short sections of track laid along the edge of Lincoln Park, where the rail was not subject to any vehicle wear but carried a large car traffic, showed a wear no greater than that on Cottage Grove Avenue and on Madison Street, with only half the car traffic but with heavy team traffic.

Elsewhere in the chapter on track the report says that study is being given to the development of an improved rail fastening so that the full advantages of steel ties may be realized and also to the development of reinforced concrete ties with a suitable fastening. This is being done because of the rapid deterioration of wood ties, due to the seepage of moisture through the pavements, especially where frequent sprinkling of the track is practised.

As a result of rolling the subgrade and the use of a concrete foundation with tie plates, the settlement of the track structure has been reduced to an inconsiderable amount. However, the use of the usual sand cushion under granite block paving has proved unsatisfactory, particularly for pavement adjacent to the rails. Consequently, paving blocks, adjacent to the rails, are now being set in a cement mortar, applied either dry or wet. This simple expedient has practically done away with the settling of pavement along the rails.

The report also refers to the method of making track repairs by electric welding. Current is taken from the trolley wire through a resistance, and tool or alloy steel is deposited at defective points by means of the electric arc. Up to this time the attempt to repair defects in solid manganese special work has met with only indifferent success, presumably owing to lack of definite knowledge as to the metallurgical process involved. But on rails the plan has been successful. Cupped joints have been built up level, hammered special work has been resurfaced, flangeways have been built up so as to renew flange-bearing special work, broken intersections have been saved until the renewal is made of the whole layout, loose sections have been welded in place, and numerous other applications of extra metal have been made to lengthen the life of the track structure.

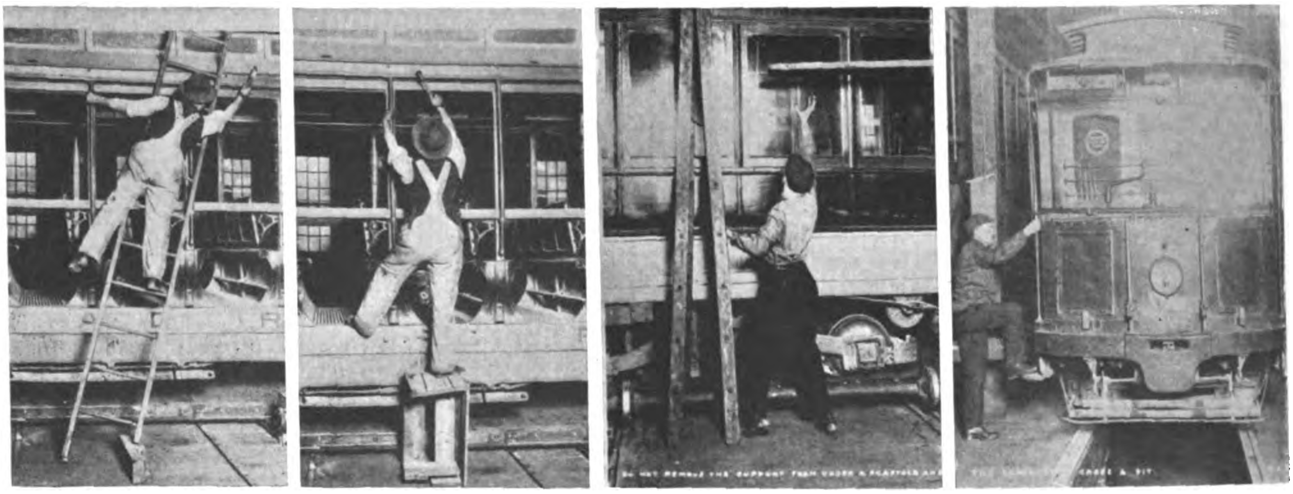


Fig. 1—Never use a broken ladder; it always slips—sometimes without giving you the chance to catch hold. Fig. 2—Never use a broken box or barrel to stand on; it is time well spent to get the proper horse or ladder. Fig. 3—Do not remove the support from under a scaffold and try to catch the plank; always climb up and carry it down. Fig. 4—The safe way to cross a pit.

CAUTION PICTURES USED IN THE SAFETY WORK OF THE MECHANICAL DEPARTMENT, BROOKLYN RAPID TRANSIT SYSTEM

Brooklyn Safety Reports for Employees

Many Safety Suggestions Made by Employees—Table of Costs of Safety Installations

The third quarterly safety report of the mechanical department, Brooklyn Rapid Transit System, covering the quarter year ending March 31, 1915, shows a praiseworthy decrease compared with the preceding three months. The interest of the rank and file in the work is shown by the many safety suggestions which are made by them.

The first part of the report contains a plea for co-operative interest on the part of the employees, without which the efforts of the company in safeguarding the machinery and making other improvements will be of little value. There is a quotation also from the report of the National Safety Council in Chicago, stating that, as a result of an investigation made of 8000 accidents, the following were found to be the four principal causes: (a) Men falling from high places, (b) men dropping heavy parts, (c) things falling on men, (d) handling tools. Protective devices could have prevented very few of these accidents, the responsibility was entirely on the man on the job.

One feature of the quarterly reports of the company is to give a list of the safety suggestions received at the different regular meetings of the safety committee held every two weeks, and also the action taken. The following are some of the suggestions contained in the second quarterly report, and will give an idea of the kind of suggestions received:

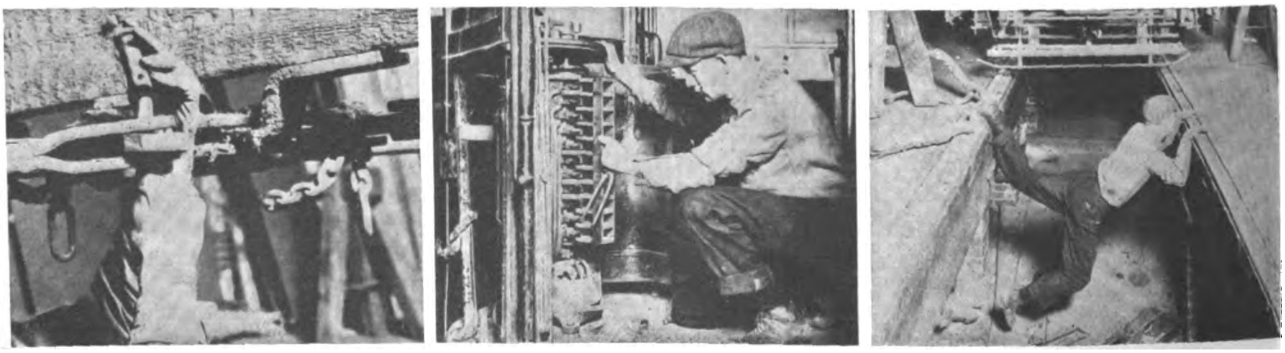


Fig. 5—Always use a drift pin in lining up the various members. Fig. 6—Is the pole off the wire? Fig. 7—Never attempt to jump across a pit.

CAUTION PICTURES USED IN THE SAFETY WORK OF THE MECHANICAL DEPARTMENT, BROOKLYN RAPID TRANSIT SYSTEM

SAFETY SUGGESTIONS RECEIVED

Suggestions	Made by	Action Taken
Purchase special jacks for removal of air compressors.	Departmental safety committee.	Adopted
Paint red those equipment parts on snow sweepers that might under certain conditions be the cause of accidents.	P. S. Scott.	Adopted
Stop all cars operating on a track where other cars are jacked up a full car-length from the jacked-up cars.	W. S. Sutton.	Adopted
Install iron hooks or racks at all shops to hold spare trolley poles.	M. F. Hutt and departmental safety committee.	Adopted
Install troughs or similar protection under longitudinal belts over benches.	Bernhard Glinski, Fifty-second Street Shop.	Adopted
Cover open end of planers.	Departmental safety committee.	Adopted
Remove nails from top of kegs used by storeroom in shipping supplies.	E. Newmeyer, Crosstown surface carhouse shop.	Referred to purchasing dept.
Fit chains used for lifting wheels and axles with rings on both ends; rings to be slipped over journals.	P. Rolleni, East New York surface carhouse shop.	Adopted
Order "respirators" for men employed in blowing out motor controllers and similar work.	F. N. Smith, Canarsie Surface Carhouse Shop.	Under consideration
Use round cutting heads on jointers and planers.	Departmental safety committee.	Adopted
Place caution and danger signs at certain points around transfer tables and elevator doors leading onto tracks, etc.	Departmental safety committee.	Under consideration

A list of safety work under way or completed, and its cost, also from the second quarterly report, follows:

Description	Completed or Under Way	Cost
Construction and installation of mail boxes for safety suggestions, and frames for pictorial matter at all shops.	Dec. 8, 1914.	$85.96
Installing safeguards around machinery at Fifty-second Street surface shop.	Under way.	736.81 Est.
Purchase of four hydraulic jacks for use at DeKalb Avenue surface carhouse shop.	Under way.	460.00 Est.
Safeguarding machinery at surface carhouse shops.	Under way.	1074.73 Est.
Safeguarding machinery at Fresh Pond repair shop.	Under way.	324.50 Est.
Purchase and place in use steel jack-up beams for supporting cars at surface carhouse shops.	Under way.	502.18 Est.
Installing gates at elevator well at Fifty-second Street shop.	By way and structure department.	127.00 Est.

The following table shows the total number of accidents which have occurred in the shops of the company during the past three quarters:

		For three months ended		
Class	Injuries	Oct. 1, 1914	Jan. 1, 1915	April 1, 1915
A	Cuts	152	94	71
B	Burns	17	10	10
C	Bruises	85	44	37
D	Bones broken	1	3	1
E	Sprains and strains	14	12	5
F	Electric shocks	2	1	2
G	Foot punctures	6	1	4
H	Nails torn off	4	2	4
J	Eye injured	9	10	8
K	Loss of member	1	0	1
L	Internal	2	1	3
	Totals	293	178	146

These reports are put in the hands of every shop man on the system. Besides the text, each report contains a group of views. The views in the report for the quarter ended April 1 show different types of safety guards used on shop machinery. Those for the previous quarter were of common causes of accidents. The latter are reproduced herewith.

In the description of the test of the arc welded joint, described by E. C. Price of the Indianapolis Switch & Frog Company on page 1156 of the last issue of this paper, the pressure to which the joint was subjected should have read 300,000 lb. instead of 30,000 lb.

Jitneys at San Antonio

Jitney operation at San Antonio, Tex., began about the middle of January. Observations made by the San Antonio Traction Company on March 16 showed that there were then in service 154 jitneys, which carried 11,991 passengers on 7103 trips, or but 1.69 passengers per trip. The average revenue per car therefore was $3.89. A second count, made on April 15, showed 182 cars in service, carrying 11,981 passengers on 7775 trips, or 1.54 passengers per trip. This reduced the average revenue per car to $3.29. A later count, made on May 7, showed that the number of cars had increased to 201, but as the trips and passengers respectively had risen only to 8093 and 12,559, the average gross earnings per car decreased to $3.14.

A peculiar characteristic of the jitney business at San Antonio is that the cars do not display route signs until they have picked up a passenger, who indicates his destination. Upon this they put up a sign in addition to the regular 5-cent symbol. The cars also do a great deal of sniping from taxicabs, and in the late afternoons they desert the business district to take the baseball fans home.

Although the jitneys generally operate over paved streets within a 2-mile zone they have failed to make a good living for their operators despite no allowances for depreciation and amortization. As in other cities, more than one-half of the jitney operators have dropped out after becoming acquainted with the harsh facts of tire renewal and general repairs. Nevertheless, the gaps in the jitney ranks have been quickly filled by others who, as the foregoing figures show, are earning less than their predecessors.

An ordinance to regulate jitney operation at San Antonio has been passed by the Council but is now under review by the Court of Criminal Appeals on application of the local Auto Service Association. This ordinance calls for operation over specific routes; a license fee of $25; a bond which would call for a maximum payment of $5,000 to one injured passenger and $10,000 to all passengers injured on a given trip; definite stops in the central district; provision against riding on running boards or fenders, etc. The ordinance was passed on March 8 and was to have become effective on April 1.

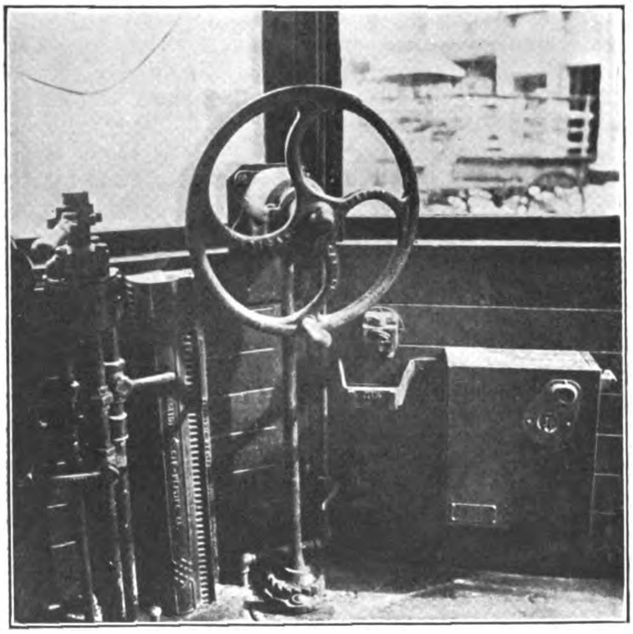
An Enviable Safety Record

Although it was making a perfect record in the matter of avoiding accidents, the St. Louis (Mo.) Electric Terminal Railway only recently had occasion to check up the results of its safety movement. The St. Louis Electric Terminal Railway operates a 7½-mile line between St. Louis and the Tri-Cities, namely, Venice, Madison and Granite City, Ill. Regular service includes 114 trips daily, during which an average of 9000 passengers are transported in the week days and 14,000 on Sundays. This line has now been in operation four and one-half years, and there has not been a single fatal accident in connection with the local surface or the through interurban cars of the Illinois Traction System, which also operates over this section of track. During the period approximately 238,000 car trips were made and 17,000,000 passengers carried. By making the safety-first movement a part of its every-day business in training employees and operating trains, the 100 per cent record of efficiency was obtained. In explanation of this record E. D. Bell, general superintendent, states that until he was requested by the head of the safety department for statistics regarding accidents, he was unaware of the unusual record of operation which has obtained since this line began regular service.

Coasting Records of Northern Texas Traction Company

This Company Operates Coasting Recorders on Thirty Interurban and 153 City Cars—The Average Coasting on the Interurban Lines Is Now 38.2 Per Cent and 33.2 Per Cent on the City Lines—The Cost of Energy Has Been Decreased with the Increase in Coasting

About the middle of 1911 the Northern Texas Traction Company installed for trial twenty-three Rico coasting recorders which were placed partly on interurban cars operating between Fort Worth and Dallas and partly on city cars in Fort Worth. No special follow-up organization was formed at that time, but the men were advised of the purpose of the clocks and how to take readings. A representative of the Railway Improvement Company, however, spent some time among the men to show them how to coast efficiently. These pioneer efforts did not meet with the desired success, owing partly to defects in the recorders, since corrected, and partly to lack of understanding by the trainmen. Furthermore, the following up of the work was hindered by a lack of appreciation, even by the company officials, of the real possibilities of this device.



NORTHERN TEXAS COASTING—RECORDER INSTALLED NEAR THE FLOOR IN DALLAS INTERURBAN CAR

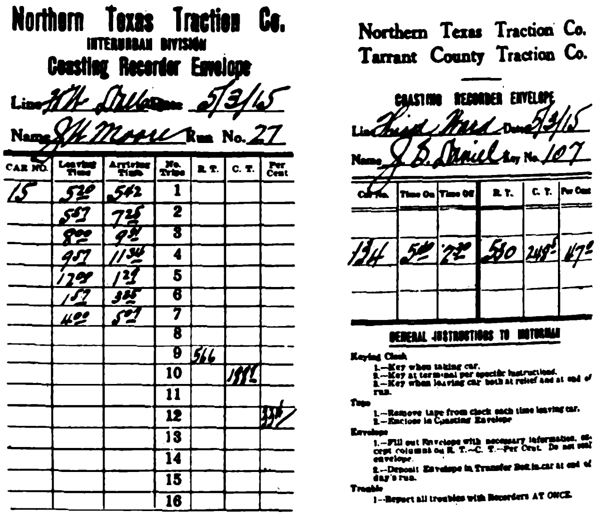
In April, 1914, following a conference between representatives of the manufacturer and the railway, the old recorders were replaced by improved ones, which were not installed on the first interurban cars but were used in such manner as to equip completely the Hemphill city line and all the cars of the Cleburne interurban line of the Tarrant County Traction Company, an affiliated property. This gave the desired opportunity to make a thorough test and a comparison against previous conditions.

For six weeks preceding the use of the recorders, the individual lines were metered for energy-consumption records. During this time nothing was said to the motormen. Following that period, however, the men were instructed mutually by the manufacturer and the railway, both at general lectures and individually on the cars.

During the first six weeks following the introduction of the recorders, the Cleburne interurban line showed coasting amounting to 22.4 per cent, and the Hemphill city line, 29.6 per cent. This test showed that the ratio of increased coasting to decreased energy use was 1:1.06 on the city line and 1:1.2 on the interurban line. Since that time the coasting percentages have increased to 38.2 per cent and 34.2 per cent respectively, but the ratio of increased energy saving to increased coasting is somewhat less. During the same test period the reduction in brakeshoe costs was 38 per cent on the city line, but no record was kept of possible brakeshoe savings on the interurban line.

RESULTS OF LATER TESTS—COASTING DEPARTMENT

As a consequence of the satisfactory operation of the recorders on the two trial lines named, the railway installed, beginning March, 1915, 160 additional instruments, making a total of 183. To handle the records properly and to maintain a follow-up system the railway organized a "coasting department," the personnel of which calls only for a superintendent and one clerk. This permits the department to be operated for a total labor, maintenance and stationery expense equivalent to about 8 per cent of what the recorders now save. It is expected, that with increased experience the ratio will be decreased.



Northern Texas Traction Co.
INTERURBAN DIVISION
Coasting Recorder Envelope

Line F.W. Dallas Date 5/3/15
Name J.W. Moore Run No. 27

CAR NO.	Leaving Time	Arriving Time	No. Trips	R. T.	C. T.	Per Cent
15	520	542	1			
	557	725	2			
	800	931	3			
	957	1136	4			
	1209	129	5			
	157	325	6			
	400	521	7			
			8			
			9	566		
			10		188½	
			11			
			12			33½
			13			
			14			
			15			
			16			

Northern Texas Traction Co.
Tarrant County Traction Co.

COASTING RECORDER ENVELOPE
Line [illegible] Date 5/3/15
Name J. B. Daniel Key No. 107

Car No.	Time On	Time Off	R. T.	C. T.	Per Cent
134	540	720	530	249.5	47.0

GENERAL INSTRUCTIONS TO MOTORMAN

Keying Clock
1.—Key when taking car.
2.—Key at terminal per specific instructions.
3.—Key when leaving car both at relief and at end of run.

Tape
1.—Remove tape from clock each time leaving car.
2.—Enclose in Coasting Envelope

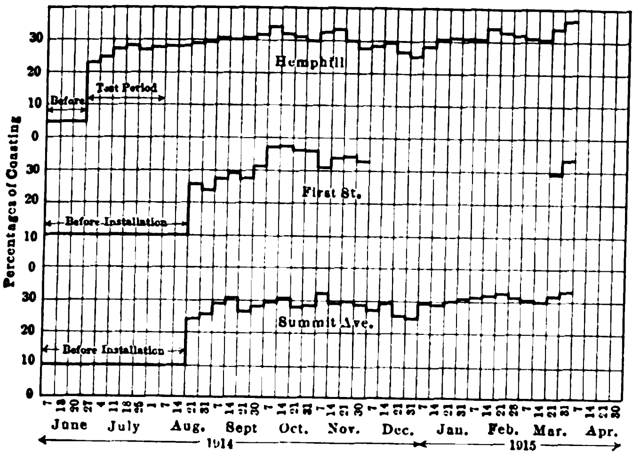
Envelope
1.—Fill out Envelope with necessary information, except columns on R. T.—C. T.—Per Cent. Do not seal envelope.
2.—Deposit Envelope in Transfer Box in car at end of day's run.

Trouble
1.—Report all troubles with Recorders AT ONCE.

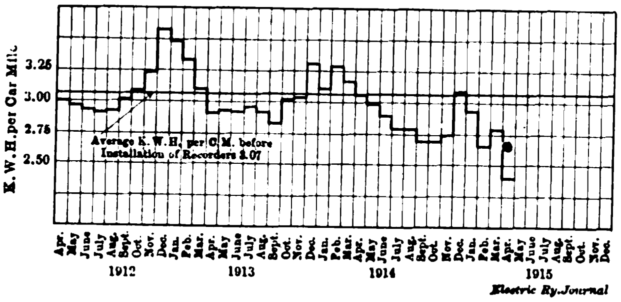
NORTHERN TEXAS COASTING—ENVELOPES USED FOR MOTORMEN'S TAPE RECORDS

METHOD OF RECORD KEEPING

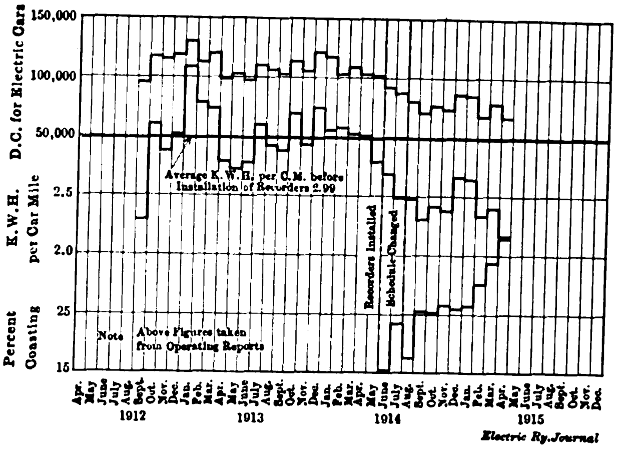
The record made by the recorder is of the Rico standard tape form. The tape is placed by the motorman in envelopes of the types reproduced, one form being used for city and the other for interurban service. The city envelopes are deposited in the conductor's transfer box, while the interurban envelopes are placed in a box at the dispatcher's office. The tape records, on reaching the coasting department, are figured for the proportion of coasting time to running time and entered for a full-



NORTHERN TEXAS COASTING—COASTING PERCENTAGES BY WEEKS



NORTHERN TEXAS COASTING—ENERGY CONSUMPTION DATA ON NORTHERN TEXAS LINES



NORTHERN TEXAS COASTING—ENERGY CONSUMPTION DATA ON TARRANT COUNTY LINES

day basis on a form designed to take care of a man's performance for a full year. The original tapes are kept on file only one week or ten days, which is sufficient to give a doubting motorman a chance to check the published statements of the department.

Comparisons of the men are posted on weekly and monthly bulletins, each line being shown separately in order to avoid unjust comparisons. The absolute average of each line is also placed at the bottom of the list.

On some lines the men are subdivided according to regular, extra and express. Men of the first class make the best passenger car records owing to their greater familiarity with the conditions on the line, the maximum for a given week ranging from 43.7 per cent to 39.8 per cent. Still better records, a maximum of 45.1 per cent, have been obtained by the operators of the express-baggage cars because of fewer stops and other more favorable running conditions. The extras work only about 5 per cent of the time so that their lower records do not materially affect the general averages.

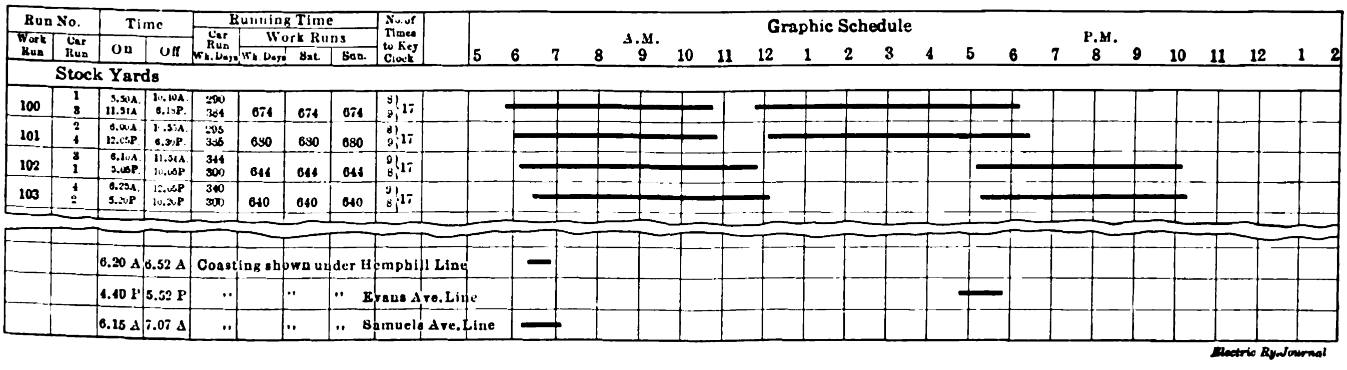
Still another kind of subdivision is in vogue on the Fort Worth-Dallas interurban line, where the men are divided according to limited runs, day local runs, night local runs, express runs and miscellaneous runs made by extra men. In comparing the records in these subdivisions it should be noted that the limited runs which might be expected to have the highest coasting do not lead in this respect because the schedule speeds are so much greater (26.3 per cent) than on other runs. However, even with the high schedule speed of 42 m.p.h. on the strictly interurban section of 26.5 miles, coasting has been as high as 28.1 per cent over a one-week period. City men, it may be added, are subdivided according to regulars and extras. The comparisons of extra men are made regardless of the lines to which they may be assigned.

SPECIAL RECORDS

Several interesting records have been derived from the coasting figures as hereinafter described. In one of the accompanying line cuts is shown a set of graphs covering operations on several city lines, from which it appears that the coasting percentage on the Hemphill line was raised from 5 per cent before the installation of recorders to a maximum of 36.7 per cent after the recorders had been in use thirty-eight weeks, on the First Street line from 10 per cent to 37.7 per cent after eight weeks, and on Summit Avenue from 10 per cent to 33.2 per cent after twenty-nine weeks.

Another graph shows the d.c. kilowatt-hours per car-mile consumed for all services of the Northern Texas Traction Company from 1912 to April, 1915. The recorder operations during the first two years were not important enough to have any bearing on the energy consumption. This graph shows a reduction from 3 kw-hr. per car-mile in April, 1914, to 2.4 kw-hr. in April, 1915.

A similar record of the Tarrant County Traction Company's cars shows a reduction from 2.99 kw-hr. per car-mile to 2.15 kw-hr. The schedule change referred to in no way effected any alteration in schedule speed,


Graphic Schedule
A.M.
P.M.
5
6
7
8
9
10
11
12
1
2
3
4
5
6
7
8
9
10
11
12
1
2
Electric Ry. Journal

Run No.		Time		Running Time				No. of Times to Key Clock
Work Run	Car Run	On	Off	Car Run Wk. Days	Work Runs Wk. Days	Sat.	Sun.	
Stock Yards								
100	1 8	5.50A. 11.51A	10.40A. 6.15P.	290 384	674	674	674	8 9 17
101	2 4	6.00A. 12.05P	10.55A. 6.30P.	295 335	630	630	680	8 9 17
102	3 1	6.10A. 5.06P.	11.54A. 10.06P.	344 300	644	644	644	9 8 17
103	4 2	6.25A. 5.20P	12.06P 10.20P	340 300	640	640	640	9 8 17
		6.20 A	6.52 A	Coasting shown under Hemphill Line				
		4.40 P	5.52 P	"	"	" Evans Ave. Line		
		6.15 A	7.07 A	"	"	" Samuels Ave. Line		

NORTHERN TEXAS COASTING—GRAPHIC SCHEDULE FOR CHECKING RUNNING TIME as it was purely an elimination of layovers which permitted three cars to do the work of four. It may be emphasized here that all schedule speeds with the recorders in use are exactly the same as they were before their installation.

On page 1199 is reproduced a chart showing a graphic schedule as prepared for individual lines. The purpose of this chart is to give a picture of each car's performance throughout the day so that the running time of the cars can readily be checked against the running times shown on the tape-holding envelopes turned in by the motormen. The record is made up as follows: The first column gives the motorman's work run number; the second column gives the car runs which make up the work run number, the number of the car run referring to the order in which the cars leave the carhouse; the third and fourth columns show the on and off time with each car; the fifth column shows the running time, in minutes, of the different car runs; the sixth, seventh and eighth columns show the running time, in minutes of work runs for week days, Saturdays and Sundays; the ninth column shows the number of times the recorder should be keyed, this record serving as a check on the correct number of recorder punchings; the remainder of the form is a straight line graph which shows the periods of time that the car is on work runs. A similar record is made for interurban service except that the graphic section is made to show the layovers at each terminal.

NORTHERN TEXAS TRACTION COMPANY AND TARRANT COUNTY TRACTION COMPANY—TABULATION OF TROUBLES WITH "RICO" COASTING TIME RECORDERS

Name of Part Developing Trouble	For Month of									
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Clock Mechanism:										
1. Main spring..	..	..	..	..	..	..	..	..	..	..
2. Release spring.	1	..	..	..	..	..	..	..	..	..
3. Balance wheel	..	..	1	..	2	1	..	..	..	..
4. Escapement ..	..	..	..	..	1	..	..	..	..	3
5. Jewel bearings	..	..	..	..	2	..	..	..	..	..
6. Hair spring...	..	..	..	.	2	2	..	..	1	..
7. Other wheels, gears, etc. ...	2	..	..	1	..	..	..	..	..	..
8. Armature	..	..	1	..	..	..	..	..	..	3
9. Magnets	..	..	1	..	..	..	..	..	..	..
10. Terminals ..	..	..	..	..	..	..	..	..	..	..
11. Dirty mechanism	..	..	..	..	..	..	..	..	..	..
12. Miscellaneous	1	..	..	..	..	..	..	..	..	1
Total	4	0	3	1	7	3	0	0	1	7
Printing Mechanism and Case:										
1. Ribbon	5	..	1	..	..	1	3	1	1	..
2. Impression hammer	..	..	..	..	..	..	..	..	..	..
3. Tape chute...	..	..	..	..	..	..	..	..	..	..
4. Key mechanism	..	..	..	..	..	..	..	..	..	..
5. Type wheel...	..	..	..	..	..	..	..	..	..	..
6. Other wheels, gears, etc. ...	..	4	..	..	..	..	..	..	..	..
7. Dirty mechanism	..	..	..	..	..	..	..	..	..	..
*8. Paper stuck..	7	10	7	9	2	5	2	3	..	14
9. Lock	..	..	1	..	..	..	..	..	..	..
10. Case	1	..	..	..	..	..	..	..	1	..
11. Miscellaneous	1	..	..	..	..	..	..	..	..	1
Total	14	14	9	9	2	6	5	4	2	15
Relay, Wiring and Contact Box:										
1. Armature	..	..	..	..	..	..	..	..	..	..
2. Magnet	..	..	..	..	..	..	..	..	..	1
3. Air cylinder..	..	..	..	..	..	..	..	..	..	..
4. Air connections	..	..	..	..	..	..	..	..	..	..
5. Piston	..	..	..	..	..	..	..	..	..	..
6. Release spring	..	.	..	..	..	..	..	..	..	..
7. Contact arm..	1	..	..	..	..	..	..	..	..	1
8. Contact plate.	..	..	..	1	..	..	..	..	..	..
9. Blowout coil..	..	..	..	..	..	1	..	..	1	..
10. Terminal connections	..	..	..	..	..	..	..	..	..	..
11. Resistance tubes	1	..	..	..	..	..	..	..	..	..
†12. Fuse	19	12	3	3	4	6	1	5	4	22
13. Controller connections ..	..	..	..	..	..	..	..	..	..	..
14. Car wiring..	..	..	..	..	..	..	..	..	..	..
15. Miscellaneous	..	..	..	..	1	..	..	..	..	1
16. Hand-brake contact box...	..	..	..	..	..	1	..	..	4	37
17. Miscellaneous	..	..	..	..	2	..	..	2	..	.
Total	21	12	3	4	7	8	1	7	9	62
Grand totals......	39	26	15	14	16	17	6	11	12	84
Average number troubles per car per month	1.70	1.13	0.65	0.61	0.69	0.74	0.26	0.47	0.16	0.46

*Paper sticking due to motormen tearing off improperly.
†Fuse blown due to reversing car.

CHECKING BAD RECORDS

In case a car has been making appreciably less coasting than customary, the mechanical department is asked to make an examination of the equipment. One occasional source of trouble thus uncovered has been traced to poor brush contact on the traction motor which acts as a generator during the coasting period in order to operate the recorder. Therefore, if there is poor contact the recorder will not operate during the full coasting period. This defect, of course, is readily corrected. Tight brakes and low bearings have also been found to cause low registration. The fact that the recorder helps to reveal defective equipment is, of course, another point in its favor.

MAINTENANCE OF RECORDERS

The recorders are maintained in the mechanical department by the same man who handles register repairs. These instruments, however, have given very little trouble as will be seen from the tabulation of defects reproduced in the accompanying table. It may be worth noting that the thirty-seven cases in April of hand-brake contact-box trouble were due to unusually heavy rains. These rains caused the swelling of the fiber through which the plunger of the contact box passes, thereby causing the plunger to stick. This has been remedied by reaming out the hole in the fiber to make ample allowance for swelling in future. The principal cases of fuse blowing are due largely to emergency reversals, thus providing a check on the motormen in this respect as well. The troubles with paper stuck are due to careless tearing off of tape.

MAINTAINING INTEREST IN COASTING PERFORMANCE

Interest in the coasting recorders is maintained chiefly by posting the individual performance records at each car station. However, when a man has an unusually low record the inspector in charge of this man's division rides with him to determine and correct his operating methods. The superintendent of the coasting department also rides with such delinquents occasionally, to point out the advantages of good coasting from the standpoints of comfort and safety to the passenger and less energy consumption and decreased car maintenance for the company.

European Sand for New York Subway

Sand imported from Europe is being used in construction of the new subways in New York City. This is not because suitable sand cannot be obtained in this country, but because the war in Europe has cut down the cargoes which steamships ordinarily bring from the other side of the Atlantic to such an extent that it is necessary for many ships to come over in ballast, for which beach sand has been used. Upon arriving in New York this ballast is discharged to make room for the returning cargoes and is practically given away by the steamship company to anyone who will haul it away and dispose of it. Rodgers & Hagerty, Inc., who have the contract for the construction of Section No. 15 of the Lexington Avenue subway, extending from about 138th Street and Park Avenue through Mott Avenue and Franz Sigel Park and River Avenue to 157th Street, have used ten scowloads of this sand in back-filling what remains of the subway excavation.

C. E. R. A. Meeting

Details of the Non-technical Features of the Boat Trip and An Abstract of W. L. Allen's Paper on Railway Motor Gearing Are Given

An account of the trip of the Central Electric Railway Association from Cleveland to Buffalo on June 17 was published in the last issue of this paper.

Upon arrival at Buffalo the association and guests disembarked and were taken in four special cars furnished by the International Railway to Niagara Falls. After viewing the American falls special cars again took the party to the Canadian falls where, after a short time, the trip through the Niagara Gorge Route was begun. The cars stopped at all points of interest, and luncheon was served en route. At the Whirlpool Rapids a brief stop was made and the entire party assembled for a photograph. The special cars returned to Buffalo from this point, arriving at the boat landing about 5 o'clock. During Friday evening the association was entertained with music, by a full orchestra, and dancing. During the progress of the evening twenty prizes for the ladies were distributed by lottery. The method of giving these prizes was especially pleasing since, unlike the card games, all ladies had an equal chance to receive one.

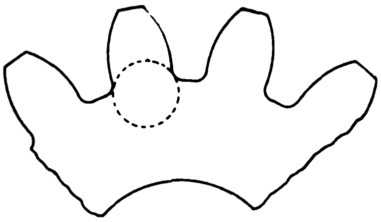
The trip was voted by all who participated in it a great success and as reflecting great credit on the enterprising and capable committee in charge.

RAILWAY MOTOR GEARING

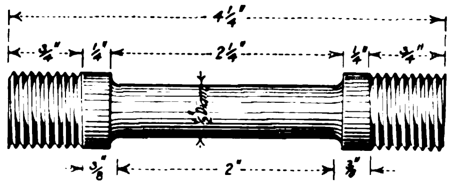
BY W. L. ALLEN, COMMERCIAL ENGINEER, R. D. NUTTALL COMPANY

Gearing is subjected to very severe stresses and wear. Its first cost and the cost of installation are such as to make economical purchase possible only through the correct selection of the grade of material for the specific service. Both the manufacturer and the operator have come to realize that such operating conditions as horsepower of the motor, gear ratio, lubrication, bearing maintenance, number of stops per mile, and topography of the country are the controlling factors in determining the life of any given grade of material. As the possible variation in these conditions is largely dependent upon the service that must be rendered and the facilities for car maintenance, the operator is forced to vary the grade of gearing to suit these conditions rather than to rearrange his operating conditions to suit any given grade of gearing.

The progressive operator is compelled to give serious consideration to plans for determining the relative merits of the various grades of material in his specific service. The larger properties maintain test departments, making service tests of each new grade offered, while the smaller properties conduct similar tests on a less elaborate scale or are governed by the results of tests made on other properties. Service tests are absolutely necessary to determine adaptability to a given service, but a great many operators have found that the indiscriminate testing of new materials is troublesome, costly and greatly retards the adoption of standards for their service. The necessity for more intelligent testing has led the operator to cast about for some method of comparing each new grade offered with materials used in the past and determining the possibilities of these new grades to solve his breakage and mileage problems. The American Electric Railway Engineering Association has endeavored to classify the respective grades of materials according to their physical characteristics.

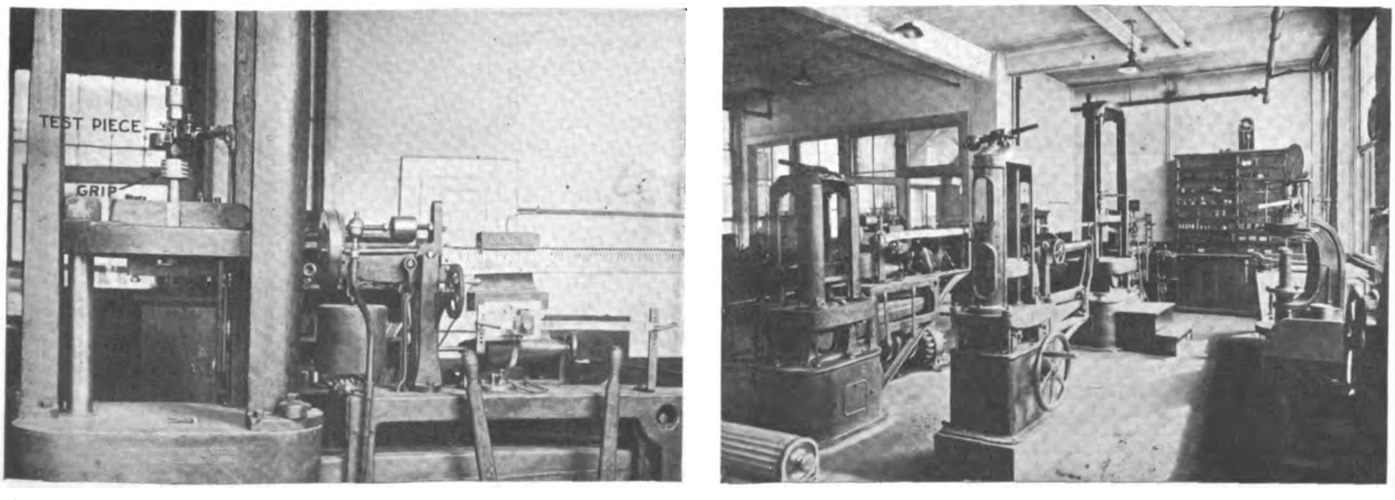


RAILWAY MOTOR GEARING—REGION FROM WHICH TEST PIECE SHOULD BE TAKEN



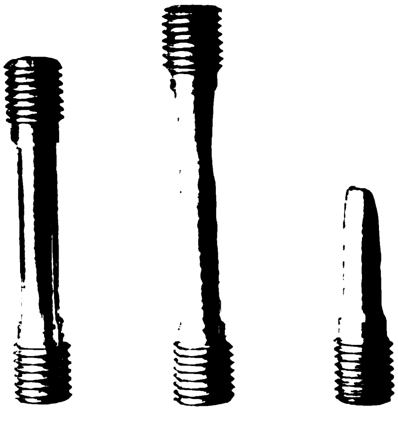
RAILWAY MOTOR GEARING—DIMENSIONS OF STANDARD TEST PIECE

The stresses to which gearing is subjected are of two kinds; those produced by the normal static load due to transmission of power, and those occurring from the dynamic load due to the impact of starting and stop-



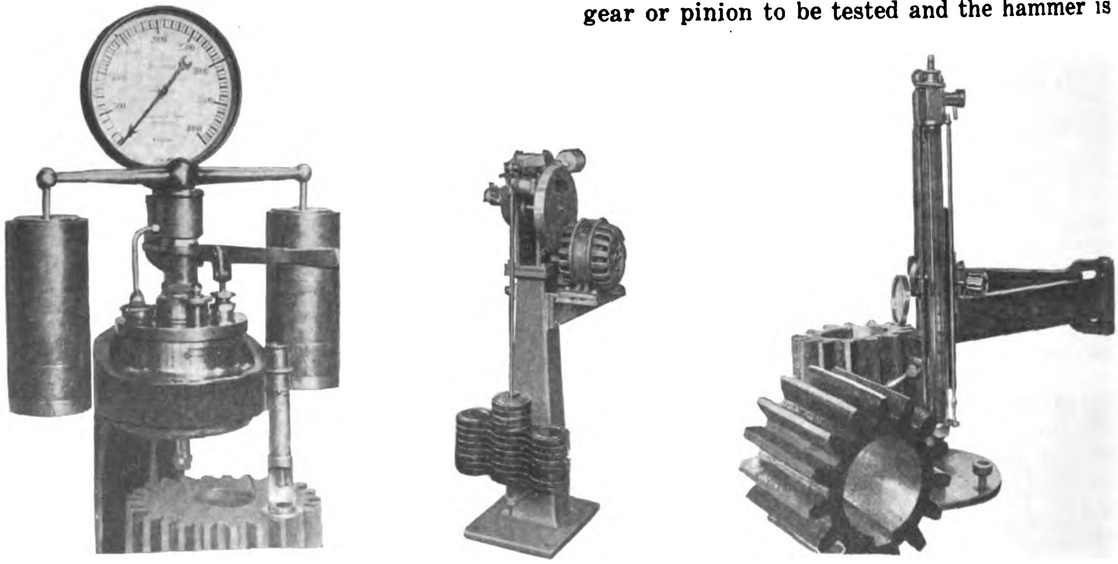
RAILWAY MOTOR GEARING—TEST PIECE UNDERGOING TENSION TEST, AND GROUP OF TESTING MACHINES IN LABORATORY ping. The resistance to static load is dependent upon the strength of the material, while the resistance to dynamic load depends upon toughness as well as strength.

As the load which is applied to gear and pinion teeth tends to break them out at the root, the quality of the material at that point should be determined. This may be accomplished by ascertaining the "ultimate tensile strength," the "yield point," the "elongation" and the "reduction of area."



RAILWAY MOTOR GEARING—TEST PIECE BEFORE STRETCHING, AFTER PASSING ELASTIC LIMIT, AND AFTER FAILURE

In testing, a standard test piece is machined from the gear or pinion at the base of a tooth, as shown herewith. Both ends are threaded and the center for two inches of its length is machined to a smaller diameter. The threaded ends are screwed into the grips of the testing machine, one grip being part of a beam scale, while a load is applied to the other grip sufficient to pull the test piece apart.



RAILWAY MOTOR GEARING—BRINELL MACHINE, MACHINE FOR TESTING RESISTANCE TO ABRASION, AND SCLERESCOPE

As the load or force is applied the test piece will elongate proportionally until the "yield point" of the steel is reached, after which the rate of elongation is materially increased.

The tension necessary to bring about this change in the rate of elongation may be observed on the beam of the scales, and may be expressed in pounds per square inch of the test piece. Similarly the load exerted to cause rupture, may be expressed as the "ultimate tensile strength" per square inch.

The elongation of the test piece is determined by making two center punch marks, usually two inches apart, upon it before subjecting it to tension and measuring the distance between these marks before and after testing. The elongation obtained in per cent of the original length is termed the "elongation in two inches," if that is the length used. Elongation of a test piece is always accompanied by a reduction in its cross-section at the point of rupture, and the amount of this reduction expressed in per cent of the original area is termed the "reduction of area."

The "yield point" and "ultimate tensile strength" represent the strength of the material, while the elongation and reduction of area indicate the toughness or ductility, and represent the resistance to fatigue, alternating stresses or dynamic blows.

RELATIVE LIFE

Resistance to abrasion depends upon hardness and refinement of grain structure. Relative hardness may be determined by means of the Brinell machine or the sclerescope.

In the Brinell machine a hardened steel ball is pressed into the surface of the gear or pinion to be tested, at a pressure of 3000 kg (6615 lb.), and the impression then made is measured with a microscope. The dimensions of the impression forms the basis of calculation of the "Brinell hardness" and the approximate tensile strength at that point. This hardness is expressed in terms of a Brinell hardness numeral, for example, 600, which represents a glass-hard steel, or 150, which represents a soft steel. The Brinell test may be applied to gears and pinions without spoiling them.

The sclerescope is an instrument adapted to test surfaces where the Brinell machine cannot be used.

It consists of a glass tube, open at one end and having an air valve at the other end. In the tube is a diamond-pointed hammer. With the hammer at the closed end the open end of the tube is placed in contact with the gear or pinion to be tested and the hammer is released by means of the air valve, falling upon the piece under test. The relative hardness is indicated by the height of the rebound. This hardness is expressed in terms of a sclerescope hardness number, for example, 100 for a glass-hard steel and 30 for a soft steel.

There has been no commercial method devised for determination of relative grain structure. Microscopic analysis has not been adapted to anything but research work up to the present time. As two gears and pinions of similar physical characteristics at the root of the tooth and at the surface may have different grain structures, it would seem advisable for the railway operator to observe the structure of the gearing under consideration by the breaking up of a gear or pinion, or by observing the grain structure of the test gear or pinion from which the test piece is machined.

It is quite possible to machine a test piece from oil-tempered and other heat-treated materials, but it is impracticable to test a case-hardened gear or pinion in this way on account of the dual characteristics of the material. In the testing of case-hardened gearing, however, the surface hardness can be determined by testing each gear or pinion with a sclerescope or Brinell machine, while the depth of "case" can be determined by breaking out a tooth and fracturing the broken piece to show the cross-section of the tooth. By grinding the broken surface and dipping in nitric acid the high carbon case will stand out black in contrast to the lighter-colored, low-carbon core.

One probable result of gear and pinion investigation by operators and the railway association gear committee will be the purchase of gearing to specifications. These specifications could be made to cover strength, toughness and surface hardness. However, as slight variation in chemical composition and heat treatment have decided effects upon physical characteristics it would be necessary for these specifications to set minimum limitations rather than definite values. This would provide a definite basis of comparison of various materials. While all might meet the specifications, their relative merits could be judged according to the extent to which they exceed the specified minimums. This method of purchase would have the effect of encouraging the manufacturer constantly to improve his material and justify any increase in first cost thus brought about. It would have the further advantage of eliminating confusion, on the part of the operator, in purchasing to trade names without complete knowledge of the characteristics of the material and would permit him to judge intelligently as to the ability of the respective materials to develop the maximum worth per dollar invested.

Investigating and Handling Automobile Accidents*

The Author Points Out the Practical Aspects of the Question and Urges Careful Preparation for Settlements

BY JOHN S. MILLS, ASSISTANT SUPERINTENDENT SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS, OAKLAND, CAL.

While the greater number of automobile accidents result in damage to the vehicle only, the cost of repairs in the aggregate amounts to a considerable item in the claim accounts of every street railway company. The mental anguish of the owner is always a consideration. He has been hit in his tenderest spot—his pocketbook. When he calls on the claim agent the latter, if wise, will greet him pleasantly and treat him very much as he would an alarm clock by patiently waiting until he runs down. The claimant should be asked to put his claims in writing on a form provided for that purpose. Then, if the company's liability is not in doubt, repairs should be ordered promptly.

Nearly all companies repair their own automobiles at the car shops because it is cheaper than to have the work done by some outside concern. Obviously, then, it should be more economical to repair privately-owned automobiles damaged in collisions with cars at the company's shop. The foreman, or man in charge, is then available for the inspection of damaged automobiles taken to public garages for repairs. If he is provided with catalogs containing the prices of parts for the several makes of automobiles and has a good knowledge of the cost of labor he should be able to prepare good estimates to protect the company from overcharge.

If an experienced repairman is not employed by the company and repairs must be made in a public garage, it is well to select one in charge of a reliable and competent mechanic and divert as much work as possible to him. He will also be available for making estimates of the cost of repairing damaged automobiles which are taken to shops selected by owners. Such a man is worth many times his hire in the saving he can effect through his knowledge of prices, labor, etc., and the protection he can give from the common practice of including the cost of replacing worn-out parts in the list of damages.

Generally speaking, the inspection of damaged automobiles in the manner outlined would be the same where responsibility for the accident is undecided, as it would be if it was admitted by the claim agent. The only difference would be in the manner of dealing with the claimant.

In nearly all cases of doubtful liability the claimant either plays the part of the injured innocent who never before had an accident—is too careful to be at fault—has no desire to claim anything more than the cost of repairs, notwithstanding the loss of his valuable time; or, he blusters into the office, hints at law, lawyers and witnesses; balks at the request for a written account of the accident and finally runs down. Patience and a knowledge of human nature if properly exercised on either type will usually secure the desired statement, names of witnesses, etc. It should then be explained that it is impossible to decide the question of responsibility until the statements of disinterested witnesses are secured, but repairs to the automobile need not be delayed on that account. They can proceed and the payment of the bill by one or the other will be decided when the evidence is all in. It should be firmly impressed on the claimant that he must order repairs made on his own account, as the company cannot undertake to assume payment of the bill at that time. Inspection of the damaged vehicle should be ordered at once, but it is not advisable to send the company's representative to the shop with the owner or to inspect it in his presence. It may be the agency through which he bought the automobile, or he may be a regular customer of the repairman. In either case the man in charge will wish to please the owner and either refrain from having anything to say or encourage the owner to include in the list of damages repairs which were needed before the accident.

Dealers in second-hand automobile parts are now to be found in all large cities, and claim agents can effect a considerable reduction in claim costs by patronizing them.

Collisions of automobiles and railway cars causing injury to persons or serious damage to the vehicles involved demand thorough investigation, of which the securing of statements from witnesses is only a small part. Preparation for settlement or lawsuit should be equally thorough. If tests, diagrams, photographs, etc., are not made until attempts at settlement have failed or suit is filed, it may not be possible to secure them. Everything for completeness of detail depends upon the intelligence, coolness and observing qualities of the men comprising the crew.

Many lawsuits have had their inception in the testimony of trainmen at coroners' inquests. At these inquisitions witnesses are asked to state opinions as well as facts, and capable motormen will give estimates of time and distance that would be laughable were the consequences not so serious.

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*Abstract of paper presented at annual convention of Pacific Claim Agents' Association, San Francisco, June 24 to 26, 1915.

Whenever a serious accident occurs or, at least, whenever death results, the car should be inspected by the company's mechanic for possible defects, and as soon as circumstances will allow, an experiment should be made with it at the place of the accident, with the same crew and under substantially similar conditions.

It is presumed the men are well trained and have marked the exact spot where the vehicles collided, also where the motorman was when he first had reason to apprehend danger, and the places where both car and automobile stopped. The company's surveyor should measure distances and secure data with which to make a comprehensive diagram of the scene. One diagram should show fixtures only—such as tracks, curbing, poles and obstructions to the view when looking in either direction, for the benefit of the jury, if needed. The other should show the locations of the car and automobile at different stages of the accident, measurements of distances and other detail. This would be for the guidance of the employees who may be required as witnesses. They may say they can explain it on the ground but not on the diagram. That is just the point. They must learn to indicate the essential features on the diagram or they will likely make a mess of it if called to do so in court.

At the time the test is made, the distance from the point where the danger first became apparent to the motorman to the place of accident should be noted, and the test made with reference to such distance as well as with reference to the rate of speed. The estimated rate of speed at the time of the accident should be duplicated as nearly as may be, the car running in the same direction at the time of the experiment as at the time of the accident. The same means for avoiding the accident which the motorman claims to have used at the time of the accident should be employed in the test. If the result of the test does not support the opinion of the motorman with reference to speed and distance, then it is evident that he made an erroneous estimate of the rate of speed the car was making at the time he first saw the other vehicle in danger, or he made an equally poor estimate of the distance from the point of his first apprehension of danger to the place where the vehicles collided. Such an experiment will demonstrate a much nearer approximation of speed and distance than is likely to be obtained from the conductor or motorman without such a test.

In nearly every trial of a suit for damages resulting from the collision of an automobile and street car the questions of speed and distance are always uppermost. The last chance doctrine must be considered.

Of course, these experiments must be in charge of other experts than the car crew—usually the division superintendent and an inspector, who should make a joint report showing the result of the test. With this report and the surveyor's diagram as aids to a thorough understanding of the situation, the carmen should be reasoned with as to speed and distance and a complete account of all features of the accident should be recorded by a stenographer to enable the men not only to answer truthfully but intelligently all the questions which may be put to them on the stand.

As an illustration of the necessity for such a course, a motorman recently testified at a coroner's inquest in the case of a man run over by the car that when he first saw the deceased in danger, he was about 126 ft. from him, the car running at between 8 m.p.h. and 10 m.p.h.; that he immediately shut off the power, applied the emergency air and did all in his power to avoid the accident. That he finally brought the car to a stop after running 126 ft., over the man and 5 ft. beyond him, making 131 ft. in all. An actual demonstration made with the same car under the same circumstances, after the inquest, showed that at the rate of 10 m.p.h. the car was easily stopped within 26 ft. Had this motorman seen this experiment before he testified at the coroner's inquest he could not have made such a glaring mistake both as to speed and distance.

He testified upon the trial that he was mistaken in his testimony before the coroner's jury as to speed and distance, but upon cross-examination by opposing counsel was finally brought around substantially to his first statement at the inquest, with the result that a verdict was rendered in favor of the plaintiff to the amount of $15,000.

Collisions of automobiles and cars wherein passengers in the automobile are killed or injured present another phase of the subject for consideration.

Formerly there was considerable conflict in the authorities as to the law with regard to responsibility, but at the present time the law of this State is well settled that where the person injured is riding with another person upon a vehicle and has neither the control of nor the right to control the driving of the vehicle, the negligence of the driver of the vehicle contributing to the injury cannot be imputed to the person injured so as to constitute contributory negligence on his part, but the defense of contributory negligence must be sustained by proof of personal failure of the person injured to exercise ordinary care. It has also been held in this State that it cannot be said, as a matter of law, that the failure of the passenger to look to ascertain the position of the car or train before the vehicle turned across the track was contributory negligence.

The passenger has the right to assume that the driver of the vehicle is competent and that he should not put it in a perilous position. If the driver is an agent or employee of the person injured, then the negligence of the driver is imputable to the person injured. The passenger is also guilty of contributory negligence if the driver of the vehicle has been careless and reckless in regard to driving and this was known to the passenger at the time of the accident, in which event evidence of such knowledge upon the part of the passenger is admissible for the purpose of showing that he did not exercise ordinary care in keeping a lookout and warning the driver of the prudent course to be pursued by him.

If the liability is doubtful, or if it cannot be proved conclusively that the person injured had knowledge that the driver is or has been careless and reckless, then it is advisable to settle upon the best terms obtainable, provided the amount demanded is not unreasonable.

While regulation will never entirely eliminate accidents, a long step in the direction of reducing their number will be made when all drivers of automobiles are required to pass examinations for physical and mental fitness and familiarity with traffic regulations before being permitted to drive over the streets of a city. They are engine drivers and should possess all the qualifications required of an engineer or motorman. The outlook for such necessary requirements is not encouraging because of the self-interest of the governing classes and the difficulty of controlling the great number of unorganized individual owners of automobiles. The increasing death rate will eventually force the adoption of the requirement. In the meantime it is well to prepare for defense.

Bay State Street Railway Arbitration

Decision Grants Certain Increases, a Six-Year Scale and a Minimum Wage

The arbitration board in the Bay State Street Railway case handed down its finding at Boston, Mass., on June 21, with the result that the blue uniformed men of the company receive an increase in wages of ½ cent per hour above the present scale, covering the period from Oct. 1, 1914, to Oct. 1, 1915, and an increase of from ½ cent to 3 cents per hour above the present compensation for the period from Oct. 1, 1915, to Oct. 1, 1916. Extra men receive a guarantee of six hours work per day; the pay of shop men and all other employees is increased ½ cent per hour up to Oct. 1, 1915, and another ½ cent thereafter; the hours of shop men are reduced from ten to nine per day, and overtime is rated at time and one-half. A minimum wage of $2.25 per day is established after the first year's service for union men other than blue uniformed employees.

The Bay State case is one of the most elaborate ever carried through in street railway arbitration and frequent references to it have appeared in this paper. Hon. Joseph C. Pelletier, district attorney of Suffolk County, Mass., was the third member and chairman of the board. The company was represented on the board by Henry E. Reynolds, assistant general manager, and the men by James H. Vahey, of Boston. The hearings covered sixty-two days, the record comprising 6800 pages of testimony and 463 exhibits, including testimony at other hearings, reports of conferences, tabulations, schedules, etc.

The Bay State company has 951.33 miles of track, about 20 per cent of which is double track, and all but 13.26 miles are in the public streets. On Oct. 1, 1914, the company employed 1577 motormen and 1628 conductors, 296 call men and about 1000 in other occupations. Since 1906 there have been four agreements or arbitrations relative to wages.

The company claimed that it could not afford to increase wages. The men claimed that the financial condition of the company should not affect the question of a fair wage. The board confesses its inability to express an opinion as to the exact financial status of the company and then says: "If the street railways generally, and this company in particular, are in need of increased revenue, it is not within the power nor is it the duty of the employees to take the initiative in securing such revenue. If we find, as we do, that an increase of wages is necessary to compensate to some extent at least for the increased cost of living, and that a minimum wage should be established, it follows that the increased cost of labor must be either paid out of the present surplus earnings or laid upon the fare-paying public through increased rates. It appears from the statement of the company that there are no surplus earnings applicable to the purpose, and no evidence has been produced which warrants the conclusion that the company is not honestly and economically managed. This being the case, the only escape from difficulties which may mean hardship upon shareholders and inefficient service to the public seems to be such an increase of fares as the Public Service Commission may approve as adequate for the purpose. The employees should not be expected to await the results of such a proceeding, although the uncertainty of its outcome, both as to the amount of increased revenue and the time when it will accrue, may be taken into consideration in fixing the scale of increased wages and reduced hours."

The unions asked for a reduction of the existing eight-year graduated scale to two years, with an increase in wages from 24 cents to 30 cents per hour for the first year, and to a maximum of 35 cents the second year and thereafter, compared with the previous eight-year maximum of 28 cents. The board is impressed by the fact that of the thirty-one principal street railways in the State, only one company (with twelve men) has a flat rate, and that the average scale, taken by companies, is 6.3 years. At present 41 per cent of the men on the Bay State are receiving the maximum pay. The board holds that to determine when conductors and motormen attain their maximum efficiency is difficult and perhaps impossible. No evidence has been presented to justify the failure to raise for the fourth and fifth years over the third, or the seventh year over the sixth. An executive of the company admitted that the present scale is a compromise and unscientific, and the board sets six years as the length of time the new scale is to be effective.

In considering the rate of wage, the board notes that the men have fairly regular and continuous employment, in striking contrast with other occupations. "Work on the railways is nearly constant all the year around, while the joiner and the bricklayer are always in danger of being made idle by slackness of trade and the bricklayer's trade is further interrupted by frost and rain. Another consideration which means a money value to the men is the free transportation of these employees in the cars of the company to and from work; a daily expense to most men of at least 10 cents."

AWARD TO UNIFORMED MEN

The board finds the following rate of wages for conductors and motormen:

BAY STATE STREET RAILWAY WAGES AWARD MOTORMEN AND CONDUCTORS IN CENTS PER HOUR, 1915

Year	Present Wage	Asked	Offered by Company Oct. 1, 1914	Award as of Oct. 1, 1914
First	24	30	24.5	24.5
Second	25	35	25.5	25.5
Third	26	35	26.5	26.5
Fourth	26	35	26.5	26.5
Fifth	26	35	26.5	26.5
Sixth	27	35	27.5	27.5
Seventh	27	35	27.5	27.5
Eighth, etc.	28	35	28.5	28.5
			From Oct. 1, 1915	From Oct. 1, 1915
First	24	30	25	*24.5
Second	25	35	26	26
Third	26	35	27	27
Fourth	26	35	27	28
Fifth	26	35	27	29
Sixth	27	35	28	30
Seventh	27	35	28	30
Eighth, etc.	28	35	29	30

*Second half-year after Oct. 1, 25 cents.
Extra men given guarantee of six hours work per day.

Motormen and conductors having regular runs with outside time exceeding twelve hours are to be paid additional compensation at the rate of 15 per cent of the employee's regular hourly rate for the first excess hour or fraction of it and 30 per cent for the second excess hour or fraction, and at the same excess rate for any further excess. All work of extra men performed in excess of fourteen consecutive hours is to be paid for, as and in addition to the six hours daily guaranteed time, and additional compensation is to be paid at the rate of 25 per cent of the employee's regular hourly rate for the first excess hour or fraction of it, and 35 per cent for the second excess hour or fraction of it, with the latter excess rate for any further excess. The board finds that men running extra trips starting before 8 a. m. are to be allowed two hours for them, this applying to all early morning crews required to report to cover the list.

EMPLOYEES OTHER THAN CONDUCTORS AND MOTORMEN

About forty classes of employees other than motormen and conductors are involved in the finding of the board, which emphasizes the importance and skill of their work, its hardships and the present time and rate of pay. It is but fair to the company, in the opinion of the board, to state that the difference between men in similar employment on its system is due to the original existence of different companies. Whenever a raise has been given in the past, it has applied throughout the system, but no attempt at uniform or union wages and conditions has been attempted. The board is of the opinion that men in the same occupation should receive the same wage regardless of their location and that hours should likewise be standardized. It finds that on and after July 1, 1915, these employees be placed on a basis of nine hours a day and eight hours on Sundays and holidays, but without extra pay on Sundays and holidays for such regular time. Such employees, when required to work overtime, are to be paid time and one-half for it. In lessening these hours, it is the intention of the board that the present total weekly wage be not reduced.

An analysis of the different rates paid employees of the shop, power house, etc., service shows a considerable variety of wages paid for similar work. Thus, armature winders receive six different hourly rates; carpenters, twenty-seven; coil winders, three; pitmen, twenty-one; babbiters, four; night watchmen, thirteen, etc. The board recommends that the company undertake a classification of wages and specifies a minimum wage of $2.25 per day for all employees who have worked one year for the company in the classes outside the blue uniformed service. This minimum wage is not to reduce existing wages in any case. The board finds that the rate of wages per hour for these employees shall be increased ½ cent per hour from Oct. 1, 1914, and another ½ cent from Oct. 1, 1915, extending to Oct. 1, 1916.

In conclusion, the arbitration board expresses its appreciation of the courtesy extended by all the parties and particularly congratulates the company for "the fine spirit shown in producing evidence and witnesses upon request of the association." The good spirit shown by the union in the proceedings is also touched upon. The board recognizes the difficulties of arriving at a decision completely satisfactory to everyone but states that it has done its best to deal fairly with all concerned. The report is signed by all three arbitrators, but the company's representative, Mr. Reynolds, states that while signing the award in the interests of harmony, he dissents, in principle and in amount, to the minimum wage which is therein established.

PRESIDENT SULLIVAN'S VIEWS

Commenting upon the decision for the press, President P. F. Sullivan said: "I have little to say about the award. Some of the increases are no more than might have been expected, considering the results of recent similar arbitrations, although we are in no position at present to meet any increase. The minimum wage as applied to our miscellaneous labor, however, is somewhat revolutionary. More than half of our labor outside of the blue uniformed men will be affected by this minimum, and the result remains to be seen. Henry Ford says it pays, but I am afraid the street railway business has not so much margin of profit with which to try experiments as has the manufacturer of automobiles. The award means that if the investors of the Bay State company shall receive a reasonable return on the investment, the price of transportation must be increased. The Bay State company has postponed as long as possible an increase in rates; it will now get ready to increase such rates."

It is estimated that the increased cost to the company as a result of the award will be about $300,000 in the two years ending Oct. 1, 1916.

COMMUNICATIONS

Jitneys vs. Light Cars

MOBILE LIGHT & RAILROAD COMPANY
MOBILE, ALA., June 10, 1915.

To the Editors:

From a four months' careful study and investigation of the jitney method of transportation I am satisfied that in all small towns and in the smaller cities up to 75,000 to 80,000 people, the best method of competing with the jitneys and killing them off is to give frequent service which, in the case of small towns and cities, can only be done with small light cars.

I have always opposed the use of double-truck cars for our service in Mobile. We use exclusively the single-truck cars, except on our suburban lines reaching out to small towns about 7 miles from the city. On these lines we operate double-truck cars carrying forty-eight people.

In Alabama, under the present motor-vehicle law, the cities have no right to regulate automobiles for hire nor to license them nor to require a permit other than under the provisions of the motor-vehicle bill, which was drawn up by automobile manufacturers. Notwithstanding this fact, which allows the jitney to operate at will, paying practically no taxes and without restrictions, we have been able to keep the number of jitneys down to the minimum. At the present time we have two white and three negro jitneys; the greatest number at any one time has been fourteen. The jitneys have never paid expenses, and of the first that started in, not one is now in business. But as some quit others take their places, and I believe this condition will continue for some time to come. I also believe that unless laws are passed increasing their taxes and requiring them to give indemnity bonds some jitneys may be able to operate during the rush hours with profit to themselves. For instance, the cost for the operator becomes practically negligible if the owner of the jitney has a boy who can work for an hour before school and for a couple of hours in the evening.

There is one jitney bus in Mobile which carries considerably more people than the seven-passenger car, and I would be more afraid if a regular line of jitney buses were placed in operation of the jitney becoming permanent. This kind of competition can best be kept out with small cars at frequent headway.

At the present time we are running on six-minute headway on Government Street, the street on which the two white jitneys operate. When depreciation is taken into consideration, the Government Street jitneys which are run by the owners are losing money, but it takes a few months before the jitney operator realizes what depreciation means. In the meantime he may possibly pay operating expenses; but he is practically living off of the investment in his machine, because at the end of a few months the machine is junk, and he has lost the money invested in it, which means he is unable to continue.

If we could operate on Government Street eight light cars, with 24-in. wheels, in place of the six cars we are now running, we could give a headway of five minutes instead of six. This would cut down the jitney's earnings and would increase our total earnings. Even though there were no jitneys in operation, the frequency of service increases riding by picking up the man who is walking, for if he continues to walk until he is within a reasonable distance of his destination, he will not get on the car. The cars would also secure as passengers many persons whom the private automobiles now pick up. In fact, these private automobiles pick up more intending passengers than the jitneys. If we could decrease the headway to four minutes or three minutes, the jitneys would have a much harder time and would die so much sooner, and we would secure many of the persons as passengers who are now carried free by automobiles, and also induce more of the walkers to ride.

If we could operate one-man cars, there is no question in my mind but that we could keep the jitney out of the transportation business, but on account of the negro population the front entrance of a one-man car would be somewhat objectionable in the South, and as the idea is to give more frequent and rapid service, the motorman making change and issuing transfers would delay the car. Therefore, we still feel that two men are necessary on our cars, but that we should have small light cars having 24-in. wheels and low platforms so we can load and unload our passengers more rapidly and give more frequent and more rapid service. The more frequent the service the fewer the stops, and this means rapidity of service. The place where the jitney thrives is in small cities and towns where fifteen-minutes headway is maintained and long double-truck cars are run. Yet in many of these towns a man can walk over 75 per cent of the route in that time. If you are going to secure business from short-distance riders you have to give them frequent opportunity to ride.

To illustrate what frequency of service can do: When I was in a Texas city during the early part of February there were in operation 355 jitneys, which had reduced the revenue of the street car company $1,000 per day, less than $3 per day per jitney, yet when I talked with the taxicab men, garage men and others that were posted, I was informed that the jitneys were taking in from $5 to $6 and more per day. This shows that about half of their receipts were from riders that would not have used the street cars even if there had been no jitneys. Part of this riding was novelty riding, no doubt, but a large portion of it was caused by the fact that the jitney came along about every two minutes and sometimes oftener, and this provided a means of reaching town so frequently that the passenger did not have the opportunity of walking any distance before he had the chance of riding offered him.

Here in Mobile we have, as I have said (except on suburban runs), single-truck cars, seating twenty-eight to thirty-two passengers. If all of our cars (outside of our double-truck cars) had been light-weight cars seating twenty-four to twenty-eight passengers, on light trucks, with two 15-hp motors, we could have operated a sufficiently larger number of cars, with no more expense, to have kept the jitneys from paying daily operating expenses, and our receipts would have been higher by the increased riding caused by the more frequent service.

I believe that if the automobile manufacturers would get out a gasoline engine that could be put on a small light car that could be run on rails, such cars would be adopted to-day wherever a new line is being built in small towns or between small towns, and I believe there is a future for the small gasoline street car, unless small electric motors and light cars can be built. The development of automobiles has been much more rapid than the development of street cars and motors, but I am in hopes that the manufacturers of electrical apparatus will be able to develop a small motor and lighter control that will answer the present need.

Let us suppose a case, say, of a small city of 15,000 people which desires a system of transportation. Part of the streets only are paved, so that it is impossible to operate jitneys all over the town. A company is organized, rails are laid and small gasoline cars are operated, the engines for the cars being designed by some of the engine makers now building engines for automobiles. I will assume that the cars are operated by one man and seat twelve to twenty passengers and are able to give six to seven and one-half minutes headway. Could not a system like the above operate more cheaply than an electric system giving fifteen-minutes headway with the present type of heavy cars? And on account of the more frequent headway would not their receipts be larger and would there be much chance for a jitney to exist in competition on the paved streets, which are apt to be the streets on which the best car lines operate?

Before jitneys began operating in Mobile we issued bulletins in the newspapers giving estimated operating expenses and receipts of jitneys and showing the injury to the general business of a town caused by jitneys and the irresponsibility of the jitney in every way. We believe these bulletins had a good deal to do with our success in keeping the maximum number so low, but the fact that we have always given frequent service with single-truck cars left no opening for any number of jitneys to operate. If our cars had been smaller and we therefore were operating a greater number at no more cost the jitney would have fared even worse.

In our fight with the jitneys we have never decreased car service, but have added service at the right times so that the jitney found it unprofitable to compete with us. The additional service cost us a small amount of money per day, but nothing in comparison with what we would have lost to the jitneys if we had not fought them with their own weapon, that is, frequency of service. J. H. WILSON, President.

NEW YORK, June 18, 1915.

To the Editors:

I have been much interested in the editorial discussion in your paper on the effect of the jitney on the desirability of small car operation. There is no doubt that small cars can be operated at a much lower cost per car-mile than large cars and that the more frequent service will encourage riding.

If we say that the ordinary two-man operation with a mixture of single and double-truck cars represents an average cost of approximately 15 cents per car-mile and that one-man light cars can be operated at 9 cents per car-mile, a conservative figure, the saving for a company operating 1,000,000 car-miles per year would be $60,000. If flagmen are required at railroad crossings, this figure would be slightly increased. If, in addition to the adoption of the type of car referred to, a zone system was installed and transfers were eliminated, additional benefits would be derived. To sum up:

1. The use of transfers reduces the average earnings of most railway systems to between 4 cents and 4½ cents per passenger. Therefore, the suggestion is made that transfers be either eliminated or given only when a 5-cent fare is paid.

2. A zone system could be established and tickets be sold at the rate of eight for 25 cents for rides within the first zone of say not to exceed two miles. This reduced fare would, in the writer's opinion, immediately be the means of recovering say 50 per cent of the jitney riders. With this reduction in jitney riders the jitneys could not exist, and within a short period of time all of the present jitney riders would again be street car riders.

3. The reduced fare would encourage many people to ride who now walk within a 1 and 1½-mile zone, and who would ride neither a jitney nor a car at 5 cents per

ride. This would result in additional business which has never before been enjoyed by the cars or jitneys. It is assumed that in some instances the additional riding from this source might be 30 per cent of the whole.

4. Collect a second 3⅛ cent fare from those riding beyond the limits of the first zone, thus making a 6¼ cent fare to outlying districts, which would more nearly compensate the railway company for this long-haul riding.

It is the firm belief of the writer that the adoption of the above rate suggestion will re-establish gross earnings on a higher basis than they were before the advent of the jitney, and irrespective of jitneys this measure would be beneficial to both the community and the company in small and medium-sized cities.

Jitneys cannot hope to carry passengers at 3⅛ cents per trip. The introduction of a zone system and the collection of a 3⅛ cent fare for a short haul, 6¼ cents for a long haul, the elimination of the transfer, or possibly the issuing of the transfer on a 5-cent cash fare, would, no doubt, meet with great favor on the part of the riding public, the city and the state officials.

The introduction of one-man cars is likely to meet with opposition from the labor unions and from the general public unless they are educated up to this question. The answer to the former is that more cars will be operated and thus will provide employment to more than half the present number of men. The answer to the latter is that the accident hazard is very much less with a one-man car than with a two-man car, as evidenced by statistics shown in the accompanying table from railway properties under the same general management, the aggregate gross earning of which for the year 1914 were $599,000. The average of the injuries and damage account for all of these companies was 3.75 per cent of the gross earnings. Two of the railway properties in this group were one-man operated and four of the properties operated with two men. The gross earnings of the one-man operated properties aggregated about 26 per cent of that for all the properties, and the injuries and damage account for this group was 1 per cent of the gross. The injuries and damage accounts of the four two-man operated properties averaged 4.7 per cent.

It may be objected that a zone system is impracticable with one-man operation. This is not the case. Both hand operated and automatic registering fare boxes are available and will overcome this difficulty. A one-zone passenger would place a ticket in the fare box on entering the car, and a two-zone passenger would place a ticket in the fare box when entering and another when leaving the car. A passenger entering a car in the second zone would not pay until leaving the car, therefore, every passenger leaving the car in the second zone would pay when passing out.

In some instances railroad crossings might be considered an obstacle. However, a considerable saving can in nearly every case be effected by establishing a flagman at railroad crossings or, if railroad crossings are near a congested traffic center, car riders could be provided to ride from the railroad crossings to the congested district and back.

The long-haul riders would object to paying a 6¼ cent fare. But as they represent an average of probably not more than 30 per cent of the total riders the vote of the larger proportion of reduced-fare riders would counteract such opposition. There might be some opposition on the part of the people to the elimination of transfers, but as an alternative the issuing of transfers might be continued on the payment of a 5-cent cash fare.

The introduction of small, one-man operated cars should be made a condition precedent to the establishing of a lower rate of fare, and it is believed that by placing on the system and operating one demonstration car, the general public and state and municipal authorities may easily be convinced of the efficiency of such means of transportation.

A condensed summary of the benefits to be derived from the adoption of the two general foregoing suggestions would be as follows:

Present operating expenses, 1,000,000 miles per annum..	$150,000
Operating expenses, 1,250,000 miles with one-man cars...	112,500
Annual saving in operating expenses................	$37,500
Present gross earnings, 1,000,000 miles at 20 cents......	$200,000
Recovery of 50 per cent of jitney riders..............	23,437
Additional short-haul riders who now walk............	31,250
Additional revenue from second-zone riders............	875
Total gross revenue..................................	$255,562
Reduction due to 3⅛-cent fare.........................	37,500
Gross earnings with one-man cars and new zone system	$218,062
Net increase in gross earnings.........................	$18,062
Saving in operating expenses..........................	37,500
Total additional net earnings........................	$55,562
Estimated operating ratio..........................	51.6 per cent

The foregoing is a conservative estimate of the result of applying the suggestions to the railway company listed as "D" in the following table:

Injuries and Damages Account, Year 1914, for Six Railway Properties, Operated Under Same General Management

	Gross Earnings	Injuries and Damages	Injuries and Damages as Per Cent of Gross Earnings
City railway, A.........	$119,099.62	$2,420.85	2.03
*City railway, B........	142,866.88	1,517.88	1.06
*City railway, C........	9,136.43	25.24	0.28
City railway, D.........	268,531.39	16,089.43	6.00
City railway, E.........	†38,402.59	1,775.90	†4.63
City railway, F.........	21,079.88	635.88	3.02
Totals	$599,116.79	$22,465.18	3.75

*One-man operated.
†Average for 2 years—1913 and 1914.

Many companies are probably in such a position that they could not finance additional car purchases at this time. In that event the savings to be derived from the modified plan of operation would permit the purchase of additional cars by the issuing of car trust certificates. The savings would be more than adequate to provide for a sinking fund to retire such certificates. Note that light one-man cars will reduce the operating accounts under every operating account classification, and the savings will not be limited to power and platform labor, as might naturally be assumed.

Short cars need not necessarily be rough riders. It is safe to assume that the equipment available will give easy riding, longer wheelbase and a minimum maintenance cost. Furthermore, it is quite within the range of possibility that one-man four-wheel cars suitable for train operation will be developed.

Note that cross-seats are a source of trouble and expense, and particularly objectionable in the case of one-man operation for the reason that the motorman would not have the time available for turning the seats. It is the writer's belief that the public can easily be converted to the longitudinal seats for short hauls providing such type of seat is introduced coincident with the new and attractive type of car.

A feature worthy of note is that the adoption of light cars will also permit the use of very much lighter track, or, in the case of heavy track now laid, will prolong its life. In either case track maintenance expense will be materially reduced.

The adoption of light cars will reduce the required investment for power station and substations to the extent of $1,000 to $2,000 per car, or, in the case of the existing properties, will permit the operation of a greatly increased car mileage.

No attempt has been made to discuss schedules or minor transportation problems incident to the adoption of small cars. In general, there will be fewer stops and less time consumed in making stops, therefore, it should be possible to operate faster schedules, especially during rush hours. RAILWAY OPERATOR.

Electric Locomotive Design

McHENRY & MURRAY, ENGINEERS
NEW HAVEN, CONN., June 14, 1915.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for June 5 an article written by A. H. Armstrong, descriptive of the Chicago, Milwaukee & St. Paul locomotives, was published. This contained several statements with which I find it difficult to agree.

On page 1072, referring to the capacity of the locomotive motors, Mr. Armstrong states: "The motor has a continuous capacity of 375 hp. Special interest attaches to the large continuous capacity of the St. Paul locomotive, as this is the first instance where such a liberal motor capacity has been required and provided for." Several electric locomotives have already been built and are in successful operation with continuous horse-power capacities per axle much greater than the above. The horse-power per axle of the Chicago, Milwaukee & St. Paul locomotives is given as 375, continuously, or 430 on an hourly basis. The latest information as to the Norfolk & Western locomotives gives the continuous capacity of the motors as 400 hp per axle, with a correspondingly greater output on an hourly basis. The hourly capacity of the motors of the Loetschberg locomotive, Switzerland, is stated to be more than 500 hp per axle, whereas the corresponding figure for the new three-phase locomotives built for the Italian State Railways is authoritatively stated to be approximately 870 hp per axle.

It is also difficult to follow the reasoning by which Mr. Armstrong reaches the conclusion that, as a general proposition, a coefficient of adhesion of 17.75 per cent is admissible for electric locomotives operating on ruling mountain grades. Steam locomotives for freight work are commonly proportioned so as to exert maximum tractive efforts corresponding to a coefficient of adhesion which varies from 22.5 per cent to 25 per cent. A 10-per cent reduction in tonnage rating is the usual practice on steep grades. This corresponds to coefficients of adhesion varying from 20.5 per cent to 22.75 per cent. Accepting the lower figure (20.5 per cent) then to this should be added the increase in available tractive effort due to the equal turning effort of the electric locomotive when compared with the pulsating effort of the steam locomotive. This increase is not 10 per cent, as Mr. Armstrong states, but amounts to 20 per cent* and gives an equivalent coefficient of adhesion for the electric locomotive of approximately 25 per cent. Assuming a 2.2 per cent grade and an acceleration rate of 0.1 m.p.h.p.s., then the tractive effort required for acceleration is only 17 per cent of the total. With this allowance deducted, we get a net tractive effort available for hauling the tonnage corresponding to a coefficient of adhesion of 21 per cent. This is approximately 20 per cent greater than the figure quoted by Mr. Armstrong. In other words, an electric locomotive rated and designed on Mr. Armstrong's basis would sacrifice 20 per cent of its available adhesion, which means that 20 per cent more trains would need to be run for the same total tonnage moved.

Admitting, however, that under abnormal conditions, with coefficients of 21 per cent, tonnage would have to be sacrificed, yet even so, for mountain grade work it is surely preferable to design electric locomotives so as to utilize their full adhesion for say 90 per cent of the time, rather than to handicap them permanently because of conditions applying to only 10 per cent of the time, conditions which can be separately negotiated when they arise. WILLIAM ARTHUR, Assistant Engineer.

Experience with Ventilated Motors

PITTSBURGH RAILWAYS COMPANY,
PITTSBURGH, PA., June 14, 1915.

To the Editors:

In connection with the discussion on the subject of ventilated motors which has been going on for some weeks, and with particular reference to the article by R. E. Hellmund and a discussion of the same article by H. H. Adams, of Chicago, I would say that we have had a large number of ventilated motors in service for several years.

We are inclined to favor the parallel-path type of ventilated motor, i. e., one in which the air is drawn in on the one end of the motor and divides into two streams, one passing through the ventilating ducts in the core of the armature, the other stream passing between the field coil and over the surface of the armature, both streams being discharged at the other end of the motor.

Our experience with the motors so far has been similar to that referred to by Mr. Adams, in that a slight deposit of dust is found in the ventilating ducts of the armature and on the exterior surface of the insulation of the field coils.

We have also found that it is quite difficult to obtain the actual temperature of ventilated motors, when testing in the ordinary manner, after the car has been in actual passenger service, since the heat-radiating feature of the ventilated motor is such that a large and unknown quantity of heat is dissipated before thermometers can be placed. So that a test by thermometer to determine the actual temperature rise of this type of motor in regular service is liable to be more or less misleading. For determining motor temperatures in this manner, it is best to refrain from moving the car any more than is absolutely necessary.

Aside from the collection of dust inside the motor, which so far has not proved serious, I really know no disadvantages in this type of motor, and it would seem reasonable that the life of the insulation of the ventilated motor should be greater than that of one of the non-ventilated type, since even in actual service the heat generated during the accelerating period is largely dissipated in coasting and braking.

F. R. PHILLIPS, Superintendent of Equipment.

Reminiscences of Veteran Employee

Jacob Fishback, assistant superintendent of the Louisville Railway, is a veteran in the service, having been with the company in one capacity or another since the early '70's. He "reminisced" the other day, to say that in those times the mule drivers of the company had from four minutes to six minutes to eat their meals, and worked from twelve to fifteen hours a day at from 12½ cents to 15 cents an hour, standing out on the unsheltered platform in all weathers. He recalled a time in 1876 when all the company's mules were disqualified by epizootic. The drivers at the old carhouse which once stood at Fifth and Oak Streets, decided to make a trip during one of the rush periods and the company promised them all the fares they took in. Eight men laid hold of a car and pulled it downtown and back again. The fare they demanded and received was 25 cents per passenger, with no transfers.

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*See C. R. Henderson, "Locomotive Operation," page 206.

American Association News

Two-Day Session of Committee on Way Matters in Chicago—Committee on Equipment Meets with Electrical Committee of National Fire Protection Association—Company Section Activity

COMMITTEE ON WAY MATTERS

Full attendance of the committee on way matters of the Engineering Association and complete reports from all of its sub-committees marked the two-day session held in Chicago, Ill., on June 11 and 12. Those present were C. S. Kimball, Washington, D. C., chairman; H. F. Merker, East St. Louis, Ill.; E. H. Berry, Cincinnati, Ohio; E. P. Roundey, Syracuse, N. Y.; R. C. Cram, Brooklyn, N. Y.; C. W. Gennet, Jr., Chicago, Ill.; W. F. Graves, Montreal, P. Q.; L. A. Mitchell, Anderson, Ind., and E. M. Haas, Chicago, Ill. No new subjects were introduced at this meeting, but the final reports upon those assigned to the committee were discussed in detail, revised and put in final form. On the subject of further consideration of proper foundations for track in paved streets the committee decided to recommend for adoption Types B and C as presented in the 1914 committee report, excepting that they were modified slightly. This conclusion was reached after a full discussion and after obtaining the recommendations of a number of prominent way engineers throughout the country.

The report upon pavements for use in connection with girder rail will take the form of recommendations by the committee on the merits of the various types. In connection with this report, traffic counts taken in Brooklyn, Montreal, Cincinnati, Anderson, Chicago, Syracuse and Washington will be presented. These counts were made according to the method recommended by the 1914 committee. Because the Society for Testing Materials had expressed a desire to take up the question of specifications for sundry track materials, the final report on this subject will not be made this year. Revised recommended designs for 7-in. and 9-in. joint plates with special reference to sizes of bolts and fits were also submitted and incorporated in the report. Completely revised conventional signs for use in railway profiles, maps and plans and conforming as far as possible to those adopted by the American Railway Engineering Association and the Interstate Commerce Commission were adopted for publication in this year's report.

The entire session of June 12 was devoted to the preparation of special-work specifications. A committee of manufacturers, upon request, had submitted specifications for special work made of solid manganese steel, cast steel with hard centers, rolled-rail arms iron bound with hard centers, plain bolted and standard section rail bound with hard centers. Since these were the first special-work specifications ever prepared by this committee extreme care was exercised in their consideration. As revised these specifications will largely cover the chemical and physical properties of the materials used, general requirements and finish for five types of special work. The manufacturers' committee was represented by Victor Angerer, vice-president William Wharton, Jr., & Company; Charles A. Alden, chief engineer Pennsylvania Steel Company; R. B. Fisher, chief engineer Buda Company; E. B. Entwisle, chief engineer Lorain Steel Company, and G. C. Lucas, general manager Cleveland Frog & Crossing Company.

In connection with the various subjects discussed, in order to clarify and terminology, the committee decided on the following nomenclature for rails: All A. S. C. E. and A. R. A. sections to be known as standard-section rail; all high T-rail sections to be known as plain girder rail; all grooved sections to be known as grooved girder rail; all girder rail with flat wagon treads to be known as tram girder rail, and all girder rail guards to be known as guard girder rail.

COMMITTEE ON EQUIPMENT

On June 8 in Boston there was held a meeting of the electrical committee of the National Fire Protection Association, of which Martin Schreiber is a member, at which a draft of rules for car wiring was considered. The meeting was a joint one between the equipment committee of the Railway Association and representatives of the Underwriters' Laboratory, the Fire Underwriters' Electrical Bureau, the General Electric Company, the Westinghouse Electric & Manufacturing Company, the American Car & Foundry Company, The J. G. Brill Company, the New York Board of Fire Underwriters and the Underwriters' Association of the middle department. The purpose of the conference was to draft rules to properly safeguard fire hazard and give reliability and continuity of service as well as efficient operation of cars at reasonable cost. The rules were drafted and approved by the electrical committee for insertion in the National Electrical Code to replace the present obsolete ones. The revised rules will appear in the report of the Railway Association committee on equipment, and the San Francisco convention will be asked to approve them from the association standpoint, although such action is not necessary for their inclusion in the code.

DENVER TRAMWAY SECTION

As announced in the issue for May 29, the May meeting of the Denver Tramway Company section, the concluding one of the season, was devoted to the subject of the inspector and his duties. In his paper on this topic, O. A. Waller, road officer of the company, gave his audience an impression of the human side of the inspector's work. He showed that inspection is not confined to railways but is a necessary element in all lines of work. The inspector system is not a system of espionage but is a necessary element in discipline. It insures smooth and regular operation, and makes it possible to continue such operation when one man drops out of his place. Proper inspection is a protection to the loyal employee, preventing "skinning the line," running ahead of schedule, "stealing the right-of-way," and other offenses against good discipline. Among the inspector's duties is that of intervening in any case of trouble that may arise in connection with car operation. He must assist in getting cars under way in cases of blockade; he must endeavor to help any employee who is having trouble with his car; he must be always on the lookout to serve the public, thereby serving the best interests of his company; his work requires good judgment, unfailing courtesy, and almost superhuman tact.

In the discussion of Mr. Waller's paper, Inspector E. T. Eckland showed how the inspector had developed on the local property from a person aloof from the men, whose duty was to report infractions of the rules, into one who is a real friend and helper of the men. Ten years ago efficiency was shown by the number of reports, while now it is shown by the reverse. Mr. Eckland showed also that the word "discipline" is often taken to mean punishment, while the best discipline is characterized by the lack of punishment. Discipline, like charity, should begin at home. The trainman's point of view was given by John W. Dawson of the South Division. After referring humorously to his supposed function of exposing the dark and mysterious ways of the inspector, he paid a tribute to the helpfulness of that dignitary. In a pinch the trainman is greatly relieved to have the inspector at hand, although the former is not always as appreciative as he might be. Promotion to the position of inspector is a reward for faithful service, so that the inspector is entitled to respect and coöperation.

PUBLIC SERVICE SECTION

Company section No. 2 held its last meeting for the season on June 17, with a good attendance in spite of a severe storm which kept many away. The program comprised talks by Charles E. Eveleth, commercial engineer car equipment, General Electric Company, and Morris B. Rosevear, superintendent of distribution Public Service Railway.

With the aid of many diagrams thrown upon the screen Mr. Eveleth showed how operating conditions affect energy consumption in car operation. He took up the different variables separately to demonstrate how variations in acceleration, braking, length of stop, etc., affect energy consumption with different numbers of stops per mile. Each variable separately permits a considerable range in energy consumption even under practicable working conditions. The talk gave the members of the local section an excellent idea of the elements of good car operation. He incidentally touched upon the use of the tapped-field motor, stating that savings of from 4 to 6 per cent could be obtained by using it.

Mr. Rosevear analyzed the work of the distribution department of the company, commenting upon the kinds of supplies used in distribution and signal work. By means of a series of slides he showed typical overhead and signal construction, describing some of the peculiar problems which had to be met in overhead work particularly in connection with contactors for operating track switches.

MANILA SECTION

The fifth monthly meeting of joint company section No. 5 was held in Manila on May 4. The attendance at the meeting was very large and included a number of prominent business men of the city.

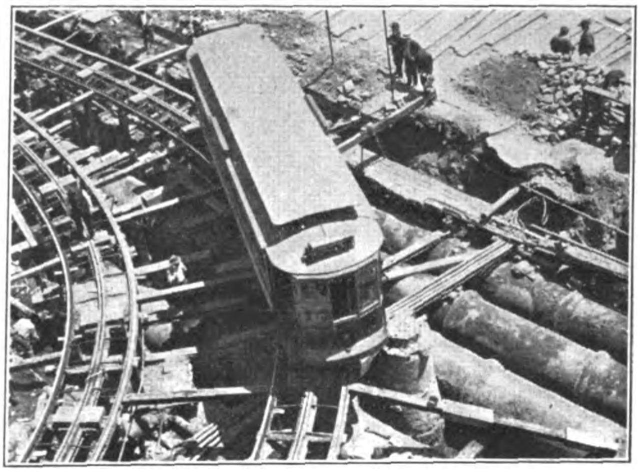
The paper of the evening was on "The Relative Advantages and Disadvantages of Private and Government Owned Public Utilities," by W. R. McGeachin, manager of the railway department of the Manila Electric Railroad & Light Company. This was followed by a spirited discussion which, with the paper, will be briefly abstracted in a later issue of the ELECTRIC RAILWAY JOURNAL. C. N. Duffy, vice-president of the company, stated that a number of individuals outside the employ of the company had been invited to become associate members of the section and that more than one-fourth of these had accepted.

The free public library of New Haven, Conn., has instituted a branch library at the Grand Avenue carhouse of the local electric railway, the Connecticut Company. The library is open for the delivery of books every pay day, which is Wednesday. Books of fiction and books on electricity are proving most popular.

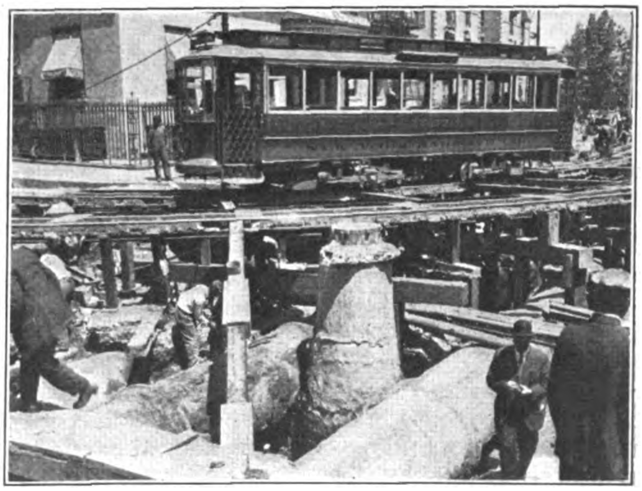
Operating Conduit Railway Over Broken Water Main in New York

Undermining of Big Conduit by Water Forces Railway to Meet with Unusual Conditions—Schedule Is Maintained Without Difficulty

The accompanying illustrations show unusual railway operating conditions on one of the lines of the New York Railways at the corner of 109th Street and Manhattan Avenue. Five 48-in. cast-iron water lines extend under Manhattan Avenue, four of them leading to the reservoir in Central Park. A break occurred in one of these pipes on the night of June 3, caused by the undermining of the big conduit by the water from a small leak. The break occurred directly below the point where the street car tracks form a curve between the two intersecting streets. The leak was not caused by shocks from the electric railway because the railway tracks were supported on I-beams from walls placed between the pipes for the very purpose of preventing shocks. Fortunately the construction of the conduit railway is such that the track and conduit form a self-contained structure, the rails and conduit being attached to the same cast-iron yokes. It was possible therefore to install temporary supports and car service was maintained without difficulty. The break disclosed a dangerous situation in view of the fact that the high apartment houses adjoining were in danger of being undermined from a break of this kind.



UNUSUAL OPERATING CONDITIONS ON NEW YORK RAILWAYS



ANOTHER VIEW SHOWING TEMPORARY TRACK SUPPORTS

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

The Life of Way Structure as Affected by Engineering and Municipal Conditions

BY P. NEY WILSON, ROADMASTER CONNECTICUT COMPANY, NEW HAVEN, CONN.

Concerning the period in which rails should be renewed in paved streets, it appears that if the problem is left to the railway company to solve, a good practical method of procedure is to renew when the annual cost of maintenance of the tracks and pavement is greater than the depreciation plus interest on the investment as represented by the replacement cost.

For example:

STREET "A"

5000 ft. double track, laid 1894.
Five-minute headway.
7-in., 70-lb. tee-rail. Electric welded 1908.
Rock asphalt pavement on 6-in. concrete base.

Cost of Replacement:			
10,000 ft. track at $6.00		$60,000.00	
Interest on investment at 5%	$3,000.00		
Depreciation at 5%	3,000.00		
			$6,000.00
Cost of maintenance of present track structure and pavement:			
1911		$11,957.44	
1912		1,385.62	
1913		501.82	
1914		1,879.10	
		$15,723.98	
Average cost per year			$3,940.00
Net saving			$2,060.00

NOTE—The year 1911 shows heavy maintenance cost on account of unusual amount of pavement repairs.

An analysis of the above figures shows that it is still profitable to maintain the old track. When the maintenance figure reaches $6,000 per year or over it will then be more economical to replace the old structure.

In this particular case the railway company will probably have the opportunity to be the judge of the proper time for the renewal as the pavement now is in good condition outside of the track area.

The increase in automobile traffic has created such a tremendous demand for smooth pavements that the city and state officials in charge of highways have spent great sums of money for so-called permanent pavements, particularly in the last few years. In many instances pavement has been renewed from three to five years before the old track and pavement had reached a point where replacement was really necessary.

These heavy and unnecessary expenses are thrust upon the operating heads, thereby greatly handicapping the property and harassing its officials. Usually no good business reasons for renewals are given except the pressure of public opinion as represented by a few individuals who have no such investment to carry and no responsibility as to results.

A great difference of opinion, no doubt, exists as to when permanent pavement may be economically placed around an old track structure. This is a problem not so easily solved. Those seeking its solution will always find a set of conditions peculiar to that particular structure.

Calculation as to head wear of the rail, probable life, etc., may throw some light on the question, but it occurs to the writer that it may properly be considered a business proposition and the following is a suggested method which may be of interest.

Depreciation is figured at 5 per cent. This percentage is open to criticism and may be raised to conform to local conditions, type of pavement, car service and vehicular traffic.

PROBLEM

Street "B"—4000 ft. single track. Apparent result of allowing old track structure to remain in the street, placing new pavement around it, the city having decided to lay a new pavement of improved type. Present track structure good for five years.

Pavement cost at $3.50 per foot		$14,000.00	
5% interest for five years	$3,500.00		
20% depreciation for five years	14,000.00		
		17,500.00	
Cost to reproduce in five years (track and pavement)		24,000.00	
Total			$41,500.00
Effect of replacement, same street:			
Replacement cost at $6.00 per foot		$24,000.00	
5% interest for five years	$6,000.00		
5% depreciation for five years	6,000.00		
		12,000.00	
			36,000.00
Saving due to complete renewal			$5,500.00

NOTE—Value of material reclaimed may be deducted from loss as shown, the amount determined largely by character of pavement used.

Assuming that the placing of an improved type of pavement is postponed for five years (the life of the track) a careful estimate based upon recorded costs on this particular street shows expenses for maintenance as follows:

Maintenance of old track and pavement:		
First year	$400.00	
Second year	800.00	
Third year	1,200.00	
Fourth year	1,600.00	
Fifth year, replacement	......	
Maintenance for five years		$4,000.00

If a complete renewal is made the first year on account of new pavement being placed, the interest and depreciation totals $12,000 for the five years. The loss due to renewal at the first year therefore is the difference, or $8,000.

These deductions are offered as showing one method by which some light may be thrown on a difficult problem, and if they provoke criticism and discussion, whereby more light on this subject is presented, it is certainly worth while, for the street railway engineer's decision in matters of this kind is important and involves large amounts.

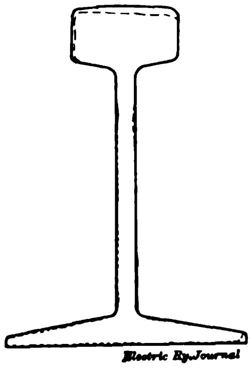
In T-rail track construction in paved streets, from the viewpoint of head wear only, the limit of life under service is indefinite. Note the results from head wear as shown in Fig. 1. This rail is now under five-minute service and has been used constantly for twenty years. It is obvious that the life of the girder rail section is governed largely by the depth of the head.

It is well known that the life of any rail section may be greatly prolonged by maintaining the tracks to at least a fair line and surface.

Two examples of rail wear in curves are shown in Figs. 2 and 3. It does not seem practicable to adopt a set rule governing the period in which rails should be renewed in curves.

The writer cannot entirely agree that the old adage, "The life of the track is the life of the joint," has become passé. All improved facilities in this regard considered, the life of the joint still governs to a large extent the life of the track. Only in a few exceptional cases has the writer known of rails being renewed entirely on account of the head wear.

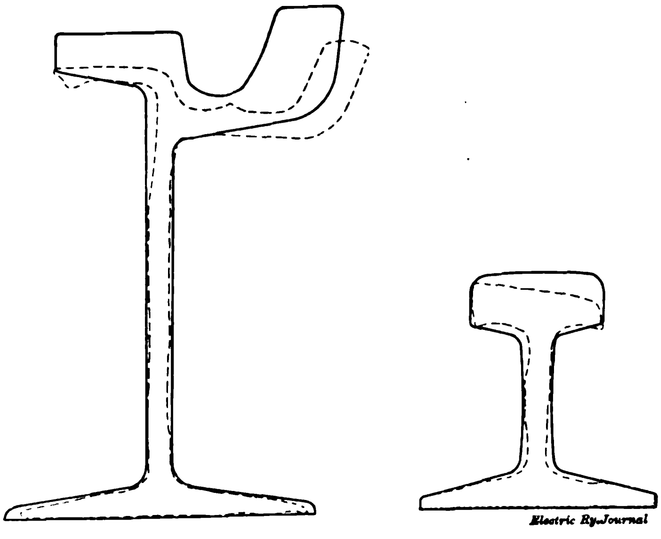
The most common reason for renewal of track in paved streets is an inadequate foundation. Of course, a great variety of conditions affect the replacement period; unfavorable conditions such as pavement failure, broken and badly cupped joints, foundation failure, change of location and rail wear. These unfavorable conditions are accumulative and frequently result in track being discarded some years before it would be otherwise. It is true that pavement, joint and foundation failures bear a close relationship to each other and it is true also that these failures are the usual reasons for replacement.



In service twenty years.
Five-minute headway.
Double-truck cars.
Gravel ballast.
Chestnut ties—2 ft. centers.
6-in. concrete base for pavement.
Rock asphalt top.

FIG. 1—SECTION SHOWING RAIL WEAR OF 7-IN., 70-LB. T-RAIL

Bad joints, bad surface and alignment, loose rails, rough, uneven pavement are more frequently the result than the cause of foundation failure. By foundation is meant the method used in supporting the rails, character of cross tie, spacing of same, depth and kind of ballast used, etc.



Four-minute service.
Double-truck cars.
40-ft. radius, single guarded curve.
Wear on head 60 per cent of original section.
Total wear 24 per cent of original section.
Rail taken out March, 1915, on account of fracture under the head.

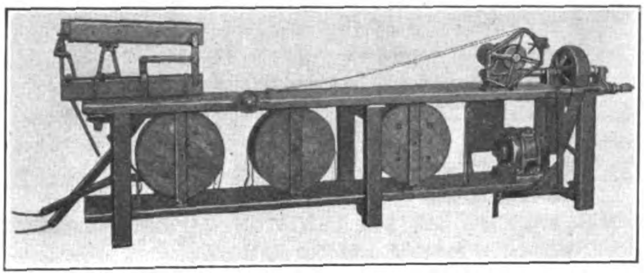
Ten-minute service, summer.
Twenty-minute service, winter.
Double-truck cars.
50-ft. radius curve, single guard.
Wear on head 50 per cent of original section.
Total wear 37 per cent of original section.
Rail removed on account of fracture in web at the joint. February, 1915, rest of lay-out now in service.

FIGS. 2 AND 3—SECTIONS OF GIRDER AND T-RAIL, SHOWING WEAR ON CURVES

A Coil-Winding Unit

BY O. P. CHUBBUCK, SUPERINTENDENT OF SHOPS, ILLINOIS TRACTION SYSTEM

In order to give substation attendants work for leisure moments, the mechanical department of the Illinois Traction system built the coil-winding unit which is shown in the accompanying illustration. This unit is self-contained and is mounted on a substantially-built combined rack and bench so that it can be moved from one substation to another without dismantling. The unit method also eliminates countershafting because an installation is complete when the bench has been set in place. Beneath the bench three reels of wire may be mounted on as many brackets. These are so made that a reel can be easily removed in case another containing a different size of wire is to be substituted. Mounted at one end of the bench beside the reel rack, is a small motor which drives the revolving forms used in winding coils. At the opposite end of the bench is a press with foot pedals, used in forming and completing the coils. The completed coils are taped by hand, dipped into a pan of insulating paint and placed on racks in a small baking oven heated by means of electric coils. This oven and pan are of portable size so that they also may be transferred between substations. The Illinois Traction System has been manufacturing its coils for some time and is well satisfied with the results. Later, if this experiment proves satisfactory, the substation attendants will receive other repair parts to finish. If this is done the mechanical department intends to adhere to the unit idea in assembling equipment for the work.



ILLINOIS TRACTION SYSTEM COIL WINDING UNIT

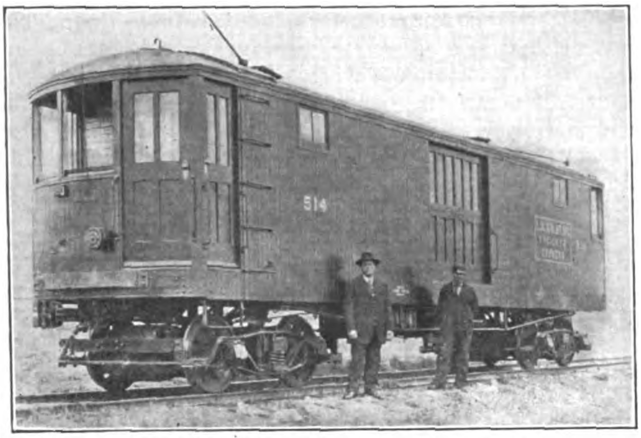
Electric Railway Freight in Maine

BY C. H. NOTTAGE, MASTER MECHANIC, LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY

There is a great field for the development of a freight business in the Androscoggin and Kennebec River valleys in the State of Maine, and the Lewiston, Augusta & Waterville Street Railway is making special efforts along this line. Shippers receive every encouragement, and rolling stock is provided to suit the needs of the various classes of traffic that originate on the route.

The view on page 1214 shows a motor freight car recently built by the Laconia Car Company for the railway. The body is 40 ft. over corner posts, has a steel underframe and is mounted on diamond-frame trucks with M. C. B. 4¼-in. x 8-in. journals in Gould journal boxes. The equipment includes four Westinghouse No. 56 motors and K-35-G controllers. The motors are spare machines that have been thoroughly overhauled. All cables are in wooden boxes bolted to the underframe, and thus are protected from moisture. The air brakes were furnished by the Westinghouse Traction Brake Company and are A M M quick service, graduated release quick recharge, high pressure emergency, automatic equipment, with straight air application and release features. The compressor is of 25 cu. ft. capacity, and there are two main reservoirs 16 in. x 42 in. The motorman's valves are located at the extreme right-hand side of the vestibule to allow the operator a full view of trail cars when coupling and operating.

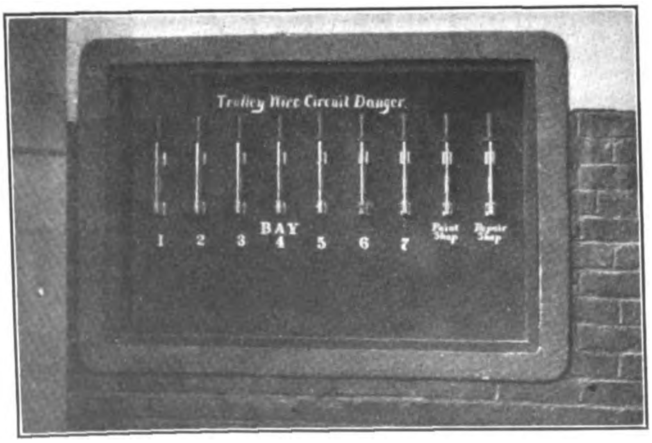
The Lewiston, Augusta & Waterville Street Railway has in operation at the present time eight motor freight cars, seventeen flat trailer cars and two box trailer cars of 60,000 lb. capacity each. The flat cars are used for handling granite from the Hallowell granite quarries, as well as wood and lumber, farming tools and general freight. The box cars are used for potatoes, apples, grain, hay and perishable goods. The company also transports the freight for the Eastern Steamship Company between Augusta and Gardiner and also handles freight cars from the steam roads.



MOTOR FREIGHT CAR FOR LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY

Feeder Panel for Carhouse Trolley Wires

At the recently completed carhouse of the Holyoke (Mass.) Street Railway the overhead contact wires for the various bays are supplied with current from the positive feeders for trolley service, a control panel for the entire carhouse being located at one end of the establishment, as shown in the accompanying halftone. As a rule each bay contains three tracks, and the taps feeding the three trolley wires for each one are supplied through a single-pole knife switch mounted with others of the same type on a recessed slate panel about 4 ft. long, 29 in. wide and set 6 in. deep into the wall. A slate border 1 in. thick provides additional protection. Nine circuits are separately fed through this compact and convenient board, which affords a high degree of protection in emergencies.



CARHOUSE FEEDER PANEL AT HOLYOKE

Car Maintenance Records at Los Angeles

For the twofold purpose of securing exact costs and spurring the division heads on to better results, the mechanical department of the Los Angeles Railway issues monthly comparative tabulations by divisions of car failures (pull-ins), wheel mileage and maintenance costs. The figures show such high reliability of service that they are well worth quoting. Those for April, 1915, which are reproduced in full, show the remarkable achievement of 1,207,319 miles per failure, or only 0.0001 per cent failure due to causes within the control of the mechanical department. The average mileage of cast-iron wheels between flats was 38,946 miles.

DIVISION PERCENTAGE—APRIL, 1915

DIVISION COMPARISON OF NUMBER OF MECHANICAL FAILURES FOR THE MONTH OF APRIL 1915, WITH PERCENTAGE OF CARS OPERATED, AND MILES AND CARS PER FAILURE

Division	Cars Operated	Per Cent of Cars	Failures	Miles per Failure	Cars per Failure	Per Cent of Car Failures	Miles per Division
1	3,565	17.35	0	432,106	......	......	432,106.19
2	6,086	29.62	0	662,353	......	......	662,353.25
3	3,447	16.78	1	433,162	3,447	0.0003	433,162.36
4	4,027	19.60	0	496,103	......	......	496,103.30
5	3,421	16.65	1	390,912	3,421	0.0003	390,912.38
Totals and averages	20,546	100.00	2	1,207,319	10,273	0.0001	2,414,637.48

DIVISION COMPARISON OF SKID WHEELS REMOVED DURING THE MONTH

Division	Mileage	PAIRS OF SKID WHEELS		Mileage per "Flat"	Mileage per Cent of Total
		Number	Cost		
1	432,106.19	4	$11.40	108,027	17.9
2	662,353.25	2	5.70	331,177	27.4
3	433,162.36	23	65.55	18,833	17.9
4	496,103.30	13	37.05	38,162	20.6
5	390,912.38	20	57.00	19,546	16.2
Totals and averages...	2,414,637.48	62	$176.70	38,946	100.0

DIVISION COMPARISON OF CARS REMOVED FROM SERVICE FOR THE CAUSES STATED

Division	Steps	Fenders	Glass	Miscellaneous	Wrecks	"O. K." Cars	Total	Miles per Car
1	25	9	7	3	1	0	45	9,603
2	46	6	10	7	5	0	74	8,951
3	10	4	6	10	1	0	31	13,973
4	30	6	10	13	4	1	64	7,752
5	10	3	4	5	1	5	28	13,961
Totals and averages.	121	28	37	38	12	6	242	9,978

DIVISION COMPARISON OF DAMAGES TO CARS

Division	STEPS		FENDERS		DAMAGED		GLASS		Total	Cost per 1000 Miles
	Number	Cost	Number	Cost	Number	Cost	Number	Cost		
1	56	$106.67	26	$95.21	17	$72.21	19	$30.19	$304.28	$0.704
2	75	139.58	42	102.92	35	243.76	36	41.60	527.86	0.797
3	28	57.30	29	43.11	13	69.37	12	11.20	180.98	0 418
4	42	79.72	29	57.58	22	127.78	32	42.77	307.85	0.624
5	25	48.94	28	78.06	19	46.15	23	29.59	202.74	0 519
Totals and averages	226	$432.21	154	$376.88	106	$559.27	122	$155.35	$1523.71	$0 631

Another tabulation shows for what causes beyond the control of the mechanical department cars were taken to the shops. These items include torn-off steps, bent fenders, broken glass, etc. The mileage per failure made with these conditions included is also given, and the cost as well. It may be interesting to summarize the figures for the preceding months of 1915 as follows:

Miles per mechanical department failure: January, 491,606; February, 745,408; March, 826,113.

Percentage of car failures due to mechanical department: January, 0.0002 per cent; February, 0.0002 per cent; March, 0.00015 per cent.

Miles per failure, all causes: January, 12,168; February, 11,468; March, 14,082.

Miles per flat wheel: January, 51,209; February, 44,724; March, 56,326.

Repair cost per 1000 miles, all causes: January, $0.72; February, $0.60; March, $0.50.

Fuse Examination by Bureau of Standards

The Underwriters' Laboratories and the Economy Fuse & Manufacturing Company have jointly appealed to the Bureau of Standards for decision on the following question: "Has it been shown that the use of the fuses manufactured by the Economy Fuse & Manufacturing Company results in no greater fire or accident hazard than the use of other cartridge-inclosed fuses at present listed as standard by Underwriters' Laboratories?"

The evidence on which the decision will be rendered will include that which is presented by Underwriters' Laboratories, by the Economy Fuse & Manufacturing Company, by any other manufacturers of cartridge-inclosed fuses, and by state, city or insurance inspectors—all such evidence being subject to investigation or check by the Bureau of Standards as it may see fit.

In accordance with this arrangement the Bureau of Standards has announced that there will be a public hearing at its bureau in Washington, D. C., on July 8, beginning at 10 a. m. Invitations have been sent to manufacturers of cartridge fuses, underwriter associations and others to be present at this hearing and to present any statements of fact or results of experience which have a direct bearing on the question at issue. Written statements will be received by the bureau on or before the above-mentioned date in lieu of personal attendance at the hearing. Written arguments in rebuttal of any statements made at the hearing may be filed within fifteen days after the date of the hearing.

Simplifying Equipment Repairing

In the current issue of the *Tramway Bulletin*, the employees' magazine of the Denver Tramway Company, W. C. Metzger, foreman of the armature department, states that through the use of the electrolytic lightning arresters on the cars, improved operation of cars and better methods in the armature room, it is now possible for five men to look after the repairs of the following equipment: 245 motor passenger cars; thirty-two motor utility cars; 203 air compressors; ninety-one extra armatures of eleven types; 4200 field spools; 825 resistance boxes; 290 lightning arresters; forty stationary motors and starting boxes; all arc headlight resistors and coils; coasting clock coils; Kitt electric track switches; bonding car; concrete mixer; elevator motors; rock-quarry apparatus and crusher, and various pieces of electrical apparatus used on cars and in buildings. The number of armatures looked after is 1109.

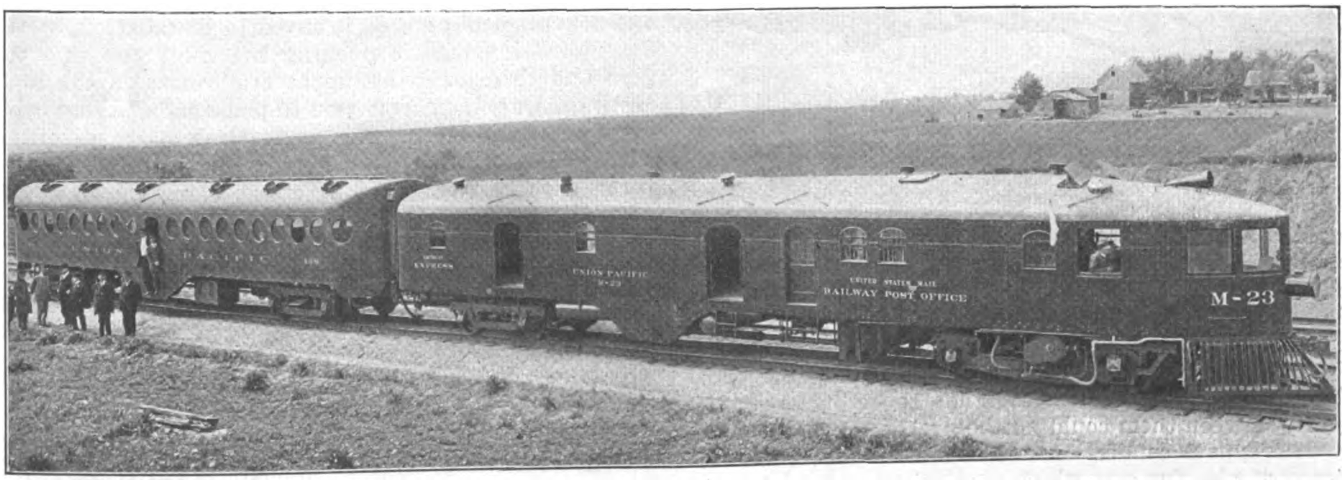
Record-Breaking Gasoline Motor Car

An unusual gasoline car has just been built by the McKeen Motor Car Company, Omaha, Neb., for the Union Pacific Railroad. It is a 70-ft. baggage, mail and express car equipped with a 300-hp engine, and it has capacity sufficient to haul a standard steel railroad coach as a trailer, making a double-unit motor-car train with all the facilities of the ordinary light steam train comprising a locomotive, a tender and three passenger cars. A. L. Mohler, president Union Pacific Railroad, has, since the original conception of gasoline motor cars, advocated higher powered units, and this new 300-hp engine was designed to meet his views. The equipment of the baggage, mail, express car with power is the conception of Charles Ware, general manager Union Pacific Railroad, the idea being to substitute the motor car and coach for the existing local and branch line trains.

The past ten years' experience in operating gasoline motor cars has shown such a stimulated traffic from their use that, notwithstanding the growth in size from the early 30-ft. car to the 70-ft. passenger and power car hauling a 30-ft. trailer, the size of the gasoline equipment must be still further increased. The new double-unit was designed in consequence. Large revenue capacity in comparison to the low dead weight, high acceleration and facility (account of light weight) in making local stops, all tend to very much improved economic results in handling passengers, mail, express and baggage on main line locals as well as branch line trains. Greater economy, less depreciation, greater safety, higher speed, greater flexibility, higher earning capacity and greater stimulation of the public good will are some of the advantages of the double gasoline unit over the five-unit steam train.

On its initial trip the new car made a speed of 55 m.p.h., and it will now go into service between Kearney, Neb., and Stapleton, Neb., displacing the old-style steam train. The distance is 103 miles, involving a round trip of 206 miles a day, which will result in a monthly average of something over 6000 miles, exceeding the average monthly mileage of passenger locomotives. The seating capacity of the motor-car train is 78 passengers, while that of the displaced steam train was 70.

The McKeen, Type "D," 300-hp, reversible engine truck is an enlargement of the latest model, Type "C," foolproof, 200-hp motor truck, the present standards and design being the results of ten years' experience

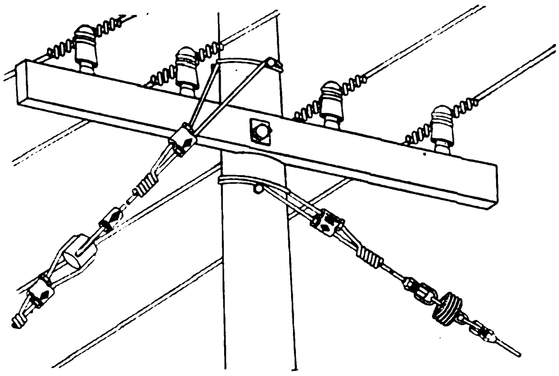


GASOLINE EXPRESS CAR WITH 300-HP ENGINE AND STEEL TRAIL COACH in the practical operation of gasoline motor cars. The engine is reversed by air-pressure mechanism, the control of which, together with the throttle, is placed on the right hand side of the engine, enabling the motorman to remain seated while taking signals and operating the car and affording the maximum of ease and convenience. The weight on drivers is 33,800 lb., and the tractive effort, 8200 lb.

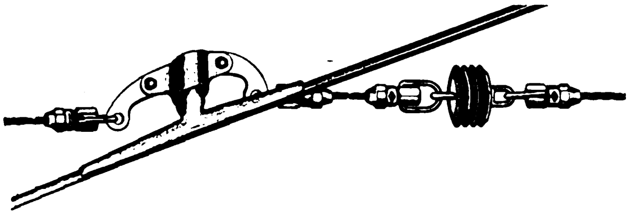
Mechanical Cable Connectors

Mechanical cable connectors that possess unusual features of reliability and rapidity of application have been brought out recently by the Fargo Manufacturing Company, Poughkeepsie, N. Y. These are made in two general types, of which one is a compression device whereby butt joints of cable ends are made so tightly that the metal is, to all practical purposes, actually welded together. The other is an ingenious scheme for twisting the ends of two cables together in much the same manner that a lineman makes connections except that the work of twisting is done mechanically, the lineman's pliers being replaced by a wrench, and the result is that absolute uniformity of each joint is attained with the expenditure of a minimum of time and skill. Both types are made in an infinite variety of forms.

The compression type of connection, known as "Type A," is made up of two couplings or sleeves, male and female, and two cone-shaped gripping cones with composition ends where they butt together. The cable ends that are to be connected pass through these gripping cones and when the couplings are screwed together the grips are wedged against the cables. At the same time they are drawn toward each other, so that the cable ends can be pressed one against the other as tightly as desired. When the couplings are unscrewed the joint, of course, is broken and the cable ends are separated, but unless a wrench is used the joint has all the strength and conductivity of a weld. This has been demonstrated by sawing the couplings off a made-up joint, the grips being found to be stuck together so tightly that the joint between them could not be broken by the hands.

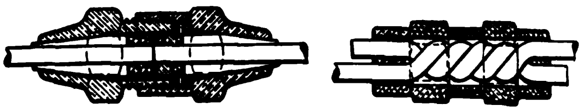


APPLICATION OF COMPRESSION-TYPE CABLE GRIPS

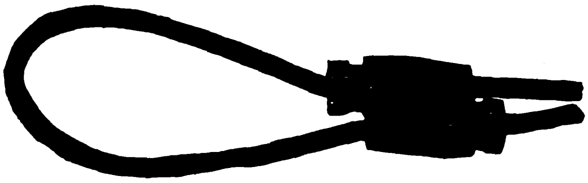


COMPRESSION-TYPE STEEL GUY GRIPS INSTALLED ON SPAN WIRE

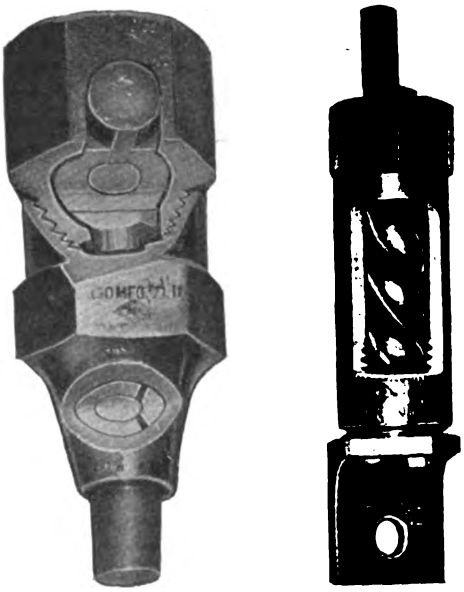
The Type A connections are used not only for conductors but also for guy wires, span wires and, in fact, in all cases where cables are ordinarily spliced, all common contingencies being provided for by variations that follow the general principle of the Type A straight connection. One of these is a steel cable grip in which the gripping cones are set side by side in a single casting, the pressure on the cable being applied by stuffing boxes that are screwed against the ends of the gripping cones. Another form, a guy grip especially adapted for span wires, has a bail passed through the casting which takes the place of the male half of the coupling for the straight cable connection. This, like all the other forms of the general type, has its grip increased with a larger pull, and puts an absolutely even strain on all strands of the cable. The cutting of strands is naturally eliminated and a great deal of time is saved in installation, as the only work involved is pushing the cable end into the grip and then screwing up several turns on the male casting. One lineman is said to place one of these cable grips in six minutes. The connections are made either with single or with double grips in series, the latter form, with its four gripping cones, being shown in one of the accompanying halftones.



CROSS-SECTIONS OF COMPRESSION-TYPE AND TWISTED-TYPE STRAIGHT CABLE CONNECTIONS



CABLE GRIP OF COMPRESSION TYPE

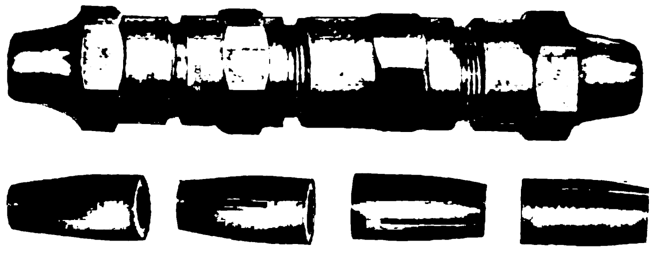


TYPICAL CONNECTORS FILED AWAY TO SHOW CONSTRUCTION

The same general principle is applied to cable lugs, busbar connections, guy terminals with bolts that thread into the dead-ending insulator, terminal connections, ground points and even wye, ell, and tee connections. These various devices are made up merely by changing the shape of the casting that takes the place of the couplings in the straight cable connection.

The other general type of cable-connecting device, which is known as Type B, is made in practically all of the various forms suitable for the Type A construction. The principle involved is exceedingly simple, the cables to be connected being merely passed through two holes in the ends of a pair of hollow couplings which are then screwed together. As the couplings turn the cables are twisted together in the hollow interior and at the same time are compressed longitudinally. In consequence, the twisted strands lie closely and evenly together, making a much better joint than could be made by hand pliers.

The strands are, of course, locked without cutting or denting and beyond any possibility of physical failure.



CABLE CONNECTION OF DOUBLE GRIP FORM AND ITS FOUR GRIPPING CONES

At the same time the casing formed by the hollow couplings constitutes a perfect protection, and keeps the wires always bright and in good condition electrically and mechanically. The casing, however, is not needed as a current conductor, as the conductivity of the bond between wires is increased 50 per cent over that of the line. As in the case of Type A, the Type B connectors are made for either single or double joints, the latter being provided for by an extra section of coupling with a central diaphragm containing two holes for the cables. This forms the joint in two twisted sections in series with each other.

Trolley Frogs for High-Speed Operation

Considerable interest has developed in the Type BR trolley frogs made by the Westinghouse Electric & Manufacturing Company, because of the claim that with this frog the trolley wheel never travels on its flanges. The value of this feature is readily apparent, particularly at points where high speeds obtain. Frog troubles at high speed are due largely to the fact that the trolley wheel travels on its flanges for a short space and a bump is caused when the bearing of the wheel transfers from the groove to the flange, which dislodges the wheel from the wire at these points.

In the Type BR frog, all this is avoided without the use of a shifting tongue or similar device, simply by the overlapping of the runners, as was shown in the illustration printed on page 428 of the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 27, 1915. There is practically a continuous contact of the tread of the wheel during the period of transition. Another effect of this continuous contact between the wheel and the frog is the possibility of using malleable iron frogs, with the consequent long life. The chief objection to malleable iron frogs heretofore has been the short life of trolley wheels owing to the burning of the flanges. As there is no running on the flanges with the Type BR frog this objection disappears. One more feature tending to increase the life of trolley wheels is pointed out by the manufacturers in connection with the Type BR frog; that is, that the frog can be placed almost directly over the track switch point because the trolley wheel does not have to be dragged angularly before entering the frog. This saves not only the wheel but the life of the trolley wire at this point. The frogs are made regularly in angles of 8 deg. and 15 deg. with malleable-iron bodies and bronze approaches.

Performance of Pennsylvania Railroad Locomotives

Some interesting figures have just been given out on the performance of the Westinghouse electric locomotives used by the Pennsylvania Railroad on the Manhattan Division, operating passenger trains through tunnels that enter New York under the Hudson River.

These locomotives were designed to start and accelerate a 550-ton train in addition to the locomotive, on a 1.93 per cent grade, but in actual operation 850-ton trains are frequently started on this grade and trains of fourteen all-steel cars, weighing more than 1000 tons, are handled without difficulty. The weight on drivers is 199,000 lb., and tractive efforts of 79,000 lb. have been registered in actual service. The continuous rating of each of the two motors with which the locomotive is equipped is 1000 hp and its weight is 43,000 lb.

Each locomotive in service passes over an inspection pit every twenty-four hours, the average time required for this inspection being approximately ten minutes. After 3000 miles the locomotives are taken into the shop for a general inspection. Shopping for general repairs is governed by tire wear, and mileages of from 90,000 to 112,000 are not unusual.

On Nov. 28, 1914, the thirty-three locomotives had completed four years' service, and during that period the mileage made and the detention record is as follows:

Locomotive-miles	3,974,746
Total engine failures	45
Locomotive-miles per detention	88,328
Total minutes detention to trains	271

During this period 463,558 train movements were made, or an average of 1300 movements per detention due to engine failures.

Dual Ownership in Alsace

Consul Milo A. Jewett at Kehl, Germany, reports that Strassburg, Alsace, encouraged by the good results of the joint ownership of lighting stations, made a similar change in the street railway organization in 1912. The old private street railway was reorganized. The capital of the new company was divided into $595,000 preferred stock, privately owned, and $595,000 common stock in the possession of the City Council. Both kinds of shares carry preferred dividends of 6 per cent. Of the remaining profit the city takes 30 per cent in dues for the use of the streets and bridges until the profit reaches $71,400; 40 per cent of the surplus profits between $71,400 and $95,200 and 50 per cent of the surplus over $95,200. The concession extends to 1965. The by-laws of the company were modified and adapted to the new agreement. The Municipal Council appoints four of the ten members of the board of directors. The length of the street railway in Strassburg is about 56 miles and there are 144 cars with motors and 319 trailers. The net profit for 1913 was $140,443, of which $3,570 was added to the reserve fund and $71,400 was paid as 6 per cent dividends on the capital stock; extra dividends of 1¾ per cent on the common stock and 4 per cent on the preferred stock were also paid. Thus the city received in first dividends $35,700; in dues (30 per cent of the surplus), $19,696; and extra dividends, $10,402; total, $65,798. To this sum may also be added the dividend on one extra majority share and that portion of the directors' percentage which falls to the four directors nominated by the Council. The above total received by the city is not net profit to the city, however, since the city must pay about half of the amount as interest on borrowed capital invested in the business and for reduction of liabilities.

News of Electric Railways

INTERURBAN MOTOR BUS SERVICE

In the Vicinity of Kansas City Many Automobile Lines Have Been Established as Electric Railway Feeders

In the immediate vicinity of Kansas City, Mo., the country is gradually being covered with a network of motor transportation service connecting the smaller towns of the outlying district with the city. For the most part buses are used, seating from twelve to twenty persons, but some smaller cars are also in service. The oldest line is that operated by Ray Renick, between the suburban manufacturing city of Leeds, about 2 miles to the east of the present built-up rim of Kansas City, and the terminus of the Twenty-seventh Street car line of the Metropolitan Street Railway. This line was first operated with horses, but in May, 1914, Mr. Renick put on a motor-driven bus. A half-hour schedule is maintained. The trip requires fifteen minutes and the twenty-passenger bus is usually well loaded. The fare is 10 cents.

Raytown, a small town 6 miles further to the east from Kansas City, beyond Leeds, also has a jitney service over a good rock road. The passengers pay 20 cents for the trip to the end of the Twenty-seventh Street line of the Metropolitan Street Railway, Kansas City.

F. W. Allen has established a motor-driven bus line between Belton, which has a population in excess of 1000 and is south of the city, through Grandview, Hickman Mill and Dodson to the corner of Thirteenth and Walnut Streets, in the heart of Kansas City, where connection is made with the Kansas City, Clay County & St. Joseph Railway. The distance is 20 miles, six of which parallel the Metropolitan Street Railway in the city. Mr. Allen does not consider this city service particularly profitable except as an advertisement of his service on the rest of the route he covers and he will probably discontinue the downtown run soon.

An autobus service between Parkville, Mo., a college town, and Kansas City, a distance of 9 miles, has proved profitable to the motor-bus owner, W. G. Leavel, who established it, for the reason that students use the line to and fro, going "out" in the morning and "in" in the evening, while the residents of Parkville come "in" in the morning and go "out" in the evening after a day's business or shopping. Thus the bus is loaded both ways. The one-way fare is 30 cents, with a charge of 50 cents for the round trip. North Kansas City, the new Swift-Armour suburban city across the river, is included in the route, which terminates at Eighth Street and Grand Avenue, Kansas City, Mo., and competes between North Kansas City and this point with the local traction system.

Independence, Mo., the eastern terminus of a Metropolitan Street Railway interurban line, now has two motor-bus lines connecting the rural towns Buckner and Osceola with Kansas City. The routes cover proposed trolley lines.

Another interurban feeder just established is the touring-car service between Platte City, Mo., which is a station on the Kansas City, Clay County & St. Joseph Railway, and Ferrell View, 8 miles beyond. This gives Ferrell View a Kansas City connection. Operation as yet is not on a fixed schedule.

The interurban motors are getting started also in the vicinity of St. Joseph. The latest line is that established by G. L. Rugg between Wathena, Mo., and St. Joseph. A combination Studebaker makes four round trips a day over 8 miles for 35 cents a single trip and supplements its passenger traffic with a light express traffic which consists largely in cargoes of butter, eggs and other country produce going "in" and supplies for the farm home going "out." Mr. Rugg plans to add a line from Wathema to Troy, a distance of 16 miles, making car service between Troy and St. Joseph, a distance of 24 miles. Residents of Wathema and Troy have been reaching St. Joseph by a roundabout steam railroad route. Motor-car service is also projected between St. Joseph and De Kalb.

The country-produce and store-delivery express business under proper regulation and restriction that will not permit delay and too much slowing of the schedule for passengers is growing. It has been made a feature of the new interurban autobus service between Independence and Wellington, Kan.

Probably the best, or at least the most prolific, development of interurban jitney service in this section is in the general vicinity of Springfield, Carthage, Webb City and Joplin. Here the Southwest Missouri Railroad operates 76 miles of interurban electric railway. In this territory the population is dense and organized communities numerous. Hence the autobus interurban, which fills in the unoccupied places and carries the people to a trolley connection. In some cases the company itself has instituted the autobus service. In others it has merely encouraged and co-operated with it. The latest line is from Carthage to Jasper, Mo., where a $30,000 bus line will cover the ground. Another is from Galena to Baxter Springs and another from Joplin to Neisho. Older routes in the Southwest Missouri section are from Joplin to Seneca, from Joplin to Granby and Diamond, from Granby to Neosho, from Carthage to Asbury and from Carthage to Golden City, a distance of 40 miles. There are also some lines out of Webb City and Springfield.

NEW SUBWAY LINES OPENED

Brooklyn celebrated the opening of the Fourth Avenue subway with appropriate exercises on Saturday afternoon, June 19, and opened the line for traffic on June 22. The company ran a special train carrying public officials and other interested citizens on Saturday afternoon. The train started from the Chambers Street station in the new Municipal Building, Manhattan, at 1:30 o'clock and made the run through the Fourth Avenue subway to Sixty-fifth Street, and thence over the tracks of the Brooklyn company's Sea Beach railroad to Coney Island. For the present the line will be operated over this route, but eventually it will be connected with elevated railroads running to Coney Island through New Utrecht Avenue and Gravesend Avenue and also with the Brighton Beach division of the Brooklyn Rapid Transit system. The New York Consolidated Railroad Company will operate the new line in accordance with the dual system lease, which provides for sharing the profits with the city.

On June 22, the Public Service Commission for the First District placed in operation the Steinway Tunnel line between Manhattan and Queens. This line runs from Forty-second Street, between Lexington and Third Avenues, Manhattan, under the East River to Jackson and Van Alst Avenues, Long Island City. Under the dual system contracts the title to the tunnel was transferred to the city, and it will be operated by the Interborough Rapid Transit Company with free transfers to and from the existing subway. The opening ceremonies were held at 11 o'clock, and the permanent operation for general traffic was begun at noon.

PROGRESS ON BOSTON TUNNEL

Rapid progress is being made by the Boston (Mass.) Transit Commission in the construction of the section of the Dorchester tunnel between upper Summer Street and the South Station. At Dewey Square one of the most important underground stations of the Boston rapid transit system is being built, and it is expected that by July 1 finishing work can be begun. Operation of the Summer Street section of the Dorchester tunnel will probably commence in the fall, providing rapid transit by trains of the Boston Elevated Railway between the South Station, Cambridge and points west. Upon the completion of the Dewey Square station it will be operated as a temporary terminal pending the extension of the tunnel along Fort Point Channel toward South Boston and Dorchester, and the new Washington station recently opened for traffic will become a way station. The Dewey Square station will include two platforms 350 ft. long for east-bound and west-bound traffic and a mezzanine lobby just below the street level, with escalator connections running to the exits. The station will be the lowest on the rapid transit system and will afford quick connection with the Boston Elevated service east and west for passengers arriving in the city by the New York, New Haven & Hartford Railroad and the Boston & Albany Railroad. It is being built by the Hugh Nawn Contracting Company, of Boston, and the estimated cost of the station is $500,000. Work has been pushed day and night since last August, and 325 tons of earth have been removed daily without closing the square to traffic. The station will be 44 ft. deep and although extensive changes in piping, sewers and building supports have been required no serious accident has as yet occurred on the work.

THE CINCINNATI VALUATION

Ward Baldwin has been selected by Director of Public Service Fosdick and City Solicitor Schoenle of Cincinnati as engineer to take charge of the city's interests in the valuation of the property of the Cincinnati Traction Company which is now being made by the Ohio Public Utilities Commission. For a number of years Mr. Baldwin was professor of engineering in the University of Cincinnati and is now chief engineer of the trustees of the Cincinnati Southern Railway. At one time he was chief assistant engineer of the Southern Railway.

Replying to the request of the People's Power League that E. W. Bemis, Chicago, be selected for this post Mr. Schoenle said he is neither a civil nor a mechanical engineer and is not familiar with conditions in Cincinnati.

The court of Common Pleas has returned a judgment of $61,220 as the portion of the cost of the Ludlow Avenue viaduct that must be paid by the Cincinnati Traction Company. The Baltimore & Ohio Southwestern Railroad paid 65 per cent of the cost and the city sued the traction company for half of the remainder, claiming this to be due under an agreement in its franchise.

MUNICIPAL OWNERSHIP OPPOSED

Peter Witt, street railway commissioner of Cleveland, Ohio, replying to the demand of the Cleveland Socialists, recently went on record as opposed to the purchase of the Cleveland Railway property by the city at the present time. Mayor Newton D. Baker said that if the city purchased the railway property by issuing bonds a security franchise would have to be made in favor of the bondholders. Seemingly, he is of the same opinion as Mr. Witt with respect to the street railway, although he advocates taking over the property of the Cleveland Electric Illuminating Company as soon as possible.

The Broadway Improvement Association was organized at Cleveland on June 16 to oppose the granting of a franchise to the Cleveland & Youngstown Railroad Company that will close forty streets within the territory bounded by Broadway, Orange Avenue, East Ninth Street and East Thirty-fourth Street. At the meeting a resolution protesting against the grant was adopted. The franchise has been approved by the board of directors of the Builders' Exchange, following a tour of inspection of the line.

THE CLEVELAND & YOUNGSTOWN RAILROAD

The success of the effort of the Cleveland & Youngstown Railroad for a franchise for a high level freight terminal in the heart of Cleveland, Ohio, will probably depend on whether steam or electric power is to be used in the yards that have been planned. The company was originally incorporated to operate an electric railway, but Attorney J. L. Cannon told the City Council on June 21 that the company desired to use steam for the operation of the freight yards.

The public utilities and the transportation committees of the Cleveland Chamber of Commerce have both reported to the Council committee of the whole, approving the company's plan. The proposed location for the yards will damage private property less than any other place in the city, the reports say, and the fact that certain streets will be closed or diverted from their present course can be arranged satisfactorily. The company, however, has proposed a plan of building a subway that will prevent interference with Broadway and this will perhaps do away with much of the objection that has been made to the plan by property owners in the section to be used.

Pennsylvania Full-Crew Law.—Governor Brumbaugh has vetoed the bill designed to repeal the full-crew law of Pennsylvania.

Mr. Herr Honored.—Edwin M. Herr, president of the Westinghouse Electric & Manufacturing Company, received the honorary degree of Master of Arts on June 23 from Yale University, his alma mater.

Extension of Portland Electrification.—Robert E. Strahorn, president of the Portland, Eugene & Eastern Railroad, Portland, Ore., recently announced plans for the electrification of the line from Whiteson to Corvallis, a distance of 43 miles, in the near future.

Sale of New York Bonds.—The city of New York will receive bids on June 29 for the sale of $71,000,000 of 4½ per cent bonds. Of the proceeds $46,000,000 will be applied to payments on the new subway system, dock improvements and for water supply. Of the remaining $25,000,000 a considerable amount will be used for refunding purposes.

Detroit Purchase Action Postponed.—As the contract for the purchase by the city of the lines of the Detroit (Mich.) United Railway within the city was not in shape to be submitted to the stockholders of the company on June 16, the meeting to act on the plan to sell to the city was postponed and the question will not come before the stockholders on June 30.

Chicago Elevated Damage Decision.—Litigation between the estate of Edwin P. Brand and the elevated railroads in Chicago, for damages from construction of the so-called "downtown loop," was decided on June 21 by the Supreme Court of the United States in favor of the railroads, because of insufficient proof and without consideration of constitutional questions.

Electrification of Birmingham Suburban Line.—The Birmingham (Ala.) *News* referred recently to the possibility of the Atlanta, Birmingham & Atlantic Railroad being electrified in the immediate Birmingham district, Woodward and Bessemer, and the likelihood of the operation of electric cars of the Birmingham, Ensley & Bessemer Railroad over the two systems.

Opening of Chicago Arbitration Delayed.—It was expected that the arbitrators selected to pass upon the questions at issue between the Chicago Surface Lines and the Chicago Elevated Railways and their employees would begin their sessions on June 21, but the absence of State's Attorney Maclay Hoyne, representing the men, from the city resulted in a postponement to June 24. The company will be represented on the board by James M. Sheean. Mayor Thompson will act as umpire.

Seattle Lease Plan Defeated.—Action on the plan advocated by Alderman Allen Dale of Seattle, Wash., of leasing Division A of the Seattle Municipal Railway to the Puget Sound Traction, Light & Power Company has been indefinitely postponed. Alderman Dale favored the abandonment of municipal ownership of the railway by the city until after the franchises of the Puget Sound Traction, Light & Power Company expire in 1925 and 1934. He pointed out that this was the procedure followed in San Francisco.

Service Resumed in Alexandria.—The Southern Power & Traction Company, Alexandria, La., which suspended the operation of its railway lines on May 18, has resumed service pending the sale of the property to the city for $30,000. The inventory of the property of the company submitted to the city by I. B. White and C. F. Crockett, receivers of the company, totaled in value $67,633. The receivers said: "For all of this we will accept in full settlement the sum of $30,000 cash, with the further understanding that the city shall assume the paving charges or any other claims that it may have against the company."

The Philadelphia Transit Loan.—The surveys committee of Councils of Philadelphia has reported favorably a bill directing A. Merritt Taylor, director of city transit, to contract for the relocations and the rebuilding of certain sewers in Philadelphia in the interest of the proposed Broad Street subway and Frankford elevated line. The report of the sewer bill was followed by the passing of a resolution providing for additional stated meetings of both chambers of Councils on June 23 and 30 to act on the bills appropriating the money and authorizing contracts to be let for an immediate start on the work of transit improvement.

Subway Ventilation in New York.—The Public Service Commission for the First District of New York has adopted a resolution directing Alfred Craven, its chief engineer, to request the Interborough Rapid Transit Company and the New York Municipal Railway Corporation to designate their consulting engineers to act together with him as a board to investigate and report with recommendations upon the question of ventilation for the dual system subways. The consulting engineers of the Interborough Company are William Barclay Parsons and S. L. F. Deyo, and those of the New York Municipal Railway are Jacobs & Davies, Inc., and L. B. Stillwell.

Franchise Renewals Opposed.—The Board of Public Utilities of Los Angeles, Cal., has adopted and forwarded to the City Council a report which advocates temporary contracts instead of franchise renewals to public service corporations. The recommendations were based on the report submitted by Chief Railway Engineer F. C. Howell of the board. Mr. Howell said that the city could take over the lines as the franchises expired, but that this would involve heavy expenditures for renewals, etc., with only 7.67 miles of disconnected line on which franchises will expire before 1926. His idea, in short, embodies a plan under which the companies may continue to operate lines covered by expiring franchises until such time as the city is prepared to acquire and operate the lines.

Brooklyn Fender Order Modified.—By a vote of three to two the Public Service Commission for the First District of New York has adopted an order modifying its previous order, requiring the Brooklyn Heights Railroad and other companies of the Brooklyn Rapid Transit System operating surface cars, to equip their cars with wheel guards and projecting fenders. The effect of the modifying order is to relieve the companies from the requirement as to projecting fenders, while leaving the former order as to wheel guards in full force. Those who voted for the modifying order were Commissioners J. Sergeant Cram, George V. S. Williams and Robert C. Wood. The prevailing opinion was written by Commissioner Cram and a dissenting opinion was filed by Commissioner Hayward.

Banquet to Mr. Smith.—Daniel W. Smith, president of the Peter Smith Heater Company, was the principal guest at a dinner on June 15 given by a number of his railway, supply and other friends. This dinner was arranged to celebrate the anniversary of the arrival at Detroit of Mr. Smith's 110-ft. yacht purchased a year ago in New York. The following gentlemen accompanied Mr. Smith on his yacht from New York by way of the St. Lawrence River to Detroit: John J. Stanley, Cleveland; Peter Witt, Cleveland; David A. Belden, Haverhill, Mass.; Dr. Thaddeus Walker, Walkerville, Ont.; William Nagel, Detroit; George Stanton, Cleveland, and Dwight B. Dean, Cleveland. At the anniversary dinner a two-hundred piece set of dishes was presented to Mr. Smith. The design of the dishes exhibits the emblems of the New York Yacht Club, the Old Town Club of Detroit, and Mr. Smith's yacht, the *Virginia*.

Agreement on Cleveland Subway Terms.—An agreement was reached on June 21 between the city of Cleveland, Ohio, and the Cleveland, Akron & Canton Terminal Railroad on all the vital points in dispute. The company had insisted upon a franchise period of ninety-nine years, while the city desired that the grant be limited to seventy-five years. A compromise was reached at eighty-five years, making the rights expire on March 1, 2000, when the property will revert to the city. Another amendment provided for the valuation of made land at the foot of Fifty-third Street at the end of seventeen years. This value plus half the increment up to any date the city may actually purchase the land will be the price that is to be paid. The ordinance was placed on its second reading after these changes had been accepted and in all probability it will come up for passage at the next regular meeting. The franchise is for a freight subway under East Fifty-fifth Street to furnish an outlet from the lake to the southern end of the city and connect with all railroads that desire its service.

Toledo Rental Case.—A motion made by Councilman Hoffman at the meeting of the City Council of Toledo, Ohio, June 21 to take the matter of collecting rent from the Toledo Railways & Light Company for the use of the tracks on the Cherry Street bridge out of the hands of the sub-committee of the street railway committee was lost. Chairman Kilbury of the street railway committee said no action had been taken toward collecting the rent because it would "muddle the situation." He also considered the rent charge exorbitant. Councilman Ruppell insisted that the committee act in some way. If the rent was too high the committee should recommend a reduction; if not, then the company should be asked to pay it. Councilman Dotson, chairman of the franchise committee, said that the company should pay rent for the use of the bridge tracks, but to take any action now, when the committee and representatives of the company were so near an understanding on the franchise draft, would be inadvisable. He favored postponing any action until after the franchise was disposed of in some way.

Memorial Service for Dr. and Mrs. Pearson.—At 2 p. m. on June 23 memorial services were held at the Church of the Divine Paternity, New York, N. Y., for Dr. and Mrs. F. S. Pearson, who lost their lives on the *Lusitania*. The services were attended by a large number of the late Dr. Pearson's associates and friends, including delegations from the American Society of Mechanical Engineers, of which he was a member, and the New York Alumni of Tufts College, of which he was a graduate. Services at the church were conducted by the pastor, the Rev. Dr. Frank Oliver Hall. Tributes were paid to the memory of Dr. and Mrs. Pearson by Prof. William L. Hooper of Tufts College and E. W. Rice, Jr., president of the General Electric Company. Work was stopped for five minutes on the Denver & Salt Lake Railroad, of which Dr. Pearson was chairman of the board of directors, and on the Rio de Janeiro Tramway, Light & Power Company, the Sao Paulo Tramway, Light & Power Company, Barcelona Traction, Light & Power Company, the Mexican Light & Power Company and the Mexico Tramways.

Storm at Indianapolis.—The city of Indianapolis, Ind., was visited by a severe wind and rainstorm on the afternoon of June 13. One of the heaviest sufferers was the Indianapolis Traction & Terminal Company, the central damage spot being St. Clair Street, from Canal Street east to East Street. The pole line on this street carries eight to ten feeders, ranging in size from 500,000 circ. mil. to 1,000,000 circ. mil. A pole at Canal and St. Clair Streets snapped and the weight of the cables carried down the entire line of poles to East Street, a distance of ten blocks. Service was maintained on the feeders, although car operation on all lines crossing St. Clair Street was at a standstill. The broken poles were removed at once and the cables cleared from the roofs and pole tops and laid in the street. At the corner of Illinois and St. Clair Streets two temporary poles were set and the feeders tied to these in order to clear the Illinois street car line. Service on this line was resumed six hours after the accident, but the other car lines were forced to suspend until early the next morning. Except at car crossings, the feeders were allowed to remain on the street until a new line of poles, on the opposite side from the old, was set and new feeders installed.

Urbana Franchise Carried.—At a special election held at Urbana, Ohio, on June 1, the twenty-five-year interurban franchise of the Ohio Electric Railway was approved by a vote of 757 to 499. This terminates a fight which has been waged for more than a year between the company and an element which opposed the extension of the franchise at a time when the company's present franchise had nine years to run. At a previous election held last February, the franchise was rejected by an adverse majority of five, but was promptly re-enacted by the Council. The company's opponents thereupon invoked a referendum, securing 708 names to a referendum petition calling the election which has just been held. An aggressive publicity campaign, embracing newspapers, letters and circulars, was conducted in behalf of the franchise by F. B. Wright, Jr., the company's special representative, with the result that the opposition were able to muster only two-thirds as many votes against the franchise on election day as they had signers on their referendum petition. The importance of securing an extension of this interurban franchise lay in the fact that it was the only interurban franchise on the Ohio Electric Railway system which expired previous to the maturity of the company's bonds.

Financial and Corporate

ANNUAL REPORT

San Francisco Municipal Railways

The net profit on operation of the San Francisco (Cal.) Municipal Railways for the calendar year 1914 was $216,541. After deducting the comparison charges for services rendered by other departments of the municipal government, for insurance and for taxes—thus to show the accounts as if the railways were owned by a private corporation—the net profit was $112,476. In the comparison charge there is included $98,047 for federal, state and municipal taxes, and $6,018 for the estimated value of service rendered to the railway by other municipal departments. With the profits of 1914 added to those of the Geary Street Division for 1913, the total profit for two years, i.e., since the beginning of operations Dec. 28, 1912, was $301,887—or, after deduction of comparison charges, $157,780. An amount of $48,971 was taken from the surplus account and transferred to the general fund of the city and county of San Francisco.

The statement of income, profit and loss for the year follows:

Operating revenues:	
Passenger revenues	$1,150,236
Miscellaneous revenues	9,202
Total	$1,159,438
Operating expenses:	
Way and structures	$21,852
Equipment	48,083
Power	137,839
Conducting transportation	353,033
Traffic	356
General and miscellaneous	52,774
General and miscellaneous comparison charges required by charter	6,018
Depreciation—18 per cent of gross revenue	208,698
Total	$828,656
Net operating revenue	$330,782
Miscellaneous income—Income from municipal bonds owned	6,124
Gross income	$336,905
Deductions from income:	
Taxes—comparison charges required by charter:	
State franchise 5¼ per cent on gross revenue	$60,870
Municipal franchise 3 per cent on pass. revenue	34,507
Municipal car license	1,533
Federal income—1 per cent on net income	1,136
Total taxes	$98,047
Interest on funded debt	122,642
Other interest	3,740
Total	$224,429
Net profit for 1914	$112,476

The municipal railway pays no taxes, nor is any payment made for services rendered to it by other departments of the municipal government. The above income statement includes the comparison charges required by the charter.

Taking the profit shown above	$112,476
And adding comparison charge for legal and clerical services	6,018
And comparison charges for taxes	98,047
Produces the true net profit for the year	$216,541

As compared to the period from Dec. 28, 1912, to Dec. 31, 1913, the last year's results show, as stated below. The passenger revenues increased from $444,393 to $1,150,236, an amount of $705,843. This was caused by the addition to the Geary Street Municipal Railway, operating in 1913, of the Union Street Division in December, 1913, the Van Ness Avenue Line and Potrero Avenue Line to the Exposition grounds in August, 1914, and the Stockton Street, Columbus Avenue and North Point Line in December, 1914. As compared to the 1913 item of $354 there was a 1914 credit of $9,202 for miscellaneous revenues, so that the total operating revenues increased from $444,747 to $1,159,438, an amount of $714,691. The operating expenses increased from $291,431 to $828,656, an amount of $537,225. This increase was divided mostly as follows: Maintenance of way and structures, $16,193; maintenance of equipment, $37,522; traffic, $274; conducting transportation, $170,936; power (not segregated in 1913); general and miscellaneous, $44,384, and depreciation and injuries and damages, $128,643. The net operating revenue increased $177,466, and miscellaneous revenues $4,795. The deductions increased $115,088, and the net profit $67,172.

The reserve for depreciation and renewals is computed at 14 per cent of the gross operating revenues, instead of on annual percentages of physical value of the property. The rate of 14 per cent is arbitrary, being based on Chicago experience as reported by Bion J. Arnold (12 per cent) and the opinion of Delos F. Wilcox as expressed in a paper on "Elements of a Constructive Franchise Policy." There is added 4 per cent on the gross revenue for accidents:

The following table gives other statistical data for the year:

	Total Amount	Per Car Mile	Per Car Hour
Total passenger revenue	$1,150,236	$0.35046	$3.1745
Total operating expense	613,939	0.18706	1.6944
Operating earnings (taxes and depreciation not deducted)	$536,297	$0.16340	$1.4801
Ratio of earnings to passenger revenue	0.4662		
Total taxes and charter charges	$104,065	0.03171	0.2872
Ratio to passenger revenue	0.0905		
Operating expenses and taxes	$718,005	0.21877	1.9816
Ratio to passenger revenue	0.6242		
Depreciation	$208,699	0.06359	0.5760
Ratio to passenger revenue	0.1814		
Operating expenses and depreciation	$828,656	0.25248	2.2870
Operating expenses, depreciation and taxes	$926,703	0.28236	2.5576
Ratio to passenger revenue	0.8057		
Net income from operation	$223,533	0.06811	0.6169
Ratio to passenger revenue	0.1943		
Passenger car mileage	3,282,012		
Passenger car hours	362,333		
Total platform expense (37½ cents per hour, 8 hours per day)	$291,606	0.08885	0.8048

Number of cars owned	197
Total single-track mileage operated Dec. 31	37.24
Passengers carried	27,933,049
Revenue passengers carried at 5 cents	22,732,478

KANSAS CITY REORGANIZATION TIME EXTENDED

The time limit for the acceptance of the franchise granted the Kansas City Railways, under which title the street railway properties in Kansas City are to be reorganized, was to expire on July 7. This time limit was extended on June 21 by the lower house of the City Council for four months. The upper house referred the extension ordinance for a week. It was represented by aldermen in both houses that the franchise was favorable to the city and that the street railway interests should receive consideration on account of general financial conditions.

The proposal to extend the time for acceptance of the franchise reached the Council with a request from Mayor Jost for its granting and a special letter from Judge Hook of the Federal Court, in whose hands the street railway properties now lie under the receivership. Mayor Jost had declared that he would not countenance an extension of time unless it should be demonstrated to his satisfaction that the stockholders and the note and bondholders were reasonably near an agreement. His action in asking extension is taken to mean that such agreement is not hopeless.

The letter from Judge Hook to the Mayor follows:

"The time for the reorganization of the street railway properties of Kansas City will expire on July 7. So far I have left the initiative to certain committees of bondholders and stockholders, but they have been unable to agree upon a plan which in my opinion observes the purpose and spirit of the new franchise. My position has been that the new franchise is primarily for the benefit of the city and that the city has a direct interest in the character of the financial structure of the new company as affecting the ability of the company readily and fully to discharge during the life of the franchise all of its obligations to the public. Those obligations are many and substantial, and there would be danger if the reorganization were solely from the standpoint of the bondholder or the stockholder, or both.

"Though I have devoted very much more time to the matter than could reasonably be required by official duty, still I wish to make a final effort, and for that purpose I personally and earnestly request an extension of time for four months. I am preparing a plan of reorganization myself, the general outlines of which I have explained to you, and I will shortly submit it to the stockholders and bondholders for their adoption or rejection. If at any time during the period given me such opposition develops as will defeat the plan I propose, I shall promptly advise you and the Common Council so that the franchise ordinance may be repealed."

Alton, Jacksonville & Peoria Traction Company, Alton, Ill.—The Public Utilities Commission of Illinois has authorized the Alton, Jacksonville & Peoria Traction Company, recently taken out of receiver's hands, to issue $347,000 each of stocks and bonds. The commission was asked to authorize an issue of $1,270,000 in securities. It is stated that the property will be operated in conjunction with the East St. Louis & Suburban Railway, controlled by the Clark interests.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—A dividend of 2 per cent has been declared on the $5,100,000 of limited preference stock of the Dominion Power & Transmission Company, Ltd., payable on July 15 to holders of record of June 15. This is the same amount as was paid on Dec. 15 last and leaves a dividend of ½ of 1 per cent to be paid, after which the stock becomes common stock.

Fairmount Park Transportation Company, Philadelphia, Pa.—The property of the Fairmount Park Transportation Company was sold under foreclosure on June 22 for $58,000 subject to $750,000 of mortgage bonds. The purchaser was P. E. Foederer, acting for the reorganization committee.

Fort Madison (Ia.) Street Railway.—The Mississippi Valley Electric Company, Iowa City, will take over the property of the Fort Madison Street Railway, provided the new franchise to the latter company which has been passed by the City Council is approved by the people at the election which is to be held on July 15. The property will be rehabilitated by the new owners.

Halifax (N. S.) Electric Tramway.—The Nova Scotia Tramways & Power Company has applied to the Board of Public Utility Commissioners of Nova Scotia for permission to proceed with its plans to take over the property of the Halifax Electric Tramway and the hydraulic development of the Nova Scotia Light & Power Company on the Gaspereau. The company's petition asks permission to increase the capital to $9,500,000 and to authorize $5,000,000 of first mortgage thirty-year 5 per cent gold bonds, $3,000,000 of the bonds to be issued at once and the balance to be reserved for future requirements. The stock is to be divided into 32,500 shares of preferred and 62,500 shares of common of a par value of $100 each. A public hearing on the petition will be held on July 7.

Interborough Consolidated Corporation, New York, N. Y.—The Interborough Consolidated Corporation announced that its preferred stock would be ready for delivery in exchange for preferred stock of the Interborough-Metropolitan Company on and after June 23. Voting trust certificates for the Interborough-Metropolitan preferred shares may be exchanged for either voting trust certificates of Interborough Consolidated preferred stock or for the preferred stock itself. Deposits of the Interborough-Metropolitan stock and certificates may be made at the company's offices. Deposits of voting trust certificates for Interborough-Metropolitan common stock will be received on and after July 6 for exchange for certificates of the new corporation. Application has been made to the New York Stock Exchange to list $45,740,500 of preferred stock and 932,621 shares of common stock voting trust certificates of the Interborough Consolidated Corporation. On June 23 the directors of the company declared from surplus a dividend of 1½ per cent on the preferred stock of the Interborough Consolidated Corporation, payable on July 6 to stockholders of record at the close of business July 3, 1915, and thereafter to the holders of all such preferred stock of the Interborough Consolidated Corporation as may be issued in exchange for the preferred stock of the Interborough-Metropolitan Company and the Finance & Holding Corporation. The directors have decided that hereafter dividend action will be taken quarterly.

Interstate Railways, Philadelphia, Pa.—There has been listed on the Philadelphia Stock Exchange $704,130 of permanent preferred stock of the Interstate Railways in shares of a par value of $10 each, full paid and non-assessable, countersigned and registered by the Real Estate Title, Insurance & Trust Company, Philadelphia, issued in exchange for a like amount of redeemable preferred stock of the company, surrendered and cancelled and stricken from the list.

Janesville & Madison Traction Company, Janesville, Wis.—The Janesville & Madison Traction Company has filed for record a mortgage for $1,344,000 in favor of the Peoples' Savings & Trust Company, Green Bay, Wis., authorized by the stockholders at a meeting on May 14 to provide funds with which to complete the proposed road of the company.

Lisbon (Portugal) Electric Tramways, Ltd.—The net financial result of operations of the Lisbon Electric Tramways, Ltd., for the calendar year 1914 was a profit of £84,708, making a total surplus of £86,457 at the end of the year. From this amount £15,000 was placed to the credit of the depreciation reserve, and £5,000 from the exchange reserve and £19,012 credited to premium on ordinary share capital were also transferred to the depreciation reserve. During the year the company carried 63,758,037 passengers, as compared to 58,840,923 in 1913. The increased cost of supplies and the falling off in the exchange rate, however, caused a diminution of the profits by nearly £20,000.

Municipal Railways, San Francisco, Cal.—It is expected that a considerable part of the earnings of the municipal railway system of San Francisco for the next year will be needed for the extension of the road through the Twin Peaks tunnel. With the tunnel nearly 25 per cent completed, plans are already being roughly sketched for financing the railroad through the tunnel and out into the territory beyond. At a recent meeting of the city's finance committee a resolution was ordered prepared providing for setting aside nearly $300,000 of the earnings of the municipal street railway system for investment in library or other bonds.

Plymouth & Sandwich Street Railway, Plymouth, Mass.—The Plymouth & Sandwich Street Railway has petitioned the Public Service Commission of Massachusetts for authority to issue 870 shares of additional preferred stock of a par value of $100 each, the proceeds to be used to pay off floating debt and to complete the extension of the railway in Plymouth, Bourne and Sandwich. The stock is to be offered to the present holders of common stock at $100 per share.

Republic Railway & Light Company, New York, N. Y.—H. F. McConnell & Company, New York, N. Y., say: "Provision has been made by the Republic Railway & Light Company to the issuance of a blanket mortgage to retire maturing bonds due this year and the note due on Jan. 1, 1916. Unsettled financial conditions, however, have caused the bankers to hesitate in offering these bonds for sale, although all arrangements have been made for underwriting the issue and taking care of maturing obligations. Officials of the company state that the dividend on the preferred stock is absolutely secure."

Southern Iowa Railway & Light Company, Albia, Ia.—A. C. Mueller, Davenport, has been appointed receiver of the Southern Iowa Railroad & Light Company as the result of a suit filed by the trustee under the mortgage securing the holders of the bonds of the company. On June 1, the company had maturing $9,000 of bonds, which it was unable to take up.

Southern Power & Traction Company, Alexandria, La.—The sum of $30,000 has been agreed upon as the price at which the city of Alexandria will take over the railway property of the Southern Power & Traction Company in Alexandria. As noted briefly elsewhere in this issue, the company has resumed the operation of its railway line pending the completion of the negotiations for the sale to the city.

Stockton Terminal & Eastern Railroad, Stockton, Cal.—The Railroad Commission of California has denied the application of the Stockton Terminal & Eastern Railroad for authority to issue $319,500 of bonds for the purpose of completing its road from Bellotta to Jenny Lind under an agreement with the De Mayo Engineering & Construction Company, New York. At the hearing of the application J. E. Adams, president of the company, stated that the opinion of the directors of the company was divided on the subject.

Tidewater Southern Railway, Stockton, Cal.—Subscriptions for $100,000 of securities of the Tidewater Southern Railway have been advanced in Modesta, Ceres and Turlock to cover the proposed extension of the line from Modesta through Ceres to Turlock. The total cost of the extension is estimated at $180,000, of which $80,000 has been subscribed outside of Stanislaus County.

Washington Railway & Electric Company, Washington, D. C.—Negotiations are being conducted in Washington for the merger of the Capital Traction Company and the Washington Railway & Electric Company. It is now said that the only thing standing in the way of an agreement between the two companies is whether proposed collateral trust bonds to be issued by the Washington Railway & Electric Company in exchange for the capital stock of the Capital Traction Company shall bear 5 per cent or 6 per cent interest. The proposed bond issue would be secured by deposit with the trustee, to be named, of the entire stock issue of the Capital Traction Company. Failure to meet payments on the collateral trust bonds when due would result in the reversion of the Capital Traction Company shares to the holders of the collateral trust bonds. The Capital Traction Company has outstanding $12,000,000 of stock on which dividends of 6 per cent a year have been paid since 1905. The proposed basis of exchange of the stock for bonds has not been divulged. Besides requiring the approval of the stockholders of both corporations the plan would also have to be approved by the Public Service Commission of the District of Columbia and by the national Congress.

Western Ohio Railway, Lima, Ohio.—Application has been made to the Public Utilities Commission of Ohio by the Western Ohio Railroad for permission to sell its property to the Western Ohio Railway. Application has also been made to sell its property in Sidney to the Standard Power & Equipment Company.

DIVIDENDS DECLARED

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred stock.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, common and preferred.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred A.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

Germantown (Pa.) Passenger Railway, quarterly, $1.31¼.

Halifax (N. S.) Electric Tramway, quarterly, 2 per cent.

Hestonville, Mantau & Fairmont Passenger Railway, Philadelphia, Pa., $1.50, preferred; $1, common.

Interborough Consolidated Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Reading (Pa.) Traction Company, 75 cents.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1 per cent, common.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1½ per cent.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
ATLANTIC SHORE RAILWAY, KENNEBUNK, MAINE					
1m., May, '15	$27,879	$25,319	$2,560	$685	$1,675
1 " " '14	27,199	23,563	3,636	650	2,986
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Apr., '15	$142,011	$96,837	$45,174	$40,039	$5,135
1 " " '14	155,640	105,492	50,148	37,383	12,765
10 " " '15	1,653,821	1,061,363	592,457	398,809	193,648
10 " " '14	1,733,775	1,093,703	640,072	380,655	259,417
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Apr., '15	$69,861	*$61,584	$8,277	$17,177	†‡$8,809
1 " " '14	70,566	*37,738	32,828	32,502	‡405
10 " " '15	795,163	*715,698	79,465	172,338	†‡91,472
10 " " '14	822,454	*720,077	102,377	170,764	†‡66,812
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO					
1m., Apr., '15	$30,151	*$18,266	$11,886	$10,961	$925
1 " " '14	31,896	*17,316	14,580	11,005	3,575
4 " " '15	113,038	*69,127	43,911	43,779	132
4 " " '14	115,833	*66,498	49,335	43,789	5,546
THE CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., Apr., '15	$612,898	*$449,561	$163,337	$98,178	‡$86,710
1 " " '14	618,574	*414,349	204,225	88,372	‡137,269
10 " " '15	6,587,443	*4,809,690	1,777,753	982,711	‡1,011,255
10 " " '14	6,626,482	*4,878,424	1,748,058	890,634	‡1,074,659
FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.					
1m., Apr., '15	$135,938	$80,340	$55,598	$53,257	‡$2,624
1 " " '14	146,264	86,078	60,186	52,640	‡7,673
4 " " '15	566,280	324,105	242,175	213,871	‡29,623
4 " " '14	606,695	346,617	260,078	205,612	‡55,498
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.					
1m., Apr., '15	$465,488	*$190,929	$274,559	$211,748	$62,811
1 " " '14	484,776	*196,942	287,834	208,008	79,826
4 " " '15	1,861,908	*777,400	1,084,507	844,852	239,655
4 " " '14	1,911,468	787,848	1,123,020	831,199	292,421
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., Apr., '15	$2,926,690	*$1,268,849	$1,657,841	$907,378	‡$806,365
1 " " '14	3,020,204	*1,245,325	1,774,879	907,378	‡904,740
10 " " '15	27,839,526	*12,556,348	15,283,178	9,091,690	‡6,684,503
10 " " '14	27,851,791	*12,472,276	15,379,551	9,299,842	‡6,581,146
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., Apr., '15	$63,612	$33,153	$30,059	$29,754	‡$15,193
1 " " '14	62,538	34,872	27,666	20,739	‡11,346
10 " " '15	673,217	358,307	314,910	197,748	‡144,690
10 " " '14	639,170	338,121	301,049	204,862	‡123,675
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1m., Apr., '15	$101,548	*$71,191	$30,357	$35,963	†$5,606
1 " " '14	109,200	*75,175	34,025	35,287	†1,262
4 " " '15	391,307	*282,175	109,132	143,871	†34,739
4 " " '14	410,161	*278,344	131,817	140,929	†9,111
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., Apr., '15	$25,508	*$23,247	$2,261	$7,976	†‡$5,692
1 " " '14	25,903	*23,520	2,383	7,807	†‡5,402
10 " " '15	308,568	*255,950	52,618	79,061	†‡26,070
10 " " '14	301,058	*248,200	52,858	77,301	†‡24,054
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Apr., '15	$37,555	*$48,041	†$5,486	$5,990	†‡$11,407
1 " " '14	34,340	*41,385	†7,045	5,013	†‡11,624
10 " " '15	366,508	*435,442	†68,934	63,608	†‡130,881
10 " " '14	325,413	*480,065	†154,652	57,159	†‡206,939
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Apr., '15	$279,282	*$183,538	$95,744	$51,423	$44,321
1 " " '14	287,719	*173,322	114,397	50,331	64,066
4 " " '15	1,101,351	*709,451	391,900	204,437	187,463
4 " " '14	1,080,884	*668,302	412,582	200,155	212,427
PACIFIC GAS & ELECTRIC COMPANY, SACRAMENTO, CAL.					
3m., Mar., '15	4,749,327	*2,290,725	2,458,602	1,104,231	‡1,425,685
3 " " '14	4,342,576	*2,237,961	2,104,615	1,108,079	‡1,094,898
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY					
1m., May, '15	$2,070,160	$1,213,939	$856,221	$817,319	$38,902
1 " " '14	2,178,843	1,260,510	918,332	605,473	112,859
11 " " '15	21,846,967	12,700,116	9,146,851	8,918,780	228,071
11 " " '14	22,195,756	13,089,983	9,105,773	8,817,810	287,963
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.					
1m., Apr., '15	$442,526	*$248,634	$193,892	$182,985	$10,907
1 " " '14	533,973	*286,989	246,984	176,595	70,389
12 " " '15	5,886,595	*3,182,996	2,703,599	2,202,489	501,110
12 " " '14	6,751,158	*3,335,666	3,415,492	2,082,284	1,333,208
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.					
1m., Mar., '15	$242,236	*$157,143	$85,094	$56,840	‡$28,257
1 " " '14	248,882	*156,756	92,126	55,963	‡36,208
3 " " '15	724,837	*456,844	267,993	170,634	‡97,625
3 " " '14	739,118	*466,070	273,048	166,682	‡106,586
THE RHODE ISLAND COMPANY, PROVIDENCE, R. I.					
1m., Apr., '15	$349,814	*$329,941	$19,873	$117,301	†‡$70,607
1 " " '14	415,948	*304,859	111,089	111,264	†‡26,425
10 " " '15	4,263,809	*3,308,088	955,721	1,179,249	†‡129,672
10 " " '14	4,404,417	*3,301,197	1,103,220	1,080,699	‡139,363
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., Apr., '15	$410,943	$201,145	$209,798	$136,904	‡$80,505
1 " " '14	420,582	192,998	227,584	134,969	‡98,842
10 " " '15	4,271,727	2,060,012	2,211,715	1,362,488	‡916,559
10 " " '14	4,284,090	2,048,974	2,235,116	1,343,958	‡961,903
WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.					
1m., Apr., '15	$19,369	*$21,097	†$1,728	$1,449	†‡$3,168
1 " " '14	19,384	*21,241	†1,857	1,190	†‡3,043
10 " " '15	213,056	*224,792	†11,736	13,168	†‡24,799
10 " " '14	205,064	*214,789	†9,725	11,098	†‡20,638

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

The Jitney Problem in Philadelphia—Company's Interesting Tabulation of Bond and License Requirements in Ordinances Already Passed

The question of jitney regulation is before the law committee of the Select and Common Councils of Philadelphia. The original ordinance fixed the license fee at $25 for each car, with a liability bond of $2,500. On June 18 the law committee approved a bill that called for a license fee of $50 and a liability bond of $2,500 for all jitneys and taxicabs. The committee decided, however, that in case of a company operating more than ten cabs or cars it shall put up a single bond of $50,000. The committee also decided upon zone rates.

The case of the Philadelphia Rapid Transit Company was presented to the committee of the Councils in the form of a memorandum from T. E. Mitten, president of the company, to which was appended a statement of taxes paid by the company in 1914 and a table giving information in regard to the indemnity bonds and license fees that are required in various cities which have enacted regulatory ordinances.

The statement of the company showed that the Philadelphia Rapid Transit Company has property devoted to the transportation business in Philadelphia which the State authorities last year assessed for taxation at a value of $164,023,727. Out of gross receipts of $24,255,813 it last year paid taxes to city, State and nation of $1,903,662, or more than 7½ per cent of its gross receipts. It carries every day more than 1,500,000 passengers and it pays out every year in wages to its 10,750 employees more than $8,500,000. The city is a part owner of the property, for in addition to receiving each year $700,000 cash as taxes and on account of paving, a sinking fund is being built up out of the receipts of the company through which the city of Philadelphia will acquire the property of the company in 1957.

At the present time the loss from the jitney is estimated at not less than $3,000 a day, or at the rate of $1,000,000 a year. If continued, this loss can only be met by reducing wages or decreasing the number of cars operated. The company contends that if the jitney is to be operated it must be regulated, its routes should be ascertained, the fares to be paid should be fixed, the schedules should be maintained, congestion should be avoided, and those engaged in the business should not only pay their fair share of taxes through a proper license fee, but should also give a bond sufficient to insure a response in damages where accidents happen through their negligence. Mr. Mitten said that if it is felt that the best interests of Philadelphia require jitney competition in the transportation business then competition should be fair, as any unfair or wasteful competition can only do harm in the long run. At present the competition is unfair in respect to length of ride, in respect to regularity, in respect to responsibiilty for damages, and in respect to taxation.

The statement made by the company to the committee of the Councils is concluded in part as follows:

"All the company asks is a square deal. If you believe that the jitney should be licensed for the good of the community, then let the license be granted on such terms that the competition is fair. Let the jitney pay its fair proportion of taxes. Let it give assurances that it will respond in damages where accidents have happened. Let its routes be established and its schedules maintained in the lean hours as well as in the fat ones. In other words, make it a real business with real obligations to the public, and the Philadelphia Rapid Transit Company will then do its best to adjust its schedules and its business to the changed conditions."

The provisions of practically all the city ordinances included in the company's summary have been published previously in the ELECTRIC RAILWAY JOURNAL, but the table prepared by the company makes the data so convenient for reference that it is reproduced herewith.

City	Population 1910 Census	Date of Passage	Amount of Bond	Annual License Fee per Car
Arizona:				
Tucson	13,000	4- 5-15	$2,500	$30—up to 7 seats 60— 8 to 10 seats 80—11 to 20 seats
Arkansas:				
Little Rock	45,000	May, 1915	$2,000	$36—up to 7 seats 72— 8 to 12 seats 96—over 12 seats
California:				
Long Branch	17,000	10-27-14	$10,000	$25—up to 6 seats 30— 7 to 9 seats 35—10 to 15 seats 75—over 15 seats
Los Angeles	319,000	3- 4-15	$10,000	$60
Oakland	150,000	2-12-15	$10,000	$60
Pasadena	30,000	11-21-14	$10,000	$30—up to 4 seats 35— 5 to 7 seats 45— 8 to 15 seats 55—16 to 29 seats 75—over 30 seats
San Francisco	417,000	May, 1915	$10,000	$10 to $40
Colorado:				
Denver	213,000	(Must obtain a city franchise)		
Pueblo	44,000	....	$10,000	$50
Georgia:				
	On June 8, 1915, the Georgia Railroad Commission rendered a decision taking full supervision over jitney buses in the State.			
Atlanta	155,000	4-10-15	$5,000	$75—up to 4 seats 100— 5 to 7 seats 125— 8 to 9 seats 150—over 10 seats
Idaho:				
Boise	17,000	1915	$10,000 for two vehicles or less $20,000 for more than two vehicles	$75—up to 4 seats 100— 5 to 10 seats 150—10 to 20 seats
Illinois:				
	Illinois Public Utilities Commission has ruled that all jitneys must obtain a Certificate of Public Convenience.			
Kentucky:				
Louisville	224,000	4-22-15	$5,000	$10—up to 8 seats 20— 9 to 15 seats 25—over 15 seats
Louisiana:				
New Orleans	339,000	4-27-15	$5,000	Regular motor vehicle fee.
Nebraska:				
Lincoln	44,000	....	$10,000	$25—up to 4 seats 30— 5 seats 35— 6 seats 40— 7 seats 50— 8 to 10 seats 75—11 to 20 seats 100—21 to 30 seats
New York:				
	New York State Law passed at 1915 session of the Legislature provides that no jitney shall operate until the owner has procured the consent of the local authorities and has executed a bond in an amount fixed by said local authorities.			
Buffalo	424,000	4- 7-15	$5,000 for one automobile $1,000 for each additional automobile	$75—up to 5 seats 100— 5 to 10 seats 150—over 10 seats
Schenectady	73,000	....	$1,000 per seat Minimum $5,000	$5 per seat Minimum $25.
North Dakota:				
Fargo	14,000	4-16-15	$10,000 for not exceeding two vehicles	$50—up to 4 seats 75—over 5 seats
Ohio:				
Ashtabula	18,000	....	$5,000	$100
Youngstown	79,000	....	$5,000	$25
Oklahoma:				
Oklahoma City	64,000	2- 2-15	$10,000	$50—up to 8 seats 75— 9 to 12 seats 150—over 12 seats
Tulsa	18,000	....	$5,000	$5 per seat. Maximum $20
Pennsylvania:				
	Pennsylvania State Law passed at 1915 session of the Legislature places jitney regulation under individual municipalities.			
Rhode Island:				
Providence	224,000	5-13-15	$500 per seat	$5 per seat Maximum $50
Tennessee:				
	Tennessee State Law passed April 1, 1915, defines a jitney as a common carrier and makes it unlawful for jitneys to operate without first obtaining from the municipality a license by ordinance and further provides that no such license shall be granted which does not require a bond of not less than $5,000, said bond to be executed to the State of Tennessee. The amount of the license fee is to be fixed by each municipality.			
Nashville	110,000	1915	$5,000	$60
Texas:				
Beaumont	21,000	2-19-15	$10,000	$20—up to 5 seats 30— 6 to 7 seats 5—per seat over 7
Dallas	92,000	4-21-15	$2,500	Not stated
El Paso	39,000	4-24-15	$5,000 for less than 6 vehicles; $10,000 for 6 and less than 11 vehicles; $15,000 for 11 or more vehicles	$18

City	Population 1910 Census	Date of Passage	Amount of Bond	Annual License Fee per Car
Texas (Continued):				
Ft. Worth	73,000	1915	$11,000	$10—up to 5 seats 20— 6 to 7 seats 30—over 7 seats
Port Arthur	7,000	2-13-15	$10,000	$7.20 per seat
San Antonio	97,000	1915	$10,000	$25—up to 7 seats $3.50 per seat over 7
Sherman	12,000	3- 5-15	$10,000	$10—up to 5 seats 20— 6 to 7 seats 30— 8 to 12 seats
Waco	26,000	3-22-15	$5,000	$25—up to 5 seats 5 per seat over 5
Utah:				
Ogden	25,000	4- 1-15	$10,000	$75—up to 5 seats 100— 6 to 10 seats 150—11 to 20 seats
Salt Lake City	92,000	3-24-15	$5,000	$75—up to 4 seats 100— 5 to 9 seats 125—over 10 seats
Washington:				
Seattle	237,000	1-17-15	$2,500	Not stated
West Virginia:				
Huntingdon	31,000	5-17-15	$5,000	$50—up to 4 seats 75—over 5 seats

STATE REGULATION OF JITNEY URGED

Counsel for the Pennsylvania Street Railway Association has asked the Public Service Commission to require jitneys to secure certificates of public convenience from the commission, post tariffs and schedules, as other common carriers are required to do and furnish $5,000 bonds for damages in case of accidents. The commission deferred consideration of the petition. In the course of the discussion, Commissioner Ainey remarked that if the jitney operators considered themselves common carriers they should post tariffs. This petition was presented by H. B. Gill, Philadelphia, counsel for the association, during the hearing by the commission on the protests of representatives of the Williamsport street railways against the incorporation of the Jitney Service Company, Williamsport. The Williamsport jitney people declared that the gross receipts from each car were $13 a day, while the cost was $8 a car daily. Counsel for the street railways contended that jitneys were soliciting street railway business and that they should not be permitted to parallel trolley routes which were set forth in charters and conducted by corporations under state regulation. One of the officials of the street railway system testified that the jitneys were impairing the credit of trolley companies and that there would either have to be a reduction of expenses, including salaries and wages, or an increase in suburban fares. C. L. S. Tingley, president of the association, said that the companies had made investments in good faith and having accepted regulation, ought to be protected. The commissioners asked numerous questions as to whether street cars were not frequently overcrowded and whether it would not be preferable to have jitney lines incorporated rather than have cars operated by individuals. Briefs will be filed later.

In New Orleans a temporary injunction has been granted preventing the enforcement of the ordinance regulating jitneys. The ordinance requires an indemnity bond of $5,000 from each jitney and provides for strict regulation. It also requires the New Orleans Railway & Light Company to file indemnity bonds for its 535 cars.

The Governor of California did not sign the bill for State regulation of the jitneys. He said that local conditions vary so much that no general State law could be made equitable, and that the control of the jitneys should remain subject to local regulation.

The Washington Water Power Company, Spokane, has been considering the operation of electrically driven jitneys to afford transportation in the districts beyond the ends of the car lines and cheap gasoline cars in the more congested sections of the city in competition with private jitney machines. The reason for using electrically driven vehicles in the outskirts and cheap gasoline cars in the downtown districts, Vice-President McCalla states, is because it is not believed that the downtown service will be a paying business for very long, but that there will probably be need for making the service permanent in the outlying districts. In some cases the electric machines will serve as feeders for the street cars to which they will transfer on a 5-cent fare. In other sections it is thought that it will be necessary to charge a 5-cent fare to the car lines and then the regular fare into the city. Mr. McCalla said that the matter had been studied very carefully, but he did not know how soon the plan would be carried out.

The United Railroads, San Francisco, Cal., has been keeping a tabulation of the number of jitneys in operation passing different points of the city. One such tabulation, made during a pleasant day in the early part of this month of the jitneys on Market Street passing Sixth Street from 6 a. m. to 1 a. m. the following morning showed that the average number of passengers per car was 2.88 and the average earnings per car mile was $0.0401.

Judge Pittman, of the Circuit Court of Tennessee at Memphis, has held the law providing for the regulation and bonding of jitneys, passed by the State Legislature, invalid. The chief point on which the law was declared unconstitutional was that it required the jitneys to file indemnity bonds and did not require these bonds for street cars or for other vehicles traversing the streets.

THE WASHINGTON AUTO BUS COMPANY

The Puget Sound Traction, Light & Power Company, Seattle, Wash., under the management of Stone & Webster and operating electric railways in Bellingham, Everett, Seattle and Tacoma, and interurban lines between Seattle and Tacoma, Seattle and Everett, and Mt. Vernon and Bellingham, has organized and incorporated the Washington Auto Bus Company, Stuart Building, Seattle, as noted previously in the ELECTRIC RAILWAY JOURNAL. The new corporation is capitalized at $25,000, and the trustees are the managers of the properties of the Puget Sound Traction, Light & Power Company in the four cities previously mentioned. K. K. Carrick, of the Pacific Northwest Traction Company, Everett, is active manager of the bus company. Other officers are: president, A. W. Leonard, president of the Puget Sound Traction, Light & Power Company; vice-president, W. H. McGrath, who holds a similar position with the Puget Sound Company; secretary-treasurer, F. P. Dexter, general accountant of the Puget Sound Company. As business of the company advances and extensions are made, company managers in various territories will have local direction in their individual districts. The business of the Tacoma district will be cared for by L. H. Bean, manager of the Tacoma Railway & Power Company; Seattle District by A. L. Kempster, of the Puget Sound Traction, Light & Power Company; Everett territory by D. C. Barnes, manager of the Pacific Northwest Traction Company, and Bellingham section by L. R. Coffin, manager of the Whatcom County Railway, Light & Power Company.

The company began operating on June 1. The nature of the service is passenger transportation, and the run is from Buckley and Enumclaw to Auburn, a distance of 21 miles, making connections at the latter place with the interurban trains of the Puget Sound Electric Railway. The initial schedule calls for two buses, and a third is used for a stand-by. Flat fares are charged as follows: between Tacoma and Buckley, or Enumclaw, one way, 90 cents; round trip, $1.50; between Seattle and Buckley, or Enumclaw, one way, $1.25; round trip, $2.10, with stop-over privileges at Auburn. A joint ticket is sold covering a ride on the bus between Buckley or Enumclaw, or Auburn, and Seattle and Tacoma, on the Puget Sound Electric Railway. No transfers are given to the local railway lines. The machines in use on this line are Studebaker cars, carrying bodies built in Seattle, with seats for twelve passengers.

The company also plans to institute service at once between Edmonds and Seattle Heights, where connections will be made with the interurban trains of the Pacific Northwest Traction Company and the Seattle-Everett line for Seattle or Everett. Operations on this line will begin with a Studebaker car, carrying a body constructed in Seattle, with seating capacity of nine passengers. Flat fares will also be charged on this line, and no transfers will be issued to the local railway lines. A joint ticket, however, will be sold similar to the one referred to above. Three Mack machines, with bodies constructed by The J. G. Brill Company, have been ordered, and will be placed in service as soon as the cars are ready. They are expected to be delivered in July. Each of these machines will seat twenty passengers. The route for these cars has not been selected. The Washington Auto Bus Company is the direct result of an effort on the part of the Puget Sound Traction, Light & Power Company to increase the patronage of its interurban lines in the Puget Sound country.

RULES FOR JITNEYS

Public Service Commission of Maryland Prescribes Rules for Jitney Operation

Some time ago W. Cabell Bruce, general counsel to the Public Service Commission of Maryland, rendered an opinion to the commission holding that jitneys are common carriers and as such are under the jurisdiction of the commission. As a result the commission ordered all jitney owners to register with it by June 1. The commission has now announced effective at once rules designed to insure the safety, adequacy and dependability of jitney service. In promulgating its rules the commission said:

"Upon proper registration, the owner or owners will be furnished with an identification card, one for each vehicle, whether in actual operation or held in reserve. Such card will give the name and address of owner or owners; the license number issued by the commissioner of motor vehicles; the maximum numbers of persons each vehicle shall be permitted to carry at any time; the definite route to be traveled, and the schedule of operation to be maintained.

"Each such public bus shall follow such route, and maintain such schedule, under the provision of Circular No. 41 (providing for the reporting of the commission of 'interruptions to service') to the same effect and in the same manner as said Circular No. 41 is applicable to electric railways.

"The identification card shall be carried by the operator of the public bus, upon the vehicle itself, and shall always be presented for inspection upon the demand of an authorized representative of the commission, or other legally constituted authority. Failure to produce said card shall subject the owner to the penalty set out in Circular No. 40.

"If, in the opinion of the commissions, any public bus fails to render satisfactory service, or is operated under such conditions as to render such services inadequate, unsafe or improper, the registration of such public bus shall be annulled and further operation prohibited.

"All the provisions of Circular No. 3-B in respect to 'accidents' shall be applicable to public buses to the same extent that they are applicable to electric railways, and to such further conditions as may be imposed by any revision or revisions of said Circular No. 3-B.

"Each public bus shall be provided with an indicator, upon which all fares collected shall be registered, showing both the fares collected during the current trip and also the total fares collected. A permanent record shall be kept of the total fares collected during each tour of duty of each public bus, giving the index of the register when first starting out, and the index at the completion of the tour of duty.

"Violations of existing laws or of street traffic regulations will, in the discretion of the commission, cause annulment of registration.

"Public buses shall adhere, as closely as practicable, to the established routes and schedules, and any departure therefrom must be reported to the commission."

The rules then state that not more than one person shall be allowed to occupy the front seat of a bus, in addition to the driver; that no one shall be allowed to ride upon the top of a bus, unless it be constructed for that purpose and be provided with seats and protective railings; that schedules of rates shall be filed with the commission before becoming effective; that the commission reserves the right to arrange or re-arrange routes and schedules to prevent unnecessary congestion on streets, and that sufficient reserve equipment shall be kept in good condition to insure maintenance of the established routes and schedules.

The commission, in conclusion, prescribes the following rule as to the maximum load:

"The maximum number of persons each vehicle shall be permitted to carry at any one time, and which carrying capacity shall be designated on the identification card when issued, shall be based upon the following rating, this rating being based upon the total length of seats in inches, allowing 16 in. per passenger when such number so designated does not exceed the carrying capacity of the chassis, allowing an average of 140 lb. per passenger:

Total length seats.....	128	140	160	176	192	208	224	240
Pounds capacity......	1120	1260	1400	1540	1680	1820	1960	2150
No. passengers	8	9	10	11	12	13	14	15

MILWAUKEE FARE DECISION

The United States Supreme Court has affirmed the decision of the Wisconsin Supreme Court of May 29, 1913, which in turn affirmed the order made by the State Railroad Commission of Wisconsin in August, 1912, requiring the company to sell tickets in packages of thirteen for 50 cents instead of twenty-five for $1 as provided in an ordinance and accepted by the company in January, 1900.

The point at issue was whether the municipality had power to make a contract with the railway covering a term of years for a specified rate of fare, and the opinion upholds the Wisconsin Court in denying this right. According to President Mortimer of the Milwaukee Electric Railway & Light Company the case will now go back to the lower courts on the question of the reasonableness of the original order, and possibly also to the Railroad Commission of Wisconsin, and the company hopes to prove its case. While the question was before the courts, beginning in October, 1912, and up to last February, the company has been giving coupons as receipts for the excess fare charged. In view of the decision of the commission last January, reported on page 333 of the issue of this paper for Feb. 13, it is thought that the plea of the company as regards the unreasonableness of the fare charged will be favorably received.

Increase in Fare Suspended.—Public Service Commission of Massachusetts has further suspended until July 15 the proposed increase in the unit passenger fare on the Blue Hill Street Railway.

Re-hearing in Suburban Fare Case.—The Public Service Commission of Pennsylvania has denied the application of Philadelphia commuters for a rehearing in the commutation case involving fares over the lines of the Pennsylvania Railroad and Philadelphia & Reading Railway out of Philadelphia.

Lake Shore Electric on Standard Time.—Cars on the Lake Shore Electric Railway between Cleveland and Detroit are now being operated on Eastern standard time. This was done because of the adoption of Eastern time in Detroit recently. Cleveland has had Eastern time for a year or more.

Wage Adjustment.—The representatives of the trainmen in the employ of the Shore Line Electric Railway, Norwich, Conn., and the officers of the company have agreed upon an advance in wages from a minimum of 22 cents an hour and a maximum of 28½ cents to a minimum of 23 cents and a maximum of 29 cents.

Wage Conference in Rhode Island.—A. E. Potter, president of the Rhode Island Company, Providence, R. I., will confer with a committee representing the employees of the company in regard to new working conditions. On June 17 the representatives of the men were empowered by vote to call a strike of the employees.

Increase in Fare Asked.—Following an appeal made by George A. Stanley, president of the New York & North Shore Traction Company, Roslyn, N. Y., the Board of Trade of Port Washington has sent a communication to the Public Service Commission for the Second District favoring a 15-cent fare between Port Washington and Mineola, providing the claims made by Mr. Stanley regarding the inadequacy of the present fare are found to be correct.

Experimental Week-End Excursion Rate.—An amendment has been filed with the Public Service Commission to Puget Sound Electric Railway Experimental Tariff No. 6 covering passenger rates, which became effective on June 1, 1914, naming an experimental week-end excursion rate between Tacoma and Seattle of 75 cents for the round trip, effective on June 19. Tickets will be good for use on Saturdays and Sundays only during the months of June, July and August.

Complaint Against Jersey City Service Dismissed.—The Board of Public Utility Commissioners of New Jersey has dismissed the complaint of Jersey City against the Public Service Railway. The action related to the adequacy of service furnished. The commission said in part: "In this situation no useful purpose will be served by continuing the consideration of the present proceeding, which is general in its scope and relates, in part, to conditions which have in the meantime been materially changed. Further consideration in the present proceeding will, therefore, be suspended and the matter taken from the board's conference list."

Wage Negotiations in Toronto.—The offer of the Toronto (Ont.) Railway to its employees to renew the agreement fixing the scale of wages at the present rate for a further period of three years has been rejected by the men. The latter have signified their willingness to withdraw the demand recently made for an increase of 2½ cents an hour and to consent to a renewal of the present agreement for two years. The suggestion of the men will be considered by the company upon the return of R. J. Fleming, general manager, to the city.

Complaint Against Scranton Railway Dismissed.—The Public Service Commission of Pennsylvania has dismissed the complaint filed with the commission against the city of Scranton to compel the Scranton Railway to accept an ordinance passed by the City Council requiring the company to extend its system upon certain streets. The commission held that the necessity for the establishment of the route covered by the proposed extension was not such as to justify it in compelling the company to make the extension and further that the public service company law did not authorize the commission to compel a public service company to extend its facilities beyond the territory covered by its charter or amendments thereto.

Suspension of Smoking Order for Summer.—On the application of the companies of the Brooklyn Rapid Transit system and the New York Railways, the Public Service Commission for the First District has adopted resolutions suspending for the summer months the orders forbidding smoking on the convertible cars of the Brooklyn system and the low-level center-entrance cars of the New York Railways. Under the suspension smoking will be allowed upon the four rear seats of the convertible cars in Brooklyn and upon the two rear seats and the circular seat in the rear of the low-level center-entrance cars of the New York Railways system. Action upon the Interborough Rapid Transit Company's application for permission to allow smoking on the open cars of the Third Avenue elevated railroad has been deferred.

Albany Wage Negotiations.—The demands of the employees on the Albany and Troy division of the United Traction Company, Albany, N. Y., that they shall have control of runs over the Hudson Valley Railway from Waterford into Troy has resulted in a temporary suspension of the negotiations looking toward the adjustment of the working conditions on the United Traction Company's lines before July 1, on which date the present agreement between the company and its employees expires. It is stated that about thirty motormen on the Hudson Valley Railway are members of the Brotherhood of Locomotive Engineers and that conductors to the number of thirty are members of the Order of Railway Conductors. The question of union jurisdiction has therefore arisen. C. F. Hewitt, general manager of the United Traction Company, threw the conference between the representatives of the company and the union open to the newspaper men.

New Advertising Policy in Brooklyn.—On June 17 a new policy was inaugurated for the benefit of all advertisers and consumers using the Brooklyn Rapid Transit System. On that date the Broadway Subway & Home Boroughs Car Advertising Company, Inc., which now controls the advertising privileges on the Brooklyn Rapid Transit System, began using the news and vending stands for furthering and exploiting all of the wares advertised in the cars and on the stations of the system by making it possible for consumers impressed with advertising in the cars or stations to order advertised goods by slip through the company. Any possible antagonism of the large or small storekeepers of Brooklyn has been guarded against by an arrangement for a suggested system of credits to the store carrying the goods nearest to the ultimate consumer. The plan is to make it possible for the consumer to secure the advertised product at once with the least possible inconvenience to himself.

Personal Mention

Mr. Julian M. Bamberger, vice-president and general manager of the Salt Lake & Ogden Railway, Salt Lake City, Utah, has been elected president of the company.

Mr. F. R. Southard has been appointed purchasing agent of the United Railroads, San Francisco, Cal. In addition to his new duties, he will continue to act in the capacity of storekeeper.

Mr. R. W. Crook, general manager of the People's Railway, Wilmington, Del., which has been absorbed by the Wilmington & Philadelphia Traction Company, was recently presented with a diamond pin by the employees of the People's Railway as a token of their esteem.

Mr. S. T. Henry, second vice-president of the McGraw Publishing Company, Inc., and formerly Western editor of the *Engineering Record*, has been appointed by Secretary of the Treasury McAdoo a member of the committee of the Pan-American Financial Conference which will have charge of the visits of American bankers and business men to Central and South American countries.

Mr. H. T. Matthew has been appointed Pacific Coast representative for the Society for Electrical Development. Mr. Matthew for six years beginning in 1901 was business manager of *Electrochemical Industry* (now *Metallurgical & Chemical Engineering*), one of the McGraw papers, and later was western manager for *Electrical World*. For the past three years he has represented the McGraw publications on the Pacific Coast.

Mr. L. F. Rye has been appointed auditor of the Kentucky Traction & Terminal Company, Lexington, Ky., to succeed Mr. G. L. Langton. Mr. Rye was formerly connected with the Detroit (Mich.) Edison Company as assistant general accountant. He was with the company for five years, entering its employ as chief clerk. Previous to that he was auditor of the Watt Motor Car Company, Detroit, for a year and a half and prior to that was chief clerk of the Detroit & Suburban Gas Company for a year. He also served as head bookkeeper of the Citizens' Gas & Electric Company, Waterloo, Ia., for two years.

Mr. Horace Field Parshall, formerly chairman of the Central London Underground Railway, London, England, will hereafter have charge of the physical property of the Barcelona Traction Light & Power Company, Barcelona, Spain, as a result of changes in the administration of the company following the recent death of Dr. F. S. Pearson. Mr. Parshall is an American, but has been in England about twenty years. He was electrical engineer for the Dublin Tramways, the Glasgow Tramways, the London United Tramways and the Bristol Tramways, and has been connected with many other large electrical projects in Great Britain. He prepared the plans for the Central London Underground Railway installation, the first railway in England to be operated on the multi-phase system with converting substation, and was associated with the work on the Central London Underground Railway for more than ten years.

OBITUARY

Richard S. Brown died on June 5 in New York City. Mr. Brown was born in Great Barrington, Mass., seventy-six years ago. He became connected with the Belt Railway in New York and subsequently joined the Daft Company in its early electric railway work. In 1890 he entered the service of the Westinghouse Electric & Manufacturing Company, continuing with that company until the end. Practically his entire period of service was spent as a salesman for railway apparatus at the Boston office.

Dr. Emil Rathenau, founder of the German Edison Company and for many years managing director of its successor, the Allgemeine Elektricitäts Gesellschaft, Berlin, is reported dead at the German capital in a dispatch from that city by transatlantic wireless, June 21. Dr. Rathenau in recognition of his work in organizing the electrical industry of Germany had been the recipient of many honors from Emperor William, the German government, the universities and engineering schools, and leading commercial engineering organizations.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Calhoun County Railway, Pearl, Ill.**—Chartered in Illinois to build a railway from Pearl to Golden Eagle. Capital stock, $2,500. John E. Melick, Kampsville, is interested.

FRANCHISES

***Birmingham, Ala.**—W. W. Shortridge, Birmingham, and associates have asked the Council for a franchise to construct an electric railway from the city limits of Birmingham to the Warrior River.

Aurora, Ill.—The Aurora, Mendota & Western Traction Company has received from the Council of Aurora a twenty-five-year franchise to construct a line through the city. The franchise gives the company the right to operate its cars from the north side of Benton Street along Broadway and across intersecting streets to the southerly limits of the city. This is part of a plan to build a railway from Aurora to Montgomery. It is proposed to extend later the line south through Princeton to connect with the Illinois Traction System. Upshaw Hord, Aurora, is interested. [April 10, '15.]

Evansville, Ind.—The Public Utilities Company has received a franchise from the Council to extend its Main Street line on Morgan Avenue to Heidelbach Avenue, Evansville.

Hutchinson, Kan.—The Hutchinson Interurban Railway has asked the Council for a franchise to extend its line on Second Street from Main Street to Walnut Street.

Revere, Mass.—The Bay State Street Railway has asked the Council of Revere for a franchise to alter and relocate its tracks on Revere Street between Pierce Street and Bellevue Street.

Youngstown, Ohio.—The Lake Erie & Youngstown Railroad has received from the Public Utilities Commission of Ohio an extension of time within which to complete its line from Conneaut to Youngstown. [May 8, '15.]

Pottsville, Pa.—The Schuylkill Electric Railway, which is controlled by the Eastern Pennsylvania Railway, has received a franchise from the Council to construct a railway over Broad Mountain, which separates northern and southern Schuylkill County.

TRACK AND ROADWAY

***Huntsville, Ark.**—It is reported that a stock company has been organized to build an interurban railway from Huntsville to a connection with the St. Louis & San Francisco Railroad, 15 or 20 miles.

Tidewater Southern Railway, Stockton, Cal.—Work has been begun by this company on the extension of its line from Modesto to Turlock. Grading and construction south of the Tuolumne River has been begun and a bridge will be constructed across the Tuolumne River. It is expected that trains will be operated over the new extension in about four months.

Connecticut Company, New Haven, Conn.—Extensive improvements in Hartford are being planned by this company to be carried out this summer. Double tracks will be laid on Wethersfield Avenue from Wyllys Street to Bond Street. The track on Fairfield Avenue will be changed from the side to the middle of the street. The tracks on Main Street will probably be replaced with new track from South Green Street to a point near Pearl Street. A number of other improvements are also being considered. Double tracks are also being laid on Elizabeth Street from Main Street to Third Street, New Haven.

Waycross Street & Suburban Railway, Waycross, Ga.—Work has been begun by this company on the construction of its Lincoln Street line to Gilchrist Park. Material is being placed for the extension as fast as it is brought from the Gilmore Street line, which is being removed. The Gilmore Street line will be transferred to Lee Avenue, from which street the railway will go through Gilchrist Park. The Lincoln Street line connects with the old Gilmore Street line at Screven Avenue.

***Bloomington, Ill.**—Residents of Stevensonville, a suburb of Bloomington, are working with members of the City Commission to secure an electric line to their part of the city. A loop system by which the West Washington and Miller Park lines of the Bloomington Street Railway can connect with a line through Stevensonville is proposed. Commissioner A. G. Erickson is trying to interest the Bloomington & Normal Railway & Light Company in the project.

Illinois Traction System, Peoria, Ill.—Officials of this company have been asked by the Mayor and the Commercial Club of Jefferson City, Mo., to build an interurban line from Jefferson City to Columbia, Mo., 35 miles.

Union Traction Company, Coffeyville, Kan.—This company is repairing its track on Eighth Street, east of Union Street. New ties are being laid and the roadbed being made more solid. Similar improvements have been made by the company on other streets traversed by its different lines.

***Lebanon, Ky.**—Right-of-way for an electric line from Lebanon to Smithville has been secured from John W. Overall by Charles Edwards, representing White & Company, Chicago. It is stated that the proposed railway will connect with the Nashville, Chattanooga & St. Louis Railway at Lebanon, which will later be electrified.

Louisville (Ky.) Railway.—This company reports that work has been begun on its 1.8-mile double-track extension from Twenty-seventh Street and Chestnut Street to Shawnee Park, via Madison Avenue, Louisville. The construction consists of Lorain Steel Company's 103-lb., No. 426 rail on wooden ties, 2 ft. centers, with crushed-rock foundation to the bottom of the ties, concrete being used on top for paving.

***Alexandria, La.**—Plans are being considered to build an electric railway in Alexandria. T. T. Constant, Alexandria, is interested.

Shreveport (La.) Railways.—This company has completed its extension from Shreveport to South Highlands. Heavy rails have been laid on creosoted ties and the track has been ballasted with broken rock.

***Skowhegan & Athens Electric Railroad, Athens, Maine.**—Plans are being considered to build an electric railway from Skowhegan to Athens, via East Madison and North Cornville, 12 miles. The line will connect with the Maine Central Railroad and the Skowhegan & Madison Electric Railway at Skowhegan. Subscriptions to the amount of $80,000 have been pledged, leaving $20,000 still to be raised, as the entire sum required to insure the road being built is $100,000. H. E. Trueworthy, George F. Ayer and James Chapman, Athens, are interested.

Sandy Springs Railway, Kensington, Md.—This company reports that construction has been begun on an extension of its lines in Kensington.

Bay State Street Railway, Boston, Mass.—Work has been begun installing new rails on both the northbound and southbound tracks on North Main Street, Fall River, from the carhouse south to Bank Street. The old 6-in. rail is being replaced with 9-in. rail.

Detroit (Mich.) United Railway.—Grading has been completed on this company's extension to Imlay City and the work of laying track will be begun at once.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company contemplates track extensions and rehabilitation amounting to approximately 20 miles of single track. This work will include new overhead construction and track laid with crushed stone and gravel ballast, treated hemlock ties, 7-in., 91-lb. T-rail and granite-block pavement.

***Kansas City, Mo.**—D. M. Proctor and associates plan to construct an electric railway in Kansas City.

Metropolitan Street Railway, Kansas City, Mo.—This company is laying new tracks on Woodland Avenue between Missouri Avenue and Tenth Street, Kansas City.

Springfield (Mo.) Traction Company.—The track on this company's Chadwick Street line as far as Sequiota Park has been raised 2 in. above the former level. Heavier rails and new ties have been laid.

Missoula (Mont.) Street Railway.—Work has been begun by this company on the construction of an extension of its Daly Addition line to the county fairgrounds.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—This company has been authorized by the Board of Public Utility Commissioners of New Jersey to issue $190,000 of 5 per cent, first mortgage bonds and $85,000 of capital stock for the completion of the construction and equipment of its line between Lakewood and Point Pleasant. Rails, ties, poles and other construction material have been ordered and construction will be begun at once under the direction of Roy C. Havens, constructing engineer. George O. Vanderbilt, Trenton, is interested. [May 29, '15.]

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission for the First District of New York has authorized the chairman and secretary to advertise for bids, to be opened Friday, July 9, at 12:15 p. m., for the installation of tracks on the New Utrecht Avenue elevated line. This line is a branch of the Fourth Avenue subway, extending from Fourth Avenue through Thirty-eighth Street in an open cut to New Utrecht Avenue, and thence over New Utrecht Avenue, Eighty-sixth Street and Stillwell Avenue as an elevated line to Coney Island. It will be operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit) in connection with the Fourth Avenue subway. As the city has arranged for the purchase of rails, ties and other track materials, the contractor will be required only to do the work of installing the tracks and switches. Operation was begun on June 22 on this company's new Fourth Avenue subway, Brooklyn, from Chambers Street, New York, to Coney Island, Brooklyn.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has awarded the contract for the construction of Section No. 1 of Route No. 29, the Nostrand Avenue subway in Brooklyn, to Newman & Carey Company, Brooklyn, for $2,073,303.20. The Nostrand Avenue subway is a branch of the Eastern Parkway subway, which in turn is an extension of the existing subway, and will be operated in connection therewith by the Interborough Rapid Transit Company. Section No. 1 covers that part of the line extending from Eastern Parkway southward under Nostrand Avenue to a point about 220 ft. south of Church Avenue. The contract must be completed within twenty-one months, and the contractor gives a bond of $200,000. On June 22 the company placed in operation the line under the East River from Forty-second Street, Manhattan, to Jackson and Van Alst Avenues, Long Island City, known as the Steinway tunnel.

***Troy, N. Y.**—Plans are being considered by the Troy Chamber of Commerce for the construction of an electric railway from Rensselaer to Troy.

Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.—Burlington has voted to issue $100,000 to aid in the construction of this company's line from Ossippee to Durham. Junius Harden, Burlington, is interested. [March 20, '15.]

Cincinnati (Ohio) Traction Company.—This company has been ordered to lay tracks across the Mohawk Bridge and to divert its Westwood and College Hill cars via that route. This is in accordance with an ordinance passed by the Council of Cincinnati in February, 1913.

Reading Transit & Light Company, Reading, Pa.—This company is laying new track on its line on Perkiomen Avenue between Thirteenth Street and Nineteen-and-One-Half Street, Reading.

Rhode Island Company, Providence, R. I.—Plans are being made by this company to install new 9-in. grooved girder rails in Clinton Street and South Main Street, Woonsocket. The company will also replace its present tracks in Providence Street with T-rails taken up in South Main Street.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Operation of the Lookout Mountain incline railway of this company has been suspended to permit replacing of the cables which are used in handling the cars. Two new steel cables are being put in place, each 5000 ft. long. The old cables have been in service more than two years.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—Work has been begun on the construction of this company's line to be built between Knoxville and Bristol. Construction is now in progress at Rader's, Washington County, and the line is being built eastward to Kingsport. Engineers are locating the route for the section of the road between Kingsport and Bristol. An option has been taken on the lines of the Bristol Traction Company, and representatives of the company are in Sullivan County looking after terminal sites and soliciting subscriptions to a fund of $75,000 to be used in obtaining rights-of-way, terminal sites, etc. The new line will connect the Norfolk & Western Railway, the Louisville & Nashville Railroad and the Carolina, Clinchfield & Ohio Railway. The connecting railroads will haul trains over the new road under steam power. Arrangements have been made to float a bond issue of $5,000,000 for the construction of the line, and counties along the line will be offered the securities to the extent of 7½ per cent to 10 per cent of the amount to be expended in those counties. H. S. Reed, 205 Grant Building, Los Angeles, president. [April 17, '15.]

Nashville (Tenn.) Traction Company.—Operation has been begun on this company's 3-mile extension from the corner of Fifth Avenue and Church Street, Nashville, south on Fifth Avenue to Mulberry Street, thence to Second Avenue, thence to Lafayette Street, extending to the present terminus of the line on Murphreesboro Pike.

Charleston (W. Va.) Interurban Railroad.—A report from this company states that it expects to build an extension from Charleston to Cabin Creek Junction, 13.5 miles.

SHOPS AND BUILDINGS

Metropolitan Street Railway, Kansas City, Mo.—Plans are being considered by this company to construct an ornamental shelter house 46 ft. by 12 ft., on the east side of the street car tracks south of the Main Street viaduct for persons waiting for street cars at the Union Station. It is to contain no benches or concession stands, but is to be only a shelter from the elements. The proposed site is now occupied by a raised platform of concrete, an island of safety. The cost is estimated at $2,000.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—This company plans to remove its carhouse and powerhouse from Pen Argyl to Wind Gap. The new carhouse will be 175 ft. x 57 ft., one story, fireproof, brick construction. It will contain the offices of the company and a room for the employees, modernly equipped for their comfort. It is expected that the new carhouse will be ready for use by the fall. The cost is estimated to be $12,000. The Pen Argyl property has been offered for sale.

POWER HOUSES AND SUBSTATIONS

Toledo Railways & Light Company, Toledo, Ohio.—This company will install one 1500-kw., 600-volt d. c., six-phase, twenty-five-cycle, 500-r.p.m. compound-wound commutating pole rotary converter and three 500-kva., single-phase, twenty-five-cycle, 2300-volt high-tension to rotary voltage low-tension, O. I. W. C. transformers. The contract for this apparatus has been placed with the Westinghouse Electric & Manufacturing Company.

Johnstown (Pa.) Traction Company.—A contract has been placed with the Westinghouse Electric & Manufacturing Company by this company for one 300-kw., 600-volt, d. c., three-phase, sixty-cycle, 1200-r.p.m. compound-wound, a. c., self-starting rotary converter; one 300-kva., three-phase, sixty-cycle, 22,000-volt high-tension to rotary voltage low-tension, O. I. S. C. transformer and one two-panel switchboard for the control of same.

Montreal & Southern Counties Railway, Montreal, Que.—This company reports that it plans to construct a substation at Granby, and expects to purchase a generator, switchboard and apparatus to be installed therein.

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company is erecting a substation at Hot Springs. The building may also be used as a passenger station. The cost is estimated to be $4,000.

Charleston (W. Va.) Interurban Railroad.—A report from this company states that it expects to build one 1200-volt substation and three 600-volt substations.

Manufactures and Supplies

ROLLING STOCK

Peoria (Ill.) Railway is contemplating the purchase of ten additional city cars.

Ogden, Logan & Idaho Railway, Ogden, Utah, is reported as having ordered six new trailers for its Ogden-Preston line.

Lake Shore Electric Railway, Cleveland, Ohio, has purchased three interurban cars from the Jewett Car Company.

Charleston Interurban Railroad, Charleston, W. Va., expects to purchase four interurban cars and one combination express and locomotive car, 300 hp.

Detroit United Railway, Detroit, Mich., has ordered fifty trail cars and twenty-five motor cars of the center entrance type from the G. C. Kuhlman Car Company.

Southern Traction & Power Company, Alexandria, La., in an unconfirmed report is said to have been purchased by the city of Alexandria, which will obtain several new cars.

Manhattan & Queens Traction Corporation, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of May 1, 1915, as considering the purchase of ten new cars through H. L. Doherty & Company, New York, has decided to postpone indefinitely the ordering of these cars.

United Traction Company, Albany, N. Y., has been ordered by the Public Service Commission of New York, Second District, to comply immediately with its order requiring the railway to purchase forty new cars or submit on or before July 6 an alternative plan of improving its present equipment.

TRADE NOTES

International Register Company, Chicago, Ill., states that after an extended test the Omaha & Council Bluffs Street Railway has purchased twenty International coin registers, type C 15.

Rail Joint Company, New York, N. Y., received a grand prize, the only medal of honor awarded for rail joint products in the transportation department by the Panama-Pacific International Exposition at San Francisco.

Union Switch & Signal Company, Swissvale, Pa., is completing an installation of interlocking signals at the crossing of the Newark-Trenton high-speed line of the Public Service Railway with the tracks of the Standard Oil Company, near Bay Way, N. J.

H. M. Byllesby & Company, Chicago, Ill., announce that their department of examination and reports, in the course of thirteen years' experience, has made commercial reports for public utility interests in every State in the Union, and in Canada and Mexico. It connection with these reports it has appraised property worth more than $300,000,000.

Edward T. Sharp, Buffalo, N. Y., who owns the patent rights for the Ideal trolley wheel, and who has been in charge of that department of the Lumen Bearing Company for the past fifteen years, has purchased the patents, tool and equipment used by this company in the manufacture of trolley wheels and on July 1 will take over this part of the company's business and manufacture and sell the Ideal wheel under his own name. Mr. Sharp's offices are located at 56-58 Indiana Street.

Western Electric Company, New York, N. Y., on June 5 received a visit from the Honorary Commercial Commissioners of China, who are in the United States for an extended tour of inspection of the commercial activities of this country. On that occasion they inspected the cable shop, powerhouse, general merchandise building, and telephone apparatus shop. The distinguished visitors were treated to an electrically cooked luncheon, after which they were taken to the Dey Street building of the American Telephone & Telegraph Company, where a telephone connection was established between that building and one of the company's exhibits at the Panama-Pacific International Exposition.

Harvey Company, Baltimore, Md., has been incorporated for the purpose of selling railroad supplies and equipment. Arrangements will be made for representing the pirncipal manufacturers of the country and thereby giving customers the benefit of quick shipments, either direct from mill or stock at the warehouse in Baltimore. In addition to the office and warehouse, which will be at 113 South Street, a storage yard will be maintained at Curtis Bay, Md., on the Baltimore & Ohio Railroad track, where facilities will be arranged for the storage of contractor's engines, cars, etc. J. Edward Harvey, president of the company, was formerly the president of the South Baltimore Steel Car & Foundry Company, and was also connected as proprietor of the Eastern Railway Supply Company.

ADVERTISING LITERATURE

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder on its totalizing fare register system.

Davis-Bournonville Company, Jersey City, N. J., has issued a special Panama-Pacific International Exposition number of its publication *Autogenous Welding*, which describes the company's exhibit at the Exposition of oxy-acetylene apparatus for light and heavy welding and cutting in connection with car and boiler repairs and for use in iron and steel foundries.

Trussed Concrete Steel Company, Detroit, Mich., has issued the thirteenth edition of its comprehensive Hy-Rib handbook. This publication embraces all the information in previous editions and includes a number of additions. The photographs of installations are particularly comprehensive, including many new applications, among which are views of applications made on the repair shops of the Louisville (Ky.) Railway and the New York, Westchester & Boston Railway. Illustrations and information on pressed steel studs and Kahn pressed steel construction, as well as the floretyle construction, have been added.

R. D. Nuttall Company, Pittsburgh, Pa., has issued Catalog No. 13 covering electric railway gears, pinions and trolleys. This publication gives general data on Nuttall railway motor gearing for Westinghouse and General Electric equipments, Nuttall trolleys, harps and wheels, flexible couplings of the spring and buffer type, and electric railway compressor gears. This company has also issued Catalog No. 12 on mine and industrial gears, pinions and trolleys. This publication covers mine haulage locomotive gears, pinions and trolleys, mining machine gearing, mine haulage and general data for ordering industrial gears.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a reprint of an article by Lester C. Hart, general manager of the company, entitled "The Field of the Out-door Substations," which appeared in the *Electric Journal*. The reprint traces in an interesting way the development of the out-door substation stimulated by the facts of the heavy cost and losses of long line and the prohibitive additional cost of indoor substations. Among the main advantages claimed for the outdoor substation are its saving in the initial cost by omitting the building, its adaptability for enlargements or alterations and its simplicity. The article contains illustrations of typical installations of this character, under varying topographical conditions.

Weber Chimney Company, Chicago, Ill., has issued a new catalog for 1915 illustrating its reinforced concrete chimneys, among the illustrations being a view of the power house of the Havana Electric Railway, Light & Power Company, Havana, Cuba, where these chimneys are installed. The catalog also contains a list of users numbering nearly 1000 throughout the United States and other countries in which the names of the following electric railways appear: Capitol Traction Company, Chicago (Ill.) Railways, Illinois Traction System, Marquette Gas & Traction Company, Jackson Electric Railway & Light Company, Laurel Light & Railway Company, Meridian Light & Railway Company, City Railway, Portland Railway & Light Company, Nashville Railway & Light Company, Utah Light & Railway Company, British Columbia Electric Railway, Havana Electric Railway, Light & Power Company. At the end of the catalog is a table of chimney sizes for steam boilers of varying horsepower.

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